Handbook of Research on

Connecting Research Methods for Information Science Research

Patrick Ngulube

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Chapter 1
Judith Mavodza, Zayed University, UAE

The library and information science (LIS) profession is influenced by multidisciplinary research strategies and techniques (research methods) that in themselves are also evolving. They represent established ways of approaching research questions (e.g., qualitative vs. quantitative methods). This chapter reviews the methods of research as expressed in literature, demonstrating how, where, and if they are inter-connected. Chu concludes that popularly used approaches include the theoretical approach, experiment, content analysis, bibliometrics, questionnaire, and interview. It appears that most empirical research articles in Chu's analysis employed a quantitative approach. Although the survey emerged as the most frequently used research strategy, there is evidence that the number and variety of research methods and methodologies have been increasing. There is also evidence that qualitative approaches are gaining increasing importance and have a role to play in LIS, while mixed methods have not yet gained enough recognition in LIS research.

Chapter 2
Patrick Ngulube, University of South Africa, South Africa

Theory is one of the major pillars of research. Methodologies as another pillar assist in theory testing and construction. Theories help to explain reality, which is the subject of any research process. Theories and methodologies should be relevant to their context if they are going to contribute to the production of progressive and transformative knowledge. This chapter looks at the understanding of theoretical and conceptual frameworks as tools of conceptualising the research process. Some scholars confuse theoretical with conceptual frameworks. Sometimes they regard research frameworks such as paradigms as theoretical frameworks. Some scholars do not even explain how these research conceptual tools help them to design and execute their research. The implications of not using context specific theories in research, and its consequences to epistemic freedom, is presented. Researchers should focus on theorising instead of theory itself and develop theories that are interesting and relevant to the profession and discipline. That will also reduce dependency on borrowed theories.

Cornelius J. P. Niemand, University of Johannesburg, South Africa
Kelvin Joseph Bwalya, University of Johannesburg, South Africa

The growth of the information management (IM) discipline and its importance in different socio-economic platforms cannot be over-emphasized. The current development of heterogeneous technologies shows that IM is the focal point of innovations such as blockchain, data science (big data, predictive analytics, etc.), artificial intelligence, automation, etc. This research was motivated by a desire to contribute towards establishing the intellectual identity of IM as a science and as a discipline. An exploration of the inventory of theories and conceptual frameworks enables us to have an understanding of the different methodologies currently being used and therefore define the level of development of the field as a discipline. This chapter aims to present the patterns and trends in theory conducted by different studies during the last 10 years (2009 – 2019). Using a bibliometric approach anchored on descriptive informetrics, the chapter explores the application of theory within the IM field.

Lorette Jacobs, University of South Africa, South Africa

The chapter focuses on important aspects of ethics that will guide an information science researcher to consider ethics as an integral part of a successful research project. The Nuremberg Code, Belmont Report, and Declaration of Helsinki informed ethical principles and practices that are seen as internationally acceptable. Since the inception of the National Health Act 61 of 2003 in South Africa, which informs research practices related to all disciplines, ethics has become a mandatory part of the research process. However, applying ethical principles during research may, at times, be fraught with difficulties. Cultural diversity, transformation, and technological advancements expand the complexity of ethical issues that researchers should consider. It is important for prospective researchers to gain knowledge and understanding of the context of ethics and its application throughout the research process. Researchers are required to adhere to strict ethical principles related to respect, consent, beneficence, non-maleficence, confidentiality, and anonymity.

Mercy Mlay Komba, Mzumbe University, Tanzania
Edda Tandi Lwoga, College of Business Education, Tanzania

The aim of this chapter is to assess the current state of application of systematic reviews (SRs) in library and information science (LIS) field and determine how information scientists can advance the SRs as a methodology. The literature shows that there is an increasing number of SRs in LIS although there are still knowledge gaps about the use of SRs as a methodology. The quality of reporting in primary studies in LIS is still poor, and hence, it becomes difficult to appraise the value of the study undertaken. In order to advance the use of SRs in LIS domain, it is important to introduce SRs in LIS education curricular, integrate SRs as part of the continuing scientist development programmes (CPD), use automated SR software to minimize workload, introduce SRs a formal role and service in the libraries, collaborate with research teams as co-authors to conduct SRs not only in the topics defined by research teams, but also in LIS topics, and create SR databases and tools in LIS.

The reputation of case study research has grown as a research strategy for developing theories and as a method for investigating and understanding world complex issues. The purpose of this chapter is to demonstrate how the case study research can add value to a research project. Case study research, although becoming increasingly popular is not adequately utilised in information science research. The chapter draws on the literature on case study research in various fields and uses examples to inform research in information science. Case study research have been used across a number of disciplines, particularly, in the social sciences, education and business to address real world problems. Many researchers tend to use case study research because of the numerous advantages it offers. For instance, the employment of multiple data collection instruments maximises the depth of information, which in turn increases transferability of the findings. Additionally, the use of multiple cases and multiple data collection instruments make generalisation easy and valid. Maximising generalisability of findings is the ultimate goal of research.

This chapter examines the concept of autoethnography as a qualitative research method. It aims to investigate the critical question of the importance of autoethnography as a transformative scientific research method for the purpose of generating and sharing knowledge to advance research in information science. The chapter is an exploratory study investigating the current context of autoethnography in information science, its applicability to the field for transformative learning and knowledge sharing, and possible challenges to be experienced. Findings indicate the potential of the autoethnographic method to provide the opportunity for information professionals to study experiences of information use in diverse contexts of information science. Recommendations highlight the viability of the application of Sense Making theory and the Information Search Process (ISP) model to research practices in autoethnography by information scientists.

This chapter challenges information management researchers to employ the grounded theory research approach as it is detailed, rigorous, systematic, and flexible. The approach also permits researchers to go beyond the conventional thinking by allowing the emergence of new conceptual models, theories, and framework(s) on the subject under investigation. The chapter provides a discourse on the key features of grounded theory and the two fundamental schools of grounded theory. The overall aim of the chapter is to explain the applicability and rationale of grounded theory in researching information centres. As such, the chapter discusses the perceived challenges of using grounded theory, debates the place of literature in a grounded theory study, and explores the issues of research population, sampling, and sample size in a grounded theory research. Other essential aspects discussed in the chapter are the concepts of credibility,

transferability, dependability, and confirmability. The chapter also demonstrates how data in a grounded theory study should be analysed and processed.

Chapter 9
Martin Collin Abner Mmapeteke Sehlapelo, University of South Africa, South Africa

Grounded theory has not been widely used in the information sciences, despite it being one of the methods or designs employed for generating theories in the humanities and social sciences. However, with the increase in research that aims to generate information science theories, more researchers and students are exploring the use of grounded theory methods to conduct their studies. This chapter intends to simplify the conceptualisation and application of grounded theory methods for research within the information sciences. It discusses its origins, philosophical groundings and assumptions, as well as its methodological approaches. The chapter describes the foundations of the grounded theory methods providing some insights into some of the methodological approaches through an example study that constructed a theoretical framework for building information societies for development in Southern Africa. This chapter enhances the example with the practical lessons that the author learned in the conduct of the study.

Chapter 10
Ken Chisa, University of KwaZulu-Natal, South Africa

This chapter seeks to ascertain whether the Delphi process can be effectively implemented to examine the extent to which policy and best practice pertaining to indigenous interests held in networked environments can address contestations regarding ownership. The chapter provides an overview of the Delphi research technique especially its design and administration. It also examines the possible bottlenecks which can undermine the proper application of the Delphi technique especially to indigenous knowledge research within the field of library and information science. Paying proper attention to these bottlenecks should ensure successful application of the method. The chapter concludes that the Delphi method can be a valid and reliable research technique in this field. The method has evolved as experience with it has accumulated, and its application to new areas of study continues to gain momentum.

Chapter 11
Esabel Maisiri, National University of Science and Technology, Zimbabwe

Knowledge sharing is broadly an act of communication, and in indigenous communities of practice, knowledge sharing can be viewed as a cultural symbol making process. This process is facilitated by indigenous language as the communication tool. The characteristics of indigenous languages that include being dynamic, constantly changing as people adjust to their life circumstances and being personal, tacit, and experiential renders it closely tied down to the person who knows the language. Thus, the most appropriate way to understand the use and exchange of such knowledge, that is, the communication phenomenon of indigenous knowledge, would be to extricate the personal experiences of individuals involved in the use and exchange of the indigenous knowledge. This can be done using van Manen's phenomenology of practice.

Phenomenology affords indigenous knowledge researchers the perfect opportunity to understand the lived experiences of indigenous communities from the participants' perspectives. Various studies have shown that indigenous knowledge is currently facing extinction. As a result, information professionals should play a leading role in recording and preserving it. Phenomenology helps indigenous knowledge systems (IKS) scholars to obtain knowledge from marginalised groups and record it without any influences as a result of prior knowledge or personal worldviews. This study demonstrates how phenomenology was applied to understand traditional healing practices in the Limpopo Province of South Africa and, furthermore, illustrates how phenomenology can be employed by information professionals as a qualitative method to conduct indigenous knowledge (IK) research.

This chapter discusses the research process and indigenous epistemologies, specifically, what is involved in conducting research using indigenous epistemology. The dictionary definition of epistemology is that it is a philosophical theory of knowledge that studies the nature and what constitutes knowledge. In this chapter, indigenous epistemology is contrasted with other epistemologies, as an epistemology that seeks to advance the voices of "indigenous" people, or the marginalized. The contention is that dominant epistemologies have downplayed the role and importance of indigenous knowledge in research. Such epistemologies have not given voice to the researched communities yet purport to have an understanding of their social worlds. This chapter therefore places indigenous epistemology at the fore for carrying out research with rather than on communities and using indigenous knowledge to theorize research and inform the theories and constructs used in the conduct of research.

Despite legislative and regulatory frameworks that have paved the way for transformation and inclusivity of public libraries in South Africa, there seems to be little or no integration of indigenous knowledge (IK). The exclusion of IK from public library services has potential to counteract efforts towards the provision of inclusive services. This chapter demonstrates how critical theory was used as a lens in a multiple case study that explored the integration of indigenous knowledge (IK) into services of public libraries in South Africa. Looking at the articulation of IK, services that are provided to ensure inclusivity, and issues that impact on IK integration in public libraries, semi-structured interviews were conducted from purposefully selected heads of provincial library services in South Africa. Thematic analysis was used. Using critical theory to frame the analysis, findings indicate understanding of aspects of IK including its oral nature. A paucity of engagement with IK as an aspect of inclusive service provision was noted.

This chapter provides an epistemological and ethical justification for (re)considering information science in terms of its potential to contribute to the way in which "information" and "knowledge" become co-constructed in social life in view of social justice aims. The chapter refers to and extends arguments for viewing information science as an interdisciplinary and indeed transdisciplinary endeavor. This is discussed in relation to transformative and indigenous-oriented paradigms for social research considered more generally and also considered specifically in relation to information science (as a social scientific approach). The chapter provides a detailed example of how the transformative potential of information science might be realized. This example can serve as a resource for information science researchers and for information systems practitioners who may find that it has some relevance to their continued work. The chapter also offers suggestions for expanding the research possibilities (co-inquiry options) provided by the example.

African societies use memory to store valuable historical information. This memory is passed from generation to generation through oral history. This method uses oral testimony, oral tradition, and, to some extent, archival sources for evidence. This memory is in danger of being obliterated as the historical truth is not directly accessible, or, in some instances, the truth can be distorted to suit the griot. While traditional archival principles such as archival diplomatics are used to authenticate records, oral history is often characterised by deliberate distortion of facts. This chapter explores the use of archival principles to authenticate oral history. It was established that some elements of archival principles can be used to authenticate oral history. Written records and oral history can complement each other to provide the 'whole truth'. It is concluded that oral history fits the description of a record. The griot is no different from any medium of a record and is as reliable as any other medium.

This chapter provides a conceptual scope of informetrics by defining the concept and demonstrating its relationship with bibliometrics, scientometrics, webometrics, cybermetrics, and altmetrics. It demonstrates that informetrics is a quantitative research design that assumes a realistic ontology and objectivism as the epistemological perspective. Based on the data that was extracted from Scopus as well as a content review of selected calls for papers, the chapter highligts methods and areas of informetrics research as reflected in the literature that was published in the subject domain and its sub-domains between 1991 and 2018. The author-supplied keywords, which were the items of analysis, yielded 96 interconnected research methods and 361 areas in which informetrics research can be applied or undertaken. Finally, the chapter provides informetrics students and developing researchers with an outline of the elements that would constitute their research proposals and research methodology chapters of their theses and dissertations.

The chapter presents general aspects of quantitative data analysis as they relate to information sciences. The chapter is based on a literature review. It begins with explaining the meaning of data and quantitative data. Kinds of quantitative data are presented. The meaning of data analysis and the reasons for data analysis are also discussed. Reasons for quantitative data analysis are also discussed. The 'what' and 'why' of statistics in general and for information science researchers in particular is also presented. The chapter also presents the main issues of quantitative data analysis. Steps in quantitative data analysis are also presented. Preparation of quantitative data analysis is followed by a presentation on quantitative data analysis methods. The chapter highlights the popular quantitative data analysis software. A brief presentation on how quantitative data are presented and interpreted is given. The chapter ends with a discussion on the advantages and disadvantages of quantitative data analysis.

The objective of the study is to develop a data quality matrix, which can be used to measure the quality of data and response rate from respondents. The study is exploratory in nature, which applied the systematic review of literature extracted from different database. The study found that all the quadrants of the matrix (e.g., active, risky, and non-functional and deferential) have importance depending upon the nature of the study. The study further suggests that risky situation can be improved through enhancing the quality of data collected. The proposed matrix is very helpful in understanding the quantity and quality dimensions of the data in survey research. It helps to interpret survey results to fit between data representativeness and desired research outcomes.

Although universities have different models for their Master's degrees, most programmes consists of course-work and research-based components. The Master's degree of the University of Botswana's (UB) Department of Library and Information Studies requires students to carry out research and write a dissertation in the final year. Research methodology is an integral component of research, including in postgraduate research. Using the descriptive content analysis technique from a census of dissertations, this chapter examines the Master's dissertations submitted in the field of library and information studies at UB between 2008 and 2018 in order to determine the trends in the research methodologies used. The findings of the study showed that although DLIS Master's degree dissertations generally conformed to globally accepted research methods in humanities; most of them did not specify the research philosophy adopted for the studies. This study found that the most dominant research approach was combined qualitative and quantitative approaches.

This chapter reflects on the lesson learnt from the application of multi-methods in a quantitative study
that was conducted to study patient record management in the public healthcare sector. In this study, a
questionnaire was the main data collection tool, which was supported by interviews, observations, and
document/system analysis data. In conducting the study, triangulation of multi-methods data was performed
at different stages of the study. Currently there is no clear framework in social science research about the
application of multi-method, mono-method, and mixed method research, which the study intends to clear.
The study revealed that quantitative data need to be augmented with some narrative/qualitative data to
make an empirical conclusion and recommendations because alone, it may not be completely reliable.
Triangulation of multi-methods eliminates bias and closes some gaps where data leave some questions
unanswered. The study provides a framework to guide on research method based on methods ingredients.

Mixed methods research integrates qualitative and quantitative research approaches in many or all phases
of a study to comprehensively address a research problem by collecting quantitative and qualitative data
concurrently or in phases with the aim to maximizing their inherent advantages while minimizing their
disadvantages. Many disciplines are embracing mixed methods research. Library and information science
research is lagging behind in the adoption and use of mixed methods research. That might be due to limited
access to the literature on the subject or difficulties in dealing with the relative lack of consistency and
incomplete coherence among mixed methods researchers. This chapter traces the common characteristics
and designs of mixed methods research, its growth, and application in research. It provides a framework
to design, execute, and evaluate mixed methods research studies so that library and information science
researchers and researchers from other fields may play a role in its development and application.

This chapter reports on a study that investigated how graduate students in the Faculty of Communication and
Information Science at NUST were approaching integration in their mixed-methods research dissertations.
There has been a concern that lack of expertise of what mixed-methods research is restricts the integrative
capacity. Using a research synthesis method, the study investigated three graduate programmes, namely
Master's degrees in Library and Information Science, Records and Archives Management, and Journalism
and Media Studies from 2016 up to 2018. A total of 95 dissertations were reviewed, and 40 employed
mixed-methods research design. It was discovered that integration was commonly done at methods and
interpretation levels. Integration of qualitative and quantitative data sets resulted in confirmation (83),
expanding understanding (27), and discordance (31). Graduate students dealt with discordant findings
by either ignoring the discordance (20), seek corroboration with existing literature (7), or give priority
to the quantitative strand (4).

Advancement in information and communication technologies has made it easier for researchers to capture and store myriad data at a higher level of granularity. Higher education institutions (HEIs) worldwide are incorporating research data management (RDM) services to enable researchers to work with their data properly. This chapter focuses on creating awareness amongst researchers on how researchers and HEIs can form strategies, design and restrict data management plan (DMP), integrate research data life cycle, and ensure quality data sharing, as well as integrate with developed RDM policies and guidelines to curb challenges prohibiting the practice of RDM in HEIs.

The global competitiveness drive, pursuit for relevance, and search for true identity continues to challenge many African universities in their quest to achieve the delicate balance of preserving national indigenous repute and worldwide visibility. For decades, universities have occupied a centre stage in this balancing act through research productivity, evaluation, and impact. The benefits of university research and innovation are varied, persuasive, well-documented, and acknowledged as benchmarks for the visibility, sustenance, and relevance of any modern university. This chapter examines the research profile of the University of Namibia (UNAM) by looking at its current research productivity, visibility, and impact in the SADC region and beyond. Using bibliometric and altimetric analysis from Web of Science, Scopus, and SciVal databases, and the institutional repository, the chapter underscores the fragility but evolving UNAM's research performance output and highlights open access and research data management as keys to enhancing institutional research productivity and visibility.

In this chapter, the author highlights why scholars publish, explores the nature and size of LIS theses and dissertations originating from South Africa, discusses their publication output, explores how to publish

from dissertations/theses, and discusses the challenges and opportunities of engaging in such publications by using largely personal experience and desk research. The author concludes that successful publication from theses and dissertations calls for significant support for and mentorship of novice researchers by research supervisors, experienced peers, and established researchers, and this requires a great deal of collaboration and patience. He also argues that publishing research results, such as dissertations/theses in a credible scholarly journal or book, symbolizes quality research output.

Chapter 27

Joshua Ebere Chukwuere, North-West University, South Africa
Precious Chibuike Chukwuere, North-West University, South Africa

Academic research writing (manuscript writing) involves many shortcomings and challenges, but the process is systematically structured. Overcoming these challenges should involve proper adherence to steps and processes when carrying out academic studies. These challenges are a continuous worry for beginners and emerging researchers. Also, the components that constitute academic writing and its structure are continuously debated by scholars globally, especially for beginners and emerging researchers. The purpose of this chapter is to provide guidelines and steps that can assist researchers (beginners) to write manuscripts that meet the requirements of journal editorial boards, their audiences, as well as theses/dissertations for academic institution requirements and expectations of examiners. To achieve the purpose of this chapter, various vital variables and constructs were explained in clear and understandable terms in line with literature review of precious studies. The constructed ideas make the chapter useful for beginners who are writing manuscripts, theses, and dissertations.

Foreword

Research is the foundation of any discipline. A discipline will grow if there is constant research on various aspects of the discipline, as new information and knowledge will be constantly generated, which will extend the frontiers of knowledge, and therefore make the discipline grow.

The book entitled *Handbook of Research on Connecting Research Methods for Information Science Research* edited by one the greatest scholars in the information science profession in Africa is written to fulfil the role of extending the frontiers of knowledge. The editor is a first-class researcher and a versatile teacher. It is therefore expected that he would be able to attract many experts in information science profession, who are very verse in all aspects of research in South Africa, including distinguished scholars from other African countries and beyond, who have come together to produce this much needed book in the library and information science sector.

This book is particularly useful at this time, when the dearth of local books in the information science profession in Africa is a major challenge, as the lack of local books to support the practice of the profession, as well as the development of the profession, has been a clog in extending the frontiers of knowledge in Africa. Many otherwise good research papers are rejected by respected journals because of not following the ground rules of research. It is hoped that this book will improve the productivity of African scholars.

Handbook of Research on Connecting Research Methods for Information Science Research consists of 27 chapters. It covers a variety of areas including: theories, methods and methodologies of research; mixed methods research; informetric studies; ethics of information science research; research process and indigenous epistemologies; information science research and social justice; oral history and archival sources as evidence in research; data and quantitative data; and guidelines on academic research writing. Each of the contributors is an eminent scholar in his /her own right. The contributors are experts in their individual fields.

There is no doubt that the editor and contributors of this book have done an excellent job. This book will be useful to all undergraduates and postgraduates in the broad field of information, including library science, information science, knowledge management, archives and records management, as well as researchers and scholars in cognate fields. This book is a useful information resource in any library collection in Africa and beyond.

I have no hesitation in recommending this book to all those interested in research in the information profession.

Lenrie Olatokunbo Aina
National Library of Nigeria, Nigeria

Preface

The American Library Association (ALA, 2009) lists research as one of the eight areas of basic knowledge expected of students graduating with a master's degree in library and information science. A graduate with research competency should possess knowledge of the principles of research, including (a) The fundamentals of quantitative and qualitative research methods, (b) The central research findings and research literature of the field and (c) The principles and methods used to assess the actual and potential value of new research. This handbook partially assists novice researcher such as masters' and PhD graduates, and established and experienced researchers to traverse the methodological landscape. The relationship of theory to research, and mixed methods research, the third methodological movement are missing elements in ALA competency framework. This book goes beyond the ALA competency framework and discusses the fundamental role that theory plays in the research process and provides a comprehensive methodological toolkit by drawing upon all research traditions, including quantitative, qualitative and mixed methods research. The book attempts to connect various research methods to information science research.

The book will meet a need among policy makers, academicians, researchers and advanced-level students who are interested in research that is conducted from various perspectives and putting the stakeholders at the centre of social reality. The book may assist researchers in navigating the research landscape in general, and information science in particular. The book comprises original and well-researched scholarly contributions that were peer-reviewed. Two scholars reviewed each chapter through a double-blind methodology, pus the two members of the Advisory Editorial Board also reviewed each revised manuscript-chapter.

Handbook of Research on Connecting Research Methods for Information Science Research addresses aspects of quantitative, qualitative and mixed methods research methodologies as they all add value to research in library and information science (LIS). Qualitative research has value, including its ability to develop and validate theory, which is particularly needed in the field of library and information science, which has not fully matured as a discipline. Well-developed theories are one of the marks of a mature discipline. On the other hand, quantitative research tests and confirms theories in the production of knowledge.

Research in library and information science has been dominated by the qualitative and quantitative dichotomy (Ngulube & Ukwoma, 2019). The use of multiple methodologies in LIS has been limited (Fidel, 2008; Ullaha & Ameen, 2018). Combining quantitative and qualitative approaches by applying mixed methods research can yield knowledge that may not have been achieved using monomethods which traditionally do not integrate findings.

This handbook is unique because it is written by practitioners who mainly represent voices from the Global South. According to Anderson (2019), views from developing countries add another perspective to the research enterprise and provide "incredible richness to the development and application of knowledge in the field of library and information science (LIS)" (p. 100970). There are limited texts that deal with library and information science research that emanate from the South. The Global South has not played prominent role in the methodological discourse. The concern of the Global South is the need to move away from mechanistic research methods that result in limited social change. Hence, the transformative epistemology runs through many chapters in this book. There is a call for researchers to theorise with a transformative intent and conduct research with the aim of contribution to social justice and change. Such research has the potential of building a better world than now. Other than introducing readers to various research methods, the handbook deals with quantitative data analysis, research data management and strategies of publishing and disseminating research findings.

Chapter 1 reviews the library and information science landscape as expressed in the literature and demonstrates that the number and variety of research methods and methodologies have been increasing. Although qualitative approaches are gaining popularity, the chapter concludes that mixed methods research is not prevalent in LIS research in general. Chapter 2 demonstrates that theory is one of the major pillars of research as it assists in explaining reality. The chapter calls for the use of contextually relevant theories. The implications of not using context specific theories in research, and its consequences to epistemic freedom, is presented. Chapter 3 presents an informetrics study on the use of theory in information management. The use of informetrics in library and information science is further discussed in Chapter 17. Chapter 3 further emphasises the importance of theory in the maturity of a discipline given the interdisciplinary and transdisciplinary nature of information science. Chapter 4 underscores the importance of ethics when conducting information science research. Chapter 5 discusses the potential of systematic reviews as a research method in library and information science. The affordances of information and communication technologies provide an opportunity to explore this research method.

Chapter 6 explores the potential contribution of the case study research method to information science research. Case study research has grown in reputation as a research strategy in developing theories as well as an effective method for investigating and understanding world complex issues. Chapter 7 introduces autoethnography as a qualitative research method. It underscores the importance of autoethnography as a transformative scientific research method for knowledge production in information science. Chapters 8 and 9 present case studies on the use of grounded theory in information studies. The chapters show that grounded theory has not been widely used in the information science, despite it being one of the designs employed for generating theories in the humanities and social sciences. Increasingly, more researchers and students are exploring the use of the grounded theory design to conduct their studies. Furthermore, the chapters simplify the conceptualisation and application of grounded theory research methods to encourage researchers in information science to embrace them. Chapter 10 explores the use of the Delphi method in the study of the protection of indigenous knowledge in heritage institutions in South Africa.

Chapter 11 employs van Manen's phenomenology of practice method to illustrate how phenomenology can be used to investigate and understand the indigenous communities of practice. Chapter 12 also looks at the application of the phenomenological approach in understanding traditional healing practices in the Limpopo Province of South Africa. Chapter 13 discusses the research process and indigenous epistemologies. It underscores the need to use indigenous epistemologies to use indigenous knowledge to theorize research and inform the theories and constructs used in the conduct of research. This presupposition resonates with the need to deconstruct theories used in LIS that is describe in Chapter 2. Chapter

14 uses critical theory as a lens to explore the integration of indigenous knowledge into public library services in South Africa so that they become inclusive and relevant to all the citizens of South Africa. Chapter 15 underscores the need for information science research to consider social justice aims. That has the potential of creating a better information society.

Chapter 16 discusses the use of oral history and archival sources as evidence in research. The truth entirely depends on the truthfulness of the source that is used in research. That gives rise to the question: "Whose truth is true?" Researchers need to engage transparently with the question in order to produce robust and credible research. Researchers need to recognise that oral sources and written sources complement each other as sources of research data and there is no question of one being either superior or inferior than the other. Chapter 17 moves the reader away from the realm of interpretivism which is broadly described from chapters 5 to 16 to that of positivism. This chapter demonstrates that informetrics is a quantitative research design that has entrenched itself in LIS. It also gives guidance to postgraduate students on how to craft proposals which employ informetrics. Chapter 18 presents aspects of quantitative data analysis and explains the meaning of data and quantitative data. Kinds of quantitative data are presented. Chapter 19 describes a data quality matrix which can be used to measure the quality of data and response rate from respondents in a quantitative study. Chapter 20 uses the descriptive content analysis technique to investigate the use of research methodologies by masters' students in the LIS programme at the University of Botswana. The study leans towards informetrics techniques, although it more based on qualitative content analysis than the quantitative one. The study concluded that the use of mixed methods research was limited.

Chapter 21 discusses the application of multi-methods in LIS research. An attempt is made to differentiate multi-methods from mixed methods research. Chapters 18 and 20 bemoaned the paucity of mixed methods research in LIS. Chapter 22 underscores the need for information professional and researchers to embrace mixed methods research so the they will be able to research complex and wicked problems. That will enable them to build a better world. Using the same research method as in Chapter 20, Chapter 23 reports on a study that investigated how graduate students in information science at the National University of Science and Technology in Zimbabwe approached integration in their mixed methods research dissertations. It was discovered that integration was commonly done at methods, and interpretation levels.

The research process generates a lot of data that needs to be managed. The advent of the fourth industrial, which is characterised by accelerated digitisation and the production of big data, implies that researchers and organisers of the resultant products of the process must keep data management on the top of their research management agenda. Chapter 24 and 25 presents a case for the inclusion of research data management in higher education institutions.

Researchers disseminate their findings after carrying out the investigation of social reality. The last two chapters give guidelines on academic research writing. Chapter 26 describes how postgraduates and their supervisors can convert their projects into publishable manuscripts or what Ocholla refers to as "taking a photograph" with one's student. Chapter 27 traces the steps that are mundane to publishing. The chapter is useful to novice and established researchers.

The chapters presented in this book provide a sound starting point when researching social reality in general, and library and information science in particular. Policy and practice may benefit from evidence that is based on research that taps on a variety of research methods. The chapters are a mix of many research methods, although they do not provide a complete methodological toolkit. What is clear from the chapters is that the research methods landscape is very diverse and there is a need for researchers to

embrace the diversity of research methods. That will save researchers from being tempted to treat every problem as a nail if the only tool they had were a hammer.

Enjoy the read!

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Chapter 1
The Evolving Landscape of Research Methods in Library and Information Science

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ABSTRACT

The library and information science (LIS) profession is influenced by multidisciplinary research strategies and techniques (research methods) that in themselves are also evolving. They represent established ways of approaching research questions (e.g., qualitative vs. quantitative methods). This chapter reviews the methods of research as expressed in literature, demonstrating how, where, and if they are interconnected. Chu concludes that popularly used approaches include the theoretical approach, experiment, content analysis, bibliometrics, questionnaire, and interview. It appears that most empirical research articles in Chu's analysis employed a quantitative approach. Although the survey emerged as the most frequently used research strategy, there is evidence that the number and variety of research methods and methodologies have been increasing. There is also evidence that qualitative approaches are gaining increasing importance and have a role to play in LIS, while mixed methods have not yet gained enough recognition in LIS research.

INTRODUCTION AND BACKGROUND

Library and information science (LIS) includes all aspects of human recorded information. According to Dick (2013, p.8), "there is a consistent effort in LIS to deal with the entire corpus of recorded human knowledge." As such, its research efforts overlap with other disciplines, e.g. communication, sociology, education, psychology, computer science, health, and more. To convey the idea that there must be mutual impact among various branches of knowledge and not exclusive to any specific one influencing the rest, Jamali (2018) proposes that high quality LIS research methods could be applied in other disciplines too. As a field consisting of both professional practice and scientific inquiry, the discussion

here is inclusive of both professional librarians and other information professionals who all appreciate the merits of methods used in information science research. In that regard, even the properties of theory used are articulated according to whether they are inductive (using various premises that are believed to be true) or deductive (data-generated new or emerging theory tested through deductive reasoning). Ritchie et. al. (2013, p.6) explains that "inductive processes involve using evidence as the genesis of a conclusion – evidence is collected first, and knowledge and theories built from this. Deductive processes use evidence in support of a conclusion – a hypothesis is first developed, and evidence is then collected to confirm or reject it." Quantitative research has a deductive approach where a hypothesis is expected before research progress is made, while the qualitative approach is inductive and concerned with generation of new theory emerging from research data.

The use of theory must be discussed because of its relevance to research. Ocholla and Le Roux (2011, p. 61) suggest that a theoretical framework is "informed by four major components: the hypothesis, the theoretical model, the research methodology – to be used to answer the hypothesis – and a well-defined literature review (supporting the focus of the research)," and this applies to the quantitative design. Creswell (2014, p. 67) points out that "how theory is used affects its placement in a qualitative study. In those studies, with a cultural theme or a theoretical lens, the theory occurs in the opening passages of the study. Consistent with the emerging design of qualitative inquiry, the theory may appear at the beginning and be modified or adjusted based on participant views." Thus, the approach to theory use varies depending on whether the study is qualitative or quantitative. Chapter Two further discusses the importance of theory to research.

The purpose of this chapter is to scan the unfolding research practice landscape that is based on qualitative and quantitative approaches, and an increasing mixed methods use, and alert librarian practitioners to the need to keep involved and updated about the impact of these in LIS research. The reason for compiling the chapter is the realization of a tendency to be minimally concerned with research once an individual attains the terminal degree which remains a masters level programme in library and information studies accredited or recognized by the ALA (or the appropriate national body of a country (ALA, 2019). But then as a natural progression of their careers, LIS professionals can enhance their expertise through becoming practitioner-researchers, evidence-based practitioners, with the ability to link theory with practice as in many other disciplines, while also following new and evolving trends. If that happens, research methods knowledge serves to build their confidence, develop them into informed consumers of research, enhance their ability to critically evaluate research, discuss and share research findings. It also helps them acquire a greater understanding of researchers' needs. Increasingly the ability to make informed decisions (evidence-based decision making and assessments), mentor and develop new researchers has become central to daily transactions. Librarians with research methods skills appreciate the development and use of theoretical foundations while conducting research and contribute to quality and rigor of the research environment.

The chapter is based on a review of literature that reveals the use of research methods, and how they are significant to LIS research. It provides an overview of the topic. The author also makes comments on the preparedness of LIS professionals to contribute to this research environment.

RESEARCH METHODS IN LIS

Some researchers use the terms research methods and research methodology interchangeably (Kothari, 2004; Ngulube, 2019; Ngulube & Ukwoma, 2019; Ullah & Ameen, 2018), but others put a distinction between them. Specifically, Kothari (2004, p. 8) explains that:

we can say that research methodology has many dimensions and research methods do constitute a part of the research methodology. The scope of research methodology is wider than that of research methods. Thus, when we talk of research methodology we not only talk of the research methods but also consider the logic behind the methods we use in the context of our research study and explain why we are using a particular method or technique and why we are not using others so that research results are capable of being evaluated either by the researcher himself or by others.

Research methods refer to the tools for research, which may be designed according to qualitative or quantitative, or increasingly, mixed strategy. Quoting Somekh and Lewin (2005), Ullah and Ameen (2018, p. 54) refer to "the collection of methods or rules" applied to conduct research about a particular problem and the aggregation of "principles, theories and values" that govern the entire path to research as the methodology. Kothari (2004, p. 8) defines it as "a way to systematically solve the research problem," and points out that in fact "methods are a part of methodology" (p.9).

Use of the term "research design" merits explanation. According to Kothari (2004, p. 31), research design refers to the "decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study." While research design is a plan or procedure of enquiry, which may involve several methods to answer the research question, research method is a strategy (qualitative or quantitative, or mixed) used to implement that plan. Because LIS research is multidisciplinary in nature, it tends to be influenced by research designs developed in other disciplines, e.g. social and behavioral sciences, management sciences, and the humanities. For example, the influence of computer science is reflected in information retrieval research, while evidence-based librarianship results from clinical medicine. In the process, library science and information science become difficult to separate. Because of this gradual blurring of the distinction between library science and information science as the profession focuses more on information (Ocholla & Le Roux, 2011, p. 65). Connaway and Radford (2017, p. 19), (quoting Wiegand, 2015) call for "the integration of a variety of scholarship and methodological approaches from outside of LIS to avoid continuation of narrow perspective that has pervaded the field." Wiegand (2015, p. 347) laments the "tunnel vision and blind spots" existing in LIS research for its failure to adequately expand its discourse while investigating certain library user habits. Equally important, Matusiak (2017, p. 59) proposes "updating the classification of LIS research methodology to align it with broader research in social sciences, and to include unique LIS methods." Ullah and Ameen (2018) advocate having a list of research methods that serves as a toolkit for LIS researchers to select from.

PHILOSOPHICAL ASSUMPTIONS

When undertaking research, there are assumptions or paradigms or worldviews (Creswell, 2014) that the researcher makes. They are useful for informing the ideas and beliefs that clarify the research agenda and influence the appropriate approach that can help unravel a research discussion using quantitative,

qualitative, or mixed methods. To study why an event happened, the qualitative method works well. For an answer that can be reduced to numerical evidence, the quantitative method works best. However, there are instances where the use of both quantitative and qualitative research is useful so that they complement each other, resulting in using mixed methods (see chapters 21 to 23 for a discussion of mixed methods).

Ngulube (2013) and Ngulube (2019) mention that "qualitative methods are linked to the paradigm of constructivism and interpretivism while quantitative methods are related to that of positivism." This confirms a point made by Hathaway (1995, p. 543) who mentions that in the quantitative domain, "scientific methods can be applied to human experiences" because the researcher is detached from the organizational setting under study and is an onlooker. This is an expression of a positivist stance where truth is revealed and verified through scientific evidence such as experiments and statistics. The quantitative method ontology (reality) is that subjects and objects exist separate or detached from the perception of them. On the other hand, in qualitative research, Creswell (2018, p. 75) suggests that the researcher uses the words of participants to express different perspectives to interpret the nature of reality (ontology). Ritchie et. al., (2013, p. 24) assert that qualitative method ontology is based on realism ("external reality which exists independently of people's beliefs or understanding about it") and idealism ("reality is mind-dependent") resulting in varying interpretations by researchers.

The values in inquiry (axiology) in place during qualitative research are based on the researcher using their own interpretation in conjunction with the interpretations of participants. This approach acknowledges values that the researcher brings into the interpretations. There is acceptance of possible biases due to the value-laden nature of research situations that are experienced by both the researcher and the participants. According to Given (2008), axiology has a bearing on the ethical context of qualitative research and offers a basis for making assumptions of different research paradigms. Concurring with that explanation but inclusive of quantitative method assumptions, Kivunja and Kuyini (2017, p. 28) mention that axiology encompasses privacy (of research subjects), accuracy (authenticity and fidelity), property (data ownership – who owns the data), and accessibility (data access and security) because it "involves defining, evaluating and understanding concepts of right and wrong behaviour relating to the research." Quoting Martens (2015), they confirm that all research should aim at maximizing good outcomes for the research project, for humanity in general, and for the research participants. Chapter 15 calls for LIS research to reconsider the research methods and adopt a transformative stance.

Hathaway (1995, p. 558) suggests that between the qualitative and quantitative approaches, "each method type uses different presentation techniques and means of persuasion to express assumptions about methodology, ontology, and epistemology and to convince readers about conclusions." This methodological assumption specifies that the researcher uses the research context and continuously revises research questions informed by field experiences in finding ways of investigating whatever s/he believes can be known. Referring to qualitative and quantitative research methods, Ritchie et.al., (2013, p. 24) explain that epistemology (the nature of knowledge) benefits from the merits and roles of induction through finding patterns and associations derived from observations of the world; and deduction that generates propositions and hypotheses theoretically through a logically derived process. Given (2008), suggests that this philosophical assumption includes rationality and justification of knowledge. In quantitative research, this assumption denotes objective reports of a phenomenon's measured dimensions. Hathaway (1995, p. 542) points out that differences or no differences in the dimensions of measured phenomenon are attributable to "hypothesized causal relationship, to lack of validity of instruments, or to alternative causes." Further explanation on the characteristics of qualitative and quantitative research methods, while

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distinguishing one from the other, may bring out the reasoning behind how mixing them is gradually becoming acceptable and sometimes necessary in LIS research.

QUALITATIVE RESEARCH METHOD

The qualitative design is used in studying human behavior, opinions, themes and motivations, resulting in the use of ethnography (reliant on participant observer immersion), narrative (based on in-depth interviews), phenomenological (reliant on a combination of methods such as document study, using relevant audiovisual sources, etc.), grounded theory (theory or explanations built on data), and case study (can be explanatory or exploratory). The case study method is presented in chapter 6, autoethnography described in chapter 7, grounded theory is covered in chapters 8 and 9, the Delphi method is outlined in chapter 10 and phenomenology is discussed in chapters 11 and 12. Ritchie, et.al., (2013) confirm the sociological and psychological tradition of the qualitative approach. Looking at the qualitative design from another angle, one can suggest that it is an interpretive methodology where the data collected in research studies are interpreted to give meaning to them and hence to the participants' lives. There is empathy and involvement by the researcher. The aim is to explain and critique an understanding of the socially constructed nature of reality through which individuals or groups make sense of their everyday lives. The presupposition is that what happens in people's lives is usually situated within their societies, whatever that might be resulting in a social element to everything they do and experience. This is reflected in their attitudes to, experiences of, confrontations with, and perceptions of society. In this design, a researcher also needs to have an interpretive framework woven into their research and data. This is dependent on understanding and interpreting how people create and maintain their social worlds. The researcher formulates a question, identifies a sample (purposive), performs the investigation through interview, or observation, recording, etc., generates a hypothesis, and the process is based on understanding the participants' context and perspectives.

QUANTITATIVE RESEARCH METHOD

Within the quantitative design are descriptive, correlational, quasi-experimental and experimental types. Evidence in research is measurable, hence the use of numeric data and statistical analyses. Creswell (2018) suggests that this design is used within a post-positivist worldview, a perspective of the persuasion that existing theories, background, knowledge and values of the researcher can also influence what is observed (and this is an advancement from the original positivist stance where independence exists between the researcher and the object of research). According to Togia and Malliari (2017), this approach is the most popular in LIS research, and relies on statistical approaches used in analyzing variation in quantitative data. Data collection methods used include secondary data analyses (analyzing existing data sets), randomized controlled trials (where there is a control group and an intervention group, to which participants are assigned randomly), social network analyses, and surveys. However, Halpern, et.al (2015) point out that mastering survey design is difficult and requires pre-testing for validity. For this reason, they advise LIS professionals to consider using scales, measurements, and surveys that have already undergone rigorous testing. Table 1 lists the attributes of qualitative and quantitative before explaining what the mixed methods approach entails.

Table 1. Qualitative and quantitative methods

Attribute	Qualitative method	Quantitative method
Worldview/paradigm/philosophy	Idealism/ constructivism/ interpretivism	Realism/ positivism
Ontology (what is reality?)	Reality is subjective and multiple as seen by the participants	Reality is objective and singular
Epistemology (theory of knowledge)	Researcher interacts with the subjects of research	Researcher is independent from the research subjects
Rhetoric	Informal style	Formal style, e.g. use of agreed definitions of variables
Role of theory and research process	Inductive approach, theory generation (hypothesis not needed to begin research)	Deductive approach; theory testing (requires hypothesis before start of research)
Data instruments	In-depth interviews, words, field notes, open-ended questions, text and image analysis	Uses variables; structured and validated data-collection instruments Close-ended questions Predetermined approaches to numerical data
Data analysis	Descriptive data, searching for patterns and themes in the data	Statistical analysis and relationships
Reliability	Low reliability. That is because a margin of variability for results is tolerated but systematic checks are required since accuracy or correctness of the findings should be consistent (how changes in a setting accounts for changes in the results must be clearly accounted for in a manner that can be corroborated by others)	High reliability with exact replicability of the processes and the results
Validity	High validity. Findings are highly believable, consistent, applicable and credible (e.g. results must be credible to the end user and the participants)	Low validity because there is not always a guarantee that the test measures intended phenomena. It is the extent to which a concept is accurately measured (e. g. a questionnaire can be reliable but not valid)
Results	Provision of insider viewpoint	Generalizable from sample to population

(Adapted from Creswell, 2014, p. 47).

MIXED METHODS RESEARCH

From the foregoing discussion, quantitative and qualitative research claim different philosophical perspectives, and correspondingly, work with different underlying assumptions. However, sometimes it is necessary to benefit from both approaches, and researchers are increasingly realizing that "all methods have strengths and weaknesses leading to the emergence of mixed methods research (MMR) and a decline in the epistemological debates of the paradigm wars" (Ngulube, 2013, p. 11). The mixed methods approach integrates attributes from both qualitative and quantitative designs, therefore textual and numerical data is collected. Teddlie and Tashakkori (2009) mention that it mixes and combines qualitative and quantitative research methods, resulting in a third way. Tashakkori and Creswell (2007) explain that the researcher collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches. Results of a research by Onwuegbuzie, Gerber and Abrams (2017) suggests that the question should no longer be whether mixed methods research techniques ought to be used, but how. Its dialectical stance bridges the different perspectives.

The ontology (reality) and epistemology (knowledge) from qualitative and quantitative designs is different though not necessarily opposed. The ways in which they are used, and the insights provided are a function of the underlying assumptions in the worldviews grounding the designs. Firestone (1987, p. 16) points out that "while rhetorically different, the results of the two methodologies can be complementary." The worldviews or paradigms provide "a level of generally unexamined common assumptions, attitudes, and expectations, and a framework within which inquiry operates" (Hathaway, 1995, p. 541). In quantitative research, the approach is to start with a hypothesis of a relationship between cause and effect, test the hypothesis, develop instruments, identify a sample (random), measure/code the relevant phenomenon, and use theory that has withstood testing. The qualitative approach does not have to start with a hypothesis. The mixed methods approach is pragmatic.

If a flexible approach is adopted in the application of mixed methods research, then barriers between the qualitative and quantitative approaches are broken, resulting in pragmatism in research (Onwuegbuzie & Leech, 2005). Creswell (2018) highlights the elements of pragmatism as possessing singular and multiple realities, being practical for the researcher, the use of biased and unbiased stances by the researcher, a combination of qualitative and quantitative methods, and the use of various writing styles by the researcher. Mertens (2012) posits that mixed methods research can be practical for transformative researchers because it permeates the entire research process, from the problem to the conclusions, and the use of results. The given definition of a transformative approach is based on being participatory and multifaceted. With this definition of the mixed methods worldview, the researcher has flexibility in investigation and interpretation of data, but that also depends on the context and type of mixed methods study. Ngulube (2010, p. 252) suggests that "a paradigm shift and a change of mindset are recommended for LIS researchers in SSA [Sub-Saharan Africa] so that they may exploit the advantages offered by mixed methods research in conducting their studies." Literature used in compiling this chapter is from LIS sources, suggesting that research activity has been taking place for some time. The next section provides developments in the LIS research methods landscape.

EVOLVING LIS RESEARCH METHODS LANDSCAPE

Historically, librarians used procedure-based approaches with a focus on practical problems in the administration of libraries. For example, Smiraglia (2002, p. 330) reveals that "Panizzi (1841), Cutter (1876), and Dewey (1876)" developed catalogues and classifications, simultaneously explaining the principles by which they constructed their tools. By the early 1990s, practice evolved into situation-specific reporting of how librarians do their jobs, rather than to solve problems, but still focused on the same set of practical operations of libraries without necessarily incorporating systematic cross-disciplinary research elements. But then, Butler (1933) already believed that research was necessary in LIS and merited using quantitative methods and ideas in the social sciences. The aim was to use librarianship to address society's information needs. His approach as a faculty member at the University of Chicago Graduate Library School provoked dialogue concerning the structure and focus of education for librarianship in the 20th Century. Connaway and Radford (2017) confirm that most library-related research prior to the 1980s has been characterized as applied in nature, meaning that it was targeted at solving problems (mostly to do with cataloguing, indexing, abstracting, etc.).

Quantitative methods (surveys and questionnaires) have been prevalent in LIS research as confirmed by Togia and Malliari (2017) referring to the years 1950s to 1980s, and by Chu (2015) for the period 2001

to 2010. Malliari and Togia (2017) cite survey, content analysis, and citation analysis (all of which are quantitative methods) as most popularly used in the *Library and Information Science Research* (LISR) journal between 2005 and 2010. Then there are several qualitative approaches including case-study, experiment, action research, ethnography, observation, transaction log analysis, verbal argumentation, concept analysis, and a few instances of mixed strategies which have not been popular in LIS research. A review by Callison (1997) reflected a shift from survey to case study from 1980 to 1995, suggesting a gradual appreciation of this qualitative approach and confirming the conclusions of Smiraglia (2002) who found the approach suitable in research involving classification, user-interface design, and bibliometrics. This reflects that prevailing research environments dictate suitable approaches for research enquiries. As the topics covered keep expanding, the methods broaden too. For example, the 1990s also saw the development of evidence-based library and information practice. This is applied most in experimental studies that are intended to show causal relationships among variables. Other techniques, for example, secondary data analysis, concept-mapping, literature review, and discourse analysis are employed in both qualitative and quantitative approaches.

Topics chosen for investigation have an impact on whether the qualitative, or quantitative, or mixed method is used. Within those options, topics for study in LIS now include bibliometrics/infometrics (especially citation analysis and content analysis), information system/technology/database design, publishing/ copyright, digital library, and information networks/cooperation in addition to other more traditional ones. To reflect this, Katsirikou and Lin (2017) and Demasson, Partridge, and Bruce (2019) refer to phenomenology, while VanScoy and Evenstad (2015) introduce interpretative phenomenological analysis (IPA), which are qualitative. Smith and Osborn (2015, p. 41) explain that IPA is a "qualitative approach which aims to provide detailed examinations of personal lived experience. It produces an account of lived experience in its own terms rather than one prescribed by pre-existing theoretical preconceptions and it recognises that this is an interpretative endeavour as humans are sense-making organisms." According to Ullah and Ameen (2018), despite the prevalence of automated systems in libraries, the information system design and analysis research approach is infrequent. But then, articulating it can be with the use of any of the three methods – quantitative, qualitative, or mixed. Some of these research methods are discussed in the subsequent chapters of this book.

In discussing the evolution of LIS research methods, Togia and Malliari (2017, p. 49) also confirm that research "approaches include focusing on particular publication years, geographic areas, journal titles, aspects of LIS, and specific characteristics such as subjects, authorship, and research methods." This view coincides with that of Chu (2015) who identifies certain characteristics of library and information science journals according to their origin in the statement:

JDoc's slant towards theoretical research methods may suggest, since most of the authors are European, that there is stronger emphasis among European LIS scholars on theoretical topics while, by contrast, researchers from North America appear to focus mainly on applied research using empirical methods (p. 39)

Mention of geographic areas in turn confirms the comment made by Dick (2013) about the politics and economics of LIS model and theory production in developed Northern hemisphere countries being consumed in developing Southern hemisphere countries. The credibility of certain conclusions as applicable to the Southern hemisphere becomes questionable. In that respect, Dick (2013) states that:

epistemology is traditionally devoted to the study of the justification or the evaluation of the beliefs we have on the basis of some given body of evidence. Epistemology in library and information studies questions its assumptions and methods in order to test the reliability of its knowledge claims and to eliminate false claims and errors in models and theories (p. 7).

The comments by Dick (2013) imply that Southern hemisphere LIS professionals must become more active in research so that the creation, testing, and revision of theories can be more relevant to broader sets of circumstances. That way, epistemological (the theory of knowledge) and methodological approaches to LIS can become more inclusive of approaches that are suitable to its research. The influence of the Northern hemisphere is undeniable, and the main types of research methods remain qualitative and quantitative. Indigenous epistemologies discussed in Chapter Thirteen are neglected in LIS research. Current literature confirms the trend in LIS research methods pointed out by Connaway and Radford (2017) corroborating point about the paucity of qualitative research methods in LIS. However, Chu (2015) and Ullah and Ameen (2018) comment that LIS research is to a large extent still descriptive in nature, and the use of comparative and explanatory approaches is increasing at an unimpressive rate. Descriptive research generates both qualitative and quantitative data, and the most common LIS descriptive research method is the survey. This point was earlier made by Rochester and Vakkari (1998) concerning the popular nature of the survey method in LIS research, despite the comment by Callison (1997) about a shift from survey to case study. But then, researcher findings also depend on which area in LIS research the studies quoted refer to, for example the latter was concerned with research methods used in school library media dissertations. There is also merit in having a clear definition of what is considered as research to establish LIS research boundaries. Luo, Kennedy, and Brancolini (2016, p. 442) mention a study that analyzed the contents of 1,880 articles in library and information science journals and found that only 16% "qualified as research".

RESEARCH METHODS WITH THEORY IN LIS

Research methods include the use of theory which is based on some philosophical stance about the nature of reality. Ullah and Ameen (2018) and Luo (2017) view research theory as a part of the definition of research method, suggesting an interpretivist approach based on the premise that all knowledge is a matter of interpretation (predominantly using qualitative analysis) of data collected. Nguyen (2017, p. 4) uses the anecdote that "theory without practice is empty and practice without theory is blind" to emphasize how important theory and practice must be interlocked throughout the research process. Chapters 2 and 3 demonstrate that theory is one of the two pillars of research along with methodology.

Previously, some practitioners believed that the LIS field was not mature enough, including the charge that it was "fragmentary and noncumulative" (Callison, 1997, p. 347), to have theories of its own now. For example, Feehan et al. (1987) claimed that LIS literature had not evolved enough to support a rigid body of its own theoretical basis. But then, the profession has not been static despite Ullah and Ameen (2018) pointing out the fact that different countries are at different stages of development in LIS research, and social contexts, such as cultural and economic conditions influence the use of method and theory in research. This again puts into the picture the point provoked by Dick (2013) about the need for LIS professionals from various parts of the world to be involved so that they can follow and understand trends.

The IL part of LIS research has taken threshold concept theory (ACRL, 2015), for instance, to a new level. It already has applications in various disciplinary and learning contexts, and has been used in reviewing IL practice, with the result of becoming closer to evidence-based research and practice. This positivist approach to LIS research, based on logical empiricism, arose from evidence-based librarianship, incorporating many of the research designs and methods used in clinical medicine. Connaway and Radford (2017) state that evidence-based research and decision making has become a part of a larger movement that is overtaking libraries in the form of an assessment imperative. What the researchers mean is that in assessing the value of the library, it has become increasingly necessary to use quantitative, qualitative, or mixed methods research, not just one single method, for evidence-based decisions that impact student/ faculty success. This also needs to be applicable to non-academic library and information environments. This requires effort and commitment.

Because Jarvelin and Vakkari (1990) point out the vagueness of LIS theories, one may want to step back and evaluate the clarity of threshold concepts. The theory has been heavily criticized for being highly biased towards one region only, disregarding the rest of the world. This may be so, but then that is part of academic discourse leading to theory creation, use, and development. In fact, Dick (2013, p. 9) suggests that "we will become better LIS professionals and researchers when we are aware that our epistemological attitudes influence how we practice our profession and conduct our research." For that reason, even the adoption or use of theories formulated elsewhere (such as the threshold concept theory or others) can be tailored for local research interests and be evaluated for their ability to adapt to the LIS field. But then, the readiness or preparedness of LIS professionals to be involved in research whether in LIS-only focused research or as cross disciplinary ventures is an important consideration.

RESEARCH-READINESS OF LIS PROFESSIONALS

Currently, for many librarians, even when the day job gets in the way of doing research, they must keep in touch with an evolving research landscape surrounding their workplaces. They must have professional development time built into their jobs, especially (but not exclusively) those directly involved with research activities of their library users. Research by Finlay, et.al (2014) confirms a decrease in librarian-authored articles but is optimistic that this may be an anomaly to be reversed over time and may also suggest systematic changes in the scholarly communication practices within the field. These authors further comment that many practicing librarians do not contribute to LIS scholarship, but focus on daily operations within their own libraries or library systems, confirming the assertion made by Connaway and Radford (2017). They do, however, acknowledge that academic librarians perform original scholarly LIS research and contribute to the academic end of the field. This is how they find out what works best, not from anecdotal evidence alone, but from actual research. In the process, various methods of research become clearer. In the words of Berg and Banks (2016, p.470) who mention the necessary shift in focus in the competencies of librarians, "we need to frame our thinking and acknowledge that librarians' greatest strength is our curiosity and our ability to evolve." McCluskey (2013 p. 12) points out that "as a profession which promotes evidence-based practice in other arenas (such as health), it seems contradictory that librarians do not live out the value of critical engagement in their own work."

A good command of research methods and methodology in LIS research is meant to support library professionals in their appreciation of the experiences of their user community. In the process, that is likely to improve LIS practice while enhancing opportunities to partner with and understand the needs

of researchers. Being active in the research world enhances chances of collaboration among librarians in different environments whether these are geographical or disciplinary. In support of that perspective, Connaway and Radford (2017) advocate for making sure that LIS education programmes impart research skills to librarians. They lament that currently "most students view LIS programs as primarily concerned with providing professional skills, not academic training" (p. 19), and a research methods course has not been a requirement in ALA accredited LIS programmes. Wiegand (2016) draws attention to the fact that there is no robust LIS research community, and that researchers are few and far between because librarians are by and large practitioners, also revealing that possessing a PhD in LIS is not considered an advantage in the profession. On the other hand, part of the evidence required in the Chartered Institute for Library and Information Professionals (CILIP) of the UK accreditation is that courses contain a research skills component. This may explain the view expressed by Chu (2015) differentiating European from American LIS research methods command. CILIP also uses the Professional Knowledge and Skills Base (PKSB) career development tool to hone-in required LIS professional skills. In that sense, they sharpen research skills of practitioners. On a comparative level, the University of Saskatchewan based Centre for Evidence Based Library and Information Practice is another example of a research network that supports librarians as researchers and promoting evidence-based practice.

Gauchi Risso (2016, p. 75), while acknowledging the need for research methodology instruction in library schools suggests that "if LIS is to be defined as a field of study within social sciences, its researchers should have comprehensive knowledge of scientific methodology and philosophy." Citing a need for standardized research methodology, Gauchi Risso (2016) suggests that the taxonomy used to classify research methods is an important factor in discussing the subject, and Ullah and Ameen (2018) concur with this is point. Furthermore, to determine methodological design, a research strategy must be selected, data collection methods defined, and a decision on the type of analysis and type of research made (Jarvelin & Vakkari, 1993). Besides suggesting that a would-be researcher needs to take advantage of continuing professional development opportunities and programmes, Connaway and Radford (2017, p. 20) infer that "LIS programs do not have the entire responsibility for educating competent researchers." Of concern is the noticeable reduction in publishing by Western librarians as discovered by the research of Finlay et.al (2013) who mention that:

the apparent disengagement of librarians from the traditional channels of scholarly communication will necessarily decrease librarians' familiarity with scholarly communication, and this in turn may affect how librarians, especially those employed at academic institutions, interact with students and academics who are conducting research (p. 419).

In short, different environments place different emphasis on LIS practitioner research skills, and that in turn affects the evolvement of disciplinary research methods. Ocholla and Leroux (2011) suggest that multi-disciplinary research theory/frameworks and models can be used to facilitate LIS research.

Besides lacking preparation to be involved with research while in LIS school, sometimes there is no incentive for LIS professionals to publish, so mastering research methods and methodology remains a peripheral subject. But when there is a stipulation in their job requirements to publish, as in many academic libraries, there is an increase in the number of librarians with faculty status, therefore having to publish in accordance with university research agendae. The best ways of gaining more guidance where individuals lack in experience and practice is to make use of professional development opportunities and follow the activities of such bodies as the Association of College and Research Libraries

(ACRL), American Library Association (ALA), Association of Research Libraries (ARL), Association for Information Science and Technology (ASIS&T), International Federation of Library Associations and Institutions (IFLA), Library and Information Association of South Africa (LIASA), Association of European Research Libraries (LIBER), United Kingdom Serials Group (UKSG), and Australian Library and Information Association (ALIA) Research, Library and Information Association of New Zealand Aotearoa (LIANZA), and more according to special interest. They all support professional development, of which research is a part. Additionally, it also makes sense to use research-oriented journals because they provide trends in research methodologies. Examples are in LIS include *College & Research Libraries* (C&RL), the *Journal of Academic Librarianship*, *Library & Information Science Research*, the *Library Quarterly*, the *South African Journal of Libraries and Information Science*, and *Portal — Libraries and the Academy*. Evidence-based journals are useful for practitioners so that they can study how research is organized to reflect actual practice is a systematic manner, e.g. the *Evidence-Based Library and Information Practice* (EBLIP) journal.

Hall (2012) reports the achievements of the LIS Research Coalition which was established in 2009, as a three-year project funded by the British Library (BL), the Chartered Institute of Library and Information Professionals (CILIP), the Joint Information Systems Committee (JISC), the Museums, Libraries and Archives Council (MLA), and the Research Information Network (RIN). The intention was to bring together information about LIS research opportunities and results, encourage dialogue, promote practitioner research and the translation of research outcomes into practice, and to promote the development of research capacity among professionals. It appears that the benefits of this approach were realized mostly in medical and health sciences librarianship. Halpern, et.al (2015) suggest that the LIS profession must actively support skills development in research data collection, analysis, and distribution to allow librarians to investigate and address their most pressing issues and advance our field of knowledge. They note the lack of research skills in many LIS professionals, especially knowledge of statistical methods and research design. The skills gap leaves them with a tendency to use the survey even where it is not the best research method, and worse still, using poorly created survey items, resulting in defective results (Ullah & Ameen, 2018).

In fact, citing the San Jose University programme structure, Luo (2017, p. 62) suggests that the LIS education curriculum needs "further pedagogical innovations in research methods education". This approach is in line with the goals of the LIS Research Coalition mentioned above. Adding to this discussion, Jamali (2018, p. 206) suggests that "LIS schools might consider emphasising issues related to rigour of qualitative research and best practices in implementing qualitative methods in their research method courses," and expresses the possibility of editorial boards of journals soliciting for more articles based on qualitative research. It is important to make research methods courses timely, relevant, and practically useful.

Halpern, et.al (2015) concur with other researchers that use of evidence-based practice in decision-making enables librarians to offer demonstrably better collections, services, and spaces. The requirements by accreditation boards and senior university administrators have also left LIS professionals with no option but to equip themselves with skills to research and present assessment data or library-specific metrics effectively. Additionally, in academic environments, librarians need to be participants in promoting the research agendas of their parent universities as researchers and research supporters. There is a real possibility that LIS gradually is evolving into a genuinely research-reliant discipline because of the dictates of socio-economic realities, and the need to regain the requisite recognition from professional peers and the communities that LIS professionals serve and interact with.

Further impediments to getting involved with or practicing research include a lack of time, "awareness and perception, connection and relationship, funding, passion and enthusiasm, research culture and support, research expertise, shared understanding and interest" (Nguyen 2017, p.3), and a focus on practice over research in the LIS field (Luo, 2017). The same is confirmed by Hoffmann, Berg, Koufogiannakis (2017, p. 103) who cite "individual attributes, peers and community, and institutional structures and supports." The likelihood of conducting cross-disciplinary research to enrich the LIS profession also depends on the respect and reputation among professionals, to encourage joint research projects. Different disciplines have different terminal degrees. Not all information science related specializations consider the master's degree as terminal. For that reason, it sometimes leaves academic librarians suffering from professional image challenges and exposed to being regarded as research assistants and keepers of books, therefore occasionally perceived as not academic enough for research collaboration. Research by Nguyen (2017) on *Relevance 2020: LIS research in Australia* confirms this point. Consequently, it may sometimes be advisable to embark on post-master's qualifications and active academic /professional research projects to get over this recognition hurdle. In fact, Tzanakou (2014) points at one of the advantages of attaining advanced qualifications for societal recognition. But then, the mention of geographic areas by Togia and Malliari (2017) also comes into play in the sense that the recognition challenges are not universal, therefore may not always stand in the way of collaborative research.

CONCLUSION

The research methods landscape in LIS is no longer an intra-disciplinary affair. It is now impacted by research tendencies and habits from cross-disciplinary, multi-disciplinary, inter-disciplinary, and trans-disciplinary opportunities, resulting in ontologies and epistemologies that echo evolving research techniques. Decisions to use a specific method are determined by the nature of topics to be investigated. This is how LIS contributions are made towards existing and expanding research methodologies. Like in most disciplines, LIS researchers use theoretical frameworks to guide the collection, analysis, and interpretation of collected data, all within the qualitative, or quantitative, or mixed methods disposition.

The expansion of the LIS discipline has some scholars suggesting having standardized LIS research methods and taxonomies that provide guidance. Many have expressed the importance of enhancing the LIS curriculum, emphasizing research methods to give more confidence and expertise to professionals. The current LIS environment also demands the use of evidence-based qualitative research methods to inform practice more accurately, particularly with new and previously unexpected requirements coming up in a fast-changing information environment. Research indicates that qualitative approaches are gaining increasing importance and have a major role to play in LIS too. That is in addition to quantitative methods. But then, mixed methods have so far gained little recognition in LIS research. One can conclude that the evolution or expansion of research methods is a manifestation of prevalent and developing research questions, values, and realities in many disciplines including LIS. Literature also indicates a shift from predominantly quantitative to a visible appreciation of qualitative methods, with a gradual adoption of the mixed methods approach in LIS. This is because the discipline is impacted by cross-disciplinary research tendencies, therefore reflects a variety of research traditions. The unfolding areas of investigation that are manifesting themselves within LIS as well as in conjunction with other disciplines and their plurality are noted.

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Chapter 2
Theory and Theorising in Information Science Scholarship

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ABSTRACT

Theory is one of the major pillars of research. Methodologies as another pillar assist in theory testing and construction. Theories help to explain reality, which is the subject of any research process. Theories and methodologies should be relevant to their context if they are going to contribute to the production of progressive and transformative knowledge. This chapter looks at the understanding of theoretical and conceptual frameworks as tools of conceptualising the research process. Some scholars confuse theoretical with conceptual frameworks. Sometimes they regard research frameworks such as paradigms as theoretical frameworks. Some scholars do not even explain how these research conceptual tools help them to design and execute their research. The implications of not using context specific theories in research, and its consequences to epistemic freedom, is presented. Researchers should focus on theorising instead of theory itself and develop theories that are interesting and relevant to the profession and discipline. That will also reduce dependency on borrowed theories.

INTRODUCTION AND BACKGROUND

Scientific ways of knowing mainly depend on a sound methodology and an elegant theory. In fact, "nothing can be studied empirically in the absence of theory and research methods" (Bergman, 2011, p. 99). Theory guides researchers to formulate research questions that inform a study (Grant & Osanloo, 2014; King, Keohane & Verba, 1994; Ngulube, 2018; Ngulube, Mathipa & Gumbo, 2015). Theory also influences the concepts to be reviewed in the literature, research design and results of a study. A theoretical framework that is developed from a theory guides one's study and is the central piece in the research puzzle (Ennis, 1999, p. 129). Research conducted without theories is poor and lacks a sound foundation. Such research has limited usefulness (Sarter, 2006). There is a lack of theoretical research in library and information science (LIS) (Kim & Jeong, 2006). Earlier on, Pettigrew and McKechnie

(2001) bemoaned the limited application of theory and the failure of LIS research to address the practical problems of the profession.

The same observation was made by Ukwoma and Ngulube (2019). The two authors revealed that many theses and dissertations in LIS from Nigeria and South Africa were devoid of theory. Some of the studies even used concepts of theory, theoretical framework, and conceptual framework interchangeably (Ukwoma & Ngulube, 2019). This may partly be explained by a lack of awareness of the role of theory in the research process and the fact that many LIS researchers are concerned with LIS practice and applied practitioner-oriented research, rather than developing and applying theory. However, the use and understanding of theory can make LIS research interesting, relevant, insightful and rigorous.

Consequently, Kivunja (2018) advised educators of master's and doctoral students to spend more time on topics related to the application of theory in research. That will give future practitioners and professionals a sound basis for applying theory in their work and research irrespective of the discipline and context. Despite the recognition of the importance of theory in the research process, there is limited discussion in LIS of the application and use of theory, and how theoretical and conceptual frameworks differ. There are conflicting views on the utility of theory in LIS research. Misconceptions of theory and theoretical contribution in the LIS field are also rife (Ngulube, 2018; Ocholla & Le Roux, 2011).

Based on personal experience as a facilitator of master's and doctoral workshops, and examiner of dissertations and theses, this chapter provides signposts on the importance and use of theory in research and the development of a conceptual framework. At the end of reading this chapter, readers should be able to do the following:

- Understand what theory is;
- Articulate the role and significance of theory to research;
- Employ theory effectively in research;
- Appreciate that theories are social constructions and are disposable;
- Differentiate between a theoretical and conceptual framework; and
- Apply theory in qualitative, quantitative and mixed methods research.

The rest of the chapter discusses the relationship of theory to research, the differences among metatheories, theories and models, the use of theory in research, the difference between the theoretical and conceptual framework, and the use of theory in various research traditions.

RELATIONSHIP OF THEORY TO RESEARCH

Theory is important in conducting research. Good theory advances knowledge, directs researchers to important questions, and provides knowledge and understanding about a research topic and the discipline (Sonnenwald, 2016; van de Ven, 1989). It is central to research (Thomas, 1997). Knowledge production is rooted "in theory whether we acknowledge it or not" (Compeau & Olivera, 2014, p. 347). However, there is still a need to ask: Do we really need theory? Is it really central to research? The answer is partly provided by Bichler et al., (2016) who posited that: "At its core, scientific knowledge is based on theories" (p. 292). Deming (1993) stressed, "Without theory, experience has no meaning, and without theory, one has no questions to ask. Hence, without theory, there is no learning" (p. 106). According to Jeong and Kim (2005), "Theory is the ultimate destination as well as the starting point of research" (p. 52). While

atheoretical research or research devoid of theory is commonplace in social sciences, such research does not contribute to the development and maturity of a discipline (Shoemaker, Tankard & Lasorsa, 2004).

However, a nagging question remains: What is theory for? Theories connect the body of knowledge in a discipline with broader fields. On the other hand, theories are tested and developed by research. This implies that research generates data that describes observed patterns or patterns that are expected to be observed, while theories explain the phenomenon and answer the question "why?" in contrast to only answering the question, "what?"(Hempel & Oppenheim, 1948). The identification of the theories to be used in a study is dependent on a comprehensive, and thorough review of literature. Stated differently, a literature review assists in finding a theory or developing "a conceptual framework or to explore a topical area for study" (Merriam & Simpson, 2000, p. 10).

Theories can form part of a theoretical or conceptual framework as is going to be discussed later. They can also form part of a model. Researchers can use the whole theory or parts of the theory as theoretical and conceptual frameworks respectively. The theoretical and conceptual frameworks guide the researcher about what variable to include and measure in a study. According to Ivey (2015):

Scuttling theoretical and conceptual frameworks is taking the risk that we accept answers that may leave out major parts of the whole, misinterpret the meaning of the findings, or miss incongruences and contradictions (p. 153).

Lastly, Van de Ven (1989) avers: "Good theory is practical precisely because it advances knowledge in a scientific discipline, guides research towards crucial questions, and enlightens the profession…" (p. 486). A theory must be appropriate to the research problem for it to be useful to research. The theory should have a predictive and explanatory power for it to inform research and practice. The power of prediction of a theory largely depends on how the prediction is explained by the theory (Tsang & Ellsaesser, 2011). Theory has a place in qualitative, quantitative and mixed methods research as will be demonstrated later.

Metatheories, Theories and Models

Metatheories and models are not theory. However, some authors routinely use these concepts in lieu of theory. This has not only caused confusion, but it has also led to misconceptions and disagreements about whether these concepts can be distinguished. According to the *Merriam-Webster Dictionary* (2019), metatheory is "a theory concerned with the investigation, analysis, or description of theory itself". Methodology may be regarded as a meta-theory that deals with the construction and testing of theories. There is a need to ask: Do we really need to define theory? It is necessary to define theory because the meaning of theory is elusive as researchers conceptualise it differently. As Merton (1967) put it:

Like so many words that are bandied about, the word theory threatens to become meaningless. Because its referents are so diverse – including everything from minor working hypotheses, through comprehensive but vague and unordered speculations, to axiomatic systems of thought-use of the word often obscures rather than creates understanding (p. 39).

A lack of agreement on exactly what theory is may partly explain the misconceptions about theory. Researchers may hold varying views about what constitutes a theory and which theoretical perspective is best suited for the field. Theory in its etymological sense may mean observation. Thomas (2016) describes

it as "an explanatory model" (p.135). A theory is the glue that holds a study together (Thomas, 2016). It facilitates sensemaking in data analysis. Therefore the purpose of theory is to explain the findings of research. According to Strauss and Corbin (1994, p. 278), "[t]heory consists of plausible relationships produced from concepts and sets of concepts". Stated differently, a theory is "a system of ideas or statements explaining something" (*Oxford English Dictionary*), or "interrelated concepts, definitions, and propositions that explain or predict events or situations by specifying relations among variables" (Glanz, 2008, p. 114). Gregor (2006) summarises different perspectives on theory and considers theories as: "abstract entities that aim to describe, explain, and enhance understanding of the world and, in some cases, to provide predictions of what will happen in the future and to give a basis for intervention and action" (p. 616). A theory is composed of (i) concepts and constructs that identify elements of the phenomenon, (ii) a definition of relationships between concepts and constructs, and (iii) contextual boundaries indicating the generalisability of the theory (Weick, 1989, 1995; Whetten, 1989). The definition by Campbell (1990) aptly distinguished these components of a theory:

It is a collection of assertions, both verbal and symbolic, that identifies what variables are important for what reasons, specifies how they are interrelated and why, and identifies the conditions under which they should be related or not related (p. 65).

The term "variables" in the definition refers to concepts or constructs. Concepts and assumptions form the "mortar and bricks of theory structure" (Reed, 1984, p. 678). Concepts and assumptions are key to formulating and organising theories. Concepts are descriptions of something and are the building blocks of theory. On the other hand, assumptions "are statements that something is true for the purpose of theoretical development (Reed, 1984, p. 678). The assumptions include hypotheses, propositions, postulations, suppositions, theorems and theses (Weick, 1995). The relationship between concepts and assumptions constitutes a theory that explains a phenomenon. The research methodology determines the value of a theory, its development and its possible modification.

Models may be used to test or represent a theory, but they are not theories. Models mediate between abstract ideas and reality. They qualify as conceptual frameworks rather than theoretical frameworks. Models show the relationships and "direction of those relationships between these variables" (Ivey, 2015, p. 145), but they do not provide the reasons behind the link between variables (Shoemaker et al., 2004). They help to describe a process or an object, but a theory is needed in order to "understand how the object or process works" (Shoemaker et al., 2004, p. 112). Thus, a theory explains reality while a model explains how to change something (phenomenon) (Reed, 1984). A theory is modelled to make it practically applicable. Models may help to develop theories. The relationship between theories and models is vividly explained by Morgan and Knuuttila (2012) when they viewed a theory as a classified set or series of models. That implies that models are representations of theories (Bichler et al., 2016). Indeed, Hesse (1966) described a model as a pre-theoretical and unrefined representation of social reality. Fawcett and Downs (1986) posited that a conceptual model is always the starting point of research. A conceptual model is not necessarily a conceptual framework.

Paradigms are not Formal "Theories"

There are many levels of theorising including, "formal theories, epistemological theories, methodological theories and meta-theories" (Creswell, 2009, p. 71). These levels of theorising assist in understanding reality, but some of them cannot explain how and why things work the way they do. For instance, paradigms can provide a theoretical lens, but they are not theories as they do not explain a phenomenon.

Similarly, it is not accurate to regard interactionism, phenomenology and critical theory as theories as suggested by Reeves, Albert, Kupe and Hodges (2008) and Henning, Van Rensburg and Smit (2004). For instance, critical theory focuses on empowering society to deal with issues related to race, class and gender to mention a few. It draws from theories such as Marxism, feminism, social model of disability and other postmodern knowledge claims. Thus critical theory is concerned more with the "political and emancipatory effects" (Ormston et al., 2014, p. 14) of certain circumstances on the researched "than the extent to which they portray and explain the social world of participants" (Ormston et al., 2014, p. 16). Unlike paradigms and other knowledge claims and perspectives, theories emerge from research (Ngulube, 2018). In other words, "paradigms or frameworks do not, of themselves, describe, explain, or interpret anything. But they tell us how descriptions, explanations and interpretations should be developed within the tradition in which they are working" (Six & Bellamy, 2012, p. 33).

THEORIES AS SOCIAL CONSTRUCTIONS

Theory is a linguistic and social construct that is based on "ideological interests and cultural peculiarities" (Zima, 2007, p. ix). Scientific theories are not universal statements as claimed by Popper (1959). In his own words:

Scientific theories are universal statements. Like all linguistic representations they are systems of signs or symbols. Theories are nets cast to catch what we call "the world"; to rationalize, to explain and to master it. We endeavor to make the mesh even finer and finer (p. 56).

The academe and some researchers have decontextualised theories and applied them as universal statements and even elevated theories that are developed in a particular context to grand theories that are used to explain phenomena in a universal manner. Theories have a cultural character (Zima, 2007). They are disposable. They are incomplete as no theory can explain all social reality. The academy in the developing world (Global South) has institutionalised Western theories and marginalised indigenous ones. There is a need to revise the established theories in order to respond to the social context. There might be a need to also discard some of these theories completely in order for the academy in Africa to gain epistemic freedom. Researchers and the academy have decontextualised Western theories as they apply them. The caution about decontextualising theory offered by Benson (1982) in relation to organisational collaboration is instructive:

Interorganisational phenomena, dyads, sets, networks, are theorised as if context-free. Resource dependencies and other interorganisational relations are then analysed without regard to the larger political and economic structures in which they are embedded particularly those of the capitalist mode of production and capitalist state apparatus (p. 145).

This disregard of the social, political, economic and cultural context when applying theories is rife in the academy and particularly in LIS. Consequently, some of the theories that have been applied in many disciplines, including LIS, are irrelevant to practice because of a lack of consideration of contextual factors. The failure to apply contextually relevant theories increases the gap between knowledge production and practice (Sandberg & Tsoukas, 2011).

Stated differently, theories that are not contextualised fall into the trap of being irrelevant to practice. Depending on decontextualised theories when conducting research makes it nearly impossible for researchers in general and LIS in particular to use and develop theories that capture "the logic of practice" alluded to by Bourdieu (1990). Hassan, Mathiassen and Lowry (2019) advised researchers to question and be willing to forget previous theorizing and conceptualizing that limited "thinking to the sanitized, rationalized reconstructions found in published works" (p.14).

Take a step back and ask yourself why, for instance, Marxism and capitalism as theories of development failed to uplift Africa and many parts of the Global South. Africa and the Global South has remained underdeveloped, haunted by foreign debt and under the shackles of poverty and neocolonialism. The answer can be partly provided by the fact that these theories were developed in a different context and applying them whole and retail in different political, cultural and economic context was always going to be a recipe for disaster. The application of theory in research also raises ethical questions and political goals of the research including social justice (Adams, Cochrane & Dunne, 2012).

Existing theories should be used in a generative manner taking cognisance of the local context. Perhaps, LIS researchers and researchers from other fields should consider using the approach outlined in circle (iii) of figure 1. That will give them an opportunity to combine some aspects of existing theories with knowledge of the context and their personal experiences. That will enable LIS researchers and researchers from other fields to produce relevant knowledge that may result in epistemic freedom. Such knowledge will be produced taking into cognisance what Strauss and Corbin (1990) referred to as theoretical sensitivity. The factors outlined in circle (iii) have a potential of fully explain a phenomenon and assist researchers to theorise without letting the factors limit the theorising. The portrayal of the stages of theorising in research by Hassan (2014, p. 13) can be used as a starting point in achieving theoretical sensitivity and theory building. Theorising in this manner will facilitate the development of good theory, which is capable of producing knowledge that addresses the needs of the profession and the discipline. It is important to note that explaining a phenomenon is theorising.

Maxwell (2005) warned researchers against uncritically adopting and reproducing existing theories. While existing theories may be used as a building block for a conceptual framework, they should not be used wholesale and retail in disregard of the local context. Theories as a social reality are "historical products" (Bourdieu, 1988) that should be judged in the context of their era. Reflexivity may assist researchers to use theories in a generative manner. Researchers should be creative and move away from the theories of the deceased Germans (e.g., Karl Marx) and the deceased Swiss (e.g., Jean Piaget), for instance. According to Whitehead (1917): "A science which hesitates to forget its founders is lost" (p. 115).

The context of a discipline – or what Gregor (2006) called the "domain questions", and what Hassan, Mathiassen and Lowry (2019) labeled "context of discovery" – matter in theorising and applying theory in a discipline. The domain questions relate to the phenomenon of interest in the discipline, the core problems or topics of interest, and the boundaries of a discipline (Gregor, 2006). The central argument is that the domain interest of a discipline influences the nature of its theory (Gregor, 2006). The nature of theory in LIS could differ from that found in other disciplines. That implies that in recognition of the fact that theories are social constructions, their application to LIS must take into cognisance the questions that LIS seek to address.

Theories also have boundaries. Some theories may apply to all situations while others may apply only in some instances. The boundaries of theories determine their level of generalisability (Gregor, 2006). This implies that the level of generality largely depends on the context and the limitations of the theory. This approach applies more to social sciences than natural sciences. In natural sciences there might be

universal laws, for instance, Ohm's Law. It should be noted that theories are more comprehensive than experimental laws such as Ohm's Law (Nagel, 1979). Even in natural sciences there are laws that do not fully explain reality. For instance, other geometry theories were developed because of the shortcomings of Euclidian geometry theory (Bichler et al., 2016).

Theories can be described as grand, mid-range and micro level (Merton, 1968). Grand theories (e.g., Marxism, functionalism and feminism) purport to focus on universal explanations, while mid-range and micro-level theories are concerned with local systems and local contexts. Grand theories have limited explanatory value. In their attempt to explain everything, grand theories explain nothing. They should be avoided when doing research as they do not describe or explain a context-specific social phenomenon.

USE OF THEORY IN RESEARCH

LIS researchers have used and misused theories in a variety of ways (Ngulube, 2018). Mutula and Majinge (2017) and Ocholla and Le Roux (2011) pointed out that LIS researchers in eastern, western and southern African universities have difficulties in choosing and using theory. Kumasi, Charbonneau and Walster (2013) explained that the use of theory can be classified in a continuum. At one end of the spectrum is the lowest level, which involves minimal use of theory. Minimal use of theory may be equated to semantic use of theory (Kitchel & Ball, 2014). Semantic use of theory is closer to what Jeong and Kim (2005) described as spot citing, whereby a theory is just mentioned in passing. The moderate use of theory is in the middle with the major application of theory at the other end. Kumasi, Charbonneau and Walster (2013) described minimal use of theory as theory dropping and theory positioning. Theory conversation and diversification constitute the moderate use of theory. The major application of theory includes theory testing, theory application and theory generation. Jeong and Kim (2005) used analytical evaluation, theory application and theory discussion to describe the major application of theory.

The focus of researchers should be the major use of theory. Typically the researcher who is concerned about the major use of theory would state the theory they intend to use, followed by the central concepts or constructs of the theory, then a discussion of who else has used the theory, and its applicability and an adaptation of the theory to variables in the study (Creswell, 2009).

Understanding Theory

Reed (1984) suggested that understanding theory was the first step in learning research. A surface level knowledge of a theory is not helpful when doing research (Kitchel & Ball, 2014). According to Reed (1984), theory analysis identifies the frame of reference on which a theory is based in order to compare with the general philosophical base of the discipline and to establish relationships. Secondly, theory analysis provides a means of linking the assumptions, concepts and definitions in the theory to suit the research problem and the objectives of the study. Theory analysis may uncover the need to elaborate and refine the theory. Theory analysis may also identify the important points that are useful in information science to others, and may indicate the areas that other professions have in common. Concepts to inform the research are selected from understanding the theory. Thirdly, a hypothesis or research question can be formulated to support or refute the identified research problem. Fourthly, understanding theory can help researchers to make trade-offs between the theory that is mostly relevant to the study and the less relevant ones. The researchers will be able to answer the question: Why use this theory rather than any other?

The lack of understanding of depths of the theory may lead to semantic use of the theory or the mismatch of theory to a study. This inaccurate use of theory is related to theory dropping, which is discussed later. The semantic use of theory occurs when the study uses limited wording of the theory to justify the theoretical rationale for the study. A surface level understanding of theory may conceptually result in a surface level research question (Kitchel & Ball, 2014).

The checklist for evaluating the quality of theory based on attributes such as testability, falsifiability, parsimony, explanatory power, predictive power, scope, degree of formal development and heuristic value provided by Shoemaker et al. (2004) is instructive:

- Can you measure the variables/concepts from the theory?
- Is the theory specific enough to be disproved?
- Is the theory as simple as it can be?
- How much can the theory explain?
- How much can the theory predict?
- How much can this apply?
- How many studies contribute to the development and refinement of the theory?
- To what degree is the theory formalised by the researcher and the field?
- Does this theory help generate ideas for more theory?
- Is the theory "beautiful" in its own right?

Framing a study employing the appropriate theory partly depends on engaging with the literature, and the questions outlined above. Providing answers to these questions demonstrates one's understanding of the utility of theory to the research project. The use of a theory should depend on the research problem. The researcher should determine the role of the theory in addressing the research question. Gregor (2006) suggests that the researcher should decide on the purpose the theory is going to serve.

The purpose of the theory may be to provide tools for analysis and description or explanation or prediction, or prescription. A theory that serves an analytic purpose describes "what is", and they are used when there is limited knowledge about the phenomenon under investigation (Fawcett & Downs, 1986). It provides a springboard for developing other theories. A theory for explaining – or what Gregor (2006) labels "theory of understanding" (p. 624) – clarifies what, how, when, why and where some phenomena take place. This type of theory mainly applies to interpretivist studies, case studies and surveys (Gregor, 2006). A theory for predicting predicts what is and what will be. Statistical techniques such as correlation and regression use this type of theory. Natural sciences use this type of theory, including the theory of explaining and predicting. Social sciences also use the theory of explaining and predicting. The theory is concerned with what is, why, when and what will be. The Technology Acceptance Model (TAM) falls under this category. A theory of design and action provides a prescription of how things are done. This theory is applicable to systems development (Gregor, 2006).

Theory Borrowing

Theory borrowing is prevalent in many disciplines (Kenworthy & Verbeke, 2015; Truex, Holmström & Keil, 2006; Whetten, Felin & King, 2009), especially those with a broad disciplinary base, including LIS (Mutula & Majinge, 2017; Ukwoma & Ngulube, 2019) as a result of a shortage of applicable home-based or native theories and core theories. Importing "coherent and fully formed ideas that explain

a phenomenon (or phenomena) into [LIS] from outside the discipline" is theory borrowing (Oswick, Fleming & Hanlon, 2011, p. 319). Scholars borrow, adapt, extend and at times generate new theories when conducting research (Doherty, 2012). Theories are adopted and adapted or some variables are excluded to suit the LIS context. LIS has an interdisciplinary foundation that results in its borrowing from other disciplines. LIS domesticate theories mainly from sociology, management, psychology and information systems (Ukwoma & Ngulube, 2019).

Theory borrowing can pose conceptual problems in the use of conjecture. The essence of the theory may be lost or distorted in the process of adaptation. Rose, Jones and Truex (2005) warned that problems emerge when theories are adapted to a discipline. The adaptation of theories may involve "streamlining and/or modifying the original theory in order to fit the problems or conceptual tasks [of the field of interest], and the original nuance is often sacrificed to fit the indigenous field's concern" (Oswick et al., 2011, p. 328). Researchers should fully understand the use of theory in its original environment and acknowledge its previous use in order to apply it appropriately (Holmström, 2005).

While theory borrowing is welcome in research, disciplines should also focus on theory generating research, which is likely to culminate in the maturity and enrichment of the discipline. Uninformed theory borrowing, which is based on a limited understanding of the applicability of a theory, may have a negative impact on a discipline (Truex, Holmström & Keil, 2006). Theory borrowing practices should be closely monitored and scrutinised by the professionals and researchers. Uncritically borrowing theories should be guarded against as it is inimical to the development and maturity of a discipline. Researchers should also be able to distinguish between theories of LIS and theories in LIS. Theories of LIS are general theories in LIS while theories in LIS are rooted in other subject areas such as sociology and psychology, but are suitable in researching LIS phenomena. Theorising has the potential to develop theories of LIS and reduce theory borrowing.

Theory Diversification

The use of many theories without demonstrating how the concepts in the theories are linked to the study constitutes theory diversification (Kumasi, Charbonneau & Walster, 2013). Consequently, the relevance of the theories to the study may be clouded. Chilimo (2008) used five information and communication technologies for development models and the sustainable livelihoods framework to address six objectives of the study. A closer look at the objectives suggests that some of the constructs in the models are not captured in the objectives. This may result in theory dropping that emanated from using too many theories (i.e., theory diversification) that do not all apply. Similarly, Lwoga (2009) used nine knowledge management models to investigate the extent to which knowledge management approaches and information and communication technologies can be used to manage agricultural indigenous knowledge. Although the study had nine objectives, some of the models did not address the constructs in the objectives owing to theory diversification. Researchers should guard against the practice of theory diversification. It is recommended that researchers should restrict their theories to three in a single study depending on the variables and concepts that are outlined in their objectives. Having too many theories may suggest that the objectives and the research questions of the study are not focused. The number of theories to be used in a single study suggested here is neither based on any empirical research nor prescriptive. However, practical considerations dictate that theories informing a study should not be too many to avoid theory diversification.

Theory Triangulation

Denzin (1978) and Patton (2002) outlined four categories of triangulation, including methods triangulation, data triangulation, analyst triangulation and theory/perspective triangulation. Theoretical triangulation involves using more than one theoretical perspective to examine and interpret the data. Hoque, Covaleski and Gooneratne (2013) refer to it as theoretical pluralism. Theory triangulation is depicted in circle (iv) in figure 1. Theory triangulation can enrich research as it offers multiple theoretical perspectives that lead to a better understanding of the phenomenon under study. All the concepts or constructs in the theories must be used in theory triangulation. However, the outcome of combining theories is not a theoretical framework. Rather it is a conceptual framework as illustrated in figure 1. A balance should be struck between theoretical triangulation and theory diversification.

Theory Dropping

Theory dropping is one of the problems encountered in the use of theory by researchers. Theory dropping was rife in research conducted in LIS in eastern, western and southern Africa between 2008 and 2016 (Mutula & Majinge, 2017). Researchers should measure all the variables in their theory to avoid theory dropping. This conceptual problem can be solved by understanding the difference between the conceptual and theoretical framework and applying these analytic tools appropriately. All the variables or concepts in the theory must be operationalised if a theoretical framework is used. A mismatch between theory and data is one of the manifestations of theory dropping – see the assertion by Fowler (2006) in the next subsection. Listing theories or schools of thought without providing an explanation of why a theory leads to new or unanswered theoretical questions is also tantamount to theory dropping. References to a theory do not imply the presence of theory (Sutton & Staw, 1995). There is a need to discuss what the theory is about and arguments why the theory is useful to the research and in addressing the study question. The reader needs to follow the logic in the arguments used by the author or researcher. Related to theory dropping is theory conversation whereby the relevance of a theory is discussed without applying it to answer the research question or analyse the data (Kumasi, Charbonneau & Walster, 2013).

Major Application of Theory

Major application of theory is its substantive use. The role played by theory or theoretical framework in the study is clearly articulated. The theory is in line with the stated epistemological view. The choice of a particular theory is well motivated. This implies that the researcher identifies a particular theory to answer the research questions and design of the study and applies the theory in the various stages of the inquiry including analysis (Kumasi, Charbonneau & Walster, 2013). The application of theory may also include theory generation and theory testing. Theory generation involves collecting data and analysing it in order to generate some theoretical explanation(s) of social reality (for example, grounded theory). On the other hand, in theory testing data is gathered in order to support or disprove an existing theory. Major application of theory makes it mandatory that the theory is integrated into the discussion of the findings and implications of the study.

All That Glitters is not Gold

The previous sections have emphasised the supremacy of theory in research. In agreement, Straub (2012) suggested that "Theory is King" (p. vi), and good research "sufficiently uses or develops theory" (p. vi). However, some researchers have made a case against the over-emphasis on the role of theory in research. In the context of information systems research, Avison and Malaurent (2014) suggested that the preoccupation with, and an over-emphasis on theory to the point of fetishism, has produced unimaginative and uninteresting research based inappropriate theories and oversimplification of complex phenomena, for instance. Furthermore, Lester (2005) pointed out that some researchers make their data fit a theory, strip data of context and local meaning in order to serve the theory, fail to link theory with practice and offer limited theoretical triangulation. The following assertion by one of the researchers supports one of the views of Lester (2005) on theory use:

Regardless of what Mazzoni himself had said, I approached my data analysis with the implicit assumption that one of Mazzoni's models had to fit the Ohio data, or there would be something seriously wrong with my study… Although there were obvious discrepancies between my findings and the second model, I did not acknowledge this in the article (Fowler, 2006, p. 56).

The description of Fowler (2006) can also be linked to the concept of theory dropping discussed above. On the other hand, Markus (2014), in defense of theories, posited that it is the narrow conceptualisation of theory that lead to trivial and unimaginative findings.

Writing against the focus on theory use, Van Maanen (1989) suggested that disciplines first need more descriptive narratives about social reality based on qualitative studies than focusing on writing about mediocre theories. There is a need to develop fundamental knowledge before worrying about the application of theory.

THEORETICAL AND CONCEPTUAL FRAMEWORKS

Literature on what theoretical and conceptual frameworks are and how they should be used in research is limited (Grant & Osanloo, 2014; Green, 2014; Ngulube, 2018; Ngulube, Mathipa & Gumbo, 2015; Ravitch & Riggan, 2012). There are also misconceptions about the differences between the two terms, which are at times used interchangeably (Antonenko, 2015; Green, 2014; Imenda, 2014; Kivunja, 2018; Ngulube, 2018; Rocco & Plakhotnik, 2009). Consequently, some scholars give the impression that they are similar. That compounds the problem of understanding the two terms in practice and theory. Theoretical and conceptual frameworks are analytical tools used in the research process to guide the study, but they are conceptually different. Both analytical tools may provide a theoretical perspective or theoretical rationale. That does not make them similar. The research questions and objectives of study are both formulated from the theoretical and conceptual frameworks before they get operationalised. Although theoretical and conceptual frameworks share similar functions, each takes a research project in a different direction.

A conceptual framework is a researcher's map of matters to be investigated. It also provides a scope of the most important variables to be studied, or specifies what information should be collected and analysed (Miles, Huberman & Saldaña, 2014, p. 20). The question that arises from the foregoing explanation of

a conceptual framework is: Is there a difference between a concept board, or conceptual schema, or a map of the literature review and a conceptual framework? The explanation and the diagrams given by Miles, Huberman and Saldaña (2014) tend to lean towards the map of literature than a tool to explain the relationship between the variables. Indeed, the authors later on likened it to "storyboards of filmmakers" (p. 25), or an analytic display, which is a visual representation of "main conceptual ideas about a study and how they interact and interplay each other" (Miles, Huberman & Saldaña, 2014, p. 24). For an extended discussion on theoretical and conceptual frameworks and how they contribute to the research process, see Ngulube (2018), Ngulube, Mathipa and Gumbo (2015) and Ravitch and Riggan (2012).

A theoretical framework is generally based on one overarching theory (Bergsten, 2007; Ngulube, 2018; Nieswiadomy, 2012). In other words, all the concepts or constructs in a single theory underpin a study when a researcher uses a theoretical framework. It becomes a conceptual framework when aspects of the theory are used instead as shown in circle (ii) in figure 1. For instance, if one applies one or less than five concepts of the five categories of human motivation from Maslow's (Maslow, 1954) hierarchy of needs theory propounded by Abraham Maslow in 1934, one would have a conceptual framework based on Maslow's theory. However, if one applies all the five basic categories of needs (i.e., physiological, safety, love, esteem, and self-actualisation), then one would have a theoretical framework. A theoretical framework is the basis of knowledge production. The whole theory may be selected from the literature and applied to a study. Formulating a conceptual framework may be a bit challenging as there are a number of strategies of coming up with one. There are many ways of formulating a conceptual framework, but only a few are illustrated in figure 1.

Figure 1 illustrates five ways of formulating a conceptual framework of a study: (i) putting together various concepts from different theories, (ii) aspects of a theory, (iii) incorporating aspects of a theory or theories, concepts from the literature, personal experiences, knowledge of the context and models, (iv) integrating all the concepts from more than one theory, and (v) combining concepts from the extant literature. The way of formulating a conceptual framework is partly articulated by Nieswiadomy (2012) who explained that "a conceptual framework links concepts from several theories, from previous research results, or from the researcher's own experience" (p. 94-95). The explanation partly overlaps with the description of a conceptual framework depicted in circle (iii) in figure 1. In line with the second way of formulating a conceptual framework outlined in figure 1, Puttergill (2000) posited that theories are constituted through concepts, and certain aspects of a theory may therefore be used as a conceptual framework. The third way of formulating a conceptual framework resonates with the assertion by Lester (2005) that it is "based on different theories and various aspects of practitioner knowledge, depending on what the researcher can argue will be relevant and important to address about a research problem" (p. 460).

The act of formulating a conceptual framework described in the third circle of figure 1 is similar to what Lawler (1985) described as a *bricolage* after a metaphor taken from Claude Levi–Strauss. Gravemeijer (1994) explained that: "A bricoleur is a handy man who invents pragmatic solutions in practical situations…. [T]he bricoleur has become adept at using whatever is available. The bricoleur's tools and materials are very heterogeneous: Some remain from earlier jobs, others have been collected with a certain project in mind" (p. 447). Circle (iii) is also similar to "conceptual blending" (Oswick et al., 2011, p. 328), which attempts to add new variables from the context to concepts from theories in order to have a contextually relevant conceptual framework. The formulation of a conceptual framework depicted in circle (iv) is similar to theory triangulation described by Denzin (1988). All the five circles resonate with Miles and Huberman (1994) who described a conceptual framework as being "rudimentary or elaborate, theory-driven or commonsensical, descriptive or casual" (p. 18).

Figure 1. Five ways of formulating a conceptual framework of an empirical study
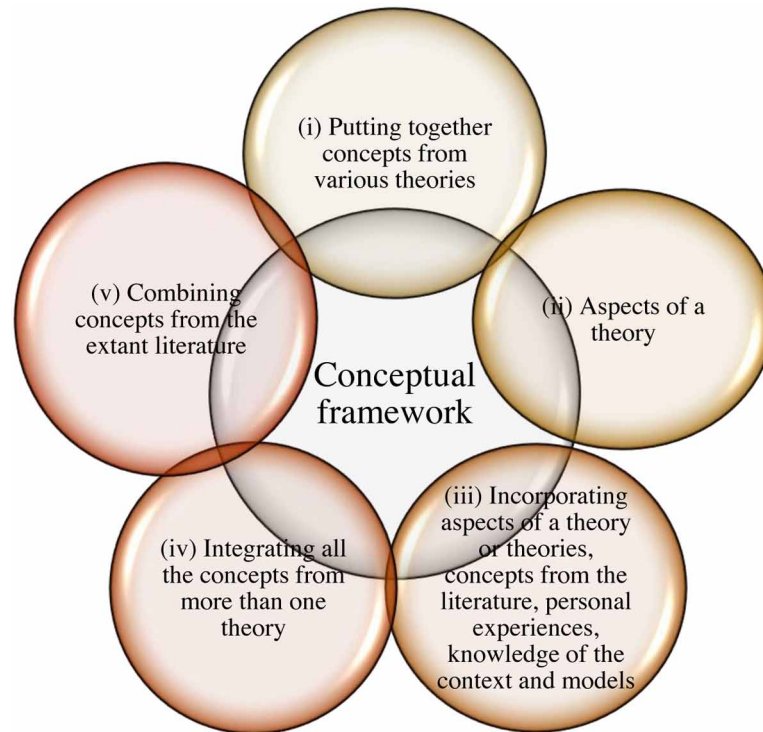
ROLE OF THEORY IN QUALITATIVE RESEARCH

The role of theory in qualitative research has been a subject of hot debate (Thomas, 2002). This partly explains why Anfara and Mertz (2006) call for further "discussion about the role and place of theoretical frameworks in qualitative research" (p. xi). Theoretical frameworks are useful to qualitative research because they can uncover the strengths and weaknesses of certain theories and "situate the research in scholarly conversations and provide a vernacular" (Anfara & Mertz, 2006, p. 192). While some qualitative studies do not explicitly state their conceptual framework, it is generally embedded in the literature review.

Grounded theorists were against the use of theoretical or conceptual frameworks in research. This was a reaction against the dominant view in the 1960s that a study was supposed to be based on a definite theory (Robson, 2002). Theory has been criticised for shutting down discovery (Anfara & Mertz, 2006). Having a theory upfront in qualitative research may also subject the researcher to preconceived concepts and theory at the expense of concepts and theory that may be generated by the data. That implies that qualitative researchers depend on pre-existing knowledge. Qualitative researchers should remain open to concepts that may emerge from the data so that they do not shut down the emergence of new insights into a phenomenon under study. A theoretical or conceptual framework was regarded as an outcome of research rather than its driver and foundation. Although qualitative researchers should not have preconceived ideas derived from existing theory, it should be noted that qualitative researchers have "open but not empty minds" (Janesick, 2000, p. 384).

ROLE OF THEORY IN QUANTITATIVE RESEARCH

Quantitative research is positivist, logical, systematic and reductionist in nature. It is deductive in approach and determined by *a priori* theories (Creswell, 2009; Kitchel1 & Ball, 2014). Quantitative research does not develop theories, but it tests and verifies them. Researchers in the quantitative tradition start with a theory and collect data to confirm or refute it (Creswell, 2009). The research questions or hypotheses are derived from it. The operationalisation or measurement of the variables or constructs, or variables is based on the theory. It is unimaginable to encounter the problem of theory dropping in quantitative research because it is usually driven by the relevant theory. That is usually the case because the researcher tests concepts and variables derived from the theory.

ROLE OF THEORY IN MIXED METHODS RESEARCH

Although mixed methods research is gaining popularity as demonstrated in chapter 19, there is no consensus on the use of a conceptual or theoretical framework to guide a mixed methods study (Evans, Coon & Ume, 2011). Mixed methods research studies should be framed around a philosophical perspective or theoretical framework (Creswell, 2015). The dominant theoretical frameworks "fall under either social or behavioural theoretical models or transformative theoretical models" (Creswell, 2015, p. 8). The arguments advanced in chapter 18 seem to suggest that more research should be done into transformative models as they are not really theories in the true sense of the word. Mixed methods research studies may develop and test theories and vice versa. For instance, a sequential exploratory mixed method design described in chapter 19 can be developed in a quantitative phase, which may seek to generalise the results to a larger population or test a theory developed in the qualitative phase. On the other hand, an explanatory mixed methods design may use a theory deductively in the quantitative phases and then the qualitative phase would inductively develop a broad explanation about the phenomenon under study.

FUTURE RESEARCH DIRECTIONS

The matter of whether a study may have both a conceptual and theoretical framework remains a grey area. There is need for further engagement to shed more light on the matter. There is no agreement as to where theory should be placed both in an empirical article and a dissertation or thesis. These are issues that need further research. Studies can also be conducted on the extent to which information science professionals make trade-offs between theory use and developing descriptive narratives about information science. Finding out the extent to which information science professionals use theories that are devoid of context and local meaning may contribute to cognitive and epistemic freedom.

Using theories in LIS research is growing in importance. However, the extent of theorising in LIS research is unknown. Weick (1989; 1995) called on researchers to start focusing on theorising instead of the theories themselves in order to develop theories to support a discipline. This is imperative in the LIS field where native theories are not abundant.

CONCLUSION

This chapter discussed the relationship between theory and research and demonstrated that although theory is not a panacea, it is a valuable analytical tool to the research process. The chapter went on to illustrate that metatheories, theories and models have commonalities, but they are different. The discussion then turned to showing that theories are social constructions and the epistemic freedom of researchers, especially in the Global South, depends on utilising theories in a generative manner. The chapter went on to present the use of theory in research, including conceptual challenges such as theory dropping, theory triangulation and theory diversification. Theoretical and conceptual frameworks were presented followed by an exposition of the place of theory in quantitative, qualitative and mixed methods research.

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ADDITIONAL READING

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KEY TERMS AND DEFINITIONS

Operationalisation: Definition of concepts used in an empirical inquiry, and identification of variables to be measured using research instruments such as questionnaires.

Chapter 3
Theories in Information Management:
Analysing Development Trajectory

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ABSTRACT

The growth of the information management (IM) discipline and its importance in different socio-economic platforms cannot be over-emphasized. The current development of heterogeneous technologies shows that IM is the focal point of innovations such as blockchain, data science (big data, predictive analytics, etc.), artificial intelligence, automation, etc. This research was motivated by a desire to contribute towards establishing the intellectual identity of IM as a science and as a discipline. An exploration of the inventory of theories and conceptual frameworks enables us to have an understanding of the different methodologies currently being used and therefore define the level of development of the field as a discipline. This chapter aims to present the patterns and trends in theory conducted by different studies during the last 10 years (2009 – 2019). Using a bibliometric approach anchored on descriptive informetrics, the chapter explores the application of theory within the IM field.

INTRODUCTION

The ever-increasing emphasis of multi/inter-disciplinary orientation in different fields of enquiry entail that there are no fields which can purely be defined by their original theoretical or conceptual orientations. Over the years, Information management (IM) has evolved to encompass emerging conceptualisations and thinking discovered in various research and practice. As a result, there is now a higher proportion of

theories and conceptual underpinnings borrowed from other disciplines further adding to the intellectual richness of the discipline. Although, in general, the increased multi/inter-disciplinary orientation of IM is welcome, it is still important to explore the key theories, conceptual frameworks and methodologies that underpin the discipline. The understanding of the key theories is important to accentuate the intellectual identity and ascertain the degree of maturity of IM both as a discipline and a science before it is pre-consumed by emerging fields.

This chapter intends to explore the key theories that form the pinnacle of IM intellectual base. Specifically, the chapter focusses on research over a 10-year period (2008 – 2018) in order to ascertain the level of development of IM as a discipline and a scientific field of enquiry. The key contribution of the chapter is not to propose a comprehensive nor exhaustive list of theories used in IM, but rather to use descriptions and definitions to analyse and interpret the key theories used in IM.

This chapter is arranged as follows: The next section presents the background which articulates the point of departure of this research and presents the development trajectory of IM over the years. After that, key definitions in light of this research are presented. The main body of this chapter explores the contextual nuances on the theories and concepts mostly used in IM research. Thereafter, a bibliometric analysis of the IM studies over the 10-year period is presented. The last sections of this chapter presents an analysis of the key IM theories and frameworks. The chapter ends with a conclusion section which gives a recap of key findings from this research.

BACKGROUND

In the contemporary age where the fourth industrial revolution (4IR) is hugely pronounced in almost all socio-economic establishments, the value of information as a competitiveness agent and the role of IM in the 4IR are further justified. A diverse range of context-aware technology innovations are being propagated to manage heterogeneous information resources (both static and dynamic). The value of information has been amplified by the proliferation of information and communication technologies (ICTs) designed sorely to focus on managing information in different contexts. Other than the rapid development of information-centric technologies, Kirkham (1991, p. 8) postulates that the result of the greater appreciation of the value of information has brought about exponential growth in the development and use of methodologies and theories concerned with the study of information. Owing to the foregoing, the contextualization of the study of information is a prerequisite for a discussion on the theories associated therewith so as to understand the intellectual grounding of any innovations related to IM. Studies on managing diverse information types have gone through a different era of evolution, hence, this study draws insights from literature and particularly builds on the earlier work by Gorman and Corbitt (2002). Figure 1 shows the different disciples that metamorphosed into the modern-day information management subject.

It is evident from Figure 1 that the central tenet of IM has evolved to incorporate more trans-disciplinary grounding from mathematics, economics, computer science, etc. Because of the increasing multi-disciplinary nature of IM, there are several technology innovations being realised. The different innovations have changed the role of individuals in the IM continuum and actual IM practices. Therefore, IM studies, research and practice have embraced a truly multi-dimensional orientation to keep abreast with the changing IM landscape. Today, there are automatic digital classification systems, intelligent systems able to make advanced decisions given their increased capabilities such as data and predictive

Figure 1. Disciplinary development of information studies (Adapted from Gorman & Corbitt, 2002)
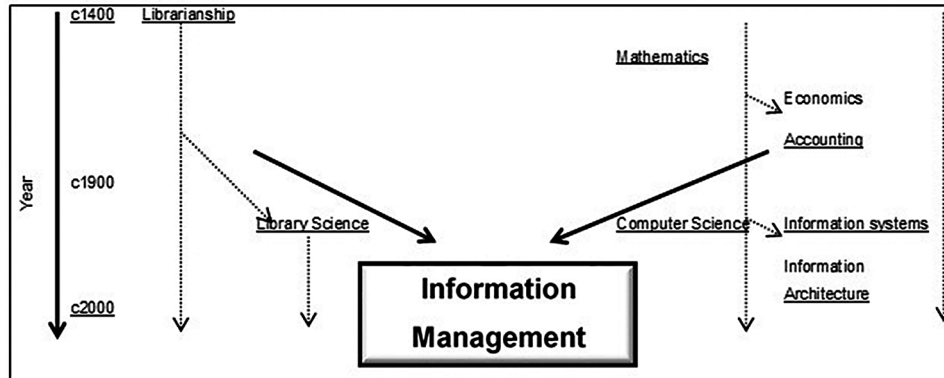
analysis of multi-dimensional structured and unstructured information, intelligent information packaging systems, etc. Given the aforementioned developments and others, it is therefore logically important that the inventory of theories and frameworks that underpin research and innovation in IM need to be closely followed. Understanding theories and frameworks in IM may pave way for their further enhancements and development.

Understanding theories and frameworks may further define how contemporary research in IM needs to be designed to incorporate the multi-dimensional perspectives and orientation of IM. For example, IM researchers have utilised Random Markov Chains, Kalman filters, and multi-variate analysis to model information risk, information seeking behaviour, uncertainty and public information management from a truly information science perspective giving full cognizance of the digital economy (Wan & Van Der Merwe, 2000; Akram, Liu, Tahir, Ali, & Wang, 2019).

DEFINITIONS OF KEY CONCEPTS

In order to understand the context in which several key words are used in this chapter, it is important to consider the operational definitions of each of the key concepts used in the paper. The following are some of the key concepts upon which this research is hinged:

Library and Information Science (LIS): Reitz (2004) is of the opinion that LIS may be defined as an interdisciplinary or multidisciplinary concept dedicated to applying theoretical concepts and tools to the management of various collections of information in various physical and digital locations.

Information Systems: Commonly defined as the application of computer and computer systems to business problems. However, considering a closer epistemological view reveals a discipline definition based on the representation, processing, and application of information via the use of various forms of technology.

Information Management: The main focal point of information management was defined and narrated by Shera in the early 1970s as fundamentally a communication process incorporating a system and message as well as the manner in which the message is transmitted. Considering the aforesaid, Shera extends the notion to the information professional, eluding to the fact that the information proferssional should realise his/her importance in the communication chain, not only facilitating the communication,

but intrenching themselve into the knowledge they communicate enhancing and uplifting the individual and society at large.

Considering the basic definitions postulated above, Gorman and Corbitt (2002, p. 443) state that the "duality of system and message'' is what gives information management its importance within the field of information studies. In summary, Gorman and Corbitt (2002, pp. 437-438) are of the opinion that "it is the aspect of self-perception that is apposite in the present context, for much of what we are addressing reflects the evolving self-perception of library professionals and information systems professionals from one disciplinary background into another one, that of information management" The aforesaid forms the basis for the focus on information management in this chapter.

IM THEORIES AND THEORETICAL FRAMEWORKS

Considering the evolving self-perception of the current information professional, the need for an understanding of the notion of theories and theoretical frameworks underpinning the IM discourse cannot be overemphasised. Theory has always been regarded as a foundation for any research or practice and provides definition and identity of a discipline. As IM with its sub-domain fields such as Information Systems and Knowledge Management keeps evolving, it is important to explore the major theoretical and methodological approaches that define the field. Van Biljon (2016) posits that understanding the trends in theory enables researchers to contribute to the intellectual development discourse of the discipline as their research reporting of contextual interpretation of different phenomena allows their perspectives on existing theory to be heard. This, therefore, enables researchers to contribute to the body of knowledge and reduces over-reliance on extant literature.

Effervescent research needs to evolve with newly-discovered theories and methodologies (Mearns, 2008). Although it is becoming increasingly evident that IM is an independent scientific discipline, it should also be noted that most of the IM theories emanate from other fields, e.g. the Deming's theory of profound knowledge is grounded in systems theory (Berry, n.d). The borrowing of theories from other disciplines delays the recognition of IM as an independent field of scientific inquiry and thereby lacking the general discipline identity. It can, therefore, be posited that, on its own, IM does not have many indigenous theories but usually borrow theories from other fields (Pettigrew & McKechnie, 2001). For example, many of the common theories and methodological approaches used at doctoral study level are: deductive reasoning and model building, deductive logic, statistical regression and model design, inductive and deductive logical principles, heuristic evaluation, hermeneutical analysis, information flow analysis, validation against models and model design with qualitative and mixed research paradigms (Mearns, 2008). However, this trend is now changing with indigenous IM theories being developed in different contextual settings. Although many of the research endeavors in IM have been hinged upon the interpretivist paradigm, there is increased tilt towards the use of the positivist approach and mixed methods research paradigms further inculcating mathematical and statistical principles in the analysis of IM phenomena using multiple vantage points. In order to understand the current developments in IM, questions need to be asked: What are these theories? And how are they being used in guiding empirical studies?

This chapter looks at both the theories and theoretical constructs that define IM. The theoretical constructs are the key conceptual underpinnings that define the research and practical discourse of IM (Jansen & Rieh, 2010). Studies in line with the current study's focus have been done by Spink, et al.

(2002), Ocholla (2002), Mearns (2008), Ocholla, (2009) and Ocholla and Le Roux (2011). For example, Spink (2000) did a study with the aim of understanding the most appropriate theoretical framework that should guide research focusing on user interaction with information retrieval technologies. Prior research conducted by information scientists has evolved from social to behavioral sciences encompassing a wide range of applied fields. This metamorphosis has impacted the types of theories in IM (Saade, Nebebe & Mak, 2011). Because it is important to take stock of advancements in a given discipline, this study will give more insights into the theory tree of information management (Vögel, 2015).

Theoretical frameworks provide the base position from which researchers engage with and view knowledge within a field of study. Depending on the methodological orientation of the researcher the same phenomenon may be viewed from varying theoretical frameworks. Frameworks may be defined in terms of the scholarly reality within which the researcher endeavors to answer a research problem and or partly relating to the framework that the researcher consciously pursues to describe and understand a phenomenon. Considering the importance of the theoretical framework, Agherdien (2007) argues that frameworks may be regarded as "epistemological devices that account for the knowledge that is produced in a study". The author furthermore postulates that without a sound theoretical framework a study may be suspended in an epistemological void.

The objective of a theory is to guide the study and research process in three unique ways. Agherdien (2007) is of the opinion that theory may pertain to and guide the philosophy of the science and the way the research is designed, the way a phenomenon is viewed within a specific academic or disciplinary stance or even facilitates the critical review of previous research and how it relates to a specific study. In order to justify the importance of the three guiding functions of a theory, it is necessary to define the concept of a theory.

Pettigrew and McKechnie (2001) are of the opinion that within the modern-day research environment, having a theory is an indication of research importance and research respectability. The dynamic nature of research impacts how a theory will be defined, for what is acceptable as the correct theory today may be replaced by an updated, more descriptive theory tomorrow. The statement is justified if the definition postulated by Flick (1998) who states that a theory may be seen as a *"versions of the world"* that are said to be revised, evaluated, constructed and reconstructed on a continues bases, is taken into account. Gorard (2004) concurs with Flick (1998:43) and postulates that a theory is *"a tentative explanation, used for as long as it usefully explains or predicts real-world events"*. Pettigrew and McKechnie (2001) are of the opinion that a theory may be represented in a written and or graphical format.

Accepting the dynamic and ever-changing nature of research and defining theories in written form, some basic definitions include: *"a set of explanatory concepts"* as postulated by Silverman (1993, p. 1) or *"a unified, systematic explanation of a diverse range of social phenomena"* as defined by Schwandt (1997, p.154). According to Correia and Wilson (2005, p. 101) theory *"…implies the identification and description of a set of categories and the relationships among them, which explain a significant part of the phenomenon under study."*

Agherdien (2007) based on the work of LeCompte and Preissle, (1993) and Creswell, (1994); states that theories may be grouped into three different levels namely grand theories, middle-range theories, and substantive theories. Saunders et.al. (2012) builds on the classification as postulated by LeCompte and Preissle, (1993), Creswell (1994) and Agherdien (2007) and describes a grand theory as being associated with the field of natural science and some examples of grand theories include but are not limited to Newton's theory of gravity, the evolution theory as postulated by Darwin and Einstein's theory of relativity. In contrast, the same author postulates that middle range theories may be regarded as signifi-

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cant in terms of research and understanding the environment around us but may not alter the way we think about the world. Some of the theories associated with the middle range theories include human motivation, information theory and the like. Substantive theory may be regarded as more restrictive in nature, i.e. restricted to a specific problem, at a time and focusing on a specific group. It should be noted that not all theories are all equally useful and or practical within the academic endeavor of discovery. In this respect, Babbie (2001, p. 25) is of the opinion that a theory should mirror the *"what is"* as opposed to the *"what should be"* within the research activity. Thus, the basic premise of a theory is to inform and enlighten society to make sense of daily experiences. According to Agherdien (2007, p. 22) *"… a theory's usefulness lies in its ability to solve practical problems of the scholarship"*

Campbell (1981, p. 45) postulates that the following criteria may be used to determine the usefulness of a theory: (1) Clarity, i.e. a state of being transparent in the use of language and or jargons to ensure understanding and facilitate assessment of the theory itself; (2) consistency, i.e. steadfast in its adherence to present a coherent view of the phenomenon; (3) empirical adequacy, i.e. the functions of the theory being able to truthfully justify the phenomenon; (4) explanatory adequacy, i.e. the ability of the theory to offer an explanation of the phenomenon under investigation as well as offer a justification of and for alternative data about the phenomenon, and (5) Normative rationality of a theory alludes to the articulated values and norms of the identified theory.

The importance of theory cannot be overemphasized as the use of theories in any academic discipline is a hallmark of maturity of their field to qualify as an independent field of scientific inquiry (Pettigrew & McKechnie, 2001). Studies which are atheoretical show that the discipline has not matured to any appreciable extent with the scarcity for conceptual underpinning regarded as a grave scholarly deficiency (Pettigrew & McKechnie, 2001). Since the theory is a mental construct, the closer the match of what it indents to represent the better. Theory is important as it is used in framing or understanding research problems, building arguments and interpreting empirical results. A theory is a lens through which a study is designed. Theory tends to attempt to answer human needs with regards to how they make sense of the world and contributes to the accumulation of knowledge towards understanding, explaining and predicting the things in the environment (Gregor, 2002). Theory can be for explaining, predicting, understanding, design, and action (Mele, Pels & Polese, 2010).

To demonstrate the multi-disciplinary nature of IM, research in the sub-domain Management Information Systems (MIS) was found to have a multi-dimensional array of contributors from economics, computer science, management, information technology, etc. (Mohanty, Hughes & Salathé, 2016). Given the growth of the field, information science has diversified fields confirming its multi-disciplinary nature (Zins, 2007). Another example is the multiplicity of the research fields found in information retrieval research where cross-cutting issues on information can be investigated from the IM or the computer science perspective. This, therefore, presents opportunities for theory in one field to be used in the other (Khapre & Basha, 2012). The implication of the multi-disciplinary nature of IM is that many fields play host to the IM theories and methodologies. Many research methodology endeavours in IM are being grounded into systems theory, cybernetics, structuration theory, chaos theory, etc. showing the cross-cutting nature of IM research (Mearns, 2008).

IM research can be classified into normative (knowledge storage and transfer systems), interpretive (collective action in systems of distributed information), critical (challenge existing theories and methodologies) and dialogic – reclaiming conflicting discourses (Deetz, 1996). Just like e-learning, IM is an evolving concept and keeps changing given the changing contextual settings in which its research and practice are conducted (Aparicio, Bacao & Oliveira, 2016). There is, therefore, need to understand the

evolution of IM – from its first mention by Taylor as engineering efficiency (Taylor, 1966), to its use for data processing, to be used in referent to professional aspects of informatics encompassing such fields as Information Systems (IS); to the current era where IM revolves around the managerial priority of IS/IT. Nowadays, IM is more biased towards the use of heterogeneous information technology or information system (IS/IT) platforms to effectively process information to inform evidence-based decision-making. This tilt towards the use of IS/IT is currently shaping the theory and practice of IM (Vodáček, 1998). This study defines IM as a synthesis of three fields: management of information resources, informatics and system approaches. IM does not have a global definition owing to the different interpretations and understanding of the terms 'management' and 'information' and varying dynamic contexts in which it is implemented. IM involves planning, organization and control of information resources and focuses on how information permeates through the organizational structure(s). In order to understand the theories used in IM, it is important to understand how thinking has revolved in this discipline.

METHODOLOGY

This chapter presents a bibliometric analysis of theory as applied in different contexts of the IM field. Bibliometric studies are mostly quantitative in nature, mostly use mathematical and statistical methods to discern trends in a given discipline, indicate the influence of the field, and analyses already-published work to discern patterns and trends thereby articulating the growth loci of the discipline (Pinto, Serra & Ferreira, 2014; Heberger, Christie & Alkin, 2010; Ferreira & Pinto, 2011).

The methodological approach of the study entailed a systematic approach, intiated by the identification of the source to be employed for the bibliometric analysis. The authors identified all relevant electronic databases available via the University of Johannesburg Library. The total number of databases are 249, these databases are subject specific, and or multidisciplinary in nature.

The next step of the processes necessitated the identification of all databases that have an IM focus. Selecting and applying the *Information Science and Knowledge Management* (preset filter on the website) filter to the UJ database search function, returned a total of four databases/database vendors meeting the said criteria. The databases included:

- ACMDL (Association of Computing Machinery Digtial Library)
- Emerald
- Library Literature & Information Science (EBSCOHost)
- Library, Information Science & Technology Abstracts (EBSCOHost).

Following the identification of the relevant databases, each individual database were analysed to determine if bulk download of metadata was possible and in what format the metadata will be downloaded. After careful analysis and consideration, it was determined that EBSCOHost database vendor offers the best possible solution interms of flexibility and easy of use in the download of metadata.

After the initial identification criteria was applied and the database selected, the next phase of the invesitgation focused on determining and formulating the search query to be applied on the selected database.

In order to clarify the inclusion and measurement criteria, this study defines the existence of theory if the author/s have given an explicit description of the theory used or proposed in the keyword list. Stud-

ies with no specific theory were excluded from the study. The study specifically wanted to know what type of theories were dominantly used within the scholarly peer-reviewed articles on the EBSCOhost Research Platform database for the publication dates, 2008-2018.

The researchers in this study agreed that the Boolean combination of theory as "Subject" and information management as deliminator in "All Text Field" would possibly yield the best results. In combination to the said search query, various limiters were also selected, these included:

- Scholarly (Peer Reviewed) Journals
- Publication Date: 2008.01.01-2018.12.31
- Database
  - All Databases
  - Library, Information Science & Technology Abstracts
  - Library Literature & Information Science Full Text (H.W. Wilson)

The following permanent link was generated by the database:

http://0-search.ebscohost.com.ujlink.uj.ac.za/login.aspx?direct=true&db=llf&db=lxh&bquery=(SU+theor*)+AND+(TX+information+management)&cli0=RV&clv0=Y&cli1=DT1&clv1=200801-201812&type=1&site=ehost-live&scope=site

The total number of articles complying to the aforementioned search query and limiters were 1261. EBSCOHost database has a built in feature that allows for the identification and removal of duplicate articles. Applying this feature resulted in the removal of 230 duplicate articles.

RESULTS

The results emanating from the search on EBSCOhost Research Platform on the 11 October 2018 maybe visually summarised in Figure 2.

According to the results obtained from the research, the top three cited theories used during the period of investigations were:

- **Information Theory:** Theory geared towards understanding the whole gamut of information from the smallest unit to big data.
- **Theory of Knowledge:** Theory focussing on contextualised information which is essentially the realisation of value of information in different contextual setups. With the proliferation of efforts towards realising the knowledge economy, the invention of knowledge management theories is on the rise in the IM discipline.
- **Probability Theory:** Theory focusing on measuring uncertainty in information environments.

These three theoretical frameworks have been used in many research endeavours and are considered part of the key theories defining the field of IM. Figure 2 also illustrates that various versions of the Information Theory were applied within the research discourse. Although not visually depicted in Figure 2 the dataset showed that a total of 133 different theories and frameworks have been used. Some of the least used theories include the neutralization theory, number theory, personal construct theory, point set theory, potential theory (Mathematics), probabilistic number theory, prospect theory, quantum information

Figure 2. Number of theory citations (Source: Authors' own work)
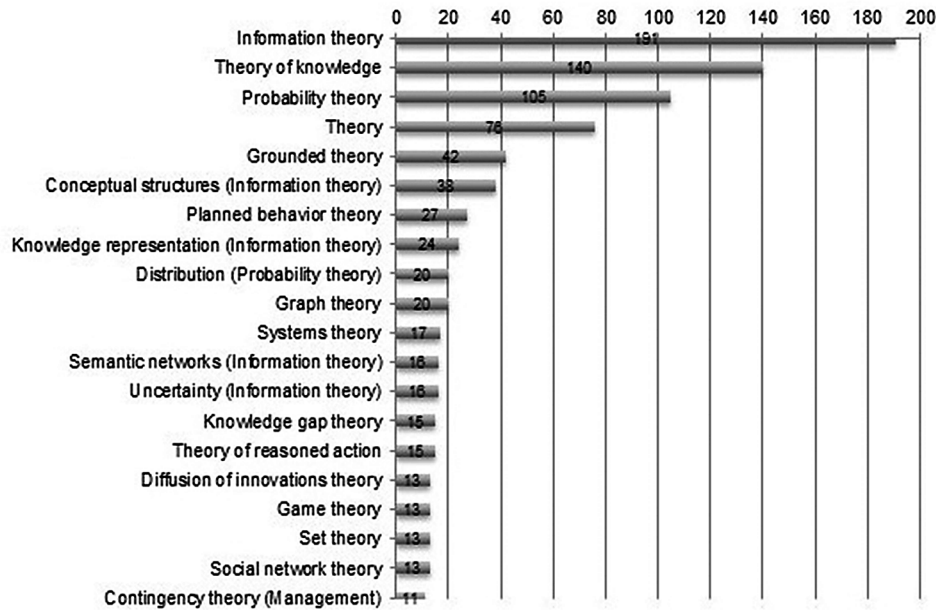
theory, role theory, sequential machine theory, situated learning theory, social learning theory (Communication), transaction cost theory of the firm, two-factor theory (Job satisfaction), uncertainty reduction theory (Communication), unified field theories, utility theory, etc. Most of the theories least used in IM research have been combined with other more established theories to form conceptual frameworks in different IM endeavours. Because of the multi-dimensional nature of IM, utilisation of conceptual frameworks informed by the study context is on the rise.

CONCLUSION

It is evident that there are a lot of changes that have taken place in information management owing to sifting dynamics with regards to information as a resource for competitiveness. Access to right information at a given moment contributes to overall competitiveness. Given this orientation, many technology solutions are being designed to handle vast amounts of structured and non-structured information to perceive traights and patterns so as to harness the overall picture forming. By so doing, technology platforms are able to present future scenarios to guide decisions using predictive analytics. The direct implication of the rapid changes in IM call for researchers to come up with theories that are relevant in contexts.

This chapter has discussed the evolutionary development of IM especially outlining the inclusion of different fields that have influenced theory used in IM research. Analysis of research in the last 10 years has revealed that there is a significant increase in the number of theories influencing research design in IM. A total of 133 theories indicate that research design in IM has not yet converged to a few theories influencing major research endeavours in the discipline. This means that various researchers can use any theory from other related disciplines as long as it addresses the key focus of the study. It can thus be posited that given the multi-disciplinary nature of IM, there are only a few chances that there will

be true theory convergence. Since technology evolves so fast, technological innovations designed to be information management tools will also evolve culminating into the need for constant evolution of theory. The emergence of global IM theories is still far-fetched given the high dynamic nature of the discipline. The direct implication of this occurrence is that IM researchers will need to continuously invent new theories and conceptual frameworks upon which future studies are going to be hinged.

An analysis of the theories dominant in the IM research shows that there is generally a widened scope of the field of enquiry to include more of a multi/inter-disciplinary focus. Further, the focus of IM has shifted from its original theoretical foundations to more open and progressive to enable unlimited innovations given the ever-evolving technology platforms. Technology is the one of the key enablers for managing diverse information types. Therefore, the future demands that information management researchers will need to have key understanding of the technology design nuances.

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KEY TERMS AND DEFINITIONS

Analysis: Detailed examination of a concept or phenomenon under investigation.

Conceptual Framework: A synthesis of different theoretical underpinnings mostly influenced by the context of the study.

EBSCOhost Research Platform: The key database whence the analysis of information theories and concepts is taken.

Emerging Conceptualizations: Concepts that ae currently being put into context in the field of information management.

Information Management: Generally a science that studies the different processes for the collection, storage, representation, sharing, integration, and usage of information in different contextual settings.

Theory: A set of contemplative, plausible, or scientifically proven concepts that can be used to guide thinking or design of research studies in a given field of inquiry.

Chapter 4
Embedding Ethical Principles in the Information Science Research Process

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ABSTRACT

The chapter focuses on important aspects of ethics that will guide an information science researcher to consider ethics as an integral part of a successful research project. The Nuremberg Code, Belmont Report, and Declaration of Helsinki informed ethical principles and practices that are seen as internationally acceptable. Since the inception of the National Health Act 61 of 2003 in South Africa, which informs research practices related to all disciplines, ethics has become a mandatory part of the research process. However, applying ethical principles during research may, at times, be fraught with difficulties. Cultural diversity, transformation, and technological advancements expand the complexity of ethical issues that researchers should consider. It is important for prospective researchers to gain knowledge and understanding of the context of ethics and its application throughout the research process. Researchers are required to adhere to strict ethical principles related to respect, consent, beneficence, non-maleficence, confidentiality, and anonymity.

INTRODUCTION

In a research project involving the San people of Southern Africa, valuable information pertaining to the Hoodia plant as an appetite suppressant was shared with researchers. Findings from this research were used in the registration of a patent, without any attempt to obtain informed consent from the participants involved in the research. Traditional knowledge from the San people was used to profit others; leading to a direct infringement of the human and intellectual property rights of this indigenous group (Chennells, 2007). A lack of ethical application in this research caused the marginalisation of this indigenous community (Dan, Mchombu, & Mosimane, 2010, p. 129) and the violation of article 27.2 of the Universal Declaration of Human Rights of 1948, that emphasises the protection of moral and material interests

resulting from, for example, any scientific production (UNESCO, 1948). This is but one example of unethical practices in research, which has brought the application of ethics in research to the fore. Even though various codes and practices of ethics exist, contentious research puts the application of these codes and practices in jeopardy and requires of researchers to be cognisant of the application of ethics during the research process (Daniels, 2008, p. 123).

As a major branch of philosophy, ethics is a vital component of research and provides *guidance* to researchers on how to conduct respectful research in different cultural and philosophical contexts (Liamputtong, 2008, p. 3). Mostak and Hoq (2012, p. 39) sees ethics as the systematic process of conducting research that can be defended on the principles of right and wrong. However, since various interpretations of right and wrong exist, Lategan (2013, p. 151) and Munigal (2018, p. 70) state that ethics must be linked to the values that a researcher applies throughout the research process, especially related to fairness, honesty, responsibility and care. Knowledge of ethics is important for researchers to make sound moral decisions on how to collect and use data to prevent misconduct and improper actions (Creswell & Creswell, 2018, p. 88). Johanson (2013, p. 444) explains that consideration of ethics is important as the act of enquiring may bring forth many challenges in terms of the collection and use of data. Because the aim of research is to question the status quo by probing for discoveries through alternative ways of thinking about problems, issues such as transparency, openness, accountability, disclosure of information and respect must be considered (Daniels, 2008, p. 123). These issues become even more relevant when considering research that relates to cultural diversity, transformation and technological advancements. To ensure consistency in the application of these values, Louw (2014, p. 263) recommends that values be linked to the moral or professional codes of conduct pertaining to a discipline that sets standards for the attitudes and behaviour of researchers. Considering codes of ethics in social sciences and humanities research is important, since the emphasis is on collecting data involving the use of humans or human documentation.

When conducting research in the Information Science context, Ndwandwe, Ocholla and Dube (2009, p. 78) purport that knowledge of ethics is imperative to conduct research that will produce reliable findings, whilst maintaining a confidential relationship with clients. Information professional researchers should be cognisant of ethical principles such as respect, trust, privacy and justice in relation to research pertaining to users, information sources, information services, the profession and society (UK Essay, n.d.). Munigal (2018, p. 70) explains that knowledge of ethics, ethical theories, principles and practices is necessary as the context of what constitutes ethical behaviour occupies a 'grey-zone', where clear-cut applications of principles may not always exist. Knowledge of ethics when conducting Information Science research is therefore imperative to guide researchers in conveying moral integrity and applying consistent values in service to the public (Karac-Kakabadse, Kakabadse, & Kouzmin, 2002). This relates to the key research issue that the chapter focuses on, namely providing foundational information that informs ethical considerations in Information Science Research and the application of these considerations to the entire research process.

METHODOLOGICAL CONSTRUCT

According to Mostak and Hoq (2012, p. 39) it is important to take cognisance of issues pertaining to ethical considerations in general, and particularly related to Information Science research, since Information Science researchers want to perform their research in an ethical manner. Ethical issues may arise

in the processing, preservation and dissemination of information. While the primary ethical concerns may relate to the misuse of information, with particular focus on intellectual property, censorship, data integrity, privacy and access to information, other factors such as information security, the right of access to information and diversification of information provide ethical dilemmas that Information Science researchers should consider (Munigal, 2081, p. 71). Because information continues to be a valued commodity in the knowledge society, ethical considerations for Information Science researchers pose new challenges to ascertain responsibilities in a complex 'infosphere' (Mostak & Hoq, 2012, p. 39), to uphold the right to access and utilise information in a manner that is supportive of producing quality research outputs.

Ethical issues that information professionals should consider are explored in this chapter with a bricolage design within an interpretivist paradigm, to present key information that may inform ethical practices. The bricolage design appreciates complexities of the issue being investigated (Rogers, 2012, p. 1) and provides the opportunity to use existing information in insightful ways (Kincheloe, 2001, p. 680). Yee and Bremner (2011) explain that following a bricolage design allows the researcher to use existing content to propose insights in the achievement of research objectives. To promote understanding of the importance of ethics by information professionals and in Information Science research, objectives of a literature review to explore key ethical considerations, as well as key recommendations to improve ethical practices throughout the research process are considered within this chapter. While exploring ethical considerations, the following objectives apply:

- To contextualise ethics within Information Science;
- To distinguish between meta-ethical theories that may inform research practices;
- To appreciate considerations of ethical principles in research;
- To debate ethical considerations in relation to the online environment;
- To argue the case for the decolonisation of ethical principles and practices; and
- To examine the application of ethical principles throughout the research process.

The chapter is organised into seven sections. The background section covers the development of ethics in research, and regulations and legislation that inform ethics in research. Ethics in social science and humanities research and Information Science, is contextualised, followed by theories that inform ethical behaviour in research. The application of ethics in the online environment receives attention due to the controversies surrounding the application of ethical principles when conducting research on digital contents. The decolonisation of ethical principles is explored before principles and practices to be considered during the research process as key recommendations of the research are examined. The chapter concludes with a final section on areas for further research.

BACKGROUND

Formalising research principles based on ethical codes came about because of unethical research conducted during the 20th century. Some of the worst ethical offences were perpetrated by Nazi physicians during World War II, such as the testing of medications, chemical warfare and transplant experiments that resulted in great harm to the inhabitants of the Nazi concentration camps. After the trials of those who had committed such atrocities, a set of 10 principles, known as the Nuremberg Code (1949), was

formulated to provide ethical guidelines for research involving humans. These principles were aligned to the Universal Declaration of Human Rights of 1948, to ensure that researchers respect human rights (Patten & Newhart, 2018, p. 46). Key principles stipulated that voluntary consent from human participants is an absolute necessity and that consent should be obtained from participants prior to their engagement in any research experiments. The Nuremberg Code (1949) made provision for the fact that the degree of risk taken during research should never exceed the importance of the research problem (Sauer, Rothman & Kelen, 2015, p. 162).

However, the principles in the Nuremberg Code did not prevent the United States Public Health Services from conducting unethical research on a group of black men for 40 years, from 1932-1972, to research the lifecycle of the syphilis disease. Named the Tuskegee Syphilis Study, researchers withheld treatment from the participants even after a cure was discovered (Nix, 2018). An investigation into the unethical practices of this research led to a report compiled by the National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, named the Belmont Report in 1978 (Miracle, 2016, p. 223). The Belmont Report emphasised that the ethical principles required to guide scientific research are often inadequate to cover complex situations. It aimed to establish ethical principles as the basis on which specific ethical rules were to be formalised. The Belmont Report provided three basic principles for conducting research in an ethical manner; namely respect, beneficence and justice. These were to be applied by using informed consent, assessment of risks and benefits, and careful selection of research participants (Belmont, 1978, p. 1; Miracle, 2016, p. 224). Principles included in the Belmont Report provided the foundation for the development of the Declaration of Helsinki by the World Medical Association in 1964, updated in 2013. This declaration provides a set of ethical principles for human research that is widely regarded as the cornerstone of human research ethics, irrespective of the discipline in which the research is being conducted (Sauer, et al., 2015, p. 162).

Since both the Belmont Report and the Declaration of Helsinki focus exclusively on biomedical research involving human participants, the relevance of the ethical principles in these reports to social sciences and humanities could be questioned. Pienaar (2013, p. 316) reports that the relation between biomedical and social sciences and humanities research ethics refer to the fact that human participants and / or information related to human participants, are commonalities. For this reason, foundational ethical principles applicable to biomedical research, must therefore also apply to social sciences and humanities research, as principles of ethical research are regarded as universal. This view is reiterated by the European Commission's document on ethics in social sciences and humanities (European Commission, 2018, p. 4). The document states that research participants' rights are anchored in fundamental human rights and fundamental ethical principles that govern all scientific research. Ethics and ethical treatment of research participants as per the Nuremberg Code, Belmont Report and Helsinki Declaration provide guidelines for central principles that apply, not only to research in biomedical sciences, but to all research involving humans.

The internationalisation of research ethics has influenced research ethics standards in Africa. Some African countries have either established or remodelled their research ethics guidelines on recommendations by the Nuremberg Code, Belmont Report and Helsinki Declaration (Ndebele, Mwaluko, Kruger, Ouwe, Oukem-Boyer & Zimba, 2014, p. 4). This includes the establishment of research oversight systems to ensure the eligibility of research to minimise risk and harm to research participants. The establishment of such oversight systems became necessary due to human rights abuses in research in various African countries. An example is the unethical experimentation of anaesthetist, Dr McBrown in Zimbabwe. He carried out research on 500 patients, conducting dangerous medical experiments with new drugs without

the approval of the Zimbabwean National Drugs Authority or the consent of the patients. Such violations of human rights have led to serious debates regarding research ethics in Africa. Due to less stringent research ethics regulations in Africa, researchers often disregard ethical principles, national laws and international guidelines, either deliberately or inadvertently. This called for the development of research ethics systems in Africa that can monitor research projects more stringently (Zielinski, Kebede, Mbondji, Sanou, Kouvividila & Lusamba-Dikassa, 2014, p. 71). Consequently, African countries are increasing their focus on research governance mechanisms such as national laws, ethics review committees and monitoring mechanisms to assess whether proposed research comply with internationally and nationally accepted ethical principles and practices.

Within the South African context, ethical principles and oversight systems were developed in accordance with international practices. For example, in 1966 the University of the Witwatersrand established a Research Ethics Committee (REC) that became responsible for reviewing research proposals involving human participants, to ensure that their dignity, rights and welfare are protected (Ndebele et al., 2014, p. 5). Other higher education institutions developed similar ethical review processes, which were aligned with the advent of democracy in 1994, to the Constitution of the Republic of South Africa, Act 108 of 1996 (Department of Justice, 1996). Section 12(2) of the Bill of Rights (1996) requires protection against research abuse by stating that citizens have the right to bodily and psychological integrity. This includes the right not to be subjected to medical or scientific research without informed consent. Aligned to this constitutional requirement, the National Health Act 61 of 2003 (South African Government, 2003) provides statutory governance of health research and the establishment of a regulatory infrastructure. Section 73(1) of the Act requires that any institution conducting research that involves humans (irrespective of the discipline), must register with the National Health Research Ethics Council.

Registered institutions must establish Ethics Review Committees that are responsible for reviewing research proposals, to ensure that they comply with acceptable ethics norms and standards (Department of Health, 2015, p. 5). In addition, the Protection of Personal Information Act 4 of 2013 was promulgated to protect the right to privacy, including protection against the unlawful collection, retention, dissemination and use of personal information. In compliance with legislation, institutions of higher learning and research institutions show an abundance of ethical rules, guidelines and oversight systems to direct researchers in their conduct with human research participants.

CONTEXTUALISING ETHICS IN INFORMATION SCIENCE RESEARCH

Ethics connects a community by proposing a social code that conveys moral integrity and consistent values to be applied throughout the research process (Denicolo & Bekker, 2012, p. 10). Ethics is closely associated with the purpose of research; its relevance and usefulness to improve societal conditions. Kumar (2011, p. 242) explains that as the focus of research is on the direct or indirect advancement of society, ethical principles must be applied throughout the research process to ensure the value of such research. To monitor and evaluate the application of ethical principles throughout the research process, access to accurate and timely information becomes imperative (Mostak & Hoq, 2012, p. 39). However, the advent of technology has brought about an overabundance of information and has increased the ability to manipulate information, which creates challenges for the monitoring of the ethical use of information and societal knowledge. Johanson (2013, p. 446) reasons that the grey zone of applying ethical principles

has increased, due to the abundance of information, since different cultures and philosophical views might support different values about the importance of information and its manipulation.

Library and Information centres as repositories of human-controlled information or knowledge serve societies by collecting, organising, preserving and disseminating available information in multiple formats (Essay UK, n.d.). Engaging with information and knowledge in an ethically sound manner has become not only the responsibility of the librarian, but all professionals who deal with information, such as archivists, record keepers, systems developers, journalists, business analysts, big data managers, publishers, authors and researchers (Johanson, 2012, p. 445). The International Federation of Library Associations and Institutions (IFLA) (2016) composed a Code of Ethics to guide individuals in their ethical use of information. In its preamble, the IFLA Code refers to the need to share ideas and information in a complex society in a just and ethical manner, that supports the right of individuals to seek, receive and impart information and ideas in any media. Though the IFLA Code focuses on various aspects such as the right to access information, responsibilities towards individuals and society, privacy, secrecy, transparency, open access, personal integrity and intellectual property, its aim is to provide guidelines for information professionals to conduct their work and research in an ethically and professionally sound manner.

In Information Science particularly, the focus of research is on the properties and behaviour of information, as well as the forces governing the flow of information. Information Science researchers are interested in the means of processing information for optimum accessibility and usability (Borko, 1968, p. 3). In addition, Cibangu (2015) explains that Information Science researchers focus on the human component of information, its production, distribution and use. Ethical research in Information Science requires that information related to or obtained from humans be used respectfully and equitably, without influencing humans or their surroundings involuntarily (Mostak & Hoq, 2012, p. 39). The fact that Information Science research relates to or involves human participants implies that international and national ethical principles and practices apply to research in this discipline. Ethical principles pertaining to respect, beneficence and justice as required by the Belmont Report (1948) and the Helsinki Code (World Health Organisation, 2001, p. 1), as well as principles related to transparency, openness, accountability and disclosure of information, must be considered as key ethical guidelines in Information Science research (Daniels, 2008, p. 123). Ethics are to be treated as a matter of integrity; involving the use of humans or human documentation in a respectful and equitable manner to conduct research. To contextualise integrity associated with ethics, it is important for prospective researchers to understand the theoretical construct that underpins ethical behaviour and practices.

THEORIES OF ETHICS

Knowledge of theories of ethics is required to consider three key issues during research: the researcher's behaviour during the execution of the research, the research environment, and the impact of the research results on society. Authors such as Chonko (n.d.), Kaptein and Wempoe (2002), Lopez (2012), Johanson (2013) and McArdle (2018) indicate that there are various philosophical theories related to ethics that can be examined. In fact, Karac-Kakabadse et al. (2002) suggest that the issue of ethics has been plaguing humankind from the days of Socrates, leading to the development of various perceptions on what constitute ethics. Because of the vast array of theories on ethics, Johanson (2013, p. 47) states that theories should be grouped together to form meta-ethical theories that can be examined to determine values that should inform sound research practices. Du Plooy-Cilliers (2014, p. 24) explains that meta-

ethical theory relates to the critical exploration of theoretical lenses that provide direction to researchers in a field of study.

Four meta-ethical theories are presented in this chapter, namely deontology, utilitarianism, discourse, and virtue meta-ethical theories. Though knowledge of these meta-ethical theories is important, McArdle (2018, p. 128) reasons that no one meta-ethical theory can be applied solely to research practices. Knowledge of and components related to various meta-ethical theories should be considered as they apply to the purpose of a research project. According to Johanson (2013, p. 447) it is important that values related to respectfulness, sincerity, humility, justice, objectivity, openness and responsible behaviour be considered to ensure sound ethical practices during the execution of a research project.

Deontology Meta-Ethical Theory

Deontology or rule-based theory focuses on the ethical principles that can be identified from accepted societal values. It comes from the Greek word '*deon*' which means '*one must*' (Kaptein & Wempoe, 2002). When applying this theory, researchers become autonomous agents that adopt positive values that give rise to a sense of moral duty (Chonko, n.d.). According to Lopez (2012) this moral duty applies to the obligation of 'doing good'. A researcher who applies this rule-based theory will produce consistent decisions in the execution of research, irrespective of the research environment, since all decisions are based on the researcher's predetermined values linked to 'doing good' (Johanson, 2013, p. 447). McArdle (2018, p. 127) states that following the rule of 'doing good' will lead to the application of ethical principles related to avoiding any harm; ensuring that participants agree to partake in the research (voluntarism) and that participants' personal information remains confidential.

The application of deontology is influenced by two key components: that the researcher establishes research values equal to acceptable social behaviour, and participants' voluntary participation in the research (Chonko, n.d.). This requires that the researcher acts according to universal laws that always apply to all people (Lopez, 2012). Researchers should treat their research and research participants with respect. This means that researchers should strive to do good, so that their research will cause no harm.

A flaw in this meta-theory is the fact that there is no rationale for deciding what moral values to follow. Societal values change, so values that informed research in the 20th century, may not be seen to promote societal good in the 21st century. Kaptein and Wempoe (2002) state that a virtuous approach may not necessarily ensure that no harm will come to those involved. For example, even though researchers from Phizer, a United States- based company, decided to 'do good' by providing experimental drugs to children in Niger with bacterial meningitis during a severe outbreak in 1996, 11 children died, whilst others suffered permanent brain damage and paralysis (Ndebele et al., 2014, p. 5).

A further flaw involves possible arbitrary decisions by researchers about 'duty' and 'justice' that might entitle them to unjustified rights or claims. Therefore, researchers must ensure that the rights of all those involved in the research process are respected and unjust actions avoided (Kaptein & Wempoe, 2002). Pure ethical reasons should guide the research process without deception or personal agendas, so that the entire research process becomes transparent (McArdle, 2018, p. 128). This approach can at best be described as extremely idealistic.

Utilitarianism Meta-Ethical Theory

Utilitarianism, also known as consequentialism or teleology, is based on the ability of the researcher to predict and follow the consequences of actions, during and after the research process. This meta-ethical theory centres on the final outcomes of research actions (Karac-Kakabadse et al., 2002). To a utilitarian, the choice that yields the greatest benefit to most people is the ethically correct choice, regardless of personal feelings or societal constraints, such as legislation and ethical laws (Chonko, n.d.). Therefore, an individual's rights might be violated to benefit a greater number of people. The focus is on the outcomes to be achieved and how that will benefit society, irrespective of the individual consequences.

Two branches of utilitarianism exist, namely act utilitarianism and follow-the-rule utilitarianism. In act utilitarianism the focus is on conducting the research, irrespective of the consequences. The researcher decides to conduct research which is necessary for the greater good of society and that will benefit the greatest number of people. Follow-the-rule utilitarianism means that actions cannot occur in isolation. Researchers must make decisions based on trial and error experiences within the research environment. In this branch, researchers follow patterns that will produce the greatest good for the greatest number of people (Lopez, 2012).

A limitation of this meta-ethical theory is that although researchers can use their life experiences to attempt to predict outcomes, no person can be certain that those predictions will be accurate. Uncertainty can lead to unexpected results and the conduct of the researcher could be perceived as unethical (McArdle, 2018, p. 128). Furthermore, research may have various consequences, and the utilitarian researcher may not be able to consider those objectively. Greedy funders may encourage research that will lead to their financial gain; irrespective of the consequences for research participants.

Utilitarian researchers are not concerned with justice, beneficence or the autonomy of an individual if the solution of the research can benefit most people (Chonko, n.d.). The consequences of the previously discussed Tuskegee Syphilis Study (Nix, 2018) are relevant here. For those researchers, expanding knowledge about the disease was of greater societal importance than curing the participants who suffered from it.

Discourse Meta-Ethical Theory

The discourse meta-ethical theory, also called the argumentation ethics theory focuses on uncovering normative or ethical truths by examining preconceived viewpoints. This theory requires argumentation and dialogue to understand moral norms, whether organisational or societal, that influence research practices. Johanson (2013, p. 447) states it means that researchers converse with others to justify the application (or lack) of ethical principles within a research construct. Instead of deciding on relevant ethical principles by themselves, researchers rely on inputs and views from others to allow understanding of ethical norms to be applied.

Gimmler (n.d.) suggests that discourse meta-ethical theory contains three characteristics. The first is cognitivism, meaning that moral problems should be resolved through critical thinking and argumentation. By analysing and obtaining viewpoints from various experts, several ethical research issues can be identified and debated. No single moral authority applies, but through argumentation, experts can come to moral insights. The second characteristic is justice vs good. For discourse theorists, discourse about the greater good of society, vs the greater good of the individual involved in the research, is imperative.

This should ultimately lead to the third characteristic: universalisation. The achievement of universal moral values should be founded on the principle of impartiality.

The value of this meta-ethical theory is that it provides arguments for testing the validity of values to be applied throughout the research process and may transform ethical practices to achieve a collective good for all (Hoenisch, 2017). However, because the theory is founded on the principle of argumentation, only those norms and values that are accepted by the majority within a specific research context, may apply. Impartiality may not be achieved, as decisions on the application of ethical principles may be influenced by differences of power, ignorance or future social standing. This limitation allows for argumentation to justify norms through a monologue, thereby ignoring participatory dialogue with those that may be affected by the research (Gimmler, n.d.).

Virtue Meta-Ethical Theory

The focus of virtue meta-ethical theory is on the integrity and moral character of the researcher, rather than principles, rules or consequences of research actions. Virtue meta-ethical theory seeks to identify characteristics that a researcher needs to behave in an ethically sound manner (Wiles, 2013). McArdle (2018, p. 129) states that in virtue meta-ethical theory, two kinds of virtues are imperative to ensure that researchers act ethically during the research process, namely intellectual and moral virtue, that should lead to theoretical and practical wisdom during the planning and execution of the research project. These virtues should be employed to care for the well-being of research participants. The emphasis is on behaving according to inner convictions and strengths, irrespective of the impact on the research outcomes (Karac-Kakabadse et al., 2002).

According to Wiles (2013), courage, respectfulness, resoluteness, sincerity, humility and flexibility are the virtues a researcher should strive for. In relation to ethical dilemmas in research, a virtue meta-ethical approach would assist a researcher to ask what actions would be in the best interest of the research participants. Agent (participants) rather than action, takes centre-stage in deciding what ethical principles to follow (Kaptein & Wempoe, 2002).

ETHICAL PRINCIPLES

Applying the various meta-ethical theories when conducting research requires continuous engagement with ethical principles, not only on a theoretical basis, but also through practical applications (Iacovino, 2002, p. 70). Meta-ethical theoretical frameworks should be considered in retrospect (real-life research experiences) as well as towards future prospective research practices. Researchers must continuously re-evaluate their own ethical standards in line with meta-ethical theoretical perspectives, but also aligned to professional ethical codes and practices, as well as institutional ethical codes and practices with which research is associated.

Denicolo and Bekker (2011, p. 11) state that various professional and research-based ethical codes exist. Within the social sciences and humanities, ones that may be considered include the American Psychological Association's Principles for Research Ethics, Ethics in Health Research: Principles, Processes and Structures of the South African Department of Health, and the San Code of Ethics. Other examples that may also be of value for Information Science researchers include the International Council on Archives Code of Ethics, the Association for Information Science and Technology (ASIS&T) Code of

Ethics in the United States, the Association of Computing Machinery and the Computer Ethics Institute Code of Ethics (Johanson, 2013, p. 485).

Though the focus of this chapter is not on analysing the code of ethics of various institutions, they are important in identifying ethical principles to consider during research. Linked to various ethical codes, the following key ethics principles receive attention in this chapter:

- Respect
- Honesty
- Beneficence
- Non-maleficence
- Justice and Fairness
- Autonomy
- Confidentiality and anonymity
- Care

Respect

Respect relates not only to how the researcher treats the participants of the research, but also how he / she presents findings, so that the dignity of the participants remains intact (The National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, 1978, p. 4). Respect should be shown for the knowledge, democratic values, intellectual freedom and decision-making rights of research participants (McArdle, 2018, p. 138). Sauer et al. (2015, p. 164) explain that the concept of respect relates to providing opportunities for participants to exercise their protected autonomy.

This view is shared by Lategan (2013, p. 142), who states that respect is imperative in research as the researcher moves beyond his / her space to interact with others. As the 'outsider', respect shown by the researcher can influence the manner and extent to which participants are willing to engage in the research process. The Department of Health (2015, p. 5) explains that respect also relates to the choice given to a participant to exercise self-determination. In instances where research involves vulnerable communities, respect for the dignity of individuals, as well as their well-being and safety must receive preferential treatment. Respect thus includes a dual moral obligation to respect the autonomy of participants to decide whether and to what extent they want to participate in a research project and the necessity to protect those with developing, impaired or diminished autonomy.

Louw (2014, p. 265) argues that showing respect to participants might involve the provision of incentives, including food, money or gifts. The problem with incentives is that they can be perceived to be disrespectful to the integrity of participants and the research process. Providing incentives may influence how people participate. Participants may believe that in exchange for an incentive, they need to respond in a way that the researcher would want them to, instead of being honest. However, Kumar (2011, p. 245) is of the opinion that most people would not participate in research because of incentives, but rather because they realise the importance of the research for themselves and their communities. Therefore, providing a small gift after having obtained the required research data can be perceived as a token of appreciation and respect for participants. However, providing a gift before data is collected, and especially to convince vulnerable participants to participate in a research project, is regarded as disrespectful and unethical.

Honesty

Respect is also associated with honesty (South African San Institute, 2017). Open and honest exchange between researchers and research participants is necessary, so that participants will fully understand the purpose, scope and extent of the research. Participants should be informed of their role in the research, what information would be required from them and what the information will be used for. According to Louw (2014, p 268), withholding information from participants about the purpose and intended outcome of research is dangerously unethical, since it may result in the falsification or distortion of research results. Deception or dishonesty also violates respect, informed consent and privacy (McMillan & Schumacher, 2006, p. 335).

In addition, Creswell and Creswell (2018, p. 92) state that honesty in research also relates to the selection of research sites. The researcher should not identify or use research sites in which he /she has a vested interest. This could lead to a conflict of interest, which can result in unethical practices where research participants and / or findings are manipulated to suit the research intertest of the researcher, donors or funding organisations. In instances where there may be a conflict of interest, researchers are encouraged to disclose such potential conflicts during the ethical application process. To limit deception as a result of personal / organisational research interest, many academic or research institutions require researchers to provide statements that clarify possible conflicts of interest.

Pienaar (2009, p. 320), however, purports that there may be instances where honesty as an ethical principle may not be applicable. For example, if the purpose of a research project is to understand the powerplay between database vendors and library brokers, a researcher may request to shadow either party to fully grasp the context of price negotiations. Explaining the purpose of such research prior to shadowing the participant may lead to a change in behaviour, which may negatively influence the validity of the research findings. Withholding information may thus be valid in studies where full disclosure will affect the validity of the research (McMillan & Schumacher, 2006, p. 335). The Department of Health (2015, p. 14) states that in instances of deception or non-disclosure of the purpose of research, the researcher must satisfy the research ethics committee that a full disclosure of the purpose and / or methodology would threaten the scientific validity of the project.

Dealing with dishonesty in research to support honesty may be achieved in various ways. If partial disclosure is required to ensure the validity of research findings, researchers are required to debrief participants after their participation in the research. Debriefing consists of reviewing the purposes of the research and the procedures used, with an offer to share results with the participant when it becomes available. Debriefing should also include assurances that data will remain confidential and that if the participant, after viewing the data, is uncomfortable with the findings, he or she may choose to withdraw from the research; implying that the collected data will not be used (Patten & Newhart, 2018, p. 49). In other cases, deception can be avoided and honesty promoted by requesting that participants sign an acknowledgement form that they have been informed of the true purpose of the research and that they consent to their data being used for research purposes (Louw, 2014, p. 268).

Beneficence

Perry and Voight (2018, p. 352) argue that the foundation of beneficence or reciprocity as it is interpreted by Doyle (2016, p. 102), is to ensure that research will empower the entire community. It refers to the ethical obligation to maximise benefits. Beneficence involves connecting individuals through a research

project that collectively solves a common problem to the mutual benefit of everyone involved (The National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, 1978, p. 6). Research that involves human participants should seek to improve human conditions. Research that fails to achieve this, is unlikely to be ethical (Department of Health, 2015, p. 5).

Beneficence speaks to the Belmont Report, which clearly states that research should be designed to minimise risk and maximise benefits. Though not all possible harm can be anticipated during the planning of a research project, the researcher must make responsible choices to carefully create a research plan that will benefit participants and the entire community (Patten & Newhart, 2018, p. 49). Beneficence can be achieved through increased self-understanding, satisfaction in assisting in the research process, assisting in finding solutions to societal problems and even by obtaining financial incentives. Beneficence occurs when research benefits participants and / or the community (Doyle, 2016, p. 102), either directly or indirectly. A good example of eventual beneficence is the case of the San people (Chennells, 2007, p. 130) who contributed to expand knowledge of the medicinal value of the Hoodia plant and who eventually (after various lawsuits because of initial dishonesty in the research process), received financial compensation for sharing their communal intellectual property.

Non-Maleficence

While beneficence focuses on ensuring benefits for the entire community through planned research, non-maleficence attempts to reduce the risk of harm. Louw (2014, p. 266) states that research should be planned and executed in such a way that no harm will come to the participants. This also includes making sure that the final research output (report) will bring no harm to the research participants. However, Kumar (2011, p. 245) elaborates that it is not always possible for researchers to avoid harm during the planning and execution of research.

Though social sciences and humanities may not harm participants physically, emotional and psychological harm can occur. Examples include causing participants to recall emotionally painful experiences, asking questions in a group setting that may cause embarrassment, creating situations where a participant's future prospects such as a job may be jeopardised, or conducting focus group interviews where some participants feel less relevant or valuable than others (McMillan & Schumacher, 2006, p. 335). In addition, Pienaar (2009, p. 318) explains that harm can be experienced through the invasion of privacy, loss of confidentiality, group stereotyping or stigmatisation.

For researchers to minimise non-maleficence it is important to engage in open discussions with participants about possible discomfort that may be experienced during the research process. Participants should be informed about the sensitivity of information that may be required (Kumar, 2011, p. 254). Seeking data for a research project that causes anxiety or harassment is unethical. A sense of caring and fairness must be part of the researcher's thinking, actions and personal morality.

In addition, harm can be minimised by selecting appropriate research methods. Some research methods may be harmful to participants, such as making children watch violent films to document their responses. The deliberate application of such research methods is unethical. The researcher should always be ethically responsible for protecting participants from harm. This can be done by constantly questioning whether a chosen research method is valid and ethical in solving or answering a research problem (Louw, 2014, p. 271).

Justice and Fairness

The San Code (South African San Institute, 2017) requires justice and fairness in research. This principle, according to the Department of Health (2015, p. 14) refers to various meanings; each of which is to be considered during the research process. Sauer et al. (2015, p. 165) state that the principle of justice may firstly relate to the fair and equal treatment of each participant in the research project. One individual or a group of individuals that forms part of the sample of a research project should not receive special treatment or be more burdened by harm than any other participant or groups of participants in a research project.

Secondly, and in a broader context, justice and fairness relate to the benefits of research, that are distributed to the wider community. The National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research (1978, p. 8) explains that the distribution of justice and fairness must ensure that each person involved in a research project receives an equal share of burdens and benefits, and that these burdens and benefits relating to the findings of the research are further fairly distributed among the community at large (Patten & Newhart, 2018, p. 49). In this way the principle of equality is expressed in the research context, so that no segment of the population is unduly burdened by the harm of research or denied the benefits of knowledge derived from it (Department of Health, 2015, 14). There should be a reasonable likelihood that the population from which participants are drawn will benefit from the research results; if not immediately, then in the future. The researcher should therefore provide participants with the opportunity to receive and interrogate the results of a study in which they are participating.

It is important, according to McMillan and Schumacher (2006, p. 144) that research data be interpreted and communicated without the data being manipulated. Misuse of research data may have negative implications for individuals and / or communities involved in a research project. Applying the principles of justice and fairness will ensure that researchers represent data as it was obtained, whether it supports initial research hypotheses or not. Research data should be presented in an objective manner without any bias from the researcher. This also applies to making research data findings known that may have potential benefit for the research participants or their communities. In such cases potential benefits may not be withheld from participants.

Autonomy

Autonomy refers to the ability of participants, or representatives of participants in the case of vulnerable groups, to decide whether to engage in research. This, Pienaar (2009, p. 318) states, relates to the principle of informed consent or voluntary participation in the research process. Kumar (2011, p. 244) opines that it is unethical to collect information from participants without their knowledge and expressed willingness to participate in the research. Seeking informed consent implies that prospective participants are made aware of the purpose of the research, the type of information that is required from them, why the information is required and for what purpose the information will be used. As part of informed consent, prospective participants should be informed about how the research will be executed and whether findings will affect them directly or indirectly (McMillan & Schumacher, 2006, p. 334).

Nusbaum, Doublas, Damus, Paasche-Orlowe and Esterella-Luna (2017, p. 1) explain that various approaches to obtain informed consent have been developed. This became necessary due to the fact that prospective participants often perceive informed consent documents as difficult to conceptualise and internalise, which is in line with the findings of the National Commission for the Protection of Human

Subjects of Biomedical and Behavioural Research (1978, p. 10), which state that controversy prevails over the ability of prospective participants to fully grasp the context and scope of research projects. This view is also supported by research conducted by Daniels (2008, p. 124) who states that many prospective participants are not familiar with, nor do they have an informed understanding of methodological terminology or practices related to data collection.

Patten and Newhart (2018, p. 49) propose that researchers or their representatives should, in addition to providing prospective participants with written consent forms, engage where possible, in verbal communication with potential participants to explain the purpose of the research, the research process, potential benefits, harm and what their rights are in the research process. These rights include the decision to withdraw from the research process at any time, without penalty. Enough time for with the completion of the consent form and the consultation process should be allowed, to ensure that participants are extensively informed about the entire research process.

In instances where engagement with prospective participants are not possible, researchers should present information included in the consent form in such a way that the information will convey the context of the research in clear and understandable terms (Pienaar, 2009, p. 218). Under no circumstances should a prospective participant be coerced into signing a consent form. Prospective participants should be given enough time to consider the invitation to participate in the research, before a decision is required.

Special provisions must also be made when prospective participants' comprehension is limited, for example due to immaturity or mental disability. In addition, the law requires that minors, i.e. persons under the age of eighteen be assisted by a parent or guardian who must act on behalf of the prospective participants. Respect for such prospective participants requires that they are given the opportunity to choose the extent of their involvement, and whether they are willing to participate in a research project (National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, 1978, p. 13). A third party may become involved to act on behalf of such vulnerable groups, on condition that such authorised persons be given the opportunity to observe the research as it proceeds, to make an informed decision to withdraw participants if any form of discomfort or harm is experienced (Pienaar, 2009, p. 318).

According to Ponterotto (2010, p. 587), the problem with informed consent is that especially in emergent or discovery-oriented qualitative research, detail about the outcomes of, for example interviews may not be determinable prior to the actual data collection process. Informed consent can therefore not provide details about the potential benefits and harm that participants may be exposed to. This compromises the informed consent process, which may lead to misapprehensions about the research process. Informed consent in the online environment may often be difficult to obtain when the personal information of prospective participants is not known to the researcher (Beninger, 2017, p. 57).

In addition, issues related to language barriers and low literacy levels may further impact on obtaining informed consent. Sauer et al. (2015, p. 166) propose that in such cases researchers should abandon the practice of written informed consent. Oral consent, that is audio or video recorded may better protect the interests of prospective participants. For example, in studies that include low-literacy study populations, written consent may undermine the relationship of trust between the researcher and prospective participants. Oral consent will ensure that the conversation between researcher and prospective participant is recorded and placed on record, with an unsigned document given to prospective participants containing the same key details about the research for their records (Liamputtong, 2018, p. 12).

Confidentiality and Anonymity

Wiles (2013) states that many research participants are concerned that their contributions will remain confidential and anonymous. Yet, anonymity and confidentiality are not synonymous and do not refer to the same rights. When assuring confidentiality, the researcher undertakes, even when he / she can connect the identities of participants to certain research responses, not to make this information available to anyone else. Confidentiality also relates to protecting the privacy of an individual and ensuring that he / she is not identifiable during the presentation of findings (Department of Health, 2015, p. 22). Confidentiality has further bearing on ensuring that information obtained during the data collection process does not invade the privacy of a participant. Information about participants' possible drug use, criminal activities and even income is often regarded as sensitive or confidential. It may not be unethical to ask questions related to these topics if such data is related to the purpose of the research. However, participants should be given enough time to decide whether they are comfortable answering such questions and if not, be provided with the opportunity to withdraw from the research (Kumar, 2011, p. 247). Confidentiality should be maintained if such information is made public.

According to Louw (2014, p. 265), an ethical researcher should protect any sensitive information as a matter of principle and should not allow his / her feelings to interfere with its disclosure. Sensitive information should remain confidential between the researcher and the participant. For example, when conducting research on skills that information professionals require to cope with changes emanating from the fourth industrial revolution, feedback to a manager should not include details about a specific individual employee's limited skills. It would be unethical to reveal such information.

However, ensuring the confidentiality of research participants goes much further. McMillan and Schumacher (2006, p. 224) state that particularly in research with small sample sizes, it may be possible to identify participants based on generic characteristics. For example, in a study of a specific organisation, participants may be asked to provide details about their gender and age. If there are only two male participants, the data provided by them will be identifiable, based on their generic information. Thus, information on locations and features of settings and participants should not be identifiable in the presentation of research findings (Kumar, 2011, p. 246).

McMillan and Schumacher (2006, p. 334) argue that confidentiality can be achieved by making certain that data cannot be linked to the individual participants by name or character. This can be accomplished in several ways, the most ethically sound being anonymous data collection. If data is collected that can identify participants by name, a system to link names to data that can be destroyed, should be constructed. Another method of ensuring confidentiality is to use a third party to link names to data and then to provide the researcher with the revised raw data, so that individuals cannot be identified. Confidentiality is often assured during in-depth interviews or where participants complete questionnaires with their names included. In such cases the names of participants can remain confidential by replacing them either with pseudonyms or a coding system (Louw, 2014, p. 267). Using aggregated numbers such as group averages can also assist in ensuring that research data remains confidential.

Confidentiality also includes how data is collected and stored. Even if participants knowingly provide information to researchers, it is the researcher's obligation to protect the confidentiality of participants. Within a digital context, this may be difficult to achieve since data saved on a computer or cloud storage may be retrievable by others. For this reason, it is important that such data be placed behind password encryptions or that names of participants are separated from their responses (Patten and Newhart, 2018, p. 50). In addition, findings should not discuss or describe individual characteristics.

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Anonymity is closely linked to confidentiality in research. Doyle (2016, p. 101) describes anonymity as the means through which the privacy and confidentiality of participants are maintained. When promising anonymity, the researcher undertakes not to record the names of the participants at any stage of the research. No identities are created to link the identity of a participant to the research findings (Louw, 2014, 2p. 67). Researchers must ensure that they can guarantee anonymity, meaning that data collection tools should not include any identifiable information and findings should be presented in such a way that the identity of participants cannot be surmised (Patten and Newhart, 2018, p. 50).

Care

Head (2018, p. 7) explains that ethics include care, which permeates the entire research process. How research is conducted refers to more than just the successful application and approval of the ethics process or the collection of the data. The decision to undertake research places any researcher in a position of care. This position does not only relate to caring for participants, but also caring for the organisation with which the research is associated, caring for the funder or sponsor, caring for the reputation of the wider research community, and caring for society in general.

The principle of care also includes cultural sensitivity. Liamputtong (2008, p. 3) states that cultural sensitivity refers to knowledge of the cultural context of the group with whom the researcher wishes to work and his/her willingness to learn from and communicate with them in such a way that shows respect and care for cultural practices. Applying the principle of care will ensure that researchers conducting cross-cultural research will behave in such a manner that it does not exploit or damage the community as a result of the data collection process or through reporting on the research findings.

The San Code (South African San Institute, 2017) requires that research should be aligned to the local needs of participants and should contribute towards improving lives. Research must therefore be carried out with care for all those involved. This includes accepting cultural and societal differences and conducting research with an awareness not to infringe upon the beliefs, values and practices of other ethnic and social communities.

ETHICAL CONSIDERATIONS IN THE ONLINE ENVIRONMENT

Wenborn (2018) states that the evolution of technology has had and will continue to have profound implications for information professionals. The use of new innovative technologies is changing the way information is created, stored, retrieved and disseminated. It influences engagement opportunities with clients to create environments where they are not only users, but also creators of information. Technological advancements have also created new opportunities for research. Online platforms offer rich naturally occurring research data mining opportunities that can be used extensively to research information creation and usage, knowledge sharing, as well as human behaviour and interaction (Beninger, 2017, p. 57). However, ethical principles become distorted in the light of mining and utilising online data in research. Various authors have various views about the application of ethical principles in the online environment.

Mostak and Hoq (2012, p. 38) proposes that similar ethical principles be applied to online data and collecting research data 'offline'. The author suggests that as with an 'offline' environment, participants should be requested to participate in the research and informed consent obtained before any of their online data be used in research. The implication, according to Beninger (2017:57) is that consent is to

be obtained from all individuals whose online data will be utilised. The practical implications of this is however questionable, as the researcher may not always have direct access to individuals who post information online. The identity of participants should be protected as far as possible, meaning that the researcher should take responsible steps to inform participants of the intent of the research and to determine their willingness to be presented as themselves or in an anonymous way as part of the research.

Another perspective presented by Kurtz, Trainer, Beresford, Wutich and Brewis, (2017, p. 7) is that information available in the online public domain can be used without obtaining consent from participants. In fact, the authors purport that publicly available information via online sources such as blogs, websites, Facebook and Twitter can be traced back to the original source through search engines like Google and therefore issues related to consent, and anonymity should not apply. Information shared on public social media without a password or membership restriction should be available for use in research without the need for informed consent (Beninger, 2017, p.58). Rogers and Sipes (2018, p. 474) agree that there is no need to protect the confidentiality and anonymity of online creators of information. In fact, it is often the case that participants posting online want to be cited and acknowledged for their intellectual contributions.

Given these two extreme viewpoints, Taylor and Pagliari (2018, p. 2) indicate that what is important is that researchers should ensure representation in and validity of findings by explicitly stating the platform used to obtain research data. In instances where information is extracted from private or closed online platforms or websites, obtaining consent and ensuring the anonymity of participants becomes ethical issues that researchers should consider. It is thus the context (open or closed platforms) in which the information is available online, that dictates the necessity to obtain consent and ensure anonymity.

Beninger (2017, p. 57) further proposes that in the absence of clearly identifiable ethical principles, researchers who want to make use of online data should consider recruiting participants in an open and honest manner. Researchers should take steps to be transparent and accommodate different user types. As far as possible, consent should be obtained from participants prior to the use of their online information in a research project. In instances where data from a closed platform is being used, informed consent must be obtained. In instances where data is mined from an open platform, the researcher should familiarise him / herself with the privacy policy of the platform, as well as the legislation of the country where the platform is hosted, to ensure that collected data does not infringe on the privacy of online users.

As information posted in the online environment becomes a permanent record, copyright and plagiarism as key components within the online environment must be considered. Direct quotations can be traced back to original sources, meaning that in all instances original authors of information should be acknowledge and receive credit for their views. The implication is that it may infringe on the anonymity of the original online publisher, especially if the person wishes to remain anonymous. This requires of researchers to make case-by-case decisions on the importance of anonymity vs citation to avoid plagiarism. This is referred to by Beninger (2017, p. 59) as ethical pluralism, where there is a spectrum of legitimate choices that the researcher should consider when utilising online data as part of a research project. The use of online data should not put the participants at risk and the principle of avoiding harm should inform all decisions pertaining to the use of online data (Robers & Sipes, 2018, p. 474). Ethical practices and standards informing research in the online environment must ensure a balance between contributing to science and protecting the rights and dignity of human beings (Nyangeni, Du Rant & Van Rooyen, 2015, p. 5).

DECOLONISING ETHICS

McArdle (2018, p. 139) explains that a clash of ethical values between Western researchers and indigenous communities requires a revisit of ethical principles. Linked to the views of Johanson (2013, p. 447) the discourse meta-ethical theory should apply where the aim is to uncover normative or ethical truths required to understand societal norms that influence the research practice. The challenge, according to Boulton (2018, p. 5) is to create spaces where the ethics and protocols of indigenous societies are considered and deemed more important than Western ethical principles. Ethical principles acceptable to indigenous communities should inform the way in which a researcher approaches the research, what questions he /she asks and how the researcher conducts him- or herself in the community and with the research participants. At every stage, research with or about indigenous communities must be founded on a process of meaningful reciprocity and engagement, where the indigenous community (research participants) and researcher are equal partners in the research process.

The San people provide a South African example of the decolonisation of ethical principles. The San Code (South African San Institute, 2017), compiled by the San people to guide research within and about their community, expresses the need for researchers to be cognisant of other cultures and ways of life. This view is also emphasised by Brannelly (2016, p. 4) who states that Western perspectives, which often dominate research practices, should be revised when research is conducted among indigenous cultures and knowledge systems. Naude (2017, p. 1) proposes that 'ubuntu' ethics be considered to decolonise ethical principles: 'I am, because we are' or 'humanity towards others'. Ubuntu expresses African communitarian views; implying that the community makes, creates or produces the individual. The individual is never more or greater than the group and the interests and needs of the individual never overshadow that of the group. Within an ethical context the researcher should be cognisant of the fact that research is about the community; for the community and should not revolve around the views, opinions and needs of a few.

Boulton (2018, pp. 5-6) explains that indigenous people often have their own set of ethical principles that must be considered when conducting research in their environment. For this purpose, the Australian Library and Information Association Guidelines for Ethical Research in Australian Indigenous Studies has been developed to assist researchers in recontextualising the ethical principles to be considered when conducting research within indigenous communities. In terms of the New Zealand Māori, this includes the principles of Whanaungatanga, Awhi, and Kotahitanga. Whanaungatanga means that we treat each other and regard each other as members of a wider family; who should all be treated with respect, whilst Awhi relates to cherishing and supporting others. Kotahitanga refers to unity and solidarity; meaning that people (research participants) are united around a single purpose, which is to transform lives through excellent research.

Mbembe (2015, p. 9) states that decolonising ethics requires that Western models of ethics be questioned and that alternative models be developed. Western researchers entering the culture of an indigenous people should study, consider and revise ethical principles to embrace those of the culture which they enter (Mcardle, 2019, p. 139). Brannelly (2016, p. 5) explains that this requires the development of ethics of care that are concerned with justice, equality and freedom. Commitment to avoid domination is required, which can be achieved through centralising the history, experiences and actions of indigenous people throughout the research process. However, more extensive research to conceptualise, theorise and test decolonised ethical principles is required to formulate a set of decolonised ethical guidelines that informs research in the African context.

CONSIDERING ETHICAL PRINCIPLES IN THE RESEARCH PROCESS: KEY RECOMMENDATIONS

Daniels (2008, p. 123) questions the effective application of ethical principles in the execution of the research process. The author is of the opinion that researchers perceive ethical clearance as mere compliance to obtain approval to conduct research. They are not concerned with the application of ethical principles throughout the entire research process. This issue is also raised by McMillan and Schumacher (2006, p. 334) who opine that a lack of training in understanding the importance of ethical application during the research process has resulted in atrocities against humanity in the name of research. To ensure that researchers acknowledge and apply ethical principles throughout the research process, authors such as Kumar (2011), Louw (2014) and Creswell and Creswell (2018) suggest that ethical principles should be considered and mapped during the initial planning of the research and executed throughout the entire research process.

Researchers need to plan how they will handle the ethical dilemmas that may appear as a result of the research. Towards this end, Figure 1 provides a summary of key ethical aspects that should receive attention during the research process, irrespective of whether the research is qualitative, quantitative or mixed method. At the initial stages of the research, *prior to the planning* stage, the researcher has the responsibility to not only identify, but also consider ethical aspects that relate to key stakeholders. Louw (2014, p. 263) explains that stakeholders in the research process include a larger group than merely the community or participants that will be targeted by the research. The academic or research institution also has an interest, as its reputation may be influenced by the ethical behaviour of the research. Funding bodies that invest time, money and expertise must also be considered (Kumar, 2011, p. 243). This is particularly important as funders often become involved in research due to potential future financial gain. In such cases the researcher should ensure that a memorandum of understanding safeguards the presentation of research findings in an honest and objective manner, that is not affected by the self-interest of any party. The Codes of ethics of research institutions associated with the research must be studied to ensure that the researcher has an extensive knowledge of the ethical requirements that may influence the planning of the study. Such ethical codes may determine the feasibility of certain studies or limit the extent to which a researcher may conduct research in an area of vested interest.

Often, a research project may be applied for at one institution but executed at another. For example, a researcher may be registered at a higher education institution and will apply for ethical approval from that institution, while the research will be executed at another organisation. Approval from this organisation in the form of gatekeeper permission must be requested (Campbell, 2012). Singh and Wassenaar (2016) explain that a gatekeeper is someone who controls access to an institution or organisation, such as the managing director of a private company. In such instances, a researcher must apply to that gatekeeper for permission to conduct research on the institution's premises. The researcher should determine beforehand whether gatekeeper permission is required and, linked to the intended purpose of the research, whether the organisation will consider approving the intended research. Gatekeeper permission is usually not required in instances where research is conducted in legitimate public spaces such as streets, public markets, taxi ranks, bus shelters or parks.

During the *initial planning stages*, ethical considerations should inform the research problem and purpose, selected sites, consideration for the autonomy of participants and the obtaining of informed consent. Creswell and Creswell (2018, p. 92) state that during the planning of the research, ethical issues related to the marginalisation of the proposed target population should receive attention. In instances where the

Figure 1. Summary of ethical considerations in the research process (Adapted from Creswell & Creswell, 2018, pp. 89-90)
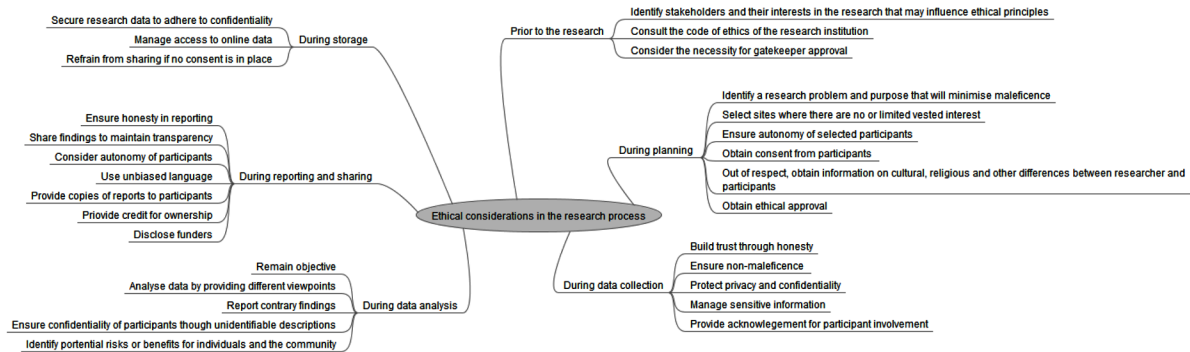
risk of harm related to proposed research outweighs the benefits to participants, careful consideration should be given to the ethicality of the proposed research. In such instances, revision of the purpose of the research may be required to minimise the risk. Sites selected to conduct research should also be considered to ensure that the researcher can act respectfully without subconsciously compromising the research with a personal or vested interest. At the initial stages of the research, the researcher should also consider any cultural, religious or gender differences that should be respected. In instances where such differences may influence the research process, the researcher is responsible for conducting extensive and additional research to learn more about the values and norms of the participants. The influence of the researcher on the participants and / or the community should be minimised (Liamputtong, 2008, p. 3).

At all times informed consent must be obtained from all participants involved. The informed consent must be explained to participants, where possible, or be presented in such a way that prospective participants can grasp the implications of participating in the research (Patten & Newhart, 2018, p. 49). Linked to the deontology meta-ethical theory, the researcher must see it as his / her moral duty to ensure that participants are extensively informed of the scope, context and purpose of the research and its potential findings. Only in instances where the motivation for withholding such information can be justified before the Ethics Review Committee of the research institution, may certain information related to a research project be withheld from the participants (Pienaar, 2009, p. 218). In such instances debriefing should occur after the data has been collected to minimise potential risk or harm.

In South Africa, the National Health Act 61 of 2003 (South African Government, 2003) requires that all institutions that conduct research on or about humans should be registered and establish Ethics Review Committees to ensure that research conducted at such institutions comply with the regulations of the Act (Department of Health, 2015, p. 5). Researchers are required to submit ethical applications to the Ethics Review Committee of their respective research institution to obtain permission to conduct research. Only once ethical approval is obtained, may a researcher enter the field to collect the actual data (Daniels, 2008, p. 124). In this way research institutions safeguard prospective participants and their communities from any potential harm or exploitation and ensure that their reputations as reputable research organisations are maintained (Louw, 2014, p. 264).

Throughout the *data collection process*, ethical principles should apply to ensure that participants' rights are protected, and that harm is avoided. During the collection of data, attention should be paid to the physical and psychological comfort of the participants. Trust should be developed by clearly stating

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how the researcher should ensure confidentiality of information shared during the data collection process. Any possibility of harm should be eliminated, or where there may be a possibility of harm, this should be discussed in detail with participants. At all times, participants should be given the opportunity to withdraw from the research without any negative implications or penalties. Participants should not be coerced into participating in the research. The offering of gifts to convince participants to participate is unethical (Kumar, 2011, p. 245). Tokens may however be provided after data has been collected to acknowledge the valuable contribution of the participants to the data collection process (Louw, 2014, p. 266). Within the context of collecting data, the researcher should adhere to the virtue meta-ethical theory where respectfulness, sincerity, humility and care influence behaviour (Wiles, 2013).

When collecting sensitive information, the researcher should provide assurances that such information will be treated as confidential. This means that the researcher should respect the relationship between participant and researcher and not share or discuss such sensitive information with any third party (Louw, 2014, p. 265). Complying with this ethical principle may sometimes be difficult, especially if participants share sensitive information with the researcher about abuse or bullying in the workplace or another social context. In such instances the researcher may feel obliged to act and inform a third party, but if this is not agreed to with the participant, such actions may violate the confidentiality of the participant, which is unethical (Patten & Newhart, 2018, p. 50).

Especially in instances where more than one researcher is involved in the research process or where a researcher is assisted by a supervisor, the application of the discourse meta-ethical theory may apply to consider ethical principles that should guide the *data analysis process*. Through discourse, a universal understanding can be achieved to ensure that all data collected is analysed according to ethically sound principles (Gimmler, n.d.). Such ethical principles may include remaining impartial, objective, presenting various viewpoints from different participants and reporting contrary findings. Creswell and Creswell (2018, p. 94) explain that researchers are required to disclose all findings and refrain from withholding important results, even if it casts their initial hypothesis in an unfavourable light. In both qualitative and quantitative research, the researcher must report on the full range of findings, even when there are contrary results. When statistical analysis is used, the result should indicate the full array of findings and not only the median. A researcher may be guilty of distorting results and therefore also the interpretation of findings if certain aspects of the analysed data is over-emphasised or if statistical values are used out of context (Louw, 2014, p. 271).

A critical part of the data analysis process, and one which is often overlooked by researchers is to share the analysed data with research participants prior to the completion of the research report. Liamputtong (2008, p. 12) states that this process is important, to ensure that data to be disseminated in the research report has been scrutinised for validity by the research participants. Especially in qualitative research, this action may prevent any unintentional identifiers to be published. Through sharing analysed data in cases where sensitive data was obtained, participants are given the opportunity to consent to the information being used or may decide to withdraw their participation in fear of identification or stigmatisation.

During the *reporting, sharing and storage* of research data, several ethical issues should be considered. The first of these is to present results in an honest and objective manner. Results should not be manipulated or revised to meet the needs of a stakeholder party involved in the research (Louw, 2014, p. 263). Linked to this is the importance of sharing the results and reports with participants. Strategies for sharing may include providing copies of the reports to participants and stakeholders and making reports available on a website. Liamputtong (2008, p. 12) explains that returning the results to the community for feedback is essential, if researchers wish to maintain a respectful relationship with participants and

their communities. To ensure that the final research report presents findings in an objective and honest manner, attention should be paid to the use of language. Creswell and Creswell (2018, p. 95) explain that the use of language in research reports should be unbiased, straightforward and clear. Language should be used that is sensitive to labels.

Another principle that should be considered is to acknowledge those involved in the research process. Acknowledgement or credit should be given to all parties involved. Head (2018, p. 7) states that often, when multiple researchers are involved in a research project, power-dynamics can determine acknowledgements. It is unethical for a senior researcher to take the main credit for a research project if the research was conducted by junior researchers. The issue of credit, along with those of authorship and co-authorship must be clarified prior to the commencement of the research project (Johanson, 2013, p. 496). Acknowledgement extends beyond the researchers involved in the project. Part of acknowledgement is also to provide credit or disclose any contribution from funders that enhances the research project. Sternberg (2010, p. 138) explains that in the research report the involvement of funders should be disclosed, as well as their contribution in the execution of the research.

If a trusting relationship is developed between researcher and participants during the research project, this relationship should be maintained after the completion of the project (Daniels, 2008, p. 123). This implies that data obtained during the research project should be stored and managed in such a way that the confidentiality of participants is not breached. As most researchers use computer technology to capture and store research data, password protections should be put in place to ensure the protection of collected research data. If research data is to be used for other purposes after the completion of the research, permission should be obtained from participants to use their data outside the context of the research project (Kumar, 2011, p. 244). This is in line with the guidelines of the Department of Health (2015, p. 52) that stipulate the necessity to obtain informed consent from participants to store and / or share research data via a repository.

FURTHER RESEARCH DIRECTIONS

Undertaking studies to ascertain how ethical principles and practices throughout the research process can be monitored, is imperative to ensure that ethical principles are indeed executed throughout the research process. Determining the extent to which ethical principles can and should be applied in the online environment may shed light on future research studies that may, to a more extensive degree, utilise online data mining as sources of research data. Further studies on how ethics can be decolonised and how such decoloniality of ethical principles can be applied throughout the research process will develop ethical theories that are truly Africanised.

CONCLUSION

The premises of this chapter were to provide the researcher with more detailed information about the importance and necessity to understand the implications and application of ethics throughout the entire research process. Through this lens, the focus was to provide a brief background about the importance of considering ethics to conduct research for individual and societal benefits. Meta-theories of research were explored as the foundation from which to make decisions on the use of ethical principles during

the research process. If a researcher wants to apply the virtue meta-ethical theory, consideration of the other theories will be important. Different ethical principles or the application of ethical principles may apply; requiring the researcher to be adaptable in different research contexts.

The application of key ethical principles respect, beneficence, justice, consent, confidentiality, honesty, anonymity and care should be considered in all research practices, but the context of application may change, depending on the purpose of the research, as well as the participant group involved. This is evident when working with data in the online environment or conducting research using indigenous knowledge groups.

The importance of applying ethical principles in research is that ethical guidelines proposed by documents such as the Belmont Report and the Nuremberg Code should always be considered to minimise any potential harm that may result from research. Never again should researchers be allowed to exploit, purposefully harm or dehumanise participants in the name of research. As suggested by Sauer et al. (2015, p. 162):

History warns us that without a structured ethical code, the conduct of research is susceptible to harm of subjects, either humans or animals.

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Chapter 5
Systematic Review as a Research Method in Library and Information Science

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ABSTRACT

The aim of this chapter is to assess the current state of application of systematic reviews (SRs) in library and information science (LIS) field and determine how information scientists can advance the SRs as a methodology. The literature shows that there is an increasing number of SRs in LIS although there are still knowledge gaps about the use of SRs as a methodology. The quality of reporting in primary studies in LIS is still poor, and hence, it becomes difficult to appraise the value of the study undertaken. In order to advance the use of SRs in LIS domain, it is important to introduce SRs in LIS education curricular, integrate SRs as part of the continuing scientist development programmes (CPD), use automated SR software to minimize workload, introduce SRs a formal role and service in the libraries, collaborate with research teams as co-authors to conduct SRs not only in the topics defined by research teams, but also in LIS topics, and create SR databases and tools in LIS.

INTRODUCTION

The rapid advancements of information and communication technologies (ICTs) have resulted in an exponential increase in the amount of available information and forced librarians to change their practices. The increasing popularity of ICTs, new ways of communicating research and the transformation in scientific publishing have also posed new challenges for librarians. Information scientists need to rethink and redefine their role in terms of addressing users' needs and thus use advanced technological skills (Vassilakaki & Moniarou-Papaconstantinou, 2014). Systematic reviews (SRs) are increasingly being

produced and published (Chasin & Scholta, 2015). There has been a sharp rise in the publication of SRs due to the increased call for evidence-based research; high publication rate of primary studies, growing number of scientist organizations promoting SRs, and high number of tools available to conduct review (Foster & Foster, 2015). The upsurge in reviews has led to more researchers seeking the assistance of librarians (Foster & Foster, 2015). According to Xu, Kang and Song, (2015), all primary research must be preceded by a SR. SR is defined as a systematic way of collecting, critically evaluating, integrating, and presenting findings from across multiple research studies on a research question or topic of interest (Pati *et al.*, 2018).

SRs help information scientists to keep up-to-date with scientific information since they combine information from several existing publications on a given topic (Don, Cnor & Faan, 2016). As information scientists, library staff could act in a more entrepreneurial style and seek out ways to add value to their roles and show the impact of their work and to do so they must go beyond the traditional parameters of the library. They need to respond more acutely to their users' needs, and develop capabilities to build better profiles of their users, for example through continual needs analysis (Delaney & Bates, 2015). Therefore, SRs provides several opportunities to librarians such as potential income, increased use of library services, research output, and alignment with the new roles of academic libraries (Gore & Jones, 2015).

Information scientists are more and more appealed to participate in the production of SRs (Gore & Jones, 2015). The information scientist are urged to participate in SRs due to the ever-increasing volume of digital information and the constant development of tools to generate and access information require information scientists to operate as information consultants and facilitators (Vassilakaki & Moniarou-Papaconstantinou, 2014). Furthermore, Information scientists need to reconsider their role in the learning process at higher levels due to increased competition among universities for developing successful graduates, hiring prominent academics and finding research funds, skills development, and the adoption of changes in the learning and research organizations (Vassilakaki & Moniarou-Papaconstantinou, 2014).

SRs have often been mainly associated with the field of health science (Don et al., 2016). Health sciences librarians have been involved with SRs since this genre of publication emerged during the 1990s. Since then, librarians have been most widely known for their prowess in searching for the evidence needed to create SRs. Even during the early years, however, librarians and other information scientists were involved in other aspects of the SR process (Spencer & Eldredge, 2018). Further, the first books on the reviews were published by researchers in the field of education, social sciences, and political science (Xu, Kang and Song, 2015; Trudel *et al.*, 2015; Petticrew, 2001). However, SRs are gaining their prominence in other fields as well, including astronomy to zoology, library and information studies and information systems.

A generally known role of information scientists in SRs is information retrieval methods because of their skills in finding and managing information. Nevertheless, information scientists can be involved in other roles of SRs. Since information scientists are more and more involved in SRs, they need to have a better understanding of what SRs are. The following are the objectives of this chapter:

a)   To discuss SRs as a research method including typologies/types of SRs and steps for conducting SRs
b)   To highlight the current state of SRs in LIS
c)   To review how information scientists advance Information retrieval practices for SRs.

OVERVIEW OF SYSTEMATIC REVIEWS

SRs emerged in the late 1970s and early 1980s in response to calls from the ''evidence-based medicine movement'. This movement aimed to bridge the gap between the best evidence from research and optimal decision making by organizing the available knowledge about the effectiveness of health care interventions into usable and reliable formats (Mulrow, 1994). According to Carr, (2002) SRs provide a research method for conducting literature reviews according to a set of procedures – systematically – and for synthesizing existing results on a research problem or a research question. Therefore, SR allows the researcher to review and assess knowledge in important areas. Such a review of knowledge can be applied effectively to improve practice; thus, SR also facilitates evidence-based practice. In addition, SRs provide a method for creating the often missing link between research and practice. Ultimately, SR serves to inform by drawing from a body of literature and summarizing the results (Ankem, 2008; Knoll et al., 2017; Xiao & Watson, 2017).

SRs present a comprehensive summary of research-based knowledge that can aid both practitioners and policy makers in decision making (Wilson, 2016). SRs are, in simple terms, studies of studies, which form a sub-category of research syntheses. SRs aim to locate all studies on a particular topic, intervention, or research question so that evidence can be synthesized and analyzed (Wilson, 2016). As such, they require systematically and comprehensively searching the literature and then documenting the search strategy for replicability and to allow the synthesis to be updated (Gore & Jones, 2015).

Further, Pati *et al.*, (2018) clarified SRs as a method that address concerns regarding quality issues, such as bias, replicability and credibility. SR method provides a way to assess the quality level and magnitude of existing evidence on a question or topic of interest. SR as a rigorous and thorough research method with a transparent and reproducible process, which includes establishment of specific research question; formulation of inclusion/exclusion criteria; a rigorous reproducible and transparent retrieval process; and quality assessment of included studies, as well as data extraction, synthesis, analysis, and presentation (Xu, Kang & Song 2015). The aim of this transparent and reproducible process is to remove the influence of personal bias on the part of the reviewer and to ensure consistency and objectivity. The terminology used to describe specific systematic approaches and variations in methods of synthesis for different types of SRs has evolved over time and varies between fields, groups of researchers, and authors (Trudel et al., 2015).

There are various types of literature reviews that exist; Trudel *et al.*, (2015) identified nine literature review types which are; narrative review, descriptive reviews, scoping reviews, meta-analyses, qualitative SRs, umbrella reviews, theoretical review, realist reviews and critical review. Moreover, Grant, Booth and Centre (2009) also identified common review types which are; critical review literature, literature review mapping, mapping review/ systematic map, meta-analysis, mixed studies review/mixed methods review, overview, qualitative SR/qualitative evidence synthesis, rapid review scoping review, state-of-the-art review, SR, systematic search and review, systemized review and umbrella review. However, According to Martín-Rodero, (2016) there are several models of reviews that differ considerably in terms of fundamental objectives, motivations and means by which they are held. It is therefore important to understand different types of reviews before embarking on conducting the review. This will enable researchers to use appropriate research methods to answer their specific research questions.

STEPS FOR CONDUCTING SYSTEMATIC REVIEWS

SRs adheres to standardized methodologies/guidelines in systematic searching, filtering, reviewing, critiquing, interpreting, synthesizing, and reporting of findings from multiple publications on a topic/domain of interest. It attempts to capture the broadest set of available literature on the topic of interest. After assessing the quality of individual studies, SRs may eliminate low-quality studies from further consideration. Furthermore, due to extensive documentation and reporting of steps and assumptions, SR renders itself open to replication. It demands a team effort (at least two) to eliminate bias, among other issues. SRs are inherently time intensive (Pati et al., 2018). The following are key steps in conduction SRs;

Formulation of a Research Question

First stage involves defining the review question, forming hypotheses, and developing a review title. It is often best to keep titles as short and descriptive as possible. A well-formulated question for a LIS topic would likely include a description of who was involved, what was being studied, the outcomes in which one is interested, and what studies or data to collect and combine. Once the question is complete, the review process moves on to identifying potential studies or data sources (Mckibbon, 2006). In order to ask a clear focused research question, it is important to break the question down into constituent parts using several frameworks. For example, in health sciences, the prominent framework is known as PICO, which stands for **P**articipants, **I**ntervention, **C**omparator, and **O**utcomes (Knoll et al., 2017). PICO is also common, where the "S" refers to the Study design, thus limiting the number of irrelevant articles during searching (Methley, Campbell, Chew-Graham, McNally, & Cheraghi-Sohi, 2014). PICO (with a lowercase o) can be equally useful for qualitative SRs. The core elements of PICO are: Population, Phenomenon of Interest, and Context (Stern & Jordan, 2014). SPICE framework can also be relevant for qualitative research questions, and this includes: Setting (Where? in what context?), Population or Perspective (For whom?), Intervention (What?), Comparison (What else?), Evaluation (How well? What result?). Another useful framework in social science can be "SPIDER" (sample, phenomenon of interest, design, evaluation, research type). SPIDER is designed specifically to identify relevant qualitative and mixed-method studies (Cooke, Smith, & Booth, 2012). Therefore, LIS researchers can choose either to use PICO for quantitative studies or SPICE or SPIDER or PICO for qualitative studies when developing their research questions.

Protocol Development and Training to the Review Team Members

For any review that employs more than one reviewer, it is critical that the reviewers be completely clear and in agreement about the detailed procedure to be followed. This requires both a written, detailed protocol document, and training for all reviewers to ensure consistency in the execution of the review (Okoli & Schabram, 2010). In actual sense, a typical SR must have a protocol that includes the research question, the methods to be used to answer, types of studies and designs that the reviewer intends to locate, how they will be located, evaluated and finally synthesized (Ferreras-Fernández, Martín-Rodero, García-Peñalvo, & Merlo-Vega, 2016). The protocol needs to be registered in a database, such as PROS-PERO, or the Cochrane Library for health sciences, or Campbell collaborations for social sciences, and CADIMA for multidisciplinary SR. These databases assist in minimizing publication bias and selective

outcome reporting by giving a permanent record of the a prior methods (Knoll et al., 2017). Protocol registrations also minimizes duplication of research efforts due to the availability of ongoing review.

Select Databases

It is essential to know the sources of information available for efficient information retrieval (Martín-rodero, 2016). It is important to identify and select database sources that are relevant to the research question. Literature search for SR must involve well-structured databases, less structured databases, grey literature, and hand searching. Mckibbon (2006), and Xu, Kang and Song, (2015) summarized the following well-structured bibliographic databases in different disciplines: 1. Health sciences (for example, PUBMED, EMBASE, MEDLINE, EMBASE, Cumulated Index to Nursing and Allied Health Literature [CINAHL], British Nursing Index, Allied and Complementary Medicine Database [AMED], Health-STAR, PsycINFO). 2. Science (for example, Science Citation Index). 3. Social Science (for example, Social Science Citation Index, Applied Social Science Index and Abstracts (ASSIA). 4. Information Science (for example, Library and Information Science Abstracts [LISA], LISTA, Information Service for Physics, Electronics, and Computing [INSPEC]). 5. Educational literature (e.g. ERIC); Agriculture (CAB abstracts); 6. Multidisciplinary bibliographic databases (Proquest, ISI's Web of Knowledge, EB-SCO, and Scopus). Less structured databases can be added to the SR depending on the relevance of the topic. These databases can include LILACS, SCIELO etc.

Apart from online databases, grey literature is important in SR to minimize publication bias. Grey literature include publications/documents published in electronic and print formats not controlled by commercial publishing (Knoll et al., 2017). Grey literature includes: dissertations, theses, conference abstracts and proceedings, and technical reports, working papers, and unpublished or ongoing studies etc. Further, researchers can conduct hand-searching to identify missing documents. Hand searching is the manual searching of journals and conference proceedings that are not fully indexed in searched databases. Researchers can augment searches with google scholar and Microsoft academic search. Research shows that Google Scholar is a good search engine to search and retrieve much grey literature and specific, known studies, however it should not be used alone for SR searches. Haddaway *et al.*, (2015) found a moderate/poor overlap in results when similar search strings were used in Web of Science and GS (10–67%), and that GS missed some important literature in five of six case studies.

Develop Search Strategy

The search strategy should be based on the elements of the review question with the study design that is considered most appropriate in order to identify all relevant literature in an area. This involves determining the location (where) and terminology (how) that will be used in the search. The key in developing an optimal search strategy is to balance sensitivity (retrieving a high proportion of relevant studies) with specificity (retrieving a low proportion of irrelevant studies). An effective search strategy must comprise descriptors and their respective qualifiers or descriptors and keywords combined together by the most appropriate Boolean operators (Ferreras-Fernández et al., 2016). The search strategy must be reported transparently in the protocol and in the review (Knoll et al., 2017). Further, the search strategy for each database has to be documented including the dates, search limits, and total number of documents found in each database. They can be attached as appendices or supplementary materials with the published SR.

Conduct Literature Search

Comprehensive searching also can include hand searching of specific journal titles using the predefined criteria. Searching is often done in two phases. In the first phase, the goal of the search is to identify published narrative and SRs. If a relevant SR is already available, the project could end. If the identified review is on target but older, the research team can build upon the older review and choose not to include studies from it in the newer one, that is, produce an update rather than a complete review. If the reviews retrieved are not exactly on target, they can, at least, provide insight into search terms and database selection as well as potential citations for inclusion in the new review. After searching for published reviews, the searching proceeds to identify potential original studies. These studies come from three main sources: primary searches in established databases and hand searches of specific journal titles; personal knowledge (team members' reprint files) and personal contact with peers and experts in the field; and "snowballing," whereby the team members find potential citations in bibliographies of reviews and original studies as well as perform citation tracking of important and older studies using resources such as Science Citation Index, Social Science Citation Index, and Arts and Humanities Citation Index. The database and hand-searching procedures are set before the study starts (preplanned) and the "snowball" accumulation occurs as the study progresses. After the predefined searching is finished, citations are downloaded, combined into one list with duplicates removed, and sorted for easy screening by members of the team.

Define Eligibility Criteria

The Cochrane acronym PICO (or PICOC), which stands for population, intervention, comparison, outcomes (and context), or SPICE or SPIDER, can be useful to ensure that one decides on all key components prior to starting the review. It is also critical to operationally define what types of studies to include and exclude (e.g., randomized controlled trials, quasi-experimental designs, survey, qualitative research), the minimum number of participants in each group, published versus unpublished studies, and language restrictions. For Cochrane Reviews or Campbell Collaborations, or other protocol registration databases (such as Prospero), this information gets prepared, peer-reviewed, and published in a Protocol format first, which is then replaced with the full Review once it is completed (Uman, 2011).

Title, Abstract and Full-text Screening

Screening including title review, abstract review and full text screening requires that the reviewer be explicit about what studies were considered for review, and which ones were eliminated without further examination (a very necessary part of any literature review). For excluded studies, the reviewer must state what were the practical reasons for their non-consideration, and justify how the resulting review can still be comprehensive given the practical exclusion criteria (Okoli & Schabram, 2010). Usually the screening process will start with the title/abstract screening, which is followed by full-text screening. Both processes must be performed independently by (at least) two reviewers. In case of any disagreements, a third independent reviewer can be consulted for resolving conflicts (Knoll et al., 2017). The decisions to whether include or exclude a publication at the full-text screening are rather definitive. Therefore, the reviewer must document all reasons for the exclusions. The search process and the final number of included and excluded studies (with the reason for exclusion) must be documented in the Preferred

Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram (Moher, Liberati, Tetzlaff, Altman, & Group, 2009).

Critical Review

Once one has have the list of final included articles, one needs to conduct in-depth critical review of each article. Extract all relevant information from each article and insert in the appropriate place in the Excel document. As part of the critical review, one need to rate the level of quality of evidence for each article using the framework one has adopted for their study (Pati et al., 2018). Librarians can use the Report formula and checklist items appropriate in LIS (Xu, Kang, & Song, 2015b). This checklist provides guidance for LIS researchers to better structure their SR, ensure methodological quality, transparency and comprehensive SR process. However, this should not limit use of other existing guidelines, since librarians/information scientists may be working with other research across other disciplines. In such circumstances, librarians can use guidelines, such as the *National Health Service (NHS) Centre for reviews and dissemination framework* (Centre for Reviews and Dissemination Systematic reviews, 2009), or the *Cochrane collaboration's reviewer's handbook* (Cochrane Collaboration, 2018).

Data Extraction

It can be helpful to create and use a simple data extraction form or table to organize the information extracted from each reviewed study. The data extraction form must include entries for study characteristics, together with relevant results and findings from quality assessment or critical appraisal. Data extraction by at least two reviewers is important again for establishing inter-rater reliability and avoiding data entry errors (Uman, 2011). It is important to pilot the data extraction for two or three studies (Knoll et al., 2017).

Data Synthesis/Analysis

Data synthesis involves collecting and summarizing the findings of the included individual studies. The included studies can be integrated quantitatively using statistical methods (meta-analysis) and / or qualitatively systematically describing, tabulating and integrating the results. In the first stage, the data synthesis involves mapping the main components of literature, which tabulate the results to identify how many studies met the inclusion criteria, who were their authors, etc. (Martín-Rodero, 2016). Another step is to detect the important topics, etc. Finally, is to "review the literature in depth and explore the quality of the works according to the fulfillment of the objectives pursued in the research questions and highlight the deficiencies in the literature" (Ferreras-Fernández et al., 2016). These three steps are important when conducting SR.

Manuscript Writing

In addition to the standard principles to be followed in writing research articles, the process of a systematic literature review needs to be reported in sufficient detail that the results of the review can be independently reproduced (Okoli & Schabram, 2010).

Automated SR Tools

Automated tools and software such as reference management software can assist librarians to export search results from the online databases into the reference managers, and conduct de-duplication, and thus reduce the workload. Example of these software include open source tools (e.g. Mendeley, Zotero) and commercial packages such as endnote etc. Further, there are open source online tools, such as CADIMA that can facilitate reporting of all activities to maximise methodological rigour (Kohl et al., 2018). CADIMA supports the following SR activities: protocol development, management and de-duplication of search results, manage and conduct study selection, offline/online data extraction, and critical appraisal processes (Kohl et al., 2018). There are other available tools that can support different SR activities, which include: Abstrackr, Covidence, DistillerSR, Eppi-Reviewer 4, EROS, ExaCT, Rayyan, RevMan HAL, SUMARI, and TrialState SRS 4.0 (Knoll et al., 2017). There is also a wide range of tools and software that can provide support to the SR process from the initial stages of protocol to data syntheses and writing, which can be found at the SRtoolbox website (http://systematicreviewtools.com/).

THE CURRENT STATE OF SR IN LIS

There are several attempts to propose the adoption of SR as a methodology for discovering, analyzing, and appraising the relevant literature in LIS (Ferreras-Fernández et al., 2016; Gore & Jones, 2015). For instance, Ferreras-Fernández et al. (2016) noted the small number of SR in LIS and proposed the adoption of SR to enhance availability of evidence for practicing librarians, quality and reproducibility of research results in LIS. Ferreras-Fernández et al. (2016) also emphasized the need to have a detailed documentation of the processes involved in search and screening of located articles and documents to enhance the methodological quality of SR. Gore and Jones (2016) emphasized that SR is increasingly becoming a new form of research in LIS, therefore library administrators need to create a conducive environment in libraries for SR methods to be effective.

Despite its importance, few SR of reviews that have reviewed the current state of methodological application of SR in LIS (Ankem, 2008; Koufogiannakis, 2012; Xu et al., 2015b). Ankem (2008) reviewed seven SRs and five meta- analyses that were published between 1996 and 2006 in LIS journals. Ankem (2008) found that most of the applied SR methods were comprehensive, which included identification of studies, inclusion/exclusion criteria, quality assessment, and data extraction. However, in most SRs, the analysis is limited to percentages rather than inferential statistics (Ankem, 2008). Koufogiannakis (2012) developed a wiki that comprised 37 SRs in the LIS domain published between 1997 and 2012. Koufogiannakis (2012) noted the small number of SRs in the field. Xu, Kang, and Song (2015) reviewed 50 SR in LIS and found that the quantity and the methodological quality of these SRs were still low. Noting that there is no established criteria for assessing the quality and process guidelines of studies on SR in LIS, Xu, Kang, and Song (2015) proposed a Report formula and checklist items that is appropriate for LIS. It is clear that there is an increasing number of SR in LIS although numbers are still small compared to those from fields such as medicine and psychology, whose total number of publications may reach more than one hundred studies in recent years. Therefore, SR is still a relatively unknown method in the LIS discipline.

Similarly, there are few meta-analyses in the LIS domain. While SR focuses on answering a defined research question by collecting and synthesizing empirical evidence based on pre-defined inclusion/

exclusion criteria, meta-analysis is a statistical technique to combine the findings from independent studies. Meta-analysis can be applied as statistical strategy to analyze data in SR. Ke and Cheng (2015) found a low use of meta-analysis technique in LIS research. An informed understanding of the role of SR and meta-analysis methods in LIS will be helpful to improve LIS research.

In terms of settings, most LIS reviews were conducted in developed countries, with very few reviews from developing countries, and especially sub-Saharan Africa. Xu, Kang, and Song (2015) found that most SR in LIS were conducted in North America, followed by United Kingdom. Countries such as Australia, Ireland, Germany, New Zealand, South Africa, and China each contributed one review (Xu et al., 2015b). It is clear that there is lack of knowledge concerning the importance of conducting SR in the LIS discipline in most developing countries.

Medical librarianship was among the early fields to embrace SR research method. Later on, it extended to other non-clinical settings, including academic libraries and LIS schools. An earlier review showed that all seven reviewed SRs in LIS had been published on medical library or medical information topics (Ankem, 2008). Koufogiannakis (2012) also found that 64% of LIS SRs were focused on health sciences librarianship. A recent SR of reviews shows that about thirty-two out of fifty LIS's SRs were undertaken in clinical settings (clinical practice), while other studies were done in LIS schools or academia libraries (Xu et al., 2015b). In particular, these LIS SR focused mainly on the following: 1) feasibility of or introduction to SR in LIS, and 2) detailed application and execution (Xu et al., 2015b). A content analysis of 35 meta-analyses revealed that studies primarily focused on five fields: information systems, human computer interaction, library reference services, informetrics, and information resource management (Ke & Cheng, 2015). These studies show that there is an increasing adoption of SR research method in the LIS domain, although the SR publications are still small. It is therefore important to build capacity of librarians and information scientists to conduct SR in different domains of LIS.

In terms of SR key components, literature shows that the quality of reporting in SR is still weak. In a review of SRs of LIS, Xu et al. (2015) found that the quality of reporting in primary studies was poor, and hence it becomes difficult to appraise the value of the study undertaken. Further, the reviewed studies rarely included the following: research question descriptions, provision of full search strategy for at least one database, supplementary research strategies, publication bias, numbers of reviewers, data extraction form, flow diagram, and research period (Xu et al., 2015b). Similarly, a content analysis of meta-analyses revealed that there are still weaknesses in the quality control of meta-analysis in the LIS literature (Ke & Cheng, 2015). Publication bias was not a problem because LIS researchers were competent in information searching, however, the journal article is still the main literature type for meta-analysis studies (Ke & Cheng, 2015). It is clear that we need to improve the quality of SR research method in LIS discipline.

SR may not be a common practice in LIS due to limited details on the research method, deficiency of rigorous processes, and replicable review (Koufogiannakis & Crumley, 2006). Other common barriers include: funding, time, experience, support, access to research and search issues (Koufogiannakis & Crumley, 2006; Xu et al., 2015b), lack of skills in some aspects of SR (Spencer & Eldredge, 2018), and assessment of study quality (Xu et al., 2015b). Some of these challenges are easier to overcome, while others need consideration to move innovation and evidence-based librarianship forward.

On the whole, the lack of SRs in the LIS domain is due to the limited amount of methodological details and lack of rigorous processes, explicit and replicable review, as they point (Koufogiannakis & Crumley, 2006; Xu et al., 2015b). Despite the fact that SR is now being applied in other fields of LIS apart from medical librarianship, there are barriers that one needs to overcome. Although SR can be one of the methods to uncover potential solutions to these challenges, there is still a need to create

more awareness and build capacity of the LIS scientists to tackle some of the challenges. Therefore, the subsequent sections uncover how information scientists can play a key role in SR, and they can advance the SR research methods.

HOW CAN INFORMATION SCIENTISTS ADVANCE SR?

Information scientists/librarians can play a key role in advancing the SR research methods. In this chapter, we propose six ways in which librarians can conduct and advance SR to enhance availability of high-quality evidence in the LIS domain and other disciplines.

First of all, SR has to be formally introduced at the LIS education curricular, as part of the research methods courses at various education levels for SR. One of the key reason why SR is not a common practice in the LIS domain, is due to the lack of knowledge on how to conduct SR as acknowledged by several scholars (Ankem, 2008; Koufogiannakis, 2012; Xu et al., 2015b). This action will enable LIS students to become competent in conducting SR when they become practitioners.

Literature showed that SR is still not common in most developing countries (Xu et al., 2015b). Librarians need to introduce SR as formal service and a new role in their library services. The librarians' role now goes beyond information search and retrieval, and therefore they should be involved in SR as co-authors, and not only as research synthesis assistants. First, as a new role, librarians/information scientists should play a key role in conducting SR in the LIS domain. This effort will enhance the development and advancement of SR methodologies, especially in areas where librarians have strength such as information search and retrieval. To enhance the methodological quality and rigour in SR, librarians can use the Report formula and checklist items appropriate in LIS (Xu et al., 2015b).

Further, librarians can collaborate with research teams as co-authors to conduct SR. This collaboration between librarians and researchers can improve the quality of search and reporting. Rethlefsen et al. (2015) found that the involvement of librarians or information specialists as co-authors was correlated with significantly higher quality of reported search techniques. SR that involve librarians have good quality of searches especially when the librarians have either acquired skills through received training or past experience (Koffel, 2015).

In collaboration with the research teams, the librarian's expertise is helpful at different stages of the review from the initial phase of the review to its publication. A recent scoping review highlights 18 different roles filled by librarians and other information scientists in conducting SR (Spencer & Eldredge, 2018). The librarians' core roles include searching, source selection, and evaluation, whereas less documented roles were planning, question formulation, and peer review (Spencer & Eldredge, 2018). Other roles include: teaching, citation management, collaboration, de-duplication of search results, Indexing of database terms, reporting and documentation (e.g. writing the methodology, and creating a flow diagram of the article selection process) (Spencer & Eldredge, 2018). Other scholars also added other roles, which include data abstraction, data extraction, bias assessment, critical appraisal, data synthesis, document supply, report writing (Bath, Beverley, & Booth, 2003; Harris, 2005), It is therefore imperative to engage librarians in SR as co-authors to help improve the quality of search strategies, and other documented roles as outlined by Spencer and Eldredge (2018).

Further, librarians can collaborate with the research teams as co-authors to conduct SRs not only in the topics defined by research teams, but also in LIS topics. Akers et al. (2018) found that research articles published in the Journal of the Medical Library Association (JMLA) between 2008 and 2017

revealed that 29% of articles had both librarian and faculty coauthors. The main topics covered in these journal articles were related to patient and consumer health information and clinical information-seeking and decision-making by health care providers (Akers et al., 2018). It is obvious that librarians can collaborate with researchers/faculty members in SR to improve the knowledge and practice of LIS, and other scientific disciplines.

The inclusion of SR as part of the continuing scientist development (CPD) programmes in libraries is also important in building the capacity of the librarians. Librarians need to play a key role in this aspect by building their capacity in different aspect of SR as outlined by Spencer and Eldredge (2018). This effort will enable librarians to become competent and serve as both co-authors in the research teams from other disciplines, and also be lead authors for LIS research works.

Use of automated SR tools and software can enable librarians to minimize time when conducting SR. As previously explained, one of the challenge that librarians encounter is limited time to conduct SR (Koufogiannakis & Crumley, 2006; Xu et al., 2015b). Automated tools and software such as reference managements software, CADIMA and other tools which can be found at the SRtoolbox website (http://systematicreviewtools.com/) can enable librarians to minimize the workload involved when conducting SR.

The creation of LIS SR databases would also enhance promotion and advancement of SR in LIS. We need to have databases such as Cochrane Library in medicine or Campbell Collaborations in evidence-based policy and practice. As echoed by Ke and Cheng (2015), "this would require a substantial amount of funding, effort, and cooperation, but the benefits are obvious". This type of database would enable researchers to find what has been done, and it will enhance reproducibility of research works, and enhance evidence-based practice in the LIS domain. Further, this database would comprise all the necessary tools and software that are important in informing librarians on how to conduct SR.

FUTURE RESEARCH DIRECTIONS

Despite the fact that this chapter focuses on how information scientists can us SR as a research method to inform LIS profession, further studies are still required in several aspects. First, it would be important to conduct further research on how most of SR processes can be automated to enhance efficiency of conducting SR. Further, more analysis is required to assess the role of information scientists in SR methodology development. Action oriented research would be useful.

CONCLUSION

This chapter discussed the current state of deployment of SRs in LIS field, and determined how information scientists can advance the SR as a research method in LIS domain. Despite its importance, SR is still not a common practice in the LIS domain. The methodological quality and reporting of SR is still poor in the LIS discipline. Since, they are experts in systematic literature search, the LIS scientists are supposed to take a lead this. Several barriers may limit deployment of SR in the LIS domain, which include: funding, time, experience, support, access to research and search issues, lack of skills in some aspects of SR. Therefore, it would be important for LIS schools and libraries administrators to overcome these issues, by introducing SR in LIS education curricular, integrate SR as part of the continuing scientist development programmes (CPD), encourage use of automated SR tools and software to minimize

workload, introduce SR a formal role and service in the libraries, collaborate with research teams as co-authors to conduct SRs not only in the topics defined by faculty members, but also in LIS topics, and encourage creation of LIS SR databases and tools.

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KEY TERMS AND DEFINITIONS

Critical Appraisal: Is the process of carefully and systematically examining research to judge its trustworthiness, its value and relevance in a particular context.

Data Extraction: Once one has identified all studies to be included in the systematic review, the next step is to extract and analyze the data contained in those studies. The data extraction should be based on the previously defined interventions and outcomes established during the research question, inclusion/exclusion criteria, and search protocol development.

Information Science: Information science is that discipline that investigates the properties and behavior of information, the forces governing the flow of information, and the means of processing information for optimum accessibility and usability. It is concerned with the body of knowledge relating to the origination, collection, organization, storage, retrieval, interpretation, transmission, and utilization of information.

Library: Is a curated collection of sources of information and similar resources, selected by experts and made accessible to a defined community for reference or borrowing. It provides physical or digital access to material, and may be a physical location or a virtual space, or both.

Meta-Analysis: Involves using statistical techniques to synthesize the data from several studies into a single quantitative estimate or summary effect size.

Protocol: A systematic review protocol describes the rationale, hypothesis, and planned methods of the review. It should be prepared before a review is started and used as a guide to carry out the review. Detailed protocols should be developed a priori, made publicly available, and registered in a registry such as PROSPERO.

Search Strategies: Is an organized structure of key terms used to search a database. The search strategy combines the key concepts of your search question in order to retrieve accurate results. Your search strategy will account for all possible search terms, keywords and phrases.

Systematic Review: Is a review of a clearly formulated question that uses systematic and reproducible methods to identify, select and critically appraise all relevant research, and to collect and analyze data from the studies that are included in the review. A systematic review can be either quantitative or qualitative.

Chapter 6
The Contribution of Case Study Research in Information Science

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ABSTRACT

The reputation of case study research has grown as a research strategy for developing theories and as a method for investigating and understanding world complex issues. The purpose of this chapter is to demonstrate how the case study research can add value to a research project. Case study research, although becoming increasingly popular is not adequately utilised in information science research. The chapter draws on the literature on case study research in various fields and uses examples to inform research in information science. Case study research have been used across a number of disciplines, particularly, in the social sciences, education and business to address real world problems. Many researchers tend to use case study research because of the numerous advantages it offers. For instance, the employment of multiple data collection instruments maximises the depth of information, which in turn increases transferability of the findings. Additionally, the use of multiple cases and multiple data collection instruments make generalisation easy and valid. Maximising generalisability of findings is the ultimate goal of research.

INTRODUCTION

Case study research has undergone substantial methodological development. This evolution has resulted in a pragmatic, flexible research approach capable of providing comprehensive in-depth understanding of a diverse range of issues across a number of disciplines (Harrison, Birks, Franklin & Mills, 2017). Thus, case study designs have been used across a number of disciplines, specifically in the social sciences, education and business to deal with real-world problems. Many researchers tend to use case study research because of the numerous advantages it offers. For instance, case study research can easily be used with other qualitative approaches such as discourse analysis and historical methods in line with methodological triangulation (Ngulube, 2015). Case study researchers usually triangulate data as part

of their data collection strategy, resulting in a detailed case description (Eisenhardt, 1989; Ridder, 2016; Stake, 2005). The use of triangulation in research makes case study research popular.

The purpose of triangulation is not to arrive at consistencies, as commonly believed (Patton, (2002) quoted in (Ngulube & Ngulube, 2017). In some cases, triangulation may result in inconsistent, contradictory and convergent findings. What is important to note is that inconsistencies may trigger the researcher to explore the phenomenon further in order to make the data sensible. Furthermore, conflicting findings may motivate the researcher to think outside the box (Ngulube & Ngulube, 2017).

Cohen, Manion and Morrison (2007) outline five different types of triangulation:

- Time triangulation employs cross-sectional and longitudinal designs.
- Space triangulation uses comparative or cross-cultural approaches instead of researching one culture.
- Combined levels of triangulation involve more than one level of analysis (individual level, group level and organisational level).
- Theoretical triangulation uses multiple theories to explain research findings.
- Investigator triangulation utilises more than one observer independent of the other.
- Methodological triangulation entails multiple methods.

All these forms of triangulation are possible, for instance, space triangulation which uses comparative or cross-cultural approaches was employed by Cohen, Manion and Morrison (2007) to explore the similarities and differences in student behaviour in the use of four academic libraries in the greater New York City area. However, the most common form is methodological triangulation, which is easily incorporated in case study research. Methodological triangulation can occur if more than two research approaches are used.

However, case study research can mean single or multiple case studies. The use of multiple case studies gives case study research a lot of validity and credibility. This also contributes to its popularity; and, as a result, researchers have confidence in it. It is imperative not to confuse case study research with qualitative research as they can be based on any mix of quantitative and qualitative evidence.

This chapter aims to provide information science researchers and researchers of other disciplines with an account of the benefits of case study research in any given research. Furthermore, the chapter relates a general debate of how different case study research designs contribute to a theory continuum. Hence, the research question: What are the contributions of case study research in information science?

Researchers might not be comfortable with case study research, because it has some level of subjectivity and researcher bias may also be a problem. Furthermore, it is not possible to conduct the research on a large scale because of the in-depth nature of the data. Hence, there are concerns about the reliability, validity and generalisability of the results. However, it of utmost importance to note that case study research has various advantages in that it presents the data of real-life situations and provides a better understanding of the detailed behaviours of the topics of interest, which cannot be provided by quantitative research. It is necessary to note that case study methods, like all research methods, is more appropriate for some situations than others. It is, therefore, the duty of the researcher to use case study research appropriately to come up with desired results.

Additionally, case study research has its strength in creating theory by expanding constructs and relationships within distinct settings (in single case studies), (Ridder, 2017). On the other hand, case study research is a means of advancing theories by comparing similarities and differences among cases

(in multiple case studies), (Ridder, 2017). Contrary to quantitative logic, the case is chosen because the case is of interest (Stake, 2005); or it is chosen for theoretical reasons (Eisenhardt & Graebner, 2007).

Thus, the objective of this chapter is to highlight various contributions of case study research and to explain how it can be used in theory building. This chapter used desktop research to present the contributions of case study research in information science. Desktop research is very effective because it is extremely quick since it is a research technique which is mainly acquired by sitting at a desk. This type of research uses the secondary sources other researchers have gathered through primary research. The advantage of desktop research is that data are already existing and available and has very low costs. The researcher, however, needs to be information-specific, since there is a lot of information on the internet.

It is not foreign to use secondary data analysis in library and information science research. The same method was employed by Johnson (2015). A secondary data collection method is also an empirical exercise and a systematic method with procedural and evaluative steps, like collecting and evaluating primary data (Johnson 2015). Alenzuela, Fong, Bloss and Chambers (2019) employed the same method to describe the development and current practices in information literacy at the University of the South Pacific. It is essential at this point to give a brief definition of a case study.

DEFINING A CASE STUDY

One of the most prominent advocates of case study research, Yin (2009), defines case study as "an empirical enquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p.14). Stake (2006), on the other hand, notes that as a form of research the case study "is defined by interest in an individual case, not by the methods of inquiry used" and contends that the object of study is a specific, unique and bounded system.

In addition, Hagan (2006) defines a case study method as "in-depth, qualitative studies of one or a few illustrative cases" (p.54). This implies that besides the case under investigation, there are also other cases. Taking this description into consideration, it can be suggested that a case study is an approach capable of examining simple or complex phenomena with units of analysis varying from single individuals to large institutions.

Case study research is normally utilised in medical research, psychology, sociology; and it is now also being adopted in other disciplines (Harrison, Birks, Franklin & Mills, 2017; Lune & Berg, 2017). Information studies have also widely adopted the case study method. However, the choice is guided by the type of questions the researcher will ask when collecting data. In information science, as in other disciplines, case study research is becoming more popular each day (Harrison et al., 2017; Herreid, 2006; Ngulube, 2019; Ngulube & Ukwoma, 2019; Ullaha & Ameen, 2018).

What makes case study research popular is that it is considered by researchers as a robust research method particularly when a holistic, in-depth investigation is required, (Lune & Berg, 2017; Zainal, 2007). Another factor might be that, when employing an exploratory case study, data collection may be conducted before the research questions and hypotheses are proposed (Zainal, 2007). Philosophical assumptions of a case study need to be considered. The following section illustrates the philosophical assumptions of a case study.

PHILOSOPHICAL ASSUMPTIONS OF A CASE STUDY

Case study research has a practical versatility in its agnostic approach whereby "it is not assigned to a fixed ontological, epistemological or methodological position" (Rosenberg & Yates, 2007, p. 447). Philosophically, case study research can be orientated from a realist or positivist perspective where the researcher holds the view that there is one single reality which is independent of the individual and can be apprehended, studied and measured through to a relativist or interpretivist perspective (Harrison et al., 2017). In terms of a relativist or interpretivist perspective, case study research adopts the premises that multiple realities and meanings exist which depend on and are co-created by the researcher (Yin, 2014).

It is therefore imperative for researchers to be "aware of the philosophical assumptions underlying their knowledge claims." Acknowledgement of knowledge claims helps the researchers to avoid inconsistencies in their research (Ngulube, 2015). Additionally, researchers become ethically accountable for their choices and make the whole research enterprise transparent by declaring their philosophical claims upfront (Ngulube, 2015). Such declarations give context to the researcher's scholarly work (Lowery & Evans, 2004). Researchers make their presuppositions explicit and demonstrate their awareness of the philosophical assumption in which their research is grounded to justify their methodological choices (Guba & Lincolin, 1994). Being cognisant of philosophical and theoretical assumptions also contextualises the researcher's scholarly work, (Lowery & Evans, 2004). Researchers should explicitly describe their research methodology and explain the reasons for choosing a specific methodology, since this may provide a widely informed overview of the nature of the craft and promote productive dialogue across a research community (Bachanan & Bryman, 2007, p. 497).

When researchers conduct case study research, the "case" under investigation may be an individual, organisation, event or action existing in a specific time and place. For example, clinical science has produced well-known case studies of individuals and clinical practices (Rolls, 2005; Corkin, 2013). It must be noted that when "case" is used in a claim or an argument, such a case can be the subject of many research methods, not just case study research.

Thus, case study is relevant to all research traditions because it is transparadigmatic and transdisciplinary (Van Wynsberghe & Khan, 2007). The purpose of this chapter is to demonstrate the contributions of case study research to information science. The following section, therefore, describes the suitability of case study research in information science.

SUITABILITY OF A CASE STUDY FOR RESEARCH IN INFORMATION SCIENCE

Social science case studies are often perceived as limited in their ability to create new knowledge because they are not randomly selected and the findings cannot be generalised to larger populations (Flyvbjerg, 2006). Hence, the social scientist researcher needs to think introspectively about how to deal with these misconceptions because this can help to strengthen the validity and reliability of the research. However, it must be noted that there is no research method which is flawless. The researcher should clarify issues of case selection; test and challenge existing assumptions; and interpret key findings and the summation of case outcomes before embarking on any research,

Like any other research method, a case study, cannot be suitable without a thorough literature review, relevant research questions and good research methods, (Aveyard, 2010; Jesson, Matheson & Lacey, 2011). However, just as a different method prevails in the natural sciences, different social science re-

search methods meet different needs and situations for investigating social science topics (Yin, 2009). For instance, for social sciences, like economics case study research, can be suitable for studying the structure of a specific firm or organisation.

In brief "case study method allows investigators to retain the holistic and meaningful characteristics of real-life events, such as individual life-cycles, small group behaviour, organisational relations and managerial processes, neighbourhood change, school performance, international relations, and the maturation of industries" (Yin, 2009, p. 4).

Case studies are mainly used as a research method for the social science disciplines, which include library information science (LIS). Ngulube and Ukwoma (2019) revealed that the case study research method was the second preference of LIS researchers in Nigeria and South Africa. Social scientists need to understand the application of case study research as well as how to design and conduct single or multiple case studies. For instance, in information science a case study can be used to investigate the curricula of an information science programme of the University of Zululand, Kwa-Zulu-Natal and the University of South Africa. Such studies can provide research with a rich foundation to be able to generalise findings on the nature of LIS curricula in South Africa.

The same approach was employed by Ngulube (2019) when investigating the functionality of public school libraries in three schools. The multiple case study was designed as a comparative investigation to show relationships between three schools to determine how functional public high school libraries are. By evaluation, a case study encompasses a problem contextualised around the application of in-depth analysis, interpretation and discussion, which often results in specific recommendations for action or for improving existing conditions.

A case study is not purely qualitative, since the methods used to study a case can rest with a quantitative, qualitative or mixed-method investigative methodology. Most studies or research utilise multiple cases because they enhance the external validity or generalisability of findings. If a single case is used, the phenomenon under investigation must be a unique one. A single case needs an in-depth analysis, which can be based on the hypothesis that the case study will reveal trends or issues that have not been exposed in prior research or will reveal new and important implications for practice. In addition, when focusing on a single case in social science research researchers can make detailed observations of something that cannot be done with large samples at a very low cost.

Recently the case study research approach has been used extensively in a wide variety of disciplines, particularly in the social sciences because of its ability to generate an in-depth, multi-faceted understanding of a complex issue in its real-life context, (Yin, 2009). The researcher employs multiple cases for an even deeper understanding of the phenomenon and comparison purposes. In addition, a case study gives the researcher an opportunity to use a range of tools in one subject which gives a holistic review of a phenomenon unlike surveys which give more of a snapshot. The employment of multiple cases needs the knowledge of case study design.

A case may be chosen because of its inherent interest or because of the circumstances surrounding the case. Apart from this, researchers may choose case study because of their in-depth local knowledge; which puts them in a position to have a good understanding of the phenomenon (Fenno, 2014). Thomas (2011) proposes a typology for the case study where the purposes are identified first (evaluative or exploratory); in addition, the approaches are delineated (theory-testing, theory-building or illustrative) and decided on with a principal choice to be made whether the study would be single or multiple; and choices are then exercised as to whether the study should be retrospective, snapshot or diachronic; and whether it is nested, parallel or sequential. It is necessary therefore to look at case study designs.

CASE STUDY DESIGN

Case study research can be categorised into a number of case study designs. There are four main types of case study research: single case (holistic) designs, single case (embedded) designs, multiple case (holistic) designs and multiple case (embedded) designs, (Yin, 2014). Case study designs can be descriptive, exploratory, explanatory, illustrative or evaluative, (Harrison et al., 2017). Descriptive research is to provide an accurate and valid representation of the factors relevant to the research question; while exploratory research focuses on identifying the boundaries of the environment in which the problem resides. Explanatory research, on the other hand, identifies any causal links among variables pertaining to the research problem. This also includes, particularistic, heuristic, descriptive (Merriam, 2009) and intrinsic, instrumental and collective research (Stake, 2006). According to, Shodhganga, (n.d.), explanatory studies go beyond description and attempt to explain the reasons for the phenomenon that the descriptive study only observed. Shodhganga (n.d.) goes on to say that in an explanatory study the researcher uses theories or hypotheses to represent the forces that caused a certain phenomenon to occur. The next section explains a single case study.

A Single Case Study

It is of paramount importance to take a decision on what type of a case study one is going to employ prior to data collection. When choosing a single case study, the case should be related to theory or theoretical propositions. The single case study can be used to determine whether the propositions are correct or whether some alternative set of explanations might be relevant (Yin, 2014). A single case study can be of great importance when used to test a theory; or when the researcher focuses on any single phenomenon, such as in clinical psychology where the focus can be on one specific patient. A second rationale for a single case study is where the case study represents an extreme case or an unusual case, deviating from theoretical norms or even everyday occurrences (Yin, 2014, p.52). A single case study can also be used as a pilot case, especially at the early stages of a multiple case study research. A single case study is two-faceted; it can be holistic or embedded. An embedded case study entails a study of an organisation with all its various departments. An embedded case study assists in adding the subunits, which in turn add validity and reliability to the study. Yin (2014) maintains that the single case study is eminently justifiable under certain conditions, where the case represents:

- A critical test of existing theory
- An extremely or unusual circumstance
- A common case or where the case serves as a revelatory or longitudinal purpose

As Gerring (2004, p. 342) is of the opinion that a case study should be "an intensive study of a single unit… a spatially bounded phenomenon – e.g. a nation-state, revolution, political party, election, or person – observed at a single point in time or over some delimited period of time". However, it is important to note that whereas Gerring (2004) refers to a single unit of analysis, it can also refer to sub-units. This is what Yin (2009) refers to as a 'holistic' case design with a single unit of analysis and an 'embedded' case design with multiple units of analysis.

When conducting research using case study research, researchers should define the unit of study as well as an operational definition. The research conducted as a single case cannot usually be satisfied by

multiple cases (Yin, 2014, p. 57). It must be noted that issues of ontology, epistemology and methodology are central to the principles of single-case study research. What are multiple cases then all about? This is explained in the next section.

Multiple Cases

Research conducted through multiple-case study is usually planned in the way one plans for multiple experiments. The individual cases in a multiple-case design may be either holistic or embedded; and each case may include the collection and analysis of quantitative data, which include the use of surveys in each case study (Yin, 2014). This is relevant in any field of study, especially when the researcher wants to apply a mixed-methods approach. However, the researcher should choose these cases carefully, since they are expensive and time-consuming to conduct. Apart from this, a multiple case study also requires expensive resources and the researcher who chooses a multiple case study must be really committed.

Although expensive and time-consuming, multiple cases are often considered more compelling and the overall study is therefore regarded as robust (Ledford & Gast, 2018, Herriott & Firestone, 1983; Yin, 2012). Furthermore, multiple cases allow for a wide pull of data and make generalisation much easier than data gathered from a single case. Multiple cases also allow the use of a replication strategy. Both single cases and multiple cases fit well in the qualitative research approach. Denzin and Lincoln (2011, pp. 8-10) summarise the characteristics of qualitative research as five key attributes:

- Reducing the use of positivist or post positivist perspectives
- Accepting postmodern sensibilities
- Capturing the individual's point of view
- Examining the constraints of everyday life
- Securing rich descriptions

The attributes mentioned above are commonly exemplified in case study research (Harrison et al., 2017). Apart from the case study, research can be used in a variety of ways. In agreement, Yin (2003) alludes that there are several designs for case studies raging from exploratory and explanatory to descriptive case studies. The following section illustrates the exploratory case study.

Exploratory Case Studies

When conducting exploratory case study research, the researcher starts with data collection. This can be done before the research question is formulated. Yin (2003) indicates that the goal of exploratory studies is to discover theory through directly observing some social phenomenon in its natural setting and raw form. In this instance, case study research is useful as a pilot study, for example when planning a larger comprehensive investigation (Swanson & Holton, 2005) cited in Lune and Berg (2017). Furthermore, exploratory case studies are set to explore any phenomenon, which serves as a point of interest to the researcher. In this instance, the phenomenon under investigation needs to be described. Moreover, when the researcher investigates information science programmes at the three institutions mentioned in the previous section, he or she needs to do a comparative analysis of the programmes.

The most important thing to bear in mind when conducting research is to utilise a research method that is more advantageous than others. In this specific example case study research is appropriate because

it allows the researcher to engage a number of data collection instruments. In a nutshell, exploratory case study can be designed quickly in response to unanticipated events. In addition, case study research allows for the exploration and understanding of complex issues through reports of past studies, (Zaidah, 2007). According to Yin, (1984) an exploratory case study is crucial in determining the protocol that will be used. Case study research can also be explanatory. The following section illustrates the explanatory case study research.

An Explanatory Case Study

Explanatory case studies examine the data closely at surface level and in-depth to explain the phenomena under investigation (Zaidah, 2007). An explanatory case study is useful when working on theory development, especially when conducting causal studies and when something new has happened. A theoretical model can then be built to explain the phenomenon. This then allows for a comparative analysis with other cases which would have occurred; and share the same feature. Lune and Berg (2017) add that case studies are essential when pursuing an inferential research question, particularly in complex studies of organisations or communities where one might desire to employ multivariate cases to examine a plurality of influences. The explanatory case study then attempts to discover and analyse the many factors and conditions that can help the researcher to build a casual explanation for the case, (Lune & Berg, 2017). The other case study design is referred to as a descriptive case study.

Descriptive Case Study

When this type of case study is employed, the investigator presents a descriptive theory that establishes the overall framework for the investigator to follow throughout the study (Lune & Berg, 2017). It is necessary to note that before embarking on the study, the researcher first needs to establish the units of analysis in the study. Descriptive case studies differ from explanatory ones in that the researcher would focus on the uniqueness of the case and would not try to develop an inferential model that would necessarily be applied to other cases (Lune & Berg, 2017).

It is actually the type of phenomenon under investigation that dictates the type of case study research design to be employed. The phenomenon that is being investigated can be researched, using all the designs, as explained. The main issue to take cognisance of when conducting case study research is generalising. Data collected through a case study approach must be generalised without compromising quality. Hence, data must be rich in order to gain an understanding of the phenomenon under investigation. This is supported by Lune and Berg (2017, p. 178) who are of the opinion that when case studies are properly undertaken, they should not only fit the specific individual, group or event studied but should generally provide an understanding of comparable individuals, groups and events.

When conducted well, case study research is a powerful tool because there are many issues and events that cannot be properly understood without this kind of deep, intense study from multiple angles (Lune & Berg, 2017 p. 180). Thus, unlike other research methods, case study research provides more context and meaning to the uniqueness of each case. However, the researcher must not get carried away by providing too much information because case study research encourages fine-tooth comb analysis. The main idea is to unveil what other researchers might have missed.

Case study research is versatile because it can be used in so many different ways; this can be based on any mix of quantitative and qualitative evidence (Lune & Berg, 2017) When a researcher does this it

yields rich data which can be generalised and clear inferences will be made. This is one of the reasons why case study research is widely recognised in many social science studies, especially when in-depth explanations of a social behaviour are sought after. Researchers who have contributed to the development of case study research and its various designs come from diverse disciplines and their philosophical underpinnings have created a variety and diversity in approaches used (Harrison et al., 2017). This makes it easier for information science researchers to embrace case study research because it is relevant to all the disciplines. To appreciate and understand case study research better, its historical development needs to be understood.

HISTORICAL DEVELOPMENT OF THE CASE STUDY APPROACH

Frederic Le Play first introduced the case study method into social science in 1829 as a handmaiden to statistics in his studies of family budgets (Edward, 1947). However, the antecedents of modern-day case study research are most often cited as conducted in the Chicago School of Sociology between the 1920s and1950s (Stewart, 2014). Anthropologists practised their methods on university cultures by conducting lengthy case studies involving field-based observations of groups with the aim to understand their social and cultural lives (Creswell et al., 2007; Johansson, 2003; Stewart, 2014). Contemporary case study research is said to have its origins in qualitative approaches to research in the disciplines of anthropology, history, psychology and sociology (Merriam, 1998; Simons, 2009).

In all these disciplines, case studies were an occasion for postulating new theories like in the grounded-theory work of sociologists, Glaser and Strauss (1967) and Lune and Berg (2017). One of the areas in which case studies have gained popularity is in education, specifically educational evaluation, MacDonald and Walker (2006), MacDonald, (1978), and Kushner, (2000). Comparative case studies in social science, policy and education research discuss one approach which encourages researchers to compare horizontally, vertically, and temporally (Bartlett & Vavrus, 2017).

It is increasingly difficult to ignore case study research, because it is a popular research method, especially among qualitative researchers. In support of this notion, Hyett, Kenny and Dickson-Swift (2014) add that several prominent authors have contributed to methodological developments which have increased the popularity of case study approaches across disciplines. A study by Ngulube and Ukwoma (2019) seems to support the claim since the case study was second in popularity in LIS research in Nigeria and South Africa.

Theory building can be designed by following the steps illustrated in the diagram below adopted from Yin (2009, p. 39). The diagram illustrates that if two or more cases are shown to support the same theory, replication may be claimed as indicated in the diagram. In terms of the diagram illustration, the researcher should aim for level-two inferences when doing case studies, (Yin, 2009).

According to Yin (2009), a good case study investigator should make the effort to develop the theoretical framework, as illustrated in the diagram. They examine one or more sites either for the purpose of examining a situation of unique interest with little or no interest in generalisation; or to call a highly generalised or universal assertion into question. This method is useful when having to answer cause and effect questions. These serve to aggregate information from several sites collected at different times. The idea behind these two levels is that the collection of past studies will allow for greater generalisation without additional cost or time spent on new, possibly repetitive studies. Furthermore, these two

Figure 1. Making inferences (Yin, 2009, p .39)
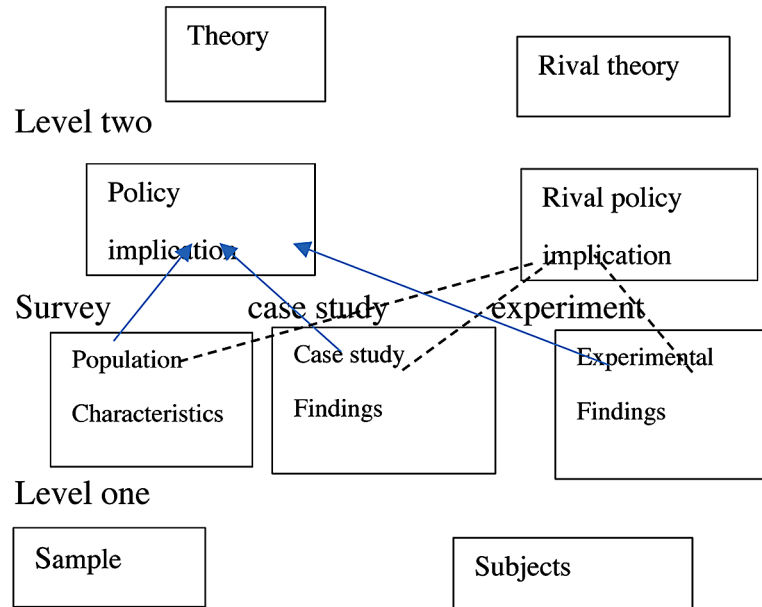
levels keep the complexity of the phenomenon investigated manageable and clarify the task of selecting which cases to study.

In terms of information science, Ocholla and Roux (2011) recognise the growth of theory in library and information science as a distinct subject; and that information science largely relies on theories from other disciplines.

USES OF CASE STUDY RESEARCH

The fundamental goal of case study research is to conduct an in-depth analysis of an issue, within its context with a view to understand the issue from the perspective of the participants (Merriam, 2009; Simons, 2009; Stake, 2006, Yin, 2014). Furthermore, scholars tend to use case study research because of the numerous advantages it offers researchers who are interested in comprehensive and wide-ranging perspectives and insights into a phenomenon under investigation.

Case studies are popular in business education where they are commonly called case methods and casebook methods (Ellet, 2007). Case methods or casebook methods have been a highly popular pedagogical format in many fields ranging from business education to science education. Harvard Business School has been among the most prominent developers and users of teaching case studies (Garvin, 2003; Ellet, 2007). The business school faculty generally develops case studies with specific learning objectives in mind. Additionally, relevant documentation such as financial statements, time lines and short biographies, often referred to in the case study as exhibits and multimedia supplements, such as video-recordings of interviews with the case subject, often accompany the case studies. Similarly, teaching case studies have become increasingly popular in science education. The National Center for Case

Studies in Teaching Science has made a growing body of case studies available for classroom use for university as well as secondary school coursework, Palmer and Lordanou (2015).

Case study as a research approach is also gaining popularity in developing theory. Researchers employ it in theory building in various disciplines. The next section describes the use of case study in the development of theory.

CASE STUDY AND DEVELOPMENT OF THEORY

Case research is related to theory building and theory testing, but is strong in theory building, (Lune & Berg 2017). This is supported by Yin (2003) who argues that there has been a revived interest in the role of theory and case studies. The use of case study in developing theory has been utilised successfully in many disciplines ranging from education and business to medicine and social sciences (Alexander & Bennett, 2005). Researchers, like Eisenhardt (1989) cited in Lune and Berg (2017), argue that case data is valuable for grounded theory research in that it challenges theoretical assumptions with real-life data; defines new areas for research by exposing unanticipated findings and has high empirical validity.

A cursory review of the literature suggests that a vigorous renewal of this interest appears to have occurred in the areas of business, marketing and information systems and the social sciences (Lune & Berg, 2017). Information science, as a social science, utilises case study in theory building, since it is a process of scholarly inquiry and exploration, the underlying purpose of which is to create new knowledge.

To develop a theory by using case study, the researcher needs to start with a research idea and then formulate a research question or topic. To strengthen this claim Lune and Berg (2017) say that in order to develop a theory the researcher starts with an idea and then develops a plan including whether to use a single or multiple-case approach and consider how data will be collected. The same approach is commonly used when developing grounded theory.

DEVELOPING GROUNDED THEORY THROUGH THE CASE STUDY METHOD

Grounded theory "merged qualitative field study methods from the Chicago School of Sociology with quantitative methods of data analysis" (Johansson, 2003, p. 8), resulting in an inductive methodology that used detailed systematic procedures to analyse data, (Harrison et al., 2017).

However, theory development from case study approach is traditionally associated with multiple rather than single cases (Eisenhardt & Graebner, 2007; Ngulube & Ngulube, 2015; Yin, 2009). The illustration clearly explains the importance of case study research in theory building and testing. Furthermore, case study research assists in providing a description of a phenomenon, testing theory or generating theory (Eisenhardt, 1989).

Apart from this, Lune and Berg, (2017) add that Howard and Oberstein (2001) also developed a model of organisational fields from his study of community-based responses to HIV/AIDS. Lune and Berg (2017 p. 171, add that by concentrating on a single phenomenon, individual, community or institutions the researcher aims to uncover the manifest interactions of significant factors characteristic of this phenomenon, individual, community or institution. In this instance the researcher is able to capture the various nuances, patterns and more latent elements that other research approaches might overlook (Lune & Berg, 2017 p. 171). In addition, case study research is given the credits of focusing on holistic

description and explanation of a phenomenon. The following section deals with the advantages of case study research.

ADVANTAGES OF CASE STUDY RESEARCH

Variations in terms of intrinsic, instrumental and collective approaches to case studies allow for quantitative and qualitative analyses of the data (Zaidah, 2007) which increase its popularity. The limitations of quantitative methods in providing holistic and in-depth explanations of the social and behavioural problems in question forced some researchers to turn to case study research. Limiting it to only the quantitative method would obscure some important data that need to be uncovered and give in-depth analysis of results. The detailed qualitative accounts often produced in case studies do not only help to explore or describe the data in real-life environments, but also help to explain the complexities of real-life situations which may not be captured through experimental or survey research (Zaidah, 2007).

Through case study methods, a researcher can go beyond the quantitative statistical results and understand the behavioural conditions through the actor's perspective, (Zaidah, 2007). By including quantitative and qualitative data, a case study helps to explain the process and outcome of a phenomenon through complete observation, reconstruction and analysis of the cases under investigation (Tellis, 1997).

Another noticeable advantage of a case study method is that it helps a researcher to closely examine the data in a specific context. In most instances, case study research concentrates on a small population or selects a small geographical area as sample of study because case studies, in their true essence, explore and investigate contemporary real-life phenomenon through a detailed contextual analysis of a limited number of events or conditions, and their relationships, (Zaidah, 2007).

Another good advantage of a case study is that the case study research method investigates a contemporary phenomenon within its real-life context when the boundaries between phenomenon and context are not clearly evident (Yin, 1984:23). In other words, a case study is a unique way of observing any natural phenomenon which exists in a set of data (Yin, 1984, cited in Zaidah, 2007).

A number of researchers used the case study research approach successfully in theory development. Among them are Stavros and Westberg (2009). In this study they used a case study to examine the factors driving the adoption of relationship marketing within major professional sporting organisations in Australia. The study investigated six Australian sporting organisations that use multiple data collection methods including semi-structured interviews with several senior executives in each organisation, secondary and historical data sources and participant observation. The findings were that using triangulation and a multiple case study approach provided a richness of information which, upon analysis within and across cases, revealed several commonalities and some limited diversity. Using this approach maximised the depth of information and increased the transferability of the findings to allow for the development of a conceptual model, which advances relationship-marketing theory.

The same approach was used by Voss, Tsikriktsis and Frohlich (2002). Their paper provides guidelines and a roadmap for operations management researchers who wish to design, develop and conduct case-based research. This implies that case study research can be used to develop theories. It can also be suggested that the same method can be utilised in other fields, among which is information science.

DISADVANTAGES OF A CASE STUDY RESEARCH

Case studies provide very little basis for scientific generalisation, since they use a small number of subjects. Some case studies are conducted with only one subject (Zaidah, 2007). Thus, they are criticised for their lack of robustness as research tools (Zaidah, 2007). Case studies of ethnographic or longitudinal nature can elicit a great deal of data over a period. The danger comes when the data are not managed and organised systematically (Zaidah, 2007). Additionally, the researcher's feelings and opinions can affect data analysis; and this will cause bias. Case study research methods, like all research methods, have limitations and flaws; thus, it is more appropriate for some situations than others, as alluded earlier. The use of triangulation and multiple cases compliment the weaknesses of case study research. This is the reason why there are more advantages than disadvantages.

EVALUATING CASE STUDY RESEARCH

The researcher needs to look at the weaknesses and strengths of case study research in order to come up with valid results. Greenwood and Levin (2007) consider reliability and validity to be the researcher's "amulet" in conventional science research but these do not apply when evaluating case study research studies. Therefore, case study research should not be evaluated using the principles embedded in the positivist paradigm. This is supported by Ngulube (2015) who maintains that even if the evaluation of qualitative studies is a contested terrain, studies are generally evaluated for their trustworthiness, credibility, dependability and transferability. The same criteria can be used for case study research if viewed from an interpretivist epistemology.

OVERCOMING THE DISADVANTAGES OF CASE STUDY RESEARCH

From the literature, it can be noted that case study research is now indisputably prominent. Researchers like, Yin (2009) and Greenwood and Levin (2007) agree on the notion that the case study method allows for the thorough analysis of the complex and particularistic nature of distinct phenomena. Some researchers have a high esteem for case study research while others criticise it for its limitations. One of the main criticisms of case study research is that the data collected cannot necessarily be generalised to the wider population. The drawback of a single case design is its inability to provide a generalising conclusion, specifically when the events are rare. One way of overcoming this is by triangulating the study with other methods to confirm the validity of the process (Zaidah, 2007).

Again, there is the possibility that the description lacks rigour and that problems may occur during the project (Zaidah, 2007). A common criticism of the case study method is its dependency on a single case exploration which makes it difficult to reach a generalising conclusion (Tellis, 1997). The employment of a number of qualitative research instrument strengthens case study research, given that the case study has often been seen as more of an interpretivist than and idiographic tool; and the fact that it has been associated with a distinctly qualitative approach. This can, however, be complemented by using multiple cases and triangulation as mentioned earlier. Researchers need to understand when to use a single case and when to utilise a multiple case.

All research methods have challenges and disadvantages, Yin (2014, p. 73), suggests that these can be minimised by adhering to the following basic list:

- Ask good questions – and interpret the answers fairly
- Be a good listener – do not be not trapped by existing ideologies or preconceptions
- Stay adaptive so that newly encountered situations can be seen as opportunities and not threats
- Have a firm grasp of the issues studied, even when in an exploratory mode
- Avoid biases by being sensitive to contrary evidence, also knowing how to conduct research ethically

Researchers should try to take note of the listed desired attributes advocated by Yin (2014), in order to cater for the weaknesses of case study research. When these attributes are taken into consideration there will be rigour, which minimises bias and factors that decrease confidence in outcomes. As a result, it makes the data valid and conclusions can be drawn with confidence.

The information science literature clearly needs ideas about the various forms in which case studies can be reported and how this can be understood. Consequently, most case study research is reported in a cultivated style that allows the researcher to employ multiple cases and a variety of data collection methods. A researcher is faced with a large variety of forms of case study accounts to choose from when writing a case study. What the researcher should bear in mind is that engaging in case study involves formulating research questions; gathering data; analysing the case and being reflective about the position of the researcher with regard to the case, among many other things (Yin, 1994; Stake, 1995).

ETHICAL CONSIDERATIONS IN CASE STUDY RESEARCH

Thomas (2011) defines ethics or moral philosophy as a branch of philosophy that involves systematising, defending and recommending concepts of right and wrong conduct. The field of ethics, along with aesthetics, is concerned with matters of value and therefore comprises the branch of philosophy called axiology (Thomas, 2011). There is a need to reconceptualise research ethics in the context of case study research. Ethical issues within research are commonly dealt with, specifically when looking at how much ownership participants have over the research, data, interpretations and outcomes. Another factor to consider is the mechanism used to review roles and responsibilities as the project progresses. The researcher can also protect participants by preserving their identities in the project, as dictated by ethical principles.

Apart from that, professional standards of ethical conduct in all research should contain core aspects including a commitment to avoid conflicts of interest. Furthermore, it is essential to maintain trust and confidence in the integrity of the entire research processes. The knowledge of ethics is of fundamental importance in information science research, because most case study researches deal with people and documents of individuals, businesses, government and organisations.

FUTURE RESEARCH DIRECTIONS

There are many shades of case study research and it is imperative to determine which shade of a case study research is best suited for information science. Information science researchers can also position and legitimate themselves and try to incorporate multiple cases and triangulation in their research. This will strengthen the method and win the respect of those who criticise case study research for its lack of rigour and difficulty to generalise. This generates an image that case study research is a distinctly identifiable research method (Stake, 1995). Case study, in itself, is very diverse and it is difficult to view it as one uniform method of research, because case studies can be designed and conducted in various ways; moreover, data gathering and analysis can be done in numerous ways.

CONCLUSION

There is no right way to conduct case study research agreed on. As an approach to inquiry, case study research is multidimensional, multi-purposeful, engages numerous research instruments and it is flexible (Harrison et al., 2017). Further experience with theory-oriented case study research will without any doubt lead to further refinements. Case study researchers must gather efforts to stimulate interest in improving and disseminating case study methods. In information science, case studies are not foreign; however, researchers need to involve triangulation more to narrow the gap of criticism and make it more attractive for interdisciplinary research. In this chapter case study research is approached as a methodological issue, it is therefore, on the researchers to choose the appropriate case study design when conducting research in information science and other disciplines.

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Chapter 7
Autoethnography in Information Science Research:
A Transformative Generation and Sharing of Knowledge or a Fallacy?

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ABSTRACT

This chapter examines the concept of autoethnography as a qualitative research method. It aims to investigate the critical question of the importance of autoethnography as a transformative scientific research method for the purpose of generating and sharing knowledge to advance research in information science. The chapter is an exploratory study investigating the current context of autoethnography in information science, its applicability to the field for transformative learning and knowledge sharing, and possible challenges to be experienced. Findings indicate the potential of the autoethnographic method to provide the opportunity for information professionals to study experiences of information use in diverse contexts of information science. Recommendations highlight the viability of the application of Sense Making theory and the Information Search Process (ISP) model to research practices in autoethnography by information scientists.

INTRODUCTION

Qualitative research methods lie within the interpretive paradigm that focuses on complex social constructs that seek to understand human actions from the perspective of the social actors themselves. The key assumption in qualitative research is that events that occur can only be understood through the eyes of the actual participant in context (Babbie & Mouton, 2001; Berg, 2012; Gorman & Clayton, 2005). As an approach, the qualitative research method is able to provide a descriptive analysis of the social context it examines; in this way, it affords the researcher the facts and figures that allow for the interpretation of findings in the context of the community or situation being investigated. Similarly, the fact that qualitative data are collected over a sustained period of time makes them useful for studying social processes within any given context (Bryman, 1988; Denzin & Lincoln, 2005).

In practice, qualitative research methods lack the precision and definition of quantitative methods, and its processes are inductive; that is, theory formulation is grounded in the findings of the research that can be used to support, refine, compare, or formulate new theories (Sarantakos, 1993). The methods and approaches used in qualitative research therefore relate to the processes and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity, or frequency, but rather emphasize the socially constructed nature of reality and the situational constraints that shape the inquiry. However, qualitative research does allow for a more nuanced approach to the development of theories (Creswell, 1994, 2014; Denzin & Lincoln, 2011). The following approaches have been identified as being distinctly aligned to qualitative research methods, among which include case study, ethnography, phenomenology, autoethnography, grounded theory, and narrative inquiry (Leedy & Ormond, 2005).

PURPOSE OF THE STUDY

Autoethnography is a relatively new research approach within qualitative research methods; it is a method that seeks to describe and systematically analyze the personal experience of a researcher in order to understand a particular context, cultural belief, or practice (Ellis, Adams, & Bochner, 2011). It entails the researcher writing about themselves as a form of critical self-inquiry in which he/she is at the center of investigation as the "subject" as well as the "object" or participant being investigated (Denshire, 2013; McIlveen, 2008; Ngunjiri, Hernandez, & Chang, 2010). However, this particular feature of the research method has been a subject of much scrutiny, as it involves highly personalized accounts where the opinion of the researcher is written in the first person, which opposes the widely accepted view that maintains that any rigorous and valuable research should be undertaken from a neutral, impersonal, and objective stance (Holt, 2003; Méndez, 2013; Ngunjiri et al., 2010). Similarly, even though autoethnography as a qualitative research method utilizes data about self and context in order to gain an understanding of the connectivity with other social phenomena, issues of ethics, the absence of a strong analytical approach, and the inability to generalize research outcomes have constituted some of its major limitations as a research method (Anderson, 2006; Ellis, 2007; Méndez, 2013). Despite these challenges, the applicability of autoethnography to various disciplines, professional practice, and organizations is growing, thereby providing an opportunity to further interrogate the assumptions and processes that define this research method (Doloriert & Sambrook, 2012; McIlveen, 2008; Parry & Boyle, 2009).

In information science research, Guzik (2013) asserts that autoethnography as a research method is underutilized. A few studies have, however, indicated that the application of this research method has the potential to enrich our understanding of the contextual character of information in terms of user information-seeking behavior (Anderson & Fourie, 2015; Guzik, 2013; Wheeler, Graebner, Skelton, & Patterson, 2014). In library and information science (LIS), Anderson and Fourie (2015) argued that rather than a continuous focus on the user, a new emphasis on the activities of librarians at varying stages of their respective careers, and the unique stories they tell through a narrative methodological approach as autoethnography, can offer useful insights into how information services can be improved from the experiences of information scholars and practitioners. There is also a growing exploration of autoethnography in health information behavior research (Chang, 2016; Scarfe & Marlow, 2015; Simeus, 2016). In this regard, autoethnography also has the capacity to encourage collaborative ways for information sharing in ways that inform professional practice, thereby transforming the knowledge base of information science and the profession (Ngunjiri et al., 2010).

In this chapter, the critical question to be addressed requires an in-depth exploration of whether autoethnography is a transformative scientific research method for the generation and sharing of knowledge to advance information science, or is it a fallacy to consider it a scientific research method that has the potential to contribute to the information science discipline? According to the National Science Board (2007), transformative research is one that restructures and revolutionizes our means of inquiry, in a way that enhances our knowledge base. It has the capacity to promote paradigm shifts, produce technological cascades, improve existing technologies, and provide a more complete understanding of the universe (Trevors, Pollack, Saier, & Masson, 2017).

Thus, in the context of the chapter and in relation to information science research, transformative scientific research can be viewed as research that has the capability to produce a major impact on current research practices that can change our understanding of existing scientific research approaches within the field, leading to the adoption of a new qualitative research method in information science (Boyd, 2008). Considering the critical question in the midst of arguments from the literature alluded to earlier in the use of autoethnography as a qualitative research method with respect to information science research, the following specific questions are posed:

1. What constitutes autoethnography in the current practice of information science research?
2. How can autoethnography be effectively adopted for knowledge sharing in Information Science research and practice?
3. To which fields of information science is autoethnography applicable?
4. How does autoethnography advance multidisciplinary or trans-disciplinary research in information science?
5. What specific challenges are experienced in the use of autoethnography as a research method in information science research?

BACKGROUND

A vast amount of research in autoethnography has been undertaken in relation to qualitative research methods in the past few years. The central position of much of the discourse in these studies is the investigation of the increasing influence and relevance of the method in various disciplines in research

practice in Higher Education Institutions (HEIs). Such studies within HEIs are also aimed at the need to further examine the broader implications of its applicability in the professional development context.

Pioneer studies on the emergence of autoethnography as a research method are credited to the ethnographic study on the Dani Valley people of Indonesia by Karl Heider (1975) and later in the work of David Hayano (1979), who used the phrase to explain the phenomenon of ethnographers researching their "own people," or "insider ethnography" (Hayano, 1979). Further developments on the method are also identified in the work of Reed-Danahay (1997), who emphasized the importance of recognizing relational ties between the researcher and the cultural members being investigated through autoethnography. However, proponents to a more radical approach to autoethnography as a research method are reflected in the works of social scientists Ellis (2004), Bochner (2001), and Denzin (2000), whose quest was to explore narratives about personal experience as a viable research methodology for analyzing cultural phenomena in ways that challenge other standardized methods of doing research (Allen, 2015; Ellis, Adams, & Bochner, 2011; Ellis & Bochner, 2000). This phase in the history of autoethnography witnessed a period of a "crisis of confidence" in the 1980s inspired by postmodernists' views, which were aimed at reforming the objectives and forms of social science inquiry, particularly in ethnographical methods (Conquergood, 1991; Denzin & Lincoln, 2005) Ellis, 2007; Ellis, Adams, & Bochner, 2011). The uniqueness of the contribution of these factors to the development of autoethnography as a method of inquiry in qualitative research is that personal experience has the potential to produce complex and meaningful research in ways that create a better understanding between people in a sociocultural environment, thereby enhancing positive social change (Ellis & Bochner, 2000).

DEFINITION OF AUTOETHNOGRAPHY

There is no general consensus on the definition of autoethnography as a research method. According to Sparkes (2000), autoethnography can be defined as a "highly personalized account that draws on the experience of the author/researcher for the purpose of extending sociological understanding" (p. 21). Ellis (2004) describes it as a "research, writing, story, and method that connect the autobiographical and personal to the cultural, social, and political" (p. xix). Adams, Jones, and Ellis (2015) also define it as a research method that uses a researcher's personal experience to describe and critique cultural beliefs, practices, and experiences. Other commentators simply view it as an alternative method of research and genre of writing where the style is personalized and subjective and different from traditional academic writing.

The difficulty in finding a precise definition of autoethnography stems from the character of the inquiry method or writing style itself, which combines the techniques of autobiography (auto—meaning self) and ethnography (ethno—meaning culture) and graphy (meaning—writing) (Ellingson & Ellis, 2008; Ellis, 2004; Ellis, Adams, & Bochner, 2011; Ellis & Bochner, 2000). The difference, however, is that while ethnographers do this by becoming participant observers in the culture in which they are studying, autoethnographers use hindsight to retrospectively and selectively write about past experiences. The writing style in autoethnography is usually done in the first person, expressed sometimes as a conversation, a dialogue, or story (Ellis & Bochner, 2000). In this regard, autoethnographers have been known to adopt a variety of genres such as fiction, novels, poetry, memoirs, diaries, songs, and many similar artifacts to share their experiences (Muncey, 2010). The reflexive manner in which the autoethnographer consciously embeds himself or herself into the discourse helps to make personal and

sociocultural experiences meaningful and engaging, thereby establishing a connection with the reader (Douglas & Carless, 2013; James, 2012). This ability to provide a thick description of a particular culture or experience by the autoethnographer has the potential to contribute to other people's lives by making them reflect on and empathize with the narrative presented. As a research method, the autoethnographic style of writing is thus helping to facilitate insight into personal experiences for the purpose of extending sociological understanding (Hughes & Pennington, 2017).

APPROACHES TO AUTOETHNOGRAPHY

As a field of research in qualitative methods, autoethnography is connected to the major types of qualitative research approaches, particularly in the way it draws on personal narratives (Hughes & Pennington, 2017). As an approach, it aims to analyze the experience of the researcher to illustrate various facets of socio-cultural life in ways that are familiar to both insiders and outsiders (Ellis, Adams, & Bochner, 2011). Autoethnography constitutes two main types of approaches, namely, analytic and evocative autoethnography (Anderson & Fourie, 2015).

Evocative autoethnographic accounts are usually emotionally engaging and primarily subjective to the researcher (Chang, 2008). They are detailed and descriptive, confessional in nature, and characterized by a high sense of emotion (Bochner & Ellis, 2016; Gariglio, 2018). Anderson (2006) says evocative autoethnography emphasizes an emotional style that aims to fully engage the reader in the writer's personal stories. They are often disseminated in varied forms including textual formats, such as poems, films, maps, and photo diaries (Denzin, 2006).

Analytic autoethnography, on the other hand is directed towards objective writing and the analysis of a particular group in ways that help connect the researcher to the social phenomena being investigated more than those provided by the data (Denshire, 2013; Wheeler et al., 2014). It is scholarly in nature and aligns more with the mainstream ethnographic understanding of the self as connected to a particular ethnographic context (Wall, 2016). Analytic autoethnography focuses on substantive issues rather than stories; in practice, theory can be merged with the ethnographic understanding of a social phenomenon and patterns of social interaction in ways that can enhance theory building (Livesey, & Runsen, 2018; Tetnowski & Damico, 2014). Anderson (2006, p. 378) identifies the following conditions for undertaking analytical autoethnography:

1. The ethnographer is a full member in the research group or setting;
2. There is analytic reflexivity;
3. The ethnographer is visible as such in published texts;
4. Dialogue is with informants beyond the self; and
5. The ethnographer is committed to developing theoretical understandings of broader social phenomena.

Differences between the two approaches have been the subject of much debate, with most of the criticisms being directed at evocative autoethnography, which is seen to be too subjective and emotive as compared to analytical autoethnography, which is systematic and rigorous (Anderson, 2006; Atkinson, 2006; Vryan, 2006). The dominance of the evocative approach in autoethnographic research is also viewed by critics as paving the way for more personalized research in autoethnography, as opposed to the analytic approach that is more conventional with accepted academic standards (Wall, 2008). The

adoption of any of the above approaches in autoethnographic studies often presents methodological challenges to researchers, hence the application of theoretical and methodological frameworks helps to provide guidance (Allen, 2015).

Theoretical foundations to research in autoethnography have often been aligned to social constructionism (Ellingson & Ellis, 2008). Social constructionism is defined by Gergen (1999) as a perspective that believes a great deal of human life exists as it does due to social and interpersonal influences. Social constructionism emphasizes the significance of the involvement of other people in the construction of the self because research data obtained are considered to be co-created by both the researcher and the participant. It can also be used as a schematic map to represent the complex picture of the interplay between the self and others. In practice, autoethnography has been used as a vehicle to operationalize social constructionist perspectives in order to establish trustworthiness and authenticity in the research process (Ellingson & Ellis, 2008). The application of social constructionism to autoethnographic research can thus be used as a means to understand the nature of knowledge production by providing the researcher with a theoretical basis for conducting a research study.

METHODOLOGY

This chapter is a conceptual analysis of autoethnography as a research method within the qualitative research paradigm. The key concepts as discussed in the chapter include:

Autoethnography: An ethnographic method of inquiry that utilizes the personal experiences of the researcher as primary data. It employs a self-narrative form of expression in engaging the reader to the experience, thereby enhancing a wider understanding of social issues (Chang, 2008; Dashper, 2015).

Information science: An interdisciplinary field of research that integrates features from information technology, computer science, library science, cognitive science, social sciences, and communication science. It explores methods for the organization and dissemination of knowledge through various processes.

Transformative generation: Research that restructures and revolutionizes the means of inquiry and enlarges the knowledge base of a particular field of study in ways that improve existing practices (Trevors, Pollack, Saier, & Masson, 2017).

Based on the research questions and review of extant literature, the chapter examines the relevance and application of autoethnography to the field of information science and identifies the gaps in knowledge as a basis for future research. The methodology is considered appropriate as it contributes to a better understanding of the concept of autoethnography and its potential application to information science research.

LITERATURE REVIEW OF AUTOETHNOGRAPHY AND ITS APPLICATION

Developments in the field of autoethnography as a research method mean it is gaining acceptance among scholars across a wide spectrum of disciplines. Informed by scholars' need to share their experiences and address social issues, current studies in autoethnography are emerging across a wide range of academic disciplines, particularly within the arts and social sciences. The differing natures of such studies are as varied as the topics, but the purpose is to produce analytical and accessible texts that are impactful to academic research (Holman-Jones, 2005).

Campbell (2016) explored the viability of autoethnography as a research method for legal education research. She examined some of the common issues faced by legal educators with respect to changes to legal training, new understandings of what it means to be a lawyer, legislative effects, and staff and student engagement with technology, and argues that despite possible challenges, the hyper-reflexive character of autoethnographic methods can be adopted to gain a deeper understanding of the culture of legal education. Personal narrative approaches with an analytical framework can be used to capture and produce meaningful phenomena, particularly in clinical legal education, which deals with the practical aspect of legal training for educational experience (Sullivan, Colby, Wegner, Bond, & Shulman, 2007).

In vocational psychology, Mcllveen (2008) posits the use of autoethnographic methods for practice in career development. He maintains that even though autoethnography has not been established or legitimized within psychology as a research method, the process of reflexive inquiry can be adopted in narrative career counseling to aid the outcome, assessment, and intervention of clients. He argues that autoethnography should be admitted to the methodological repertoire of methods of vocational psychology research, and practice as this could help provide greater insight into the psychological phenomena of cases investigated.

Besides explorations of the method within academic disciplines, there are also studies that are aimed at sharing certain lived experiences by the autoethnographer; the purpose of which is to explore his or her own identity and participants' experiences while conducting specific research within a socio-cultural context. Such studies also have a way of influencing the research process (Ellis & Bochner, 2000). O'Neil (2018) for example, in his article, explored the ways autoethnography contributes towards professional development practices in a mentor/mentee relationship. In the article, the author uses reflexive practice to provide deep insight into his personal experience as a supervisor, as well as the experiences of the group of mini-dissertation supervisors and the students being supervised. He observes that being an insider in the inquiry process enabled a deep understanding of himself as the researcher as well as a deeper interaction of his professional context. He concludes that the applicability of autoethnographic methods to professional development practice lies in its transformative power, by which it is able to impact how learning is transferred between mentor and mentee to the workplace.

Similarly, Lucero (2018), in an interesting personal narrative, presents an autoethnographic account of living without a mobile phone, the essence of which was to assess the real impact on his life. In an age of the pervasive nature of technology and where mobile connectivity is tied to our identity and experience of living in the information society, Lucero's study inspires deep reflection on how access to technology in daily life has become a dominant culture in various societies and also underlines how some of the challenges faced by people who are involuntarily disconnected from communication infrastructures are increasingly taken for granted. His study was thus able to illustrate an important aspect of daily living in a way that is familiar to both insiders and outsiders within a sociocultural context.

Within this same context of autoethnographic research, it is noted that some of the literature includes studies that center on issues of a sensitive nature or taboo subjects such as sexual harassment, gender-based violence, and bullying, which touch private sensitivities of life considered unacceptable in other methodological research methods (Douglas & Carless, 2013; Qutoshi, 2015). Outcomes from such studies have enabled the expository analysis of stigmatization, marginalization, and inequality, thereby facilitating research in under-explored areas of personal experiences in diverse sociocultural contexts. Despite the ethical challenges that could be encountered in such studies, particularly in HEIs, Qutoshi (2015) argues that such autoethnographic studies can be considered as emancipatory tools for knowledge sharing that are important in addressing inequalities in societies by developing capacities and awareness at both personal and societal levels.

Autoethnographic studies that are of a sensitive nature and use the evocative approach support the view of the method as a postmodernist construct in which the methods and procedures that are employed in research are ultimately and inextricably tied to the values and subjectivities of the researcher (Bochner, 2000; Qutoshi, 2015). Ellis and Bochner (2000) define this as "...an autobiographical genre of writing that displays multiple layers of consciousness, connecting the personal to the cultural" (p. 739). The interconnection of the researcher to the research enables a kind of critical self-reflection on past and present experiences, which is considered as one of the most powerful features of autoethnography in facilitating transformative learning (Sykes, 2014). It also supports the argument of postmodernists who see autoethnography as an emancipatory discourse that allows researchers to explore, express, and represent themselves through personal narratives, experiences, and opinions in ways that are not possible with other methodological tools (Méndez, 2013; Richards, 2008; Van Maanen, 1988).

In HEIs, the legitimacy of autoethnography as a research method is still a deeply contested issue among academics. However, changes in research trends within disciplines are influencing a gradual interest in autoethnographic methods. A number of disciplines, including anthropology, sociology, education, and mass communication are adopting autoethnographic methods in research to explore aspects of transformative learning as a tool to encourage learners to share and explore the complexity of self and social phenomena (Allen-Collinson & Hockey, 2008; Anderson, 2006; Ellis & Bochner, 2000; Etherington, 2006; Reed-Danahay, 1997; Roth, 2009). In HEIs, because decisions on academic research processes are often governed by institutional policies, requirements, resources, and other circumstances, regardless of the input or interest of the researcher, autoethnography is often not considered among other "mainstream" methods within qualitative research methods (Campbell, 2016; Lucero, 2018). However, improvements to methodological approaches to autoethnography, especially with respect to the extent to which implications for practice could be drawn from research outcomes, are likely to inform future considerations to its acceptance in academic disciplines in HEIs (Wall, 2008).

AUTOETHNOGRAPHY: ISSUES, CONTROVERSIES, AND PROBLEMS

The discourse around autoethnography as a qualitative research method of inquiry is one that has generated a lot of debate that in itself represents a broad spectrum of views. The arguments may be summarized as showing that quite a number of articles have been written that are either in support of, conflict with, or refute the main issues surrounding the method. In this section, an analysis of some of the major contending issues surrounding the debate, mainly issues of ethics, evaluative criteria, and self-reflexivity, will help in putting these views in perspective and perhaps contribute to the discourse.

The qualitative research method is well accepted as a valuable practice of research; its ability to employ a variety of methods by which the issues under investigation are examined from the experiences of individual participants implies its humanistic stance (Creswell, 2009; Merriam, 2002). Autoethnography has developed within the broad frame of qualitative research methods and is becoming increasingly popular in the social sciences. The following are some of the issues, controversies, and problems that have been associated with autoethnography as a method in qualitative research:

Reflexivity: Autoethnographic Writing Style

Among the prominent areas of criticism is the writing style of autoethnography, which employs the established qualitative method of using personal narratives to explore wider sociocultural issues. By placing the researchers' own experiences as central and the sole source of data for the research, autoethnographic writers aim to produce a narrative that is meant to evoke cognitive, emotional, and physical reactions in the reader. However, this emphasis on the individual experience of the writer has been described by critics as subjective, self-indulgent, narcissistic, and akin to navel-gazing (Allen-Collinson & Hockey, 2008; Atkinson, 1997; Coffey, 1999; Lucero, 2018).

By its practice, the autoethnographic writing style challenges the accepted norm of silent authorship, neutrality, and objectivity, particularly among social scientists (Holt, 2003; Marechal, 2009). For most autoethnographers, reflexive writing, particularly using an evocative approach, enables the right of the writer to tell his or her truth as experienced. This has, however, highlighted the issue of a crisis of representation between the researcher and the sociocultural world being studied. Within professional settings too, Denshire (2013) observed that an autoethnographic account using an evocative approach that is written within or against a profession could undermine the dichotomy between personal and professional boundaries. Such criticisms of the non-conformity of autoethnographic writing to conventional academic standards have been long standing and have led to calls for the removal of autoethnography from the lexicon of empirical research methods (Delamont, 2007). To this end, Denzin and Lincoln (2005) affirm that autoethnography does not usually make a claim to objectivity because objective reality in itself can never be captured, but is rather known through its representations towards understanding a particular phenomenon. Tomaselli (2015) also argues that, as opposed to other methods, the practice of self-reflexive inquiry has empowered autoethnographers to challenge the dominance of traditional academic forms of writing and researching and opened up possibilities for the researchers' voice and perspective to be heard (Allen-Collinson & Hockey, 2008).

Unscientific Nature of Autoethnography

Despite the increasing popularity of autoethnography among the social sciences, the method has also been criticized as being unscientific or exploratory in nature. The argument being that the application of some of the key principles of qualitative research in terms of methodological approaches, that is, the review of literature, hypothesis, theory building, collection, and analysis of data, are insufficient (Maydell, 2010). Hence, its failure to adequately incorporate established standards of rigorous qualitative research inquiry oppose the very tenets of the field of social sciences to which it claims to belong (Ploder & Stadlbauer, 2016). Similarly, the context of self-examination by which data is obtained in autoethnography typifies more to realist ethnographic practices rather than those of the social sciences (Ellis, 2009). Essentially, the categorization of autoethnography as a blurred genre limits its scientific potential among other disciplines, particularly the social sciences. However, Ellingson and Ellis (2008) argue that the inability to place autoethnography within the boundaries of art or science enhances the creative and flexible nature of its methodological approaches in ways that suit the needs of its authors (Richardson, 2000).

Lack of Evaluative Criteria

Debates concerning the methodological approach to autoethnography have also been aimed at questioning the evaluative criteria to be employed in judging its academic rigor in line with other forms of qualitative research methods. Traditional criteria in qualitative research are used for evaluating and interpreting such terms as validity, reliability, and objectivity (Holt, 2003). In autoethnography, the highly personalized approach of using experience as data is considered lacking in external verification and therefore not sufficiently rigorous to be accepted by other researchers. Walford (2004) observes that the credibility of autoethnography as scholarly academic research is contested on the grounds that the authors' own individualized interpretation of an account or situation, which is written in an emotional, engaging, and evocative manner, cannot be measured against any standard evaluative criteria in qualitative research.

The question of the failure of autoethnography to meet evaluative criteria is also aligned to the absence of a systematic method of analysis and theory building processes that could produce results that are measurable against traditional quality criteria. The scientific standards of most disciplines require the articulation of clear theoretical positions or analytical concepts for evaluative purposes. Critics in the social sciences argue that because autoethnographic research methods are neither theory forming nor argumentative, and cannot be used as reference texts for a particular theoretical position or analytical concept, they do not live up to the scientific standards of their discipline, nor of any other academic discipline (Ploder & Stadlbauer, 2016).

However, Ploder and Stadlbauer (2016) also argued that because the goal of autoethnography is not to represent acquired lessons/experiences, but to trigger cognitive processes within the recipients, the value of the use of personal narrative as data is not aimed at arriving at results or findings, but rather the positive impact that it is likely to have on the reader. They further argued that reliability and validity in autoethnographic research is established through the credibility of the narrator in providing an honest and reliable account of the work (Starr, 2010). Adams and Manning (2015a) also suggest two essential qualities that should be reflected in all autoethnography projects: Firstly, it should include personal experience and demonstrate through thoughtful analysis why the experience is meaningful and culturally significant and that such experience must be reflexively considered through the use of extant theory, other scholarly writings about the topic, fieldwork observations, analysis of artifacts (for example, photographs), and/or involvement with others (for example, interviews). In this regard, Chang (2008, p. 54) cautions researchers on some of the pitfalls to be avoided in doing autoethnography, which include:

1. Excessive focus on self in isolation from others
2. Overemphasis on narration rather than analysis and cultural interpretation
3. Exclusive reliance on personal memory and recalling as a data source
4. Negligence of ethical standards regarding others in self-narratives and
5. Inappropriate application of the label "autoethnography"

Lack of Ethics

The most scathing criticisms of the autoethnographic method is directed at concerns relating to ethical issues (Delamont, 2007). The trend toward evocative writing in autoethnography has increased the risk of autoethnographers sharing stories that are intended to be emotive, detailed, and confessional in nature. Hence the often-cited challenge in writing autoethnography by researchers is that of telling their stories

in the light of representing others, particularly in aspects relating to stories of pain, betrayal, trauma, unpopular opinions, unconventional activities, family drama, and similar factors, which may include other actors such as parents, siblings, or colleagues (Roth, 2009). Consequently, the extent to which the researcher could be openly narrative about sensitive personal issues presents the risk of self-exposure to uncertain outcomes for the writer as well as other characters/actors in the research, which leads to ethical challenges (Dashper, 2015; Tullis, 2013).

In all academic disciplines, ethical considerations are important in ensuring the quality of research and to serve as guiding principles to the researcher. Conventional practice in academic research emphasizes the obligation of researchers to clearly identify ethical decisions shaping the research design, methodology, analysis, and confidentiality agreements. The informed consent and rights of other people involved in the research are specifically considered vital because of the far-reaching consequences research outcomes are likely to have on the parties involved. The role of ethics is not well explored in autoethnography; critics have noted that the difficulty in protecting the privacy of others is also not well articulated in its methodology (Chang, 2008; Delamont, 2009; Tolich, 2010).

In HEIs specifically, primary concerns as discussed in the literature focus on the challenges of practicing autoethnography ethically, particularly in relation to issues of accountability and the risk of self-disclosure, which is seen as being contrary to established norms of academic research (Wall, 2008). As the field emerges, the controversies surrounding ethics in the practice of autoethnography are expanding beyond the procedural ethics of obtaining approval from ethics boards to relational and moral ethics, which in turn underscore the responsibility of autoethnographers in considering the characters or actors included in their personal narrative accounts (Ellis, 2007). Despite the argument by Ellis (2007) that autoethnography is in itself an ethical practice that entails being ethical and honest about the events described as well as the content of words expressed by all the people involved in the narrative event, it is seen that leading proponents of autoethnography as a qualitative research method must provide better insight into the ethical boundaries that should be anticipated between the self and others in its practical application.

Autoethnographic methods highlight the value of personal experience; the use of it as a source of data has consistently blurred the lines between the subject and the researcher, particularly in its methodological approach. With the emerging nature of autoethnography as a field of research, further considerations need to be given to these criticisms against its methodological approaches in line with the review and evaluative criteria of other forms of qualitative research methods.

AUTOETHNOGRAPHY AND INFORMATION SCIENCE RESEARCH

Like other social sciences, methodological approaches in information science are rooted in the traditions of positivism and empiricism. In the use and application of qualitative research methods, information science is also not divergent to other academic disciplines. The adoption and use of personal narratives in information science research and other social sciences has not been the norm; however, in recent years, the use of autoethnography has provided a methodological justification for using reflexive approaches in academic research (Burnier 2006). Using the research questions of the study, this section analyzes the current engagement of information science research with autoethnographic methods. It examines the applicability of autoethnography to specific fields of information science and the ways in which it

can be adopted for knowledge sharing. It also provides insights on how autoethnographic methods can be used to advance transformative scientific research for the generation and sharing of knowledge in information science and the challenges (or fallacies) to be encountered in qualitative research.

1. What Constitutes Autoethnography in the Current Practice Of Information Science Research?

According to Deitering (2017), a considerable amount of literature on library and information science research tends to focus more on providing information on well-known service areas, such as reference services, information literacy instruction, collection development, and preservation. A current challenge to this context is a redirection towards investigating the activities of librarians as actors in the sphere of information services provision, the purpose of which is to better understand the various roles they play and to improve professional practice (Guzik, 2013; Polkinghorne, 2012).

Reflexive methodological approaches through autoethnography provide a framework by which unique aspects of professional services by librarians in information science can be investigated. Through autoethnographic methods for example, Phillips (2016) identified an empathetic side to the librarian–client relationship through services provided to cyberbullied young adults in a rural public library. Similarly, a unique perspective on library disasters is well captured in Patin's (2015) personal narrative on the impact and effect of Hurricane Katrina on her community college library. Such studies on librarians' responses to disadvantaged groups or crisis interventions that are not only focused on rebuilding library structures and resources, but also encouraging community engagement, provide a good balance between personal experiences and relevant professional literature (Deitering, 2017). This ability to explore narratives about personal experience within a professional context constitutes a distinct perspective on the value of autoethnographic methods in current information science research.

In practical application, an aspect of library services that could be explored using autoethnography as a method include is collection development. Collection development in libraries is aimed at ensuring that quality resources are acquired for current use in both print and electronic resources in order to meet the needs of clientele. It provides information to clients about the nature, form, and availability of resources (Mullen, 2011). In the digital information era, collection development constitutes a major challenge; autoethnography can be employed to express some of the difficulties experienced by librarians in providing access to quality information resources. This can provide an understanding to clients of the situated context of the challenges faced and the options that can be explored (Deitering, 2017). Similarly, in aspects related to reference services and information literacy instruction, autoethnography can be used to share the experiences of librarians in implementing information literacy programs (Fister, 2011; Polkinghorne, 2012).

2. How Can Autoethnography be Effectively Adopted for Knowledge Sharing in Information Science Research and Practice?

Autoethnographic writing styles aimed at investigating professional experiences in interacting with information sources are gaining significant ground in information science. Research using the evocative approach, characterized by its use of innovative textual formats such as poems, essays, articles, short stories, dialogues, comics, and novels, was employed in Michel's (2010) study. The study, which reflected his personal experience as a student at an academic library over the course of one year of PhD study,

used an autoethnographic method in which reflections on the data were presented in the form of 3 two-minute video clips narrated with accompanying poems. Michel (2010) demonstrated autoethnography as a useful method for information scholars who seek to examine, analyze, and interpret various information phenomena and who aim to improve human information experiences (Gorichanaz, 2017; Guzik, 2013).

The analytical approach to autoethnography, as expounded by Anderson (2006), was also employed in a study by Wheeler et al. (2014), in which they were able to link theory and literature to their experiences and construct their identity in a library environment undergoing transition. Thus as a technique, tool, or means for self-examination, the ability for self-reflexivity using the two divergent approaches in autoethnography can offer more opportunities to be used to research literature and analyze experience in ways that encourage creativity and knowledge sharing. Consequently, despite the polarization of perspectives on the two approaches, active engagement with autoethnography by professionals in information science has the potential to enrich research practices in terms of data collection, analysis, and interpretation of research in information science.

3. To Which Fields of Information Science is Autoethnography Applicable?

One importance of autoethnography is the provision of a methodology for narrative approaches, which is valuable for research in information science. This is because it affords the opportunity for information professionals to study experiences of information use in-context in the different fields of library and information science, such as knowledge management, information literacy, preservation, and archives, as well as reference services. Similarly, within the context of an increasingly digital information environment, autoethnographic approaches are suitable for investigating emerging digital systems used in library and information services (O'Riordan, 2014). In this regard, Michel (2010) argues that autoethnography can inform librarians' conceptualizations of user services in the area of human–computer interaction, as well as studies on public libraries, government records and information policy development to help information experiences of students, faculty, and other individuals who use resources and services provided by information institutions such as libraries and archives.

Studies in information behavior are also exploring the use of autoethnography for investigating specialized information needs of users. Ngula's (2018) study on the information needs of people with albinism (PWA) employed aspects of autoethnography by which she was able to relieve personal experiences of the condition and in this way provide empirical data that can inform strategies for intervention for people living with the condition. Autoethnography thus has the potential for novel application to the various fields of information science, particularly in under-examined areas, in ways that can inform professional practice for the future (Gorichanaz, 2017; Guzik 2013).

4. How Does Autoethnography Advance Multidisciplinary or Trans-Disciplinary Research in Information Science?

Autoethnography can also be used to encourage collaborative research across disciplines, particularly in HEIs. This practice involves the use of collaborative approaches to writing, sharing, and analyzing stories of personal experience (Allen-Collinson & Hockey, 2008; Denshire, 2013; Lapadat, 2009). Models of such collaborations can be done fully or partially at various stages of the research such as writing, data collection, and analysis, any of which can be undertaken sequentially or concurrently between research-

ers (Blalock & Akehi, 2018). According to Denshire (2013), collaborative research is a distinct feature of autoethnographic methods and creates a path towards advancing multi-disciplinary research in ways that encourage information sharing across disciplines.

Methodological approaches to collaboration in autoethnography is reflected in the work of Ngunjiri et al. (2010), in which they noted that the collaborative processes employed facilitated a transformative process by which they were able to create community, advance scholarship, and effect changes at their institution. Similarly, Anderson and Fourie (2015) in their study, which explored the value of understanding information engagements and practices in the lives of family care-givers, observed that collaborative autoethnography helped enrich their understanding of the embedded, contextual character of information practices as they unfold in the midst of illness or care giving. Collaboration through co-conducted autoethnographic research by two or more researchers across disciplines are therefore seen to produce greater interaction and richer perspectives in ways that inform professional practice in information science than those of solo researchers.

5. What Specific Challenges Are Experienced in the Use of Autoethnography as a Research Method in Information Science Research?

Researchers writing autoethnography have often been confronted with certain challenges associated with its methodology and, like with other disciplines, these challenges may not be peculiar with information science. A reoccurring theme in the criticism of doing autoethnography is the strong emphasis on self where the researcher plays the multiple roles of author, informant, and researcher (Chang, 2008; Le Roux, 2017). In this context, there is always the tendency to stress narrative over analysis and interpretation especially when using the evocative approach (Anderson & Fourie, 2015; Chang, 2008). The challenge for information scientists in using the two methodological approaches, therefore, is to maintain a balanced perspective in ways that reflect the true purpose of the research (Wall, 2016). Similarly, Lucero (2018) suggests that well-crafted autoethnographic writing should be emotionally engaging as well as critically self-reflexive of the researcher's sociopolitical interactivity in order to elicit positive insights for the reader.

Lack of clarity in the evaluative criteria of methodological approaches to autoethnography can also be said to account for its underutilization in information science. Information science research maintains a traditional quality criteria by which the application of a systematic approach in undertaking qualitative research methods is ensured for methodological transparency in the research process (Guzik, 2013). Consequently, limitations as to the adequacy of rigorous external verification processes in autoethnography constitute a major challenge. Similarly, other considerations on the impact of ethics on research outcomes will need to be addressed by authors, particularly for studies undertaken that are likely to affect the efficiency of institutions such as libraries and archives.

Challenges of evaluative criteria are also closely associated with the question of acceptability by reviewers and publishers of research articles by information scientists. Researchers undertaking autoethnographic studies, particularly within HEIs, have consistently indicated the reluctance by their research/ethics boards to accept the validity of their studies (Dashper, 2015; Wall, 2008). Such challenges have also been identified with some publishers and reviewers with a more rigid stance on research quality and who do not regard autoethnography as scholarly work (Allen-Collinson & Hockey, 2008; Delamont, 2009; Holt, 2003; Sparkes, 2000). In this regard, it has become necessary that as methodological approaches in autoethnography gain more interest in information science, acceptable evaluative criteria should be developed by experts within the field to address such anticipated challenges.

From the foregoing review of the literature and analysis relating to information science research, it is seen that the literature of autoethnography within qualitative research methodology is evolving. The changing trends of scholarship, with the increasing interest of its applicability in HEIs, are the most likely factors to influence its implementation across various disciplines and information science in particular. Similarly, despite these challenges, future advances in postmodernism will also enhance the adoption of autoethnography as a powerful methodological tool in qualitative research methods.

CONCLUSION

This chapter aimed to investigate the use of autoethnography as a qualitative research method in information science research; it has provided an in-depth understanding of the methodological importance of autoethnography and its value for knowledge sharing. Knowledge sharing in information science constitutes the voluntary transfer of information between persons, organizations, or entities. The purpose of which is to contribute to the continuity of information dissemination and foster the development of shared awareness, understanding, and experience among people or organizations (Pilerot, 2012). One of the unique qualities of autoethnography is its transformative ability to bring about positive social change through access to textual information (Bochner, 2000; Denzin, 2000). The overview of the history, methodological approaches, and orientations of autoethnography, as discussed in this chapter, illustrate its value as a method that helps people make sense of their experiences and, in so doing, provide guidance for others. From the analyses of the literature and research questions in the chapter, this potential of the autoethnographic method to explore the complexity of the self in relation to social phenomena is seen to fully serve the purpose of transformative generation and knowledge sharing in information science.

Within the current context of information science research, emerging studies are showing that critical self-reflection, which is an important component of self-development, is serving to effect improvement in practice by facilitating a constant engagement between the individual and his or her professional context. As the scope of information science research expands and with the increasing interest in postmodernist views against conventional methods of qualitative research, autoethnography presents a new opportunity for information scientists to explore more innovative ways of understanding human information behavior in professional practice. The analysis of the literature reviewed in relation to information science has also demonstrated the value of the methodological approaches of autoethnography by which information professionals can better engage with this method of qualitative research to develop a better understanding of the research opportunities it provides.

RECOMMENDATIONS

Unlike other forms of educational research, autoethnography has provided an alternative approach to traditional qualitative research methods by its varied nature and postmodernist perspective. The dimensions of the issues regarding its legitimacy as a method are in many ways contributing to refining its relevance as a methodology; this is seen by the various apologetics written in support of autoethnography by its proponents, which is also helping to close the gap in the literature of qualitative research methods. This section provides recommendations on the prospects of the application of autoethnography to research in information science.

Reflexivity has long been accepted as a qualitative process by which researchers validate and question research practices. Its use in autoethnography is viewed as a criterion that provides researchers with a forum for expressing the awareness of their integral connection to the research context (Huang, 2015; Hughes & Pennington, 2017; Palaganas, Sanchez, Molintas, & Caricativo, 2017; Spry, 2001). This ability of the researcher to narrate his or her lived experiences in ways that connect with others is seen to represent a critical intervention in the social, political, and cultural life of people (Wall, 2006). Chang (2008) also maintains that the contextual value of the practice of reflexivity is that it enables the researcher to identify with a community or multiple communities, in an effort to synthesize a localized perspective. In practice, reflexivity demands a considerable amount of courage in the researcher's ability to look inward with radical honesty and explore the self in order to better understand others. In this regard, Johnson (2011) argues that unlike autobiographies, reflexivity through autoethnography provides the opportunity for the personal experiences of ordinary non-celebrated people to be researched within the collective experience of a larger community of people, thereby promoting positive social change.

The debate on the absence of an evaluative criteria in autoethnography is based on the general complexities and context of qualitative research methods, which makes it requisite for researchers to clearly describe how issues of research design and methods are explored in a study. Arguments in defense of autoethnography have sought to offer suggestions for developing an evaluative criteria for the legitimization of the method. Hughes and Pennington (2017), in their work, identified the following three distinct approaches by which the autoethnographic research method can be legitimized; they include:

1. Claiming links to existing qualitative constructs: By this approach, autoethnographic researchers are expected to link their study with key qualitative research requirements or criteria that are already in use and well known to members of the qualitative research community, thereby legitimizing its processes (Lincoln & Guba, 1985).

2. Linking with traditional qualitative methodology: This approach identifies with existing traditional qualitative methods and also aligns with earlier recommendations by Anderson (2006) on analytic autoethnography. Anderson (2006, p. 378) proposes and describes five key features of analytic autoethnography in an effort to legitimize it as a "viable and valuable" sub-genre in the realist ethnographic tradition. In this approach, he identifies the following features:

    a) The researcher is a complete member of the social event under study.

    b) There is awareness of the researcher's connection to the situation under investigation and his or her impact on it (analytic reflexivity).

    c) There is visibility of the researcher's own experiences.

    d) There is dialogue with informants beyond the self.

    e) There is commitment to theoretical analysis requiring not simply the documented experience of the event but also to provide some broader understanding of the situation under investigation.

This approach is specifically linked to analytic autoethnography and is committed to the possibility of using empirical data and developing theoretical explanations of broader social phenomena rather than focusing on narrative presentations that evoke emotional responses (Atkinson, 2006; Chang, 2008).

3. Claiming links to established professional associations and standards: In this approach, Hughes and Pennington (2017) advocate the involvement of professional associations to legitimize autoethnographic methods by endorsing autoethnography as a valid method of empirical research, particularly

to HEIs, ethical boards, editors, and reviewers. In addition to these three approaches, Hughes and Pennington also argued that the determination of autoethnographic researchers to remain adamant about its possibilities and strengths is a key step to legitimizing its processes especially with respect to issues of evaluative criteria.

In an effort to ensure that autoethnography does not remain within the peripheral leanings of the social sciences, issues in contention against its methodological approaches are gradually being addressed, as seen from contributions by its strongest advocates who have sought to establish its legitimacy as a valid method of qualitative research (Adams, Jones, & Ellis, 2015). Furthermore, it's potential to incorporate postmodernist views is serving to facilitate emancipatory discourses on controversial topics that are difficult to express through other research methods, particularly in HEIs (Wall, 2006). Consequently, the identified approaches can be effectively adopted in the application of autoethnography to research in information science.

FUTURE RESEARCH DIRECTIONS OF AUTOETHNOGRAPHY IN INFORMATION SCIENCE RESEARCH

As a qualitative method, autoethnography is a narrative research that recognizes that stories can be used to enable people to make sense of themselves and their inter-relationship with the social world. Autoethnography is a process of social construction, and it is an attempt to create order and meaning out of events, issues, and actions that are somehow surprising or confusing. Thus sense making is used to describe the process in which people try to make sense of ambiguous situations (Helms Mills, 2010). The narratives that emerge out of autoethnography are not mere accounts, but are intended to show struggles and passion of the circumstances experienced by the writer. Thus the use of compelling images such as vignettes, poetry, and other forms of aesthetics in the narrative are meant to evoke emotions of empathy in the reader to enable them to make sense of his or her own experiences (Ellis & Bochner, 2006). As a method, autoethnography can therefore provide a rich and nuanced understanding of the complexities of the social world to the reader and how it shapes his or her own identities. This particular feature in autoethnographic writing is viewed as facilitating a kind of logical reasoning of the different ways people make sense of their situations (Adams & Manning, 2015b).

The application and development of theory in autoethnography has been very much debated; however, the viability of theoretical development with respect to its application in information science research can be considered through Brenda Dervin's (1998) sense-making theory. Sense-making is a theory of communication practice and a research methodology; it is an approach that is grounded in constructivist learning theories and emphasizes solving problems through real actions. Sense-making comprises a set of philosophical assumptions, propositions, methodologies, and methods (Dervin 1998). It assumes life in a world of gaps change across time and space, and depend on a person's past, present, and future (Dervin 1998). The theory assumes there are gaps between entities, time, and spaces, and that each individual moves through space with other entities, i.e. people, artifacts, systems, and institutions. The theory is seen to set out a general motivation for information-seeking behavior and can be used to find out what people really think, feel, want, and dream (Wilson, 1997).

Few studies in autoethnography, such as McIlveen, (2008) and Wall (2016), have been able to include theoretical elements in ways that contribute to theory building. According to Anderson (2006),

by merging theory with the ethnographic understanding of a social phenomenon, the analytic approach in particular provides an avenue for theory building in autoethnography. Consequently, it is suggested that the prospect of the application of Dervin's (1998) sense-making theory can be considered viable in investigating aspects of information science through autoethnography, particularly research in human information behavior (Allen, 2015; Helms Mills, 2010).

In the same vein, it is seen that personal narratives that emerge through the application of evocative autoethnography are seen to capture the affective dimension by which a reader can easily identify with. This aspect is reflected in the work of Anderson and Fourie (2015), Ploder and Stadlbauer (2016), and Bødker and Chamberlain (2016). In this regard, Kuhlthau's (1993) Information Search Process (ISP) model is also viable for application in autoethnographic research in LIS research. The model, which encompasses the three realms of activity, that is, the physical, the affective, and the cognitive, can be explored as a way of expressing personal experience in relation to social issues.

Hence in the context of the topic of this chapter and with respect to current developments in qualitative research methods, the possibility of the application of this theory and model to autoethnographic research in relation to information science is suggested and should be explored more intensely in future research.

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KEY TERMS AND DEFINITIONS

Analytic: A logical, systematic way of reasoning in understanding or examining an issue.

Ethics: The principles of right and wrong that accepted by an individual or social group based on established standards.

Evaluative: A process of assessing or appraising the value of something in order to determine its worth or significance.

Evocative: A statement or action that is made to induce an emotional response.

Postmodernism: A theory or movement that that challenges a reconsideration of modern assumptions of culture, identity, history, and research.

Reflexivity: A spontaneous action that is characterized by or done in relation to one's self.

Transformative: An action that is capable of capable of bringing about definite change.

Chapter 8
The Use of Grounded Theory in Researching Information Centres

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ABSTRACT

This chapter challenges information management researchers to employ the grounded theory research approach as it is detailed, rigorous, systematic, and flexible. The approach also permits researchers to go beyond the conventional thinking by allowing the emergence of new conceptual models, theories, and framework(s) on the subject under investigation. The chapter provides a discourse on the key features of grounded theory and the two fundamental schools of grounded theory. The overall aim of the chapter is to explain the applicability and rationale of grounded theory in researching information centres. As such, the chapter discusses the perceived challenges of using grounded theory, debates the place of literature in a grounded theory study, and explores the issues of research population, sampling, and sample size in a grounded theory research. Other essential aspects discussed in the chapter are the concepts of credibility, transferability, dependability, and confirmability. The chapter also demonstrates how data in a grounded theory study should be analysed and processed.

INTRODUCTION AND BACKGROUND

Grounded theory (GT) is used when a research seeks to develop a model or theory on an investigated matter using the empirical field evidence and not to verify an existing theory. Researchers using the GT approach should conduct the research with disciplinary interests, background assumptions and an acquaintance with the literature and existing theories in the discipline but should not use the collected data to either approve or disprove the existing theories. Instead, a theory is developed through an analysis of the data collected from the research. Researchers studying on information centres (thus, repositories of public knowledge such as, museums, libraries and art galleries) are encouraged to employ the GT research approach as it is detailed, rigorous, systematic, and flexible. It permits the researcher to go

beyond the conventional thinking by allowing the emergence of new conceptual models, theories and framework(s) on the subject that is under investigation (Jones & Alony, 2011). There are two fundamental schools of GT, namely the Glaserian school and the Straussian school. These two schools have different views towards the use of GT in scientific studies. Their major distinction is seen in that the Straussian school allows researchers to have a general idea of where to begin, whereas the Glaserian school requires researchers to approach the field with a general wonderment where the mind would be blank (Onions, 2006). Ralph, Birks, and Chapman (2015) indicated thatGT is dynamic because of its differences in philosophical standpoints within its monolith. In this dynamic state, GT responds to social pressures, changes over time, and adapts to the moment in which it is used.

The key features of GT are its iterative study design, theoretical sampling and system of analysis (Lingard, Albert & Levinson, 2008). These features require researchers to conduct a series of concurrent data collection and analysis. This implies that data analysis should always inform the next cycle of data collection until a saturation point is reached. It also means that the sample of a study must not be set at the beginning of the research but should be purposefully selected as the analysis of the data progresses. The informants of the research must be chosen for their capability to supply the required data.

The objective of this chapter is to argue for the need by social science researchers, particularly scholars researching information centres to adopt the GT research approach in their studies. Based on the author's experiences on previous studies in information science, it seems as if the GT research approach is not popular with information scientists' as the bulk of research on information centres have been done following the conventional research approaches that mostly seek to test existing theories. The goals of this chapter are therefore to:

- Explicate the applicability and rationale of GT in researching information centres
- Discuss the perceived challenges of using GT
- Debate the place of literature in a GT study
- Explore the issues of research population, sampling and sample size in a GT research
- Unpack the concepts of credibility, transferability, dependability and confirmability
- Demonstrate how to analyse and process data from a GT study

RATIONALE FOR GROUNDED THEORY IN INVESTIGATING INFORMATION CENTRES

Unlike a plethora of social science studies that have been done with the intention of testing and verifying existing theories, it is crucial for researchers investigating information centres to engage in studies that seek to generate a theory, framework or model. The reader is referred to Chapter Two that further discusses the concept of theorizing. The importance of taking this approach is that a theory generated out of empirical evidence is much closer to the truth and reality than trying to suit research findings to a particular theory (Bryant & Charmaz, 2011). Moreover, a study that develops a theory presents the much needed bridge between practice and research (Southern & Devlin, 2010). GT emerges as an essential research approach that presents possibilities for the development of theoretical frameworks from the data gathered and analysed (Payne, 2016). It gives a researcher the tools to answer why questions from an interpretive paradigmatic stance (Charmaz, 2012) .GT research approach allows researchers to discern what is happening in their data that is different from what has already been said (Locke, 2015) and to

explain phenomena through an inductive reasoning process (Hussein, Hirst, Salyers & Osuji, 2014). The research approach guards against theoretical stagnation through theory development that is grounded in scientific data (Charmaz 2006; Phothongsunan, 2010) and the theory will be of importance to people's lives (Glaser & Strauss, 1967; Glaser, 1978; Strauss & Corbin, 1998; Mills, Bonner & Francis, 2006).

Amongst the benefits of using the GT research approach is that researchers are able to exploit the collected data and build a framework, construct a theory or develop a model that can be used to advance scholarship. Additionally, researchers using GT are not cramped to follow a sequential lockstep of techniques as they should be creative in the implementation of the approach since each study is unique (Corley 2015).

It is imperative for researchers to note that there are two core categories of GT research, namely the Glaserian approach and the Straussian approach. These two approaches are theoretically, philosophically and practically distinct from each other. The Glaserian school of GT functions within the positivist ontological assumptions while the Straussian school of GT operates within the constructivist philosophical world view (Charmaz, 2014). These differences are illustrated in Table 1. Of importance to note is that GT is not a rigid approach that can only be implemented in one strict formula. As such, researchers are urged to adopt and adapt the approach under specific conditions of inquiry and the circumstances shaping the research process (Charmaz, 2014). However, from the major distinction of the two categories of the GT research approach, it is apparent that the Straussian school of GT is ideal for researchers studying information centres.

Unlike Glaser's view on realism where the research findings are deemed to be revealed from within the data, Strauss' approach holds that findings are constructed by intersubjective understandings of the phenomenon being investigated. The Straussian approach to GT directs researchers to be personally engaged with the research in an attempt to better describe and understand the issues surrounding matters under investigation. This is in contrast to Glaser's approach to GT who assumes a realist epistemology that positions researchers to embody the role of an objectively detached observer so as to maintain a neutral stance towards the data in respect of objectivity as is understood by the post-positivist perspective (Payne, 2016).

The other notable difference between Glaser and Strauss's approach to GT is on formulating the research question(s). Glaser's position prohibits researchers from entering the research field with pre-research questions. On the contrary, Strauss, whose approach is recommended to researchers studying information centres argues that the researcher can enter the research field with a predetermined research question which arises from a partial perusal of the existing literature. Depicted in Table 1 is the summary of the differences between the Glaserian and the Straussian schools of GT.

Despite the differences between the founders of GT on what procedures should be followed, they both maintain the argument that researchers employing the GT approach should do constant comparative analysis; initial coding and categorisation of data; intermediate coding; selecting a core category; advanced coding; theoretical integration; theoretical sampling, theoretical saturation; theoretical sensitivity and memoing (Birks & Mills 2011; Lawrence & Tar 2013; Salaun, Mills & Usher 2013).

Unlike most other naturalistic modes of inquiry, theory development from GT research has been identified as having the capacity to predict. Using the GT research approach, the research process for studies on information centres ideally include initiating the research, data selection initiation and ongoing data collection, constant comparison data analysis and concluding the research. These research procedures appear to be typical of any other research process, yet the interchange between data collection and analysis is unique in a GT research approach. Figure 1 demonstrates the GT research steps that can be followed by researchers studying information centres.

Table 1. Glaserian school of grounded theory versus Straussian school of grounded theory

Glaserian school of grounded theory	Straussian school of grounded theory
Operates within a post-positivist paradigm.	Operates within a constructivist paradigm.
Adopts an ontological position of critical realism.	Adopts an ontological position of pragmatic relativism.
The researcher embodies the role of an objectively detached observer. There should be independence between the researcher and the method to allow the researcher to maintain a neutral stance towards the data.	The researcher personally engages with the research to better describe and understand the phenomenon under study as the participants perceive it to be.
A review of the literature is conducted only post data analysis.	A partial review of the literature should be conducted prior to data collection.
Prohibits the researcher from entering the research field with any pre-set research questions.	The researcher can (and should) initiate the research enquiry with a predetermined research question in mind which arises from a partial perusal of the existing literature.
Promotes initial coding through the comparison of occurrences with each other to reveal broad patterns and trends that will emerge as categories.	Embraces the open coding practice, which includes the conceptualisation of even solitary Occurrences.

The above cyclical process is to be repeated until a point of saturation has been reached. Then a theory or model is accordingly developed

As depicted in Figure 1, a GT research approach allows a researcher to inductively generate a theory, framework or a model that is not confined nor influenced by existing theories as the developed theory; framework or model should completely rest on the empirical data yielded from the study. A grounded research approach therefore offers a conceptual grasp of substantive issues surrounding any inquiry.

Figure 1. Grounded theory research steps
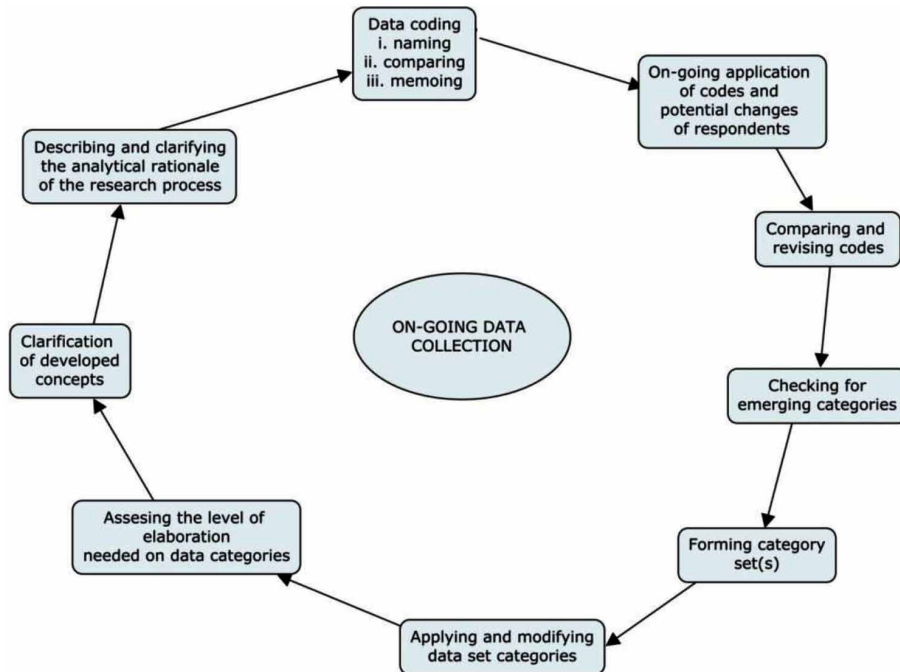
Another fundamental principle of GT as shown in Figure 1 is that data collection is not a once off session. Researchers must engage in back and forth mobility in which data collection and analysis should be constantly and repeatedly done with analysis guiding the kind of data to be collected next. During this process, researchers must identify and conceptualise patterns through the process of constant comparative coding. Thus, researcher should systematically code, compare, analyse and record data. Researchers should keep collecting more and new data, integrating newly found concepts into the emerging theory until a saturation point is reached to then present what the researcher is convinced to be a fitting, working, relevant and modifiable framework, theory or model.

It is possible that a researcher may obtain contradicting evidence in the process of data collection. In such instances, revisions should be done as part of the back and forth mobility way of collecting data. This is crucial as it enables researchers to produce frameworks, theories and models that are inductively discovered, bounded and confirmed. In developing a framework, theory or model, researchers should pay attention to the four criteria that underpin a well GT. The four criteria are "fit, work, relevance and modifiability" (Villiers, 2005, p. 23). 'Fit' refers to the need by a developed framework, theory or model to match the realities of the matters that were investigated. 'Work' implies that the framework, theory or model should be able to explain any variables of the issues that emerged from the study. 'Relevance' is when the developed framework, theory or model 'fits' and 'works'. 'Modifiability' means that the framework, theory or model that has been generated should be open to adaptation as new data and variations are integrated.

PERCEIVED CHALLENGES OF USING THE GROUNDED THEORY RESEARCH APPROACH

All research methods are prone to some challenges and imperfections and GT is not an exception. The main criticism is that the GT method suffers from misalignment as it uses interpretivist and constructionist tools yet it belongs to the positivism philosophical paradigm (Bryant, 2002). Other inherent problems of GT research are that the approach is extremely labour intensive, requiring the investment of considerable cognitive effort by the researcher.GT is an exhaustive process that has a potential for methodological errors and also suffers from limited generalizability (Lawrence & Tar, 2013; Hussein, Hirst, Salyers & Osuji, 2014).

However, it is pertinent to highlight that the purpose of constructivist interpretive studies is not to generalise but to explore the meanings placed on the issues under investigation (Rowlands, 2005). Researchers studying information centres are therefore urged to do studies that are not necessarily meant to be generalizable but rather transferrable.

Another perceived risk of GT is that the researcher may not actually uncover a significant theory and the unorthodox nature of GT is likely to alienate the potential recipients from the research findings (Jones & Alony, 2011). In this regard, it is critical for researchers to take due diligence in following the guidelines of undertaking a GT research provided in Figure 1.

Despite the perceived risks inherent in a GT research, the approach remains one of the best for studies that need to analyse large quantities of unstructured or semi-structured qualitative data for the purposes of developing a framework, theory or a model. What is important for a researcher using the GT approach is that they be wary of and be sensitive to the chances that are there for the researcher's bias and subjectivity as this will contaminate the conceptualization and interpretation of emerging is-

sues. To guard against such potentially study weakening attributes of the GT approach, researchers are advised to engage in constant comparison, saturation and core relevance (Villiers, 2005). Furthermore, researchers should ensure that data collection, analysis and presentation are linked to each step of the research process adjusting each stage to the emergent concept(s).

UNDERSTANDING THE PLACE OF A LITERATURE REVIEW IN A GROUNDED THEORY STUDY

There is so much debate surrounding the notion of reviewing literature in a GT research. The arguments propounded by various schools of thought are quite complex and at many times contrasting (Glaser & Strauss, 1967; Wiener, 2007; Strauss & Corbin, 1994; 1998; Nathaniel, 2006; Holton, 2007; Stern, 2007; McMenamin, 2006). Given the complexity of the role and the place of literature in a GT research, it is essential to provide a justification on how and why previous work need to be reviewed in a GT study. The founders of GT advised against a literature review before data collection (Glaser & Strauss, 1967). They emphasised that as opposed to most research approaches that perceive a literature review as a foundation on which a research is built, a grounded research study should abstain from literature review to avoid the contamination of the data collection, analysis and theory development.

Glaser and Strauss (1967) believed that there is a danger in an early literature review as it almost inevitably leads the researcher to impose existing frameworks, hypotheses or other theoretical ideas upon the data, hence undermining the focus, authenticity and quality of the GT research. Owing to the critical role that a literature review plays in an academic research and the uneasiness of many concerning the postponement of a literature review, the position of Strauss began to shift(Wiener, 2007). Strauss and Corbin (1994; 1998) supported an early review of relevant literature resulting in their split with Glaser (1992; 1998) who maintained the position that pure grounded theorists must learn not to know by avoiding a literature search prior to data collection. Strauss and Corbin (1994) however emphasised that the literature to be consulted must be partial and should not be done for the purposes of imposing extant knowledge onto the research but rather just to be aware and to gain an appreciation of other ideas.

The position against a literature review before data collection was also supported by Nathaniel (2006) and Holton (2007) who both asserted that grounded theorists must not enter the research field with neither a preconceived problem statement nor an extensive review of literature. In further support of abstinence from an early literature review are Glaser (1998) and McCallin (2003) who expressed the concern that a researcher's critical approach to a study may be side tracked by interpretations in extant literature that probably support taken-for-granted assumptions, which may not be applicable to their area of study. In that respect, Charmaz (2006) concurred that abstinence from an early literature review helps a researcher to avoid importing preconceived ideas and imposing them on his/her work. However, Charmaz (2015) shifted from that stance when she indicated the need for a literature review before collecting data as a standard requirement. She however acknowledges that this conflicts with early grounded theory prescriptions of delaying the literature review.

The other proponents against an early literature review are Locke (2001) and Dick (2007) who together with Glaser (1998) argued that a time consuming detailed literature review at an early stage of a grounded research study may be wasteful and inefficient given that a GT study is unpredictable and the relevant literature may not be known until some significant data has been gathered.

Despite the arguments that have been expressed by Glaser and Strauss (1967), Glasser (1992; 1998), Locke (2001), McCallin (2003), Charmaz (2006), Nathaniel (2006), Dick (2007), Holton (2007) and Wiener (2007) over conducting a literature review before data collection, this chapter upholds the idea that a literature review in a GT research is vital for academic honesty, and demonstrates how the study builds on and contributes to the existing body of literature within the field (Stern, 2007). Researchers studying information centres are therefore challenged to take the path of performing a nearly literature review as it provides a coherent rationale for a study as well as a clear justification for the chosen research approach (Dunne 2011; McGhee, Marland, & Atkinson 2007; Coyne & Cowley, 2006). Sharing the same sentiments are Chiovitti and Piran (2003) who explained that a nearly literature review in a GT research ensures that a similar study has not been done and highlights critical issues as well as gaps in the extant literature (Creswell, 1998).

An early literature review is therefore required as it helps in contextualizing the study. It also orients the researcher to his/her field of study, shows how the subject has been studied over the years, sensitizes the researcher on essential elements and theoretical concepts, guard against methodological pitfalls and it promotes a clear frame of mind towards the development of a theory. (Coffey & Atkinson, 1996; Strauss & Corbin,1998; Denzin, 2002; Maijala, Paavilainen & Astedt-Kurki, 2003; McCann & Clark,2003; Henwood & Pidgeon, 2006; McMenamin 2006; Urquhart, 2007; McGhee, Marland, & Atkinson,2007). In respect of such philosophies, information scientists are encouraged to perform a literature review so that their work is protected from open criticism. As reiterated by Coffey and Atkinson (1996, p. 157):

The open-mindedness of a researcher should not be mistaken for the empty mindedness of the researcher who is not adequately steeped in the research traditions of a discipline. It is after all not very clever to rediscover the wheel and the student or researcher who is ignorant of the relevant literature is always in danger of doing the equivalent.

In response to the fears that performing a literature review pollutes the research by imposing assumptions and preconceptions, this chapter asserts that the thinking of any researcher carrying out a study without some level of previous work or ideas is unrealistic. The argument of contaminating a GT research with preconceived ideas and interpretations in extant literature fails to recognise the ability of researchers to be mindful of how existing ideas may be used to inform their research. To that effect, Urquhart (2007) argued that a researcher's awareness and appreciation of other ideas and theories does not necessarily imply that they will impose the extant knowledge on their work. The dangers of abstaining from extant literature are more dangerous and detrimental to a research than the fears of contaminating the data, something which can be monitored and avoided.

There can be serious concerns over the researcher's familiarity and knowledge of their area of research and literature review serves to address such anxieties. In further reduction of the fears that preconceived ideas might contaminate data collected fora study, researchers must carry out the study with an open and critical mind that allows new and even conflicting findings to emerge from the study, an approach that is supported by Strubing (2007) and Suddaby (2006) and is technically referred to as reflexivity (Robson, 2002; McGhee, Marland, & Atkinson,2007; McCann & Clark, 2003). It is important for a researcher to interact and interrogate the relevant extant literature for his/her studies as it offers an adequate depth to understand the parameters of the discourse and helps the researcher to better appreciate the current theoretical conversation (Lempert, 2007; McMenamin,2006).

It is against such thinking that this chapter goes against the dicta of 'pure grounded theorists' who argue that GT researchers should learn not to know and enter the field of study with blank and pure minds (Glaser & Strauss, 1967). In actual fact, an abstinence from an early literature review ironically undermines the competence and quality of qualitative research work, yet these are part of the original reasons why GT research was introduced.

DEMYSTIFYING THE ISSUES OF RESEARCH POPULATION, SAMPLING AND SAMPLE SIZE IN A GROUNDED THEORY RESEARCH

It is odd to address the issues of sampling in a qualitative GT study given that the focus of data generation in qualitative research is on the process rather than an end point of numbers (Edwards & Holland,2013). In that respect, a sample for studies researching information centres using a GT approach is expected to be arrived at through a theory driven process that is aimed at obtaining the data needed to provide answers to the research questions. In other words, researchers should not be worried about the sample size but rather the coverage of the concepts relevant to developing an acceptable framework, theory or model. This means that sampling in a GT study does not proceed in terms of drawing samples of specific groups of individuals or units of time but in terms of concepts, their properties, dimensions and variations. This can best be described as theoretical sampling (Corbin & Strauss, 2008). The term was coined by Glaser and Strauss (1967) in the context of the development of GT.

Theoretical sampling should be done on the basis of relevance for the framework, theory or model which the researcher seeks to develop. The chosen sample should be selected on the basis of its ability to yield the theoretical ideas that are needed to come up with a sound framework, theory or model. This means that researchers should not begin by setting the sample from which the data is going to be solicited. Instead, researchers should identify sources of data collection in light of the on-going data analysis and the theoretical development emerging from the simultaneous data collection and analysis procedures. Results from one phase of data analysis must inform where a researcher should go next for data collection and how he/she should collect it. From this explanation, it is apparent that theoretical sampling goes hand in glove with snowballing. As such, the sample size for a research must not be predetermined as it is built as the research progresses.

Determining sample sizes is a major problem for many researchers (Ngulube, 2005). For studies employing GT in researching information centres, this chapter urges researchers to assume the position that there are no rules for sample size in qualitative inquiry. Sample size depends on what the researcher wants to know, what will be useful, what will have credibility, what is at stake and what can be done with the available time and resources (Patton, 2015, p. 311). However, Creswell (2014, p. 231) argues that it is typical for a qualitative researcher to study a few individuals or a few cases ranging from 1 to 40 as it enables a researcher to provide an in-depth picture of a studied phenomenon. In that respect, Creswell (2014) further argues that the use of large numbers in qualitative research may result in superficial perspectives. The same sentiments were echoed by Stake (2006) who indicated that small samples that are truly in-depth have resulted in many of the most significant breakthroughs in understanding the phenomenon under study.

Contrary to the above communicated perspectives and to which this chapter subscribes is Patton (2015, p. 313) who argued that the validity, meaningfulness and insights generated from qualitative inquiry have more to do with the information richness of the cases selected and the analytical capabilities

of the researcher than with sample size. In that respect, this chapter advances the view that researchers who should worry about sample size are those that seek to generalise their results from a sample to a population of which it is a part. This means that the researchers using GT in researching information centres should not be worried about the sample size but rather the coverage of the concepts relevant to developing an acceptable framework, theory or model.

The stance is also supported by Mason (2010, p. 139) who argued that sample size is a matter of intellectual judgement based on the logic of making meaningful comparisons, developing and testing your explanations. Similarly, Corbin and Strauss (2008) as well as Manzano (2016) argued that sample sizes in qualitative research are not based on sampling fractions, representativeness and bias elimination but on the concepts of data completeness and saturation.

Interestingly, Patton (2015) likens the question of sample size to the problem that students usually have when they are given an essay to write. Below is the conversation extracted from Patton (2015, p. 314):

Student: *How long does the paper have to be?*
Instructor: *Long enough to cover the assignment.*
Student: *But how many pages?*
Instructor: *Enough pages to do justice to the question-no more, no less.*

In light of the above conversation, this chapter concedes to the notion that sample size is an intellectual validation and judgement. A sample size is therefore neither too big nor too small for as long as it provides adequate data that is needed to comprehend the issues surrounding the subject under study. This enables the development of a relevant and meaningful framework, theory or model that is empirically trusted.

In relation to the issue of sample size(s), Edwards and Holland (2013) noted that researchers are often preoccupied with the question of how many interviews should be done when conducting qualitative research. In light of this concern, this chapter advises researchers using GT to study information centres not to worry about having a specific number of interviews to conduct as the concept of data saturation should determine when to end the interviews and other data collection ventures. The GT approach requires researchers to simply sample, collect data and analyse it simultaneously and this makes it impossible to specify in advance how many interviews are necessary for a study. Researchers should continue sampling and identifying cases until the informants are not revealing anything which they had not said before. In the end, the number of interviewees will be determined by the range of meanings and not a sample that is representative as is the case with quantitative research.

Morse (1995) noted that there is no set number of interviews that can be assumed to achieve saturation. Morse (1994), however, recommended 30-50 interviews for grounded studies while Guest, Bunch and Johnson (2006) argued that data theme saturation is achieved after twelve interviews. Closer to the recommendation of Morse (1994) of 30-50 interviews, Mason (2010)indicated that, despite the conceptual impossibility of establishing a power calculation, common professional practice situates the acceptable number of interviews between 20 and 30. This chapter does not subscribe to this rule of thumb Researchers using GT are advised to focus on relevance and rigour in obtaining data that is needed to build their frameworks, theories and models. The process of theory generation should not necessarily be consolidated in the next interview but through mining information using other research techniques which a researcher may deem appropriate for their study.

Manzano (2016) indicated that qualitative research advocates for the use of a small number of interviews although the precise number cannot be decided a priori. The variations on the recommended sample size by many scholars show that the answer 'it depends on thetype of study' is the most appropriate to answer those who are concerned with how many interviews should be held in a qualitative enquiry and how big should be the sample size.

CREDIBILITY, TRANSFERABILITY, DEPENDABILITY AND CONFIRMABILITY

Contrary to positivistic and quantitative researchers who believe in a single reality regardless of what people do, believe or think (Coll & Kalnins, 2009) and where the value of the research results is judged against the extent to which the findings can be generalised to a wider population, this chapter recommends researchers using GT to focus more on the ability of the research results to work with the perspectives of the study. The use of GT in researching information centres should be conducted on a purely constructive and interpretive methodological framework. As such, this chapter raises objections to the suitability of judging the quality of GT studies using the validity, reliability and objectivity criteria.

The quality of a GT study can best be judged against what Coll and Kalnins (2009) call the trustworthiness of a study. As such, it is appropriate to for researchers using GT to replace internal validity with **credibility**, external validity with **transferability**, reliability with **dependability** and objectivity with **confirmability**. Agreeing to the use of the terms 'credibility', 'transferability', 'dependability' and 'confirmability' in interpretive research to respectively replace 'internal validity', 'external validity', 'reliability' and 'validity' are Ritchie and Lewis (2003), Cohen, Manion & Morrison (2007) and Ponelis (2015) amongst many other scholars.

Credibility

Credibility calls for identifying all important factors in the research question and accurately and completely describing the ways in which these factors are reflected in the data gathered (White & Marsh, 2006; Bryant & Charmaz. 2011). Credibility can be enhanced through a researcher's prolonged engagement at the research site and with the research participants as well as persistent observation, member checks and progressive subjectivity. The intention for prolonged engagement at the research site and with the research participants provides researchers with an opportunity to establish good rapport and trust with participants. This also allows researchers to overcome the hawthorn effect, thus the pretentious behaviour by the study participants due to their awareness of being observed. Persistent observation of aspects under the spotlight in the study permits researchers to identify the concepts and features that are most relevant to their research inquiries.

Member checks are essential in attaining credibility fora study. This means that researchers should give their informants an opportunity to read transcriptions of their interviews so as to confirm the contents as an accurate picture of their views. Progressive subjectivity is another way that can be used to give credibility to a study. Thus, researchers should carefully monitor their own ideas, constantly reminding themselves that in interpretive inquiry the researcher's views should not be afforded a higher status than that of the participants. In that regard, researchers should ensure that the participants' views are clearly communicated in data presentation through employing 1st and 2nd order analysis.

First order analysis is when a researcher uses the respondents' centric terms as they were obtained during data collection (verbatim transcription). Second order analysis is when a researcher uses his/her own centric concepts, themes and dimensions derived from the research question and problem (Gioia, Corley & Hamilton, 2012).

Transferability

Transferability is more or less the same as external validity or generalisability in that it is a judgment about the applicability of findings from one context to another (Strauss & Corbin, 1994). The norm for most social scientist researchers is to try and fit their findings within an existing theoretical framework. Researchers operating within the qualitative research methodology often find themselves battling to justify the applicability of their findings to other comparable contexts. As such, the usual way for researchers with such a mind-set is to try and collect data on the same questions from multiple sources believing that findings obtained from such sources can be transferred with greater confidence (White & Marsh, 2006).

Researchers using GT to research information centres are urged to ensure their studies are transferrable. This can be achieved through collecting, analysing and cross-checking a variety of data on a single aspect from multiple sources. Unlike in positivistic studies where similar questions have to be repeated on a large number of respondents, researchers using GT do not have to repeat the same questions but rather pursue emerging issues and perspectives (Buchwald, 2000). Questions therefore need not be necessarily pre-determined or repeated on all the respondents. The questions should mainly be guided by the research problem and objectives and most of them should naturally arise from the emerging issues and perspectives.

In quantitative and positivistic research, external validity relies on particularly random sample selection or stratified random sampling. In interpretive work, as is the case with GT studies, theoretical sampling procedures should be employed. For the purposes of transferability, a researcher using GT should offer readers a context in which their study was conducted. They should also offer comprehensive descriptions of methodology and how the data was analysed and interpreted. This enables readers to decide on whether the findings and conclusions of the study apply to their own situations or not.

Dependability

In a GT study, reliability is replaced with dependability. Dependability refers to the stability of data over time (Ponelis, 2015). It is this criterion of dependability that presents a sharp contrast with what positivist researchers believe to be reliability. For instance, interpretive researchers believe that relevant methodological alterations and changes in research design form the basis of a strong research while positivist and quantitative proponents believe that such changes expose a particular study to unreliability (White & Marsh, 2006). Interpretive studies perceive any changes in the methods and methodology as an integral part of the research process that increases the maturity of the study and not as a flaw in methodology as positivists may want to believe (White& Marsh, 2006; Ponelis, 2015).

What is crucial, however, is for such changes to be clearly described to an extent that they can be easily tracked. Although the use of GT permits alterations in methods and methodology, researchers are warned not to make any major changes that affect the orientation of the methodological issues for the study. Researchers using GT can attain dependability through giving clear and comprehensive explanations about the systematic procedures that were followed in gathering, analysing and interpreting the data that was used to develop a framework, theory or model.

Confirmability

Confirmability in GT studies is used to mirror what researchers in the positivist paradigm refer to as objectivity. Confirmability is concerned with ensuring that the findings of a study have not been influenced by the researcher. In quantitative and positivism research, objectivity is mainly achieved through a strict adherence to a method of inquiry that is determined in advance (Ponelis,2015). However, in interpretive studies using a GT approach, confirmability entirely rests on the collected data. The research findings are confirmed by looking at the data to determine if the data support the conclusions (White & Marsh, 2006). Therefore it is prudent to supply the raw data and communicate the process that was used to analyse and code the data. To achieve confirmability, researchers should describe how the interviews were done, how observations were made and how document review was performed (*that is if those research techniques were used.*

Researchers using GT should also make available to the readers the actual questions that were asked, the observations that were made. Confirmability (objectivity) can however be very difficult to achieve given that in interpretive inquiries, the researcher is the interpreter and personal bias based on previous experiences is almost certain to creep in. Researchers using GT must be wary of such dangers and make efforts to reduce and eliminate personal biases by declaring the assumptions of the study at the beginning of their study.

HOW TO ANALYSE AND PROCESS DATA FROM A GROUNDED THEORY STUDY

Data analysis entails categorising, ordering, manipulating and summarising data to find answers to the research question (Ngulube, 2005). The process involves transforming data into research results through making succinct statements out of huge piles of data (LeCompte, 2010). Data analysis is therefore critical to the successful completion of a research inquiry as Ngulube (2005) argues that a researcher may fail to interpret research data or to draw conclusions and make recommendations if s/he does not understand how to analyse data. Similar arguments were highlighted by Flick (2014) who argued that, whatever the data are, it is their analysis that forms the outcomes of the research.

Data analysis is an exciting and challenging process of reassembling a puzzle. It is common knowledge that one cannot complete a puzzle if some pieces are missing, warped or broken. A juxtaposition of this analogy in the context of scientific research implies that if data are incomplete or biased, research objectives cannot be met and the research problem may not be solved.

It is prudent to always begin the data analysis process by identifying possible areas of bias. Please note that the word 'always' is being used here because data analysis for a study using a GT approach should not be a once off exercise but rather a constant comparison process. Identifying possible areas of bias is an essential procedure because researchers are human beings and they tend to collect data that intrigue or make sense to them. While selectivity is inevitable in people, researchers using GT must remain aware of how selectivity can affect the overall outcome of the research and therefore should always begin the data analysis process by identifying possible areas of bias and accordingly attended to them. This can be done through identifying tacit theories as advised by LeCompte (2010). It is also necessary to use both 1st and 2nd order analysis since reporting both the voices of the respondents and the researcher allows for a qualitatively rigorous demonstration of the relationship between the data and the concepts. It also defines a hallmark of qualitative research (Gioia, Corley & Hamilton, 2012).

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Effective data analysis process in a GT study requires the researcher to do a verbatim transcription of the interviews that were conducted, if any interviews were conducted. The transcriptions produced must be a word-for-word replica of everything that was said in the interviews. Verbatim transcription is a necessity in a GT study as it captures information in participants' own words, phrases and expressions, thereby allowing the researcher to uncover deeper and hidden meanings (Hennink, Hutter& Bailey, 2011). Transcription has been argued to be an inevitable and problematic step in the qualitative analysis of data that consists of spoken discourse (Kawal& O'Connell, 2014). In respect of that argument, transcription can be regarded as an indispensable step in data analysis as all qualitative researchers are compelled to carefully attend to the phase of setting down the verbal research material in writing by means of transcription. Of importance to note is that after a researcher is done with verbatim transcriptions, s/he should then work on anonymising the data. This can be done through removing any identifiers from the transcript to protect the participants' anonymity.

As reiterated earlier in this chapter, data analysis in a GT study is a constant comparative process that involves identifying and merging information categories and paying attention to the emerging theory. Kanuka (2010) underscored that the constant comparative method of data analysis has been hailed for enabling researchers to create categories that reflect the research purpose in a mutually exclusive and conceptually congruent manner. Researchers using the GT approach should therefore engage in sorting and re-sorting data from the beginning to the end of the research.

When using the GT research approach, the first step that may be taken by a researcher in data analysis is code development. Strauss (1987) underscored that the excellence of research rests in large part on the excellence of coding. Similar sentiments were shared by Hennink, Hutter and Bailey (2011) as well as Patton (2015) who indicated that, if data are poorly coded, it can limit further analytic tasks. Identifying codes is helpful in that the codes enable a researcher to identify the range of issues in the large volumes of data. This will help the researcher to conduct a focused analysis of a specific issue in the data. It also enables the researcher to understand the meanings attached to these issues by the informants. In a GT study, code development ends when the researcher has reached a point of saturation; thus when no more new issues or topics are identified in the data.

After the codes are developed, a researcher should then proceed to code the data. It is imperative to highlight that coding is distinct from code development in that code development only seeks to identify a range of codes (topics, issues and concepts) discussed while coding uses the identified codes to label the entire data set and segment the data set into smaller meaningful parts for analysis(Hennink, Hutter & Bailey 2011). Flick (2011) describes coding as the process in which data are broken down, conceptualised and put back together for the purposes of developing a theory. Ngulube (2015) describes coding as a procedure that helps researchers to move data to a high level of abstraction as it plays a key role in category identification. Coding can therefore be identified as the central process by which theories are built from data. The process of coding in a GT research occurs during data collection to enable a researcher to determine what data to collect next as underscored by Creswell (2014).

Researchers using a GT approach should therefore begin by open coding whereby data is expressed in the form of concepts. Creswell (2014) describes open coding as a process in which the researcher makes sense out of the text data, divides it into text segments, labels the segments and examines codes for overlap or redundancy. Open coding involves segmenting the data in units of meaning in order to attach concepts (codes) to them. To achieve this, a researcher can pose the following questions:

- What is the issue here?
- Which aspects of the phenomenon are being mentioned?
- When, how long and where?
- How much or how strong?
- Which reasons are given?
- What for?
- By which means?

The above basic questions and the entire process of open coding allow the researcher to achieve a deeper understanding of the text. It is crucial to indicate that a researcher may not apply the open coding procedure to the whole text of the interviews or observation data. The procedure can be performed only on particularly instructive and unclear passages.

Open coding should then be followed by axial coding which is a more formal procedure of analysis. Axial coding is an analysis procedure that involves identifying and classifying links between substantive categories (Flick, 2011).Axial coding is when grounded theorists select one open coding category, positions it at the centre of the process explored and then relates other categories to it (Creswell, 2014). Axial coding therefore serves to elaborate the relations between categories. In order to formulate such relations, a researcher can use a coding paradigm model depicted in Figure 2.

Using the above depicted model that basically outlines the relations between phenomena and concepts, a researcher should be able to clarify the relations between a phenomenon, its causes, context and the strategies involved. The axial coding paradigm model has been attested for facilitating the discovery of structures of relations between phenomena, concepts and categories (Flick, 2011).

During the process of axial coding, researchers are recommended to use the same questions which they asked during open coding. The only difference in the use of the questions should be that during axial coding a researcher should continuously move back and forth between inductive thinking. This will enable them to test the concepts, categories and relations against the data. Researcher should therefore constantly compare and revise codes checking for emerging new data sets, forming further categories and

Figure 2. Axial coding paradigm model
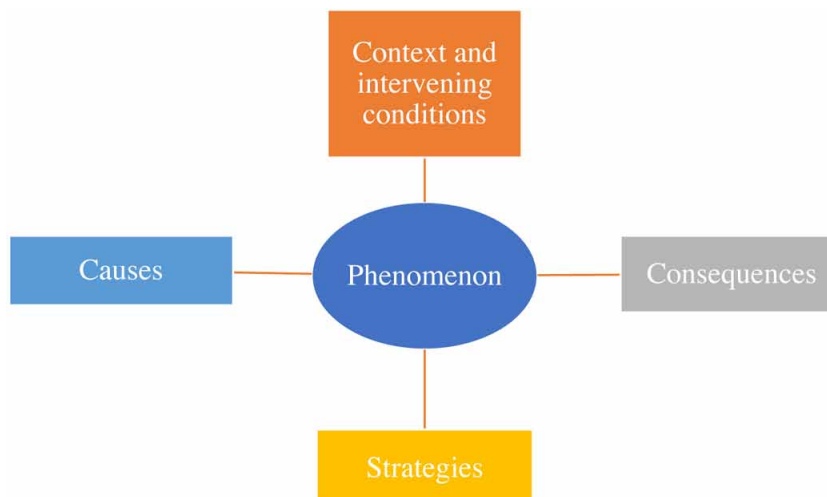
modifying them as more data are collected. What this means is that data analysis should be performed in response to the on-going data collection and comparison. This enables a researcher to go deeper into the data (Hennink, Hutter, & Bailey, 2011).

After completing the axial coding process, a researcher should then move to selective coding, a process which requires them to focus more on elaborating the core concepts. Selective coding is the final process of analysis in which the researcher develops his/her theory. It is when a researcher is able to say under these conditions this happens, whereas under these conditions this is what occurs (Flick, 2011 & Creswell, 2014). Selective coding is therefore an essential analysis procedure as it leads to the formulation of the story of the case. It is during the selective coding process that a researcher should be able to develop the core categories and formulate the theory, framework or model in greater detail, checking it against the data. Overall, data in a GT study should be coded into themes and sub-themes so as to identify significant concepts and patterns. The coding process should be inductive and it should specifically be guided by the research questions and problem. Analytic and reflexive concept memos must be used to capture emerging concepts, perceptions and ideas. Memos are notes written down by the researcher to elaborate on ideas about the data and the coded categories (Creswell, 2014). Memo writing is a crucial component of data analysis as it provides transparency of the research process and a trail of analytic decisions.

CONCLUSION

It is imperative for researchers focusing on information centres to consider using the GT research approach as it guards against theoretical stagnation. Unlike most other naturalistic modes of inquiry, theory development from GT research has been identified as having the capacity to predict. A GT research approach allows a researcher to inductively generate theory and models from the analysis of the gathered data. In GT research, there is no testing or replication of existing theories. As such, the theories that are used in a study should merely serve to acquaint the researcher with the discourse and pertinent issues regarding the subject under spotlight. Theories, models and frameworks developed from GT studies should entirely rest on the empirical data yielded from the study and must not be confined nor influenced by existing theories.

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KEY TERMS AND DEFINITIONS

Constant Comparative Coding: This is a process in which a researcher systematically code, compare, analyse, and record data. The researcher keeps collecting more and new data, combining it with newly found concepts until a saturation point is reached.

Grounded Theory: It is a research approach used by researchers who seek to develop a model or theory on an investigated matter using the empirical field evidence and not to verify an existing theory.

Information Centres: These are public information resource centres or repositories of public knowledge. Examples include archives, museums, libraries and art galleries.

Iterative Study Design: Is a cyclical process in which a researcher repeatedly collects, analyses data until data begins to repeat itself.

Literature Review: Refers to the consultation of various sources on information on a particular subject with the intention of gaining a better understanding of the concepts and to identify any existing gaps.

Qualitative Methodology: Refers to the meanings, concepts, definitions, characteristics, metaphors, symbols and description of things that are not experimentally examined or measured in terms of quantity, amount, intensity or frequency.

Theoretical Sampling: Is when a researcher collects data with the primary goal of generating a theory. In theoretical sampling, the decision on what data to collect and where to find it is guided by the emerging issues from the data the researcher would have initially collected.

Chapter 9

Using Grounded Theory to Develop a Framework for an Information Society in Southern Africa

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ABSTRACT

Grounded theory has not been widely used in the information sciences, despite it being one of the methods or designs employed for generating theories in the humanities and social sciences. However, with the increase in research that aims to generate information science theories, more researchers and students are exploring the use of grounded theory methods to conduct their studies. This chapter intends to simplify the conceptualisation and application of grounded theory methods for research within the information sciences. It discusses its origins, philosophical groundings and assumptions, as well as its methodological approaches. The chapter describes the foundations of the grounded theory methods providing some insights into some of the methodological approaches through an example study that constructed a theoretical framework for building information societies for development in Southern Africa. This chapter enhances the example with the practical lessons that the author learned in the conduct of the study.

INTRODUCTION

Grounded theory should be considered as one of the indispensable research designs within the information sciences discipline to ensure that the discipline, particularly in Africa, succeeds to generate its theories. Whatever procedures a researcher applies in their research should not be considered grounded theory unless they generate a theory. Despite the generation of theory continuing to be relevant in the information sciences, grounded theory is not as widespread in the field as other research designs (Ngulube & Ukwoma, 2019; Ullah & Ameen, 2018). For this reason, there remains room to advocate for the

consideration of its use and expose its potential to address research problems within the discipline. This chapter presents the author's perspective on grounded theory that could be applied within the information sciences.

In order to ensure the exposure to grounded theory, this chapter provides an overview of the design with a perspective on its philosophical groundings and assumptions. Juliet Corbin, suggests that grounded theory is a collection of different methods, aimed at the construction of theory from data and sharing common procedures. There are different approaches to conducting grounded theory, each with its philosophical foundation and approach to data gathering and analysis (Corbin, 2009, p. 41). Notwithstanding Corbin and others' use of the term method to refer to grounded theory, this chapter considers grounded theory to be a design as discussed in the next two sections. In some instances, this chapter refers to grounded theory as a method in line with the cited source to ensure readability and avoid confusing the reader.

The impression gained from the reading on grounded theory is that this approach is predominantly applied within a qualitative perspective. Despite noting the quantitative potential of grounded theory, one of the recent exposition of this method by Flick (2018, pp. 20–21), emphasises the qualitative nature of the design. The potential to utilise grounded theory within both the qualitative and quantitative traditions is highlighted to ensure that researchers in the information sciences do not remain in the single-track and fail to consider the method when the research problem so demands.

The approach adopted is expected to ensure that the achievement of the objective of this chapter which is to explicate grounded theory and its possible use within the information sciences based on an example to generate a theoretical framework for building information societies for development in Southern Africa that was undertaken by the author for his doctoral studies (Sehlapelo, 2018). This chapter should benefit the reader with the following:

- An understanding of the grounded theory research design;
- A consideration of what makes grounded theory relevant for application in the information sciences;
- Approaches to the construction of theories using grounded theory; and
- A recognition of the potential for utilising grounded theory to address information science research problems.

These aspects are discussed in a sequential logic from the most abstract theoretical perspective to the most practical activities related to the research, as shown in the map of the research methodology in Figure 1. An outline of the research paradigm, inclusive of the philosophical assumptions, alongside the relevant ontology, epistemology and methodology as applied to the research, based on the nature of the problem is provided. The way the design was applied in the example study, in order to respond to the research questions, is also discussed. Following that, the chapter presents aspects related to research methods, sampling, data collection instruments, as well as data collection and analysis procedures. Next, the chapter discusses the quality as well as the ethical considerations related to a grounded theory study.

DEFINING GROUNDED THEORY

Barney Glaser and Anselm Strauss developed grounded theory which they publicised in 1967 in their book titled, *The Discovery of Grounded Theory* (Babbie, 2014, p. 315; Charmaz, 2006, p. xi; Urquhart,

2013, p. 3). Although *The Discovery of Grounded Theory* is often the text that is cited as representing the origin of grounded theory, it is worth stating that Glaser and Strauss have been working on the method and challenging the then mainstream research before its publication (Flick, 2018, p. 3). There is thus, no doubt as to who the originators of grounded theory are. However, the certainty of who the originators are comes with the undesirable tendency by scholars to want to create an orthodoxy and thus diverting the focus of scholarship from addressing societal problems.

Scholars tend not to agree on the conceptualisation and naming of ideas related to research methodology, and sometimes even the same scholar changes their position. For example, Creswell has changed his characterisation of grounded theory as a strategy of inquiry (Creswell, 2009, p. 13) to research design (Creswell, 2014, p. 14). There are at least three denotations for the label grounded theory, firstly, as reference to a theory that came about as a result of a particular process; second, as a name for a research design; and thirdly, as a process and attitude to conducting research in line with any of the guidance for conducting the research (Flick, 2018, p. 3). In this chapter, grounded theory is utilised in the second sense, and it will be specified should it be utilised in another sense.

Grounded theory is a research design that is aimed at producing a theory from the ground or the data (Henning, Van Rensburg, & Smit, 2004, pp. 47, 115) or from constantly comparing unfolding observations (Babbie, 2014, p. 315), or by using multiple stages of data collection and analysis (Creswell, 2009, p. 13; Leedy & Ormrod, 2015, pp. 274–275). The consensus by all these researchers is that after conducting grounded theory, there will be a theory and that it is suitable for building theories (Díaz Andrade, 2009, p. 46). The advent of grounded theory challenged the then dominant research activities that focussed on testing existing theories (Birks & Mills, 2011, p. 2) which according to some authors should have been subordinate to theory building (Díaz Andrade, 2009, p. 45). The superiority or otherwise of theory testing to theory building is not relevant for this chapter. This chapter is focussing on the latter as applied through grounded theory.

Even though there seems to be a consensus that the outcome of applying grounded theory would be a theory, there is no agreement on how it should be applied. Without entertaining the numerous controversies related to grounded theory, the chapter provides an overview of the critical aspects related to the application of grounded theory. One way of distinguishing grounded theory from other research designs is the identification of the so-called essential features of the grounded theory. The necessary elements of grounded theory, that outline how a theory is generated, have been identified as "initial coding and categorising of data; concurrent data generation or collection and analysis; theoretical sampling; constant comparative analysis using inductive and abductive logic; theoretical sensitivity; intermediate coding; selecting a core category; theoretical saturation; and theoretical integration" (Birks & Mills, 2011, p. 9). Another approach to distinguish the grounded theory from other designs is to consider the four characteristics outlined below (Urquhart, Lehmann, & Myers, 2010, p. 359):

1. The purpose is to produce a theory;
2. The researcher makes an effort not to contaminate their work with ideas conceived *a priori*;
3. The use of theoretical sampling, which is the selection of data to analyse next, based on current coding activity; and
4. The use of constant comparison, which is a continuous interchange between data collection and data analysis, in this process new data that is collected, is compared with existing data, taking into consideration how it enriches existing categories.

The aim of the study that is utilised in this chapter to illustrate the use of grounded theory was to identify or develop a theoretical basis or framework upon which African and, more specifically, SADC countries could successfully utilise to build an information society. That study had identified, as its problem, the lack of an explicit theory for building information societies within the strategies, policies or plans that SADC countries had adopted, the research problem. For ease of language, this chapter refers to that study as the SADC Study, the example study, or the reference study. That study determined that grounded theory, a design for generating theory from the data rather than validating a theory with the data, should be utilised to generate this theoretical framework or theory (Urquhart, 2013, p. 8). This chapter's point of departure is that the reference study mentioned above is firmly rooted in the information science discipline. Having highlighted the need for Africans to develop their theories, the reference study provides a relevant example for the use of grounded theory within the continent. Figure 1 maps the research methodology that the reference study employed in order to develop a theoretical framework for building an information society; this research methodology map is utilised to clarify how that study hung together as discussed in the rest of the chapter.

THE PHILOSOPHICAL PERSPECTIVES OF GROUNDED THEORY

This section discusses the philosophical perspectives related to grounded theory with an emphasis on those relevant to the example utilised in this chapter. Even though most research designs or methods are typically associated with specific paradigms, there are several good reasons for researchers to outline their paradigms. Whenever researchers make their philosophical worldviews or assumptions explicit, their readers are enabled to establish why the researcher selected a particular design or approach and can evaluate the research (Creswell, 2014, p. 6; Díaz Andrade, 2009, p. 43). Also, making how the research was conceived, executed, and reported on explicit, contributes to ethical, logical, truthful, and cohesive research that is also a sign of good scholarship (Guba & Lincoln, 1994, p. 116; Nathaniel, 2012, p. 187).

To fully understand the choices that a researcher makes when it is necessary to know how they look at the world and how they believe the world could be understood. In social research, these aspects of the researcher's approach are referred to as broad philosophical or theoretical traditions and are referred to as research paradigms or simply paradigms (Blaikie, 2007, p. 3; 12). According to Guba and Lincoln (1994), paradigms are defined as "the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways" (Guba & Lincoln, 1994, p. 105). Paradigms could be considered as being similar to beliefs or culture, and in that regard no paradigm should be seen as being better than another (Annells, 1996, p. 383; Babbie, 2014, pp. 32–33; Durrheim, 2006, p. 40; Guba & Lincoln, 1994, p. 107; Scotland, 2012, p. 9). Paradigms answer questions related to how the researcher defines reality or the truth, the nature of the relationship between the researcher and the subject of the research, as well as how the researcher finds the truth. In addressing these questions, the researcher will be attending to what is referred to as the ontological, the epistemological and the methodological questions (Guba & Lincoln, 1994, p. 108).

Guba and Lincoln (1994, p. 108), supported by Annells (1996, p. 383) identifies positivism, post-positivism, critical theory and others, as well as constructivism as the four basic research paradigms. Annells (1996, p. 383) further notes that some authors such as Denzin and Lincoln (quoted in Annells, 1996, p. 383) have mixed the constructivist and interpretive approaches, whereas others such as Schwandt (quoted in Annells, 1996, p. 383), have split these categories. In Figure 2, a simplified model for the basic

Figure 1. Map of the research methodology
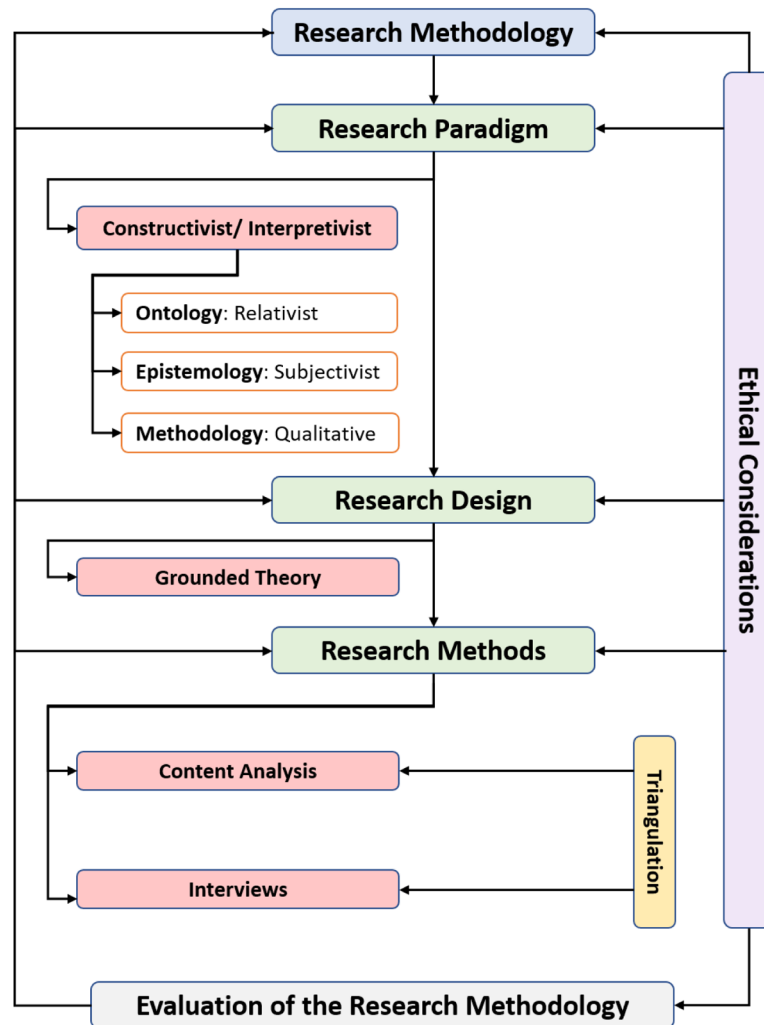
paradigms or philosophical outlooks by integrating the views of some authors (Guba & Lincoln, 1994, p. 109; Morgan, 2007, p. 65) is presented. Since different authors combine the paradigms differently, it is essential to pick one model to use as a point of reference. The model presented below is based on Guba and Lincoln's (1994) approach and fused with that of Morgan (2007, pp. 65–67). The inclusion of Morgan's work is to account for pragmatism, which Guba and Lincoln (1994) do not address. The pragmatism discussed by Morgan (2007, p. 65), is not included in the framework presented by Guba and Lincoln (1994). The inclusion of pragmatism in the model discussed in this chapter rounds it off well and renders the discussion easy to follow.

This chapter utilises the model in Figure 2 as a basis for discussing research paradigms. This model includes more paradigms than the model preferred by Ngulube (2015b, p. 128), which presents only three paradigms: realism/positivism, pluralism/pragmatism and constructivism/interpretivism. Despite presenting more paradigms than those of Ngulube (2015b, p. 128), the selected model is still more straightforward than other approaches that present many more paradigms; for instance, Blaikie (2007,

Figure 2. Selected research paradigms
Source: (Guba & Lincoln, 1994, p. 109; Morgan, 2007, p. 65; Ngulube, 2015b, p. 128)
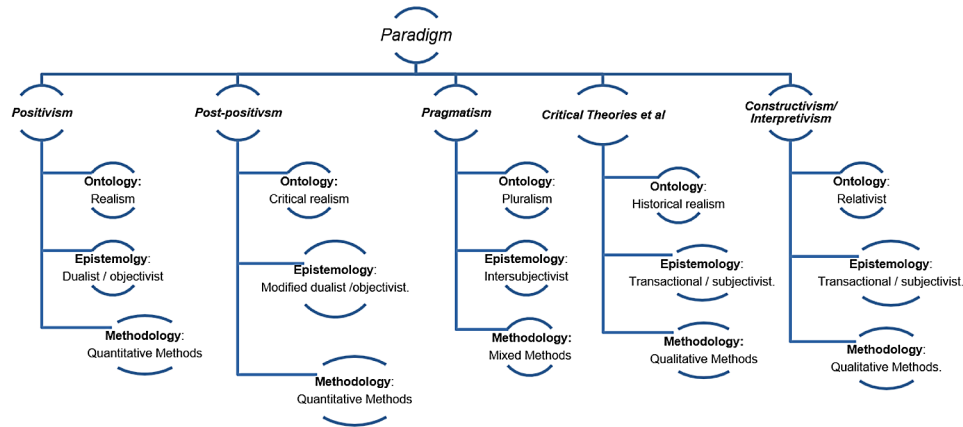
p. 27) presents ten paradigms. This discrepancy raised the question as to who labels and defines what is considered a paradigm within the social sciences (Morgan, 2007, p. 60). The researcher had not attempted to resolve this in the study.

This lack of consensus about paradigms is not only illustrated by the number of paradigms, but also by how these are interpreted. For instance, Ngulube (2015b, p. 127) argues that since critical theories have a relativist ontology, they should be considered an inherent part of interpretivism. One of the main arguments comes from Morgan (2007), who notes the challenges created by the overlap between paradigms such as constructivism and critical theory, and believes these could be resolved by ditching the over-emphasis on ontological issues over methodological issues. The approach that the determination of a paradigm should be based on the similarity in ontology, may have the unintended outcome that, should one determine an ontology, the epistemology and methodology would follow without any further mental application (Chilisa & Kawulich, 2012, p. 54). The ontological view that this chapter adopts, is that there are multiple socially constructed realities and that these social constructions of reality are probably influenced by specific academic communities to construct or understand paradigms. As a result, multiple classifications of paradigms are acceptable if any of such classifications were internally consistent. Despite the different paradigms ending up with the same methodology, the fact that they have different ontologies and/or epistemologies will have a different nuance on how the methodology would be applied.

The key concepts that this chapter considers useful for distinguishing or describing paradigms are ontology, epistemology, methodology and methods, as noted in Figure 2. These concepts explain the key characteristics of the different paradigms. There are strong arguments against this approach to understanding the core issues around social science research methodology. One of these critiques presented by Morgan (2007) is that the dominant approach/paradigm, which Guba and Lincoln (1994) also present, has significant flaws that lead to it not being able to accommodate pragmatism as a valid paradigm. Notwithstanding this significant flaw of the dominant approach, this research has brought together those two approaches as depicted in Figure 2 for convenience. Furthermore, the researcher has also flagged the critical characteristics of the different attributes of the paradigms.

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Paradigms distinguish themselves along three dimensions. These dimensions are ontology, epistemology and methodology (Hanson, Creswell, Plano Clark, Petska, & Creswell, 2005, p. 225; Terre Blanche & Durrheim, 2006, p. 6). Other research includes axiology, which relates to the role of values, as another dimension of a paradigm (Hanson et al., 2005, p. 225; Morgan, 2007, p. 58). Ontology concerns itself with the nature of reality and answers questions such as "Do things exist?" and "if they exist, in what way do they exist?" Epistemology relates to how people come to know what exists, that is the relationship between the observer/knower and what can be known, and methodology articulates how research is done and the mechanisms of undertaking research (Hanson et al., 2005, p. 225; Terre Blanche & Durrheim, 2006, p. 6).

While not stating explicitly that their philosophical approach is pragmatism, Herbert and Higgs (2004, p. 63) argue that both the quantitative and qualitative paradigms can contribute valuable scientific knowledge. Their primary argument is that it is the nature of the research that should determine the paradigm to be adopted (Herbert & Higgs, 2004, pp. 63–61). In other words, it is quite feasible and desirable from their philosophical point of view that a researcher can adopt either a qualitative or a quantitative paradigm, depending on the nature of the research question. It seems self-evident that the research questions asked, consciously or subconsciously, are dependent on the philosophical outlook of the researcher. According to Mackenzie and Knipe (2006), the pragmatic paradigm has no philosophical loyalty and may employ qualitative and/or quantitative methods and "may include tools from both positivist and interpretivist paradigms" (Mackenzie & Knipe, 2006). The ontology associated with pragmatism is pluralism (Ngulube, 2019, p. 88; Ngulube & Ukwoma, 2019, pp. 2–3). In other words, a researcher from a pragmatic paradigm is not limited in terms of what research question he or she could ask and therefore, the researcher could raise questions that may require qualitative, quantitative or both methods to address.

There is a view that grounded theory is a research methodology as well as a research method (Birks & Mills, 2011, pp. 4–5). The philosophical basis of grounded theory has been debated by various researchers (Age, 2011). According to other authors, there are different possible approaches to executing grounded theory which researchers may choose from (Birks & Mills, 2011, p. 8) and therefore, it is important to justify the mode which a researcher chooses. In the section which discusses the coding procedures adopted, the approach and procedures for implementing grounded theory selected by the researcher for the reference study are outlined. The article by Eaves (2001) focuses on the view that there was no single way of using grounded theory and that it was important for researchers to justify their specific approach to grounded theory.

It is a challenge to place grounded theory within the different philosophical paradigms. Age (2011, p. 1599) and Nathaniel (2012, p. 192) cite different researchers who have labelled grounded theory as being positivist, interpretive or pragmatic in philosophical outlook. Some authors strongly assert that Barney Glaser, one of the founders of grounded theory, had claimed that this research design was pragmatic and went beyond the philosophical approaches (Age, 2011, p. 1599; Nathaniel, 2012, p. 189). In supporting this view, Charmaz emphasises that Barney Glaser has argued that "quantitative researchers could adopt grounded theory" (Charmaz, 2012, p. 181). It is thus, considered necessary to provide a short exposition of the various approaches to grounded theory.

The idea that a theory could emerge from the data does in itself suggest a particular philosophical approach. In essence, it states that there could be an objective reality inherent in some contexts waiting to be discovered. Therefore, grounded theory is consistent with the "empiricism" as is sometimes argued. As outlined by Eaves (2001, p. 655), the process and products of grounded theory are not shaped by the

subjective conditions of the researcher but are derived from the data. In trying to find the philosophical roots of grounded theory, Age (2011, p. 1612) concludes that, in some respects, Glaserian grounded theory has an affinity for positivism. Regarding the objectives and how research is undertaken, Eaves argues that Glaserian grounded theory is pragmatic and for that reason may be utilised by people from the different philosophical and research traditions (Age, 2011, pp. 1612–1613; Díaz Andrade, 2009, p. 46). Mills, Bonner and Francis (2006) argue that Strauss and Corbin's version of grounded theory should be classified as relativist pragmatist.

A view advocated by Díaz Andrade (2009, pp. 42, 48) is that grounded theory has evolved from being positivist to being interpretivist. According to Díaz Andrade (2009, p. 44), "interpretive researchers do not recognise the existence of an objective world. On the contrary, they see the world strongly bounded by a particular time and specific context," meaning subjective. Strauss and Corbin (2013, p. 22) share this view and are aptly quoted by Annells (1996, p. 386) who emphasises a relativist-constructivist understanding of grounded theory as currently practised. In the same vein, Annells (1996, p. 379) presents grounded theory as evolving towards being constructivist and then post-modern. This conclusion seems to be different from the well-known schism (Kenny & Fourie, 2014, pp. 4–5) in grounded theory between Strauss, Glaser and Charmaz, rather than an evolution of the very same approach. Probably a better way of explaining this "evolution" is the accommodation of different philosophical approaches through the different versions of grounded theory. The fact that there are researchers who still practice the classic grounded theory (Glaserian) in its post-positivist flavour attests to this assertion (Giske & Artinian, 2007). The hype of their activity is demonstrated in an international peer-reviewed journal, *Grounded Theory Review.*[1]

Annells (1996, p. 385) describes the ontological roots of classical grounded theory as rooted in the Mead-Blumer pragmatist view and leaning towards critical realism. The founders of grounded theory, Barney Glaser and Anselm Strauss, have indicated that once a grounded theory is generated, other methods such as experiments, or surveys could be conducted to verify the generated theory. Therefore, based on the statement by Annells (1996, pp. 387–388), it seems reasonable to argue that one can utilise grounded theory without being wedded to a specific philosophical paradigm. These sequential research projects could be construed in the same manner as would be done with the mixed methods research approach.

The reference study was more inclined towards the constructivist (ontology) / interpretivist (epistemology) paradigm. To arrive at this conclusion, one had to answer what Annells (1996, p. 383) refers to as ontological, epistemological and methodological questions of Guba and Lincoln. In framing the answers to these questions, the example study argued that in building the theory, the reality was not objective, as the researcher was very much part of the constructing of this reality through his interpretation of the data to create new knowledge (Annells, 1996, p. 385).

As stated earlier, a methodology for research could be quantitative, qualitative or mixed methods. This distinction explains on what type of data or information researchers collect, analyse and base their conclusions. In quantitative research, the focus is on numbers which are amenable to statistics and other numerical analysis. In qualitative research, on the other hand, researchers focus on the written or spoken language, observations and other non-numerical data (Creswell, 2014, p. 4; Durrheim, 2006, p. 47). In addition to qualitative and quantitative research, Creswell (2014, p. 4) also includes mixed methods research. He explains mixed methods research as an approach to research that combines or associates quantitative and qualitative research. The nature of the research problem, the objectives, as well as the research question, dictated that the methodology for this research should be qualitative. Furthermore, the

data collected in the example study was the written and spoken language, which was also not analysed numerically, and thus, the study followed a qualitative methodology.

RESEARCH DESIGN

A research design guides a researcher in collecting and analysing the data in such a manner that it responds to the research questions posed. The design provides a plan and procedures applicable to the research. The design also includes how data will be collected, analysed and interpreted. The philosophical assumptions at the base of this chapter informed all these aspects. Hence, it was essential to commence by discussing these philosophical assumptions (Creswell, 2014, p. 6; Durrheim, 2006, p. 34).

Durrheim (2006, p. 37) argues that in order to construct or develop an appropriate research design, the researcher has to consider "(1) the purpose of the research, (2) the theoretical paradigm informing the research, (3) the context or situation within which the research is carried out, and (4) research techniques employed to collect and analyse data." The purpose of the example study was to generate a grounded theory for building an information society. Fundamentally, the study aimed to unearth the theoretical foundations of the information society policies adopted by the SADC countries, primarily to develop a theory. The analysis of the national ICT policies of the selected SADC countries, as indicated in Table 1, helped to unearth the theory.

The design adopted for this study was grounded theory. Some authors describe grounded theory as a qualitative research design (Eaves, 2001, p. 655). In their work that introduced grounded theory, *The Discovery of Grounded Theory*, Glaser and Strauss emphasise that the aim of grounded theory is to generate or discover a theory and that both qualitative and quantitative data are useful in that pursuit (Urquhart, 2013, p. 5; 8). The idea that grounded theory is only applicable to qualitative methods is therefore not valid. Furthermore, the methodology and research design adopted informed the methods and techniques that are appropriate for data collection as well as for data analysis (Creswell, 2014; Henning et al., 2004,

Table 1: Available ICT policies for SADC countries (English)

Country	Policy name	Date
Botswana	National Information and Communications Technology Policy	Jul 2007
Lesotho	ICT Policy for Lesotho	Mar 2005
Malawi	National ICT Policy	2013
Mauritius	National ICT Policy 2007-11	Sep 2007
Mozambique	Information and Communication Technology Policy	Dec 2007
Namibia	Overarching Information Communications Technology (ICT) Policy	Feb 2009
Seychelles	National ICT Policy	2007
South Africa	The National Information Society and Development (ISAD) Plan	2006
Swaziland	National Information and Communication Infrastructure (NICI) Policy and NICI Plan 2016	Aug 2006
Tanzania	National Information and Communications Technologies Policy	Mar 2003
Zambia	National Information & Communication Technology Policy	Apr 2006
Zimbabwe	Zimbabwe National Information and Communication Technology	Dec 2005

pp. 6, 101). As outlined later in this section, this study utilised content analysis and key informant interviews for the collection of data, its analysis and its interpretation within the grounded theory design.

Some researchers have noted an increase in the use of the grounded theory design (Age, 2011, p. 1599; Birks & Mills, 2011; Eaves, 2001). On the other hand, there are those arguing that grounded theory is not appropriate for some disciplines (Allan, 2003). Grounded theory is a design that has been applied within the information science-related disciplines (Chu, 2015; Sylta, 2002; Urquhart et al., 2010; Zhang & Wildemuth, 2005). The choice to utilise grounded theory in the example study was not merely because it could be used, but because it was considered the most appropriate approach to responding to the research problem and the questions posed.

Grounded theory is applicable for building "theory from the data acquired from fieldwork, interviews, observation and documents" (Urquhart, 2013, p. 8). Based on the research problem, as stated earlier in the chapter, the purpose of the example study was to generate a theoretical framework that underlies the information society policies for SADC countries. As the objective of grounded theory is either to generate "explanatory models of human social processes", in other words, theories or to "elaborate on and modify existing theories" (Eaves, 2001, p. 655), the grounded theory design was acceptable for the researcher to utilise. Earlier in this chapter, aspects of the grounded theory design were discussed without explicitly describing how it was to be utilised in the example study to achieve the objectives stated Figure 3 hereunder:

The example study was designed to commence with the analysis of the national ICT policies of SADC countries utilising content analysis as its first stage. This analysis formed the basis of the next stage, being the interviewing of key informants. All information collected was theoretically sampled and analysed utilising the grounded theory. The use of content analysis within the grounded design will be clarified without having to delve into a methodological debate.

The necessity to further clarify the concurrent use of grounded theory and content analysis is to address the view of some methodologists who argue that, strictly speaking, content analysis is a research design at the same level as grounded theory and that, when documents are used to collect data, the appropriate method should be document analysis (Ngulube, 2015b, p. 129). This chapter accepts that content analysis is a design on its own merits, however, in the context of the example study the researcher had opted to utilise content analysis as a research method rather than a research design. Some content analysis proponents such as White and Marsh (2006, p. 36) do concede that content analysis could be utilised within a grounded theory context.

Figure 3. The research objectives as per the SADC study

- **Objective one:** To determine the rationale of the national ICT polices for SADC countries
- **Objective two:** To explore the package of policy instruments that the SADC countries consider to be key for the building of the information society
- **Objective three:** To discover the key concepts within the national ICT policies that are related to the success of information society within SADC countries
- **Objective four:** To develop a theoretical framework for building the information society within SADC countries

RESEARCH METHODS

In this section, the chapter discusses the two research methods, content analysis and interviews, that have been adopted to execute the grounded theory research design discussed in the previous section. Much like grounded theory, content analysis, has different interpretations or versions. Neuendorf (2002) describes content analysis as quantitative and emphasises that it should not, in any way, be considered qualitative. She describes it "as the systematic, objective, ***quantitative*** [my emphasis] analysis of message characteristics" (Neuendorf, 2002, p. 1). There are others such as White and Marsh (2006, p. 23) who characterise content analysis as a method or technique that can be used on its own or with others utilising the qualitative, quantitative or mixed methods approach within the information sciences. The latter accepts Krippendorff's definition of content analysis, which states that it is "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (White & Marsh, 2006, pp. 23–27). There are a number of other definitions and descriptions of content analysis that have been proffered (Chu, 2015, p. 39; Hsieh & Shannon, 2005, p. 1277; Leedy & Ormrod, 2015, pp. 275–276; Zhang & Wildemuth, 2005, pp. 1–2), some of which are consistent with the one offered by White and Marsh (2006, pp. 23–27).

This chapter does not accept the understanding of content analysis, as outlined by Neuendorf (2002). In contrast, the chapter is in line with the views expressed by White and Marsh (2006) discussed above. In this chapter, content analysis is defined as a method or technique for "analysing written, verbal or visual communication messages" (Elo & Kyngäs, 2008, pp. 107–108). This approach led to a more effective resolution of the research problem. Content analysis is sometimes described as flexible (Elo & Kyngäs, 2008, p. 113; Hsieh & Shannon, 2005, p. 1277); as a result, it is prudent to mention how it was performed in this research study.

In their distinction between qualitative and quantitative content analysis, White and Marsh describe the qualitative process in such a manner that it mimics elements of the grounded theory process. To illustrate the point, they characterise qualitative content analysis as being inductive where the research question guides the data gathering and analysis, and the coding is subjective with the use of memos to document perceptions (White & Marsh, 2006, pp. 35–36). White and Marsh state that content analysis may be used "to develop grounded theory" (White & Marsh, 2006, p. 36) or is similar to the initial stages of the grounded theory design (Hsieh & Shannon, 2005). Others have also stated that content analysis can be utilised to develop a theory (Elo & Kyngäs, 2008, pp. 108–109).

The flexibility of content analysis, the fact that it does not proceed linearly, as well as the lack of a single approach to doing it, may seem like an advantage. However, these are the characteristics that also make it more challenging to implement (Elo & Kyngäs, 2008, p. 103; Hsieh & Shannon, 2005, pp. 1280–1281). With content analysis, large volumes of textual data and sources can be analysed to provide support for the conclusions reached. A disadvantage may be that the trustworthiness of the results is reduced due to the perceived negative influence introduced by the extensive interpretation of the text by the researcher in the qualitative version. However, this disadvantage is valid for all qualitative approaches (Elo & Kyngäs, 2008, p. 112). The use of content analysis in this study is not unique to the information sciences; it has been utilised by some researchers within the field (Chu, 2015, p. 39).

Since the example study was aimed at discovering the theoretical underpinning of the information society policies adopted by different SADC countries, latent content, as opposed to manifest content, was coded. Manifest content relates to the obvious, objective, visible content that can be identified by reading the content, in this case, policies which will be analysed. A choice to select manifest content

analysis could have improved the perceived objectivity of the analysis as opposed to latent content analysis, which requires objective analysis (Babbie, 2014, pp. 346–347). However, due to the fact that this study was about discovery, the policies of different countries were expected to utilise different words to refer to similar concepts, thus requiring some level of interpretation, hence the choice of latent content analysis. As an exploratory study, further research may have to be conducted to confirm the research findings emanating from this study.

The content analysis has identified some themes emanating from the national ICT policies of the selected SADC countries. These themes and the memos that were written in the coding process drove the theoretical sampling for additional information society-related documents and other informants that were interviewed. Babbie emphasises the distinction between an informant and a respondent, the latter being a person who provides information about him-/ herself and an informant being a person who provides information about a phenomenon he or she knows about (Babbie, 2014, p. 202). Based on this distinction, this study utilises the term informant.

Typically, grounded theory utilises field research and interviews to gather data (Allan, 2003; Eaves, 2001, p. 655). Data collected through interviews is better than that collected in questionnaires (Allan, 2003). Key informant interviews have been defined as "in-depth interviews of a select (non-random) group of experts who are most knowledgeable of the organization or issue" (Parsons, 2008, p. 408). According to Parsons (2008, p. 408), a "key informant refers to the person with whom an interview about a particular organization, social program, problem, or interest group is conducted." Because of the position of key informant concerning the issue that is being studied as well as the challenge of conducting an expensive study, this research has, in some instances, conducted key informant interviews telephonically and through Skype™2.

In addition to content analysis, interviews with selected knowledgeable people were conducted. These people selected based on their involvement in the development or implementation of the national ICT policies in any of the SADC countries. Parsons (2008, p. 408) defines key informant interviews within the context of surveys and states that they consist of in-depth interviews. This approach is misaligned with the view that surveys are by their nature quantitative, whereas in-depth interviews are qualitative.

When selecting informants, they should have the information that is required to respond to the relevant questions (Babbie, 2014, p. 202). Based on the outcome of the codes and how these directed the selection of the informants, the research ensured that these were selected based on their knowledge of the subject matter. Leedy and Ormrod (2015, pp. 282–285) provide guidelines for conducting effective interviews in a qualitative study. The guidelines are listed as follows:

1. Even though the interview might be unstructured, the researcher should identify some questions in advance. It may not be necessary to ask all the questions directly, since some may be responded to while responding to others. The way in which the questions are asked should be open and should not hint to the informant whether any response is desirable or not.

2. In framing the question, the researcher should consider the informant's background. The informant's background may influence how they respond to questions.

3. The selection of the informant should be more considerate, and the researcher should be careful of selecting informants who have extreme or exceptional views. It may be very difficult for the researcher to know in advance.

4. The interview location should be such that the informant is willing to talk, and the interview is not distracted.

5. The researcher should obtain explicit informed consent (preferably written) from the informant.
6. The researcher should maintain rapport with the informant without influencing the responses by expressing his or her views about the subject.
7. The researcher should focus on actual situations rather than abstract ones. In other words, the questions should avoid philosophising.
8. The researcher should listen patiently to the informant without putting words in the mouth of the informant, even if they appear not to have the right words.
9. The actual words of the informants should be utilised when capturing the interview; the interview should preferably be recorded.
10. The researcher should avoid expressing their responses, especially as this tends to influence the responses by the informant.
11. The researcher should not correct the informant as the informant is providing their perception rather than facts.

Key informant interviews as a means for data collection could either be face-to-face or remotely through any form of remote communication technology that could transmit voice or video. Between the two approaches, face-to-face interviews have the advantage of building more rapport and allowing the researcher to observe other forms of communication such as body language, whereas remote interviews could be cheaper than long distances. People have different concerns related to being interviewed, and these may relate to a reluctance to participate, being bothered, cost of telephone calls, or avoid being distracted by face-to-face interviews (Leedy & Ormrod, 2015, p. 160); therefore, the choice of selecting a means of data collection has been measured. In conducting informant interviews, the SADC study preferred face-to-face interviews but considered telephonic interviews where practicalities dictated otherwise, especially noting that the research required interviews with individuals from outside South Africa.

POPULATION, SAMPLING AND DATA COLLECTION INSTRUMENTS

This section describes the different techniques that were utilised to select and collect the data and to analyse and interpret the data so that a theory or model could be built.

The Population Of The Study

The population of interest for the reference study was the information society policies of all the SADC countries. The 15 countries that constitute the SADC are Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe (Southern African Development Community, 2012). Essentially, these countries and their respective national ICT policies constituted the population of interest for this research.

Based on an understanding of the purpose of the research as well as the questions that the research responded to, a unit of analysis should enable an improved identification of the population. A unit of analysis indicates what or who is being studied (Babbie, 2014, p. 101; Henning et al., 2004, p. 71). It is essential to ensure clarity of what this research is about to select and analyse the correct data. The unit of analysis is a critical concept in ensuring this clarity. "Units of analysis have an impact on sample

selection, data collection, and the type of conclusion that can be drawn from the research" (Durrheim, 2006, p. 41).

For this research, the unit of analysis was the information society policies or strategies for the individual SADC countries; this can be expressed as the country and information society policy pair. In terms of the types of units of analysis that are common within the social sciences, national information society policies can be classified as social artefacts (Babbie, 2014, p. 104; Durrheim, 2006, p. 41).

The unit of observation, described by Long (2004, p. 1158) as the actual source from which the information about the unit of analysis is obtained, was the national ICT policies, other information society-related policies and legislation, as well as key informants for the different stages of the research.

Data Sources and Sampling

As listed in Table 1, only those policies which were available in English were sampled. Consequently, probability sampling, as explained in Babbie (2014, pp. 199–215), was not considered in this study. Probability sampling refers to a sampling approach whereby all the units have an equal chance of being included in the sample. The use of grounded theory dictates the use of theoretical sampling (Boeije, 2002, p. 391; Urquhart, 2013, p. 184). Sampling methods that were considered for this research were non-probability sampling, which includes convenience, purposive, snowball, quota sampling (Babbie, 2014, p. 199), as well as theoretical sampling (Charmaz, 2006, pp. 96–102; Henning et al., 2004, p. 71).

Charmaz (2006, pp. 99–102) distinguishes between initial sampling and theoretical sampling in conducting grounded theory research. Regarding this distinction, initial sampling determines where the researcher starts to generate the categories, whence the theory will be developed. The initial sample for this study was the national ICT policies of the 12 countries listed in Table 1. It seemed that the ministries responsible for ICT were the ones that were focused on the promotion or coordination of information society programmes. These policies seemed to form the foundation on which these countries could build the information society and were the focus of this research. All these policies refer to the importance of building an information society.

The sampling strategy for the initial sample for this study is referred to as purposive sampling because policies were selected based on the judgement of the researcher in the example study (Babbie, 2014, p. 200; Neuman, 2014, p. 169). For this SADC study, the researcher was of the opinion that the national ICT policies of the SADC countries were the most informative with regard to how SADC countries plan to achieve the information society in line with what has been argued below.

Since the object of any qualitative research is not generalizability but transferability, sampling does not need to ensure that all objects being analysed have an equal or predictable probability of being included in the sample. Transferability refers to a judgment about whether findings from one context are applicable to another. Instead, the sampling should be theoretical and purposive. It may have as its objective providing the basis for identifying all relevant patterns in the data or characterizing a phenomenon. (White & Marsh, 2006, p. 36.)

In this first stage of the design based on content analysis, it is essential to emphasise that "samples for qualitative content analysis usually consist of purposively selected texts which can inform the research questions being investigated" (Zhang & Wildemuth, 2005, p. 2). The purposive sampling that was undertaken did take into consideration the fact that the national ICT policies were not the only documents

that expound on the information society policies that countries adopted. Countries express their policies in many different documents and ways. A policy does not even have to be written down in a document (De Coning & Wissink, 2011, pp. 13–16; Page, 2008, pp. 210–211). Rather than selecting a set of different policy instruments that the SADC countries have adopted to implement their information policy agendas, the SADC study elected to utilise the national ICT policies. As can been seen from Table 1, at least all English-speaking SADC countries had such a policy. In searching for information society-related documents, reference study had observed that the different SADC countries have different legislative instruments, many of which are not available online (Lewis & Abrahams, 2013). Furthermore, the nature of national ICT policies is broad enough to enable a better understanding of how the country intends to implement its information society programme.

The choice of using national ICT policies to understand the national information society policies of the various countries has a weakness in that there is a perception that such policies are policies aligned to specific administrations and could be discarded after the tenure/term of the party or leader that championed the policy. On the other hand, policy decisions which come in the form of legislation or are made by lawmakers tend to be perceived as legitimate and binding to all within that jurisdiction (Anderson, 2011, p. 125). The legislative type of policy instrument potentially stands a better chance of surviving electoral changes. This weakness does not disqualify national ICT policies adopted in a particular period to understand what the theoretical basis of the information society policies is.

Theoretical sampling drove the second stage of the sampling. The SADC study researcher decided what data to collect and where that data will be collected from (Bryant, 2014, p. 131). Accordingly, that researcher selected the data source based on their fit (Henning et al., 2004, p. 71). The data sources were primarily in the form of interviews. The criteria for the selection of key informants was their participation in the development or implementation of the national ICT policies; those who responded were from Botswana, Namibia, South Africa, Zimbabwe and the SADC whose backgrounds included the following roles:

1. Head of ICT regulatory body
2. Senior government official responsible for coordinating the development of the national ICT policy of a SADC country
3. Senior government official that contributed to the national ICT policies of multiple SADC countries
4. Academic that contributed ideas to the revision of a national ICT policy
5. Consultant that assisted a few SADC countries to implement aspects of the national ICT policy and other information society-related activities

In addition to the interviews, the other data included documents such as legislation and other policies related to the information society. These documents included national development plans and sector-specific policies as they helped clarify concepts that were emerging from the emerging theory.

The nature of theoretical sampling is such that the researcher does not commence the research process with a clear idea of what the size of the sample is (Boeije, 2002, p. 393; Hase & Ng, 2008, p. 159; Holton, 2010, p. 28). The interview transcripts and other documents were theoretical coded to establish the connection between categories that have been identified. During this phase of the study, the researcher identified when theoretical saturation had been achieved. Theoretical saturation was achieved when additional data did not introduce new insights in the categories being studied (Bryant, 2014, p. 131). The

researcher stopped the search for additional informants when the researcher noted that the responses from the informants were not providing any new information.

Data Collection Instruments

The data collection techniques sometimes referred to as data sources relate to how the data is collected and, for qualitative data, this is typically in the form of observation, surveys, interviews, and artefact and document studies (Henning et al., 2004, pp. 5–6; Recker, 2013, pp. 90–91). As stated in the previous section, the SADC study analysed the national ICT policies to understand the theoretical base for the information society programme for SADC countries. This statement confirms that the primary data source for the reference study was documents.

However, in addition to this, as determined by the outcome of the initial stage, it was necessary to conduct interviews with some knowledgeable informants. Since the need for and the nature of these interviews were determined from the outcome of the first stage, predetermined instruments were initially not available. These interviews were unstructured rather than structured and were exploratory in the sense that the interviews commenced with a broad question and allowed the informant to direct the engagement. Further questions emerged from the discussion (Recker, 2013, p. 90). The typical weaknesses of interviews, such as potential bias, were mitigated by the fact that the interview was not the primary data collection technique (Gorman, Clayton, Shep, & Clayton, 2005, p. 127). The interview took the following form:

- Introductions and other preliminaries;
- Inform the interviewee of the ethical aspects of the research (this included the fact that they were free to participate or withdraw, and to confirm their anonymity); and
- Content of the interview:
  - Please inform me of your role in the information society programme of _____ (country).
  - What is your view on _____.

The researcher transcribed the interview and loaded it into the NVivo software application for further data collection and analysis. This aspect raises the role of computer tools to assist the researcher in collecting data. As an instrument of data collection and analysis, the example study utilised the NVivo Software tool. How this tool was utilised should not suggest that the tool took over the role of the researcher, but instead made the researcher's job easier (Leedy & Ormrod, 2015, p. 27). The software was utilised to capture the documents so that the researcher was able to extract the data. In capturing the data, the researcher also undertook some element of data analysis.

DATA COLLECTION AND ANALYSIS PROCEDURES

In terms of grounded theory, there is joint conduct of data collection and data analysis (Birks & Mills, 2011, p. 10; Charmaz, 2006, pp. 20–21; Gibbs, 2010; Leedy & Ormrod, 2015, p. 274). This section explicates how this research was designed to conduct both.

As mentioned in the Data sources and sampling section above, the initial sample was purposively drawn from the national ICT policies of SADC countries. Drawing data from a purposive sample has the limitation that the result may not be generalisable. There are two elements related to the selection of this sample. Firstly, it relates to the countries from which these policies were drawn. Three of the fifteen SADC countries did not have their national ICT policies published and available in English. These policies have been excluded. Secondly, information society-related policies come in the form of national ICT policies, legislation, as well as sector-based policies such as national ICT policies within education, health and business. Noting that most countries have developed national ICT policies to conform to the World Summit on the Information Society (WSIS) (International Telecommunication Union, 2010) and do not necessarily have a plethora of or other associated policies, it made more sense to commence the data collection and analysis with the sample of national ICT policies.

The first stage of data collection and analysis through the content analysis of the national ICT policies required the coding of these policies. Babbie (2014, p. 346) characterises content analysis as essentially a coding operation. He further opines that since the analysis may often be repetitive and tedious, computer programmes may be useful for the researcher (Babbie, 2014, p. 350). Computer Assisted Qualitative Data Software Analysis (CAQDAS) refers to the use of computer technology to assist the researcher in organising and searching the data. CAQDAS also assists in ensuring that the data is efficiently backed up. Utilising a computer allowed the researcher to focus on the analysis rather than on the administrative tasks and allowed for complex searches that would have been nearly impossible when using manual methods (Bringer, Johnston, & Brackenridge, 2004). It is self-evident that using CAQDAS requires the researcher to learn the use of the specific software to be used for the research. The SADC research utilised the NVivo software by QSR International to assist with the data collection and analysis through coding.

Coding Procedures Adopted

One of the most common techniques for analysing qualitative data is coding (Ngulube, 2015a, p. 138; Saldaña, 2013, pp. 2–3). Saldaña defines a code as a "research-generated construct that symbolises and thus attributes interpreted meaning to each individual datum for later purpose of pattern detection, categorisation, theory building, and other analytic process" (Saldaña, 2013, p. 4). Another researcher, Recker (2013, p. 92), describes coding in the following words:

Coding is the process of assigning meaning and labelling or tagging portions of data, which has been grouped as words, phrases, paragraphs, or whole documents. Through coding, we can categorise or organise data. Often, coding is employed to organise data around concepts, key ideas or themes that we identify in the data. We see here that coding already is analysis – in fact, it is already an interpretation of the data.

This description or definition of coding is one of the many noted in the literature (Charmaz, 2006, p. 3,43; Creswell, 2014, pp. 197–199; Ngulube, 2015a, p. 138; Remenyi, 2014, p. 18; Saldaña, 2013, pp. 2–3; Urquhart, 2013, p. 35). It has been chosen because it focuses on all the key points that have been accepted in the example study.

The coding that was adopted for the example study commenced after the national ICT policies were imported into the NVivo software. Once the sources were imported, they were ready to provide the researcher in the SADC study with an overview of the policy document before the actual coding. At this stage, fragments, sentences or paragraphs were coded. Going beyond this was likely to have been too abstract to be meaningful (Finfgeld-Connett, 2013, p. 343).

Hsieh and Shannon (2005) describe three approaches to content analysis as conventional, directed and summative coding. "In conventional content analysis, coding categories are derived directly from the text data…", whereas with a directed approach, the researcher "…starts with a theory or relevant research findings as guidance for the initial codes". Lastly, "…summative content analysis involves counting and comparisons, usually of keywords or content, followed by the interpretation of the underlying context." (Hsieh & Shannon, 2005, p. 1277.)

Both content analysis and grounded theory use coding. Because there was limited theory upon which the coding of this research would have been conducted, the conventional approach to coding was adopted (Hsieh & Shannon, 2005, p. 1279). Based on the research questions, the initial coding focused on detecting patterns and categorisation. As the researcher in the SADC study read the national ICT policies, those sections that seemed to relate to the research questions and compared the categories and constructs that emerged were tagged (White & Marsh, 2006, p. 37). During this coding process, the researcher in the SADC study wrote memos that guided the generation of a theoretical sample of additional sources, which were also coded, which ultimately led to the theory.

To effectively communicate about coding for both the content analysis and the grounded theory, the concepts of descriptive and analytic coding are described. One way of coding is to describe a piece of text. This form of coding is referred to as descriptive coding. Another form is to look at what lies behind the words, in a sense identifying a concept that the text refers to. This form of coding is called analytic coding (Urquhart, 2013, pp. 36–37). There are several possible approaches to coding that could generate a grounded theory (Charmaz, 2006; Urquhart, 2013). The reference study followed the model outlined by Urquhart (2013) and represented in Figure 4. This choice was partially motivated by the fact that Urquhart is closest to the information society discipline of all the key researchers focusing on grounded theory design. Furthermore, her approach is simpler to understand and implement.

The process for developing the grounded theory was informed by the following three coding steps: open coding, selective coding and theoretical coding. The initial coding, which is open and likely to be descriptive, was done through line-by-line coding and segment-by-segment coding (Charmaz, 2006, pp. 50–54; Urquhart, 2013, pp. 45–48). That both line-by-line coding and segment-by-segment coding

Figure 4. Selected coding procedure
Source: (Generated from reading Urquhart, 2013, pp. 45–51)
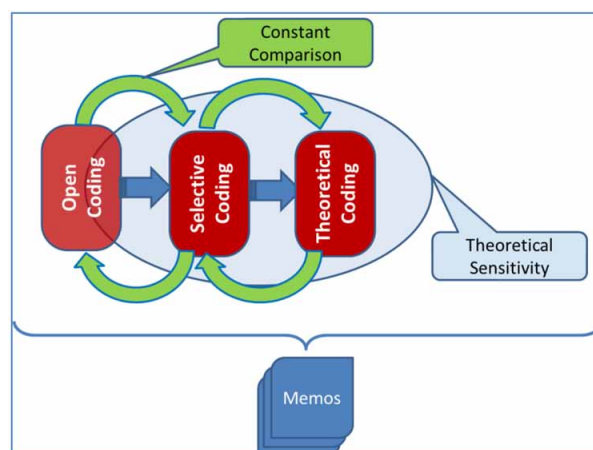
was conducted, was influenced by the researcher's intention to cut the process short. This approach was motivated by the fact that not all the national ICT policies needed to be coded line by line. However, the initial policies were coded line by line. As stated by Urquhart (2013, pp. 48–49), this approach is acceptable.

The next stage of coding was selective coding, which organised the open codes into selective codes that became the core categories of the theory. During selective coding, the codes were analysed by considering their relevance to the research problem. The memos written during this phase alerted the researcher to the core variables or categories. This phase is equivalent to what Charmaz refers to as focused coding (Urquhart, 2013, p. 50).

During the last stage of coding that Urquhart (Urquhart, 2013, pp. 50–51) refers to as theoretical coding, the researcher established the connections or relationships between the categories as well as how they relate to the core variables, essentially generating the grounded theory. Once the theory was developed, the literature was searched to compare and contrast the grounded theory with whatever base theory is available in the field (Giske & Artinian, 2007, p. 78).

Improving Credibility Through Triangulation

In addition, and as part of the research design, researchers seek to implement measures to make their conclusions more acceptable and defendable in the sense that their conclusions are likely to be accepted as credible. One of these measures is triangulation (Leedy & Ormrod, 2015, p. 104). According to Thurmond, "triangulation is the combination of two or more data sources, investigators, methodologic approaches, theoretical perspectives …, or analytical methods … within the same study" (Thurmond, 2001, p. 253). The following are examples of the different types of triangulation:

6. Data triangulation is one of the research designs/activities whereby the researcher collects data from multiple sources in order to support a hypothesis or theory; an example may be to use more than one method and look for common themes that answer a single research question. This activity is common in qualitative and mixed method designs (Leedy & Ormrod, 2015, p. 104). In qualitative studies such as content analysis, triangulation is one of the ways that can be utilised to increase the credibility and trustworthiness of the findings (Hsieh & Shannon, 2005, p. 1280).
7. Investigator triangulation is when different researchers repeat the same research to ensure that the bias of the researcher is minimised. This approached is sometimes used during coding when different researchers code the same data (Thurmond, 2001, p. 254).
8. Theory triangulation is when multiple theories or hypotheses are used on the same data (Kelly, 2006, p. 380).
9. Methodological triangulation is when multiple methods are used to study the same phenomenon. The researcher may review documentary resources and then conduct a survey in order to verify the result of the document review (Kelly, 2006, p. 380).
10. Interdisciplinary triangulation may be considered when the findings in one discipline are compared with the findings from another discipline (Kelly, 2006, p. 380).

The design for this research indicates that data triangulation through data collected from the national ICT policies as well as other documents and the interview of knowledgeable informants. Furthermore, methodological triangulation was with both content analysis and interviews. Therefore, the chapter is

more confident that the research design provided results that are more acceptable and credible in line with Kathy Charmaz' criterion for good grounded research (Puddephatt, 2007, p. 6). This procedure commenced with the data collection that is discussed next.

Data Collection and Analysis Challenges

In the SADC study, the researcher collected the national ICT policies of the SADC countries from the commencement of that study in 2013. The policies for the non-English-speaking countries of Angola, the Democratic Republic of the Congo and Madagascar that were not published and available in English have been excluded from the study. The study argued that even though the fact that the policies were not analysed would not in itself compromise the quality of the reference study. In addition, the study argued that since only three of the fifteen SADC countries were excluded, which constitutes less than 20% of the SADC countries and 80% of the countries that are included in the study have been selected based on convenience sampling, there would be sufficient interest in the theoretical framework that is generated.

Furthermore, it was noted that it was not the intention of the study to be fully generalisable to the whole of the SADC countries. Attempting to determine the impact of the sample size or the response rate on the generalisability of the study would not make sense in situations where generalisation was not the intention of the study (Henry, 2008, pp. 79–81; Lacy, Watson, Riffe, & Lovejoy, 2015, pp. 793–795). The non-English-speaking countries of Mozambique, Mauritius and Seychelles do have national ICT policies in English, and these were included in the study. Additional challenges that were raised in the SADC study related to the policies of Botswana and South Africa and are disclosed and discussed next.

The reference study had a challenge of locating the final policy document for Botswana. The document that was initially found on the website of the United Nations Public Administration Network (UNPAN) was titled as "Draft". This "Draft" is the document that was coded. This matter was of concern to the researcher who kept on searching for the document that could surely be listed as the final national ICT policy for Botswana. On 4 June 2016, after completing the initial coding, the researcher ultimately located the final national ICT policy for Botswana on the Botswana Information Technology Society website (Government of Botswana, 2007). There was no doubt that this document was the required document as it was clearly marked "as approved by the National Assembly in August 2007" and appropriately titled and accompanied by the relevant foreword from the appropriate minister.

To avoid duplicating the initial coding process for the Botswana policy, the researcher in the example study compared the two documents, line by line, and found typographical and editorial differences that were mostly insignificant. Some of these differences included that Section 5.2 of the draft document contains the words "A truly national effort", whereas the final document does not. In paragraphs 8.1 and 8.2 of the draft document, estimates for the cost of funding projects aimed at implementing the policy are provided, whereas, in the final document, these estimates are not reflected. It is possible that some of the differences may have been missed; however, these differences are likely not to be substantive, and thus, the policy was not re-coded.

The equivalent policy for South Africa that was analysed is *The National Information Society and Development (ISAD) Plan* (Republic of South Africa, 2007). As is apparent in the name of this document, when compared to the documents from the rest of the SADC countries' documents, it does not refer to ICT in its title. This difference raised the question of whether the said document is equivalent to the national ICT policies of the SADC countries. In the foreword of the document itself, the Minister of Communications, Dr Ivy Matsepe-Casaburri, specifically states that the document is responding to the

WSIS for countries to develop plans to build the information society (Republic of South Africa, 2007). In 2014, South Africa published a draft dubbed *National Integrated ICT Policy Green Paper* (Department of Communications (South Africa), 2014). This Green Paper has been circulated for discussion and has now been adopted as the *National Integrated ICT Policy White Paper* (Department of Telecommunications and Postal Services (South Africa), 2016). During the coding process, it was noted that the essence of the *National Information Society and Development (ISAD) Plan* is not different from the national ICT policy documents of the other SADC countries. Although there may be doubt about the nature of the *National Information Society and Development (ISAD) Plan*, the reference study concluded that treating this plan in the same manner as the other national ICT policies was not going to compromise the outcome of this study.

The Coding Activities

From 1 June 2014 to 1 July 2015, the national ICT policies of the 12 SADC countries were uploaded onto the NVivo Sources folder (initially version 10 and later, during October 2015, migrated to NVivo 11 Pro after this newer version was released). To ensure the "purity" of the content analysis codes, the national ICT policies were coded separately under a node titled "CODING THE POLICIES". This node was intended to specifically code the policies as part of the content analysis phase of the study.

During the coding of the policies, the Mozambique policy posed a unique challenge in that the coded parts of the document were not readable when read from the nodes within the NVivo application. This error was due to the PDF document being created in a format that garbled the text; for instance, the words "Information and Technology Policy" became ",QIRUPDWLRQ DQG &RPPXQLFDWLRQ 7HFKQRORJ\ 3ROLF\". This technicality made it more cumbersome to work with the Mozambique policy, and the researcher had to reopen the original policy every time it became necessary to check the actual text that was coded. There is a risk that the researcher could have paid less attention to some codes associated with this specific policy given the manual process.

While the SADC study had noted the broad commonality of the policies with regard to their contents, it should be noted that the different countries have addressed their needs to develop their policies differently, particularly in terms of language and how the documents are designed. An example of these differences is how the countries have named their policies. The different names of the policies are outlined in Table 1. Another example is the extent to which the documents are put together, excluding the preliminary pages. Seychelles' policy is 11 pages long, whereas the South African policy is 90 pages long. The difference in the size of the document indicates that a document may express a similar point in a longwinded manner. Another possibility is that longer documents could have addressed issues that the shorter documents did not. Besides the issues discussed in this section related to the policies of Botswana, South Africa and Mozambique, the coding process went smoothly and is reported on next.

Based on the grounded theory maxim, that "all is data" (Ralph, Birks, & Chapman, 2014, p. 2; Smith, 2015, p. 578; Walsh et al., 2015, pp. 586–587) the SADC study started the initial coding as soon as the study commenced. The initial codes were generated from the reading of the broader literature to understand the key concepts that would later contribute to the theory. The key concepts that were coded related to different aspects of development, the information society, the digital divide and policymaking. Capital letters were used to refer to codes as coded in order to facilitate the readability of the report of the SADC study.

The list in Figure 5 is a sample of the initial codes in the first column. It does not include all the codes that were generated in respect of readings related to research methods as well as the codes generated for background information on each country. These codes that are excluded from the list would not directly fit into the development of the theory which the study was about. As the research continued to conduct the selective coding, the initial codes were abstracted to the selective codes of which some examples are illustrated in the second column of Figure 5. Whenever a code is generated, it is crucial for the researcher to define what the code signified. Furthermore, the researcher has to keep on writing memos, which would explain the rationale for the code and what the researcher considered at the time.

Figure 6 is an example of memos that were written as some of the codes were developed.

The result of the coding contributes to the additional data collection that is guided by theoretical sampling. The attributes of the codes and how they related to each other start to make sense and contribute to the identification of the main idea around which the theory that is being generated evolves. In the reference study, the main idea that was identified was CAPACITATING, which later became the core of the capacitating theory for building the information society for development.

Figure 5. An example of the initial and selective codes as per the SADC study

Initial codes	Selective codes
ALIGNING	ALIGNING
ACCESS TO ICT PRODUCTS AND SERVICES	CAPACITATING
AFFORDABILITY	
BROADBAND	
CONNECTIVITY	
CONNECTIVITY DRAWS COMMUNITIES TOGETHER	
CONNECTIVITY FACILITATES ECONOMIC GROWTH AND DEVELOPMENT	
CONTENT	
DIGITAL DIVIDE	
BRIDGING THE DIGITAL DIVIDE	
DIGITAL DIVIDE DEFINITION	
INTERNAL DIGITAL DIVIDE	
MEASURING THE DIGITAL DIVIDE	
RURAL URBAN IMBALANCES	
FUNDING	
HUMAN RESOURCE DEVELOPMENT	
SKILLS	
INFORMATION ACCESS	
INFRASTRUCTURE	
ICT INFRASTRUCTURE	
OWNERSHIP OF TELECOMS	
SUPPORTING INFRASTRUCTURE	
PERVASIVENESS OF ICT OR IT	
QUALITY OF SERVICE	
SCARCITY OF RESOURCES	
SOCIAL GROUP TARGETING	
CHILDREN AND YOUTH	
ELDERLY PEOPLE	
PEOPLE WITH DISABILITIES	
POOR	
WOMEN AND GIRLS	
STANDARDS AND GUIDELINES	
UNIVERSAL SERVICE FUNDING	
IMPORTANCE OF ICT FOR DEVELOPMENT	DEVELOPMENT GOALS
POVERTY REDUCTION AND ERADICATION	
UNEMPLOYMENT	

Figure 6. Examples of memos related to coding

> **Name:** Capacitating
> **2016/04/29 11:10 AM -** This memo discussed the Human resource development or skills or training which has become necessitated as a result of the new technologies.
> The Lesotho ICT Policy starts in its foreword by stating that the Information revolution has been brought upon by the advances in communications, computing, and IT has necessitated the need to learn new skills as well as utilised technology to do things differently.
> Not only is it necessary to improve skills, but ICT are able to assist in improving the level of education and skills.
> **2016/05/02 12:17 PM -** The memo used to be referred to as New skills and training, I have now renamed is as CAPACITATING because it actually relates to building different forms of capacity which may be in the form of education, skills, etc.

ENSURING THE QUALITY OF THE STUDY

A key element required in any study is to provide to the readers the comfort that the process and, consequently, the results obtained therefrom can be trusted (Gorman et al., 2005, pp. 22–23). This ensures that the study addresses the necessary elements which will be evaluated in order to determine if the findings of the research can be accepted (Creswell, 2014, pp. 201–204; Gorman et al., 2005, pp. 22–23; Henning et al., 2004, p. 146). In many instances, a discussion around this revolves around concepts such as quality, rigour, validity and reliability, as well as trustworthiness (Ngulube, 2015a, pp. 151–152).

A number of researchers have argued that as a result of the previous dominance of the quantitative research, the concepts of reliability, validity and generalisability have continued to be utilised in qualitative research even when they are not suitable (Golafshani, 2003, pp. 599–600; Henning et al., 2004, pp. 146–147; Tobin & Begley, 2004, p. 389). Reliability is when a research instrument(s) consistently produces the same results, validity is when the research instrument(s) measures what it intends to measure (Golafshani, 2003, p. 599; Gorman et al., 2005, pp. 24–25) and generalisability refers to the applicability of the research results/ findings to other situations apart from those that were discussed in a study (Creswell, 2014, pp. 203–204). Creswell (2014, pp. 201–204) provides alternative descriptions of the concepts that could sit better within the qualitative type of research as well as some guidelines to achieve rigour in qualitative research. The use of the same terms, albeit with different connotations, is likely to create more confusion (Golafshani, 2003, p. 601) and thus this chapter prefers to use terminology that is more relevant to qualitative research. Despite the difference in the terminologies utilised to determine the acceptability of research activity, Ngulube (2015a, p. 151) and Recker (2013, p. 94) argue that all forms of research should demonstrate rigour.

What is considered good in the context of quantitative research is not necessarily considered good for qualitative research. This research is situated in the SADC context, and the theory that is being developed can reasonably be expected only to be applicable within the SADC. To expect a similar outcome to this research in a different context will be inconsistent with the underlying philosophy of this study. Therefore, generalisability is not a meaningful concept for this research. This is not surprising, as qualitative research is known for not being generalisable (Recker, 2013, p. 37).

Having stated that validity tells us whether the research achieves what it set out to achieve in quantitative research, we can note that this concept cannot be entirely discarded but should instead be modified to suit the qualitative approach. Some authors prefer to state that in qualitative research, validity can be determined in terms of trustworthiness, authenticity, credibility or conformability in an unstructured manner (Golafshani, 2003; Gorman et al., 2005, p. 27; Henning et al., 2004, p. 147; Recker, 2013, p.

94); however, there is no consistency in how these concepts are utilised. Within qualitative approaches, the criteria for trustworthiness is equivalent to both reliability and validity (Golafshani, 2003, p. 600). Furthermore, dependability, which is an element of trustworthiness, is more equivalent to reliability (Golafshani, 2003, p. 601; Recker, 2013, p. 94; Schwandt, Lincoln, & Guba, 2007, p. 12).

This chapter adopts the approach presented by Schwandt et al. (2007, p. 12) because this approach is better structured, broader and makes more sense. In terms of this approach, the quality of research is determined by its trustworthiness and its authenticity. Table 2 provides the equivalence of the quantitative criteria to assess the quality of a study compared to their qualitative equivalent.

Other researchers (Schwandt et al., 2007, pp. 20–23) see authenticity as a separate and unique criterion for achieving rigour in qualitative research. Yvonna Lincoln and Egon Guba are credited as suggesting authenticity as an additional criterion to improve the quality of qualitative research (Elo et al., 2014; Schwandt et al., 2007; Seale, 1999, p. 468) and it refers to the extent to which the researcher fairly and faithfully shows the range of realities (Elo et al., 2014, p. 8).

The study utilised triangulation to improve the trustworthiness and authenticity of the study, as suggested by (Golafshani, 2003, p. 603). Triangulation means doing more than just one thing (Recker, 2013, p. 91) and, in that study, the researcher utilised different sources, methods and investigators (Golafshani, 2003, p. 604; Schwandt et al., 2007, p. 18). Triangulation addresses different criteria for trustworthiness.

To meet the criteria for credibility for the study, the researcher engaged intensely with the national ICT policies as well as other documents that provide insight into the information society policies for the SADC countries. In addition, the researcher in the reference study engaged other information science researcher who assisted in the development of the design and, through challenging the emerging theory, the supervisors also contributed to this aspect (Schwandt et al., 2007, pp. 18–19).

Another way of ensuring that the research is considered credible is to ensure that other researchers can examine the processes followed and satisfy themselves that the process followed and the outcome is consistent with each other (Golafshani, 2003, p. 601; Krippendorff, 2013, p. 30; 40). To ensure that this happens, the researcher reported on all the steps that were undertaken with the understanding that other researchers will have access to the necessary detail.

By providing what could be considered "thick" descriptions, this study enables other researchers to determine if they can utilise the findings in other contexts they are interested in (Schwandt et al., 2007, p. 19). This criterion can conclusively be determined after the fact, as it is a judgement by the users of this research.

Table 2. Comparison of qualitative and quantitative criteria

Quantitative Criteria	Qualitative Equivalent
Reliability	Dependability
Internal validity	Credibility
Measurement validity	Confirmability
External validity	Transferability
Objectivity	Neutrality

(Adapted from Schwandt et al., 2007)

Interventions similar to those applicable to credibility described above contribute to ensuring the confirmability and dependability of the study. Also, to support all the trustworthiness criteria is to report accurately on the research process (Elo et al., 2014, p. 2). The SADC study did just that.

Despite the use of the different activities to improve the rigour in the study, the researcher noted the limitations that Barbour (2001) has indicated. She discusses purposive sampling, grounded theory, multiple coding, triangulation and respondent validation and argues that the use of these technical procedures can only contribute towards rigour if they are not utilised just to tick checkboxes, but to enhance the actual research (Barbour, 2001). The reference study considered these warnings in the way the research was implemented as was reported in more detail in the actual study and highlighted in this chapter.

ETHICAL CONSIDERATIONS

All research should be underpinned by ethical considerations. Some authors (Gorman et al., 2005, pp. 43–44; Henning et al., 2004, pp. 73–74) focus on the ethical considerations that relate to the subjects (especially if these subjects are animate) of the research. It is often these considerations that these researchers try to address. It is important to note that every researcher has to consider ethics in every step of the research process from the conceptualisation of the research problem to the writing and dissemination of the research (Creswell, 2014, pp. 92–101). Whatever design the researcher develops and adopts must have an ethical base and must ensure that the output has value. This includes the authenticity discussed in relation to ensuring the quality of a grounded theory study also contributes to addressing ethical concerns. It is critical that researchers are truthful when identifying and analysing the data and in considering all the possible factors in developing the theoretical concepts.

The design of the example study accommodates the conducting of interviews. This required that the researcher had to consider ethical issues related thereto. Participants were provided with an information sheet that enabled them to provide informed consent. In order to obtain informed consent, the participants were verbally informed in cases where the interview was done telephonically and in a consent form, in cases where the interview was done physically, the following information was communicated to the participants:

- The nature and purpose/s of the research;
- The identity and institutional association of the researcher and supervisor/ project leader and their contact details:
- The fact that participation is voluntary;
- The responses would be treated in a confidential manner;
- Any limits on confidentiality that may apply;
- That anonymity would be ensured where appropriate (e.g. coded/ disguised names of participants/ respondents/ institutions);
- The fact that participants were free to withdraw from the research at any time without any negative or undesirable consequences to themselves; and
- The nature and limits of any benefits participants may receive as a result of their participation in the research.

EVALUATION OF THE RESEARCH METHODOLOGY

It is essential to ensure that research is of high quality. Researchers have shown that any research is not perfect and that any researcher needs to identify and address, to the extent possible, the peculiar weaknesses related to their study (Ngulube, 2005, pp. 139–140). As summarised in Figure 2, the basis of the reference study has been a constructivist/ interpretivist paradigm with a relativist ontology, a subjectivist epistemology and a qualitative methodology. The research design was based on grounded theory, which was based on a content analysis of national ICT policies of SADC countries supported by interviews of knowledgeable informants, which contributed to methodological triangulation. Although this methodology appears to be robust to develop a theory, it did present some challenges.

Due to the broad understanding of what policy is, and what data sources would be applicable to understand the information society policies of the SADC countries, the example study's choice of basing the research on the national ICT policies may be considered to have unduly narrowed the scope of the research. To have included all documentation in the initial analysis would have rendered the research unwieldy since SADC countries have numerous policy instruments which are not necessarily aligned. With regard to the national ICT policies, at least 12 SADC countries had similar policies which were crafted to provide an overview of how each country intended to build its information society, thus diminishing this weakness. Furthermore, the utilisation of government policies avoided the base of any proposed theory to be disproportionately subverted by perspectives not in place when the policies were developed; however, these newer perspectives were sought out in the second phase to triangulate and test the strength of the preliminary theory.

There appeared to be a methodological incongruence in the employment of content analysis within a grounded theory design. However, this was not considered fatal to the study as it did not challenge the validity of the process or procedures. A possible source of this seeming incongruence may have been because content analysis could be considered to be a data collection technique as well as an analytic technique (Ngulube, 2015a). However, the utilisation of content analysis within a grounded theory design is not unique to this research (Chaterera, 2018).

Another potential weakness of the SADC study emanated from the challenge to access knowledgeable informants for many of the SADC government officials, especially since governments are custodians of the national ICT policies. This was made even more difficult by the fact that many of the embassies that were approached to recommend knowledgeable informant indicated that they had to defer to their ministries of foreign affairs, who would then have had to direct any request to the relevant ministry before the researcher could access the relevant individual. Fortunately, for the researcher in the reference study, it was possible to utilise their network to access some officials to interview. Another challenge related to the fact that the informants were in different countries, making it too costly to travel. To address this, the researcher utilised electronic communications such as Skype™ to conduct the interviews.

CONCLUSION

To encourage increased use of grounded theory in the information sciences, this chapter outlined the nature of grounded theory using a previous study to illustrate key practical aspects of conducting grounded theory. The exploratory qualitative grounded theory design for the example study comprised of two stages. The first stage was the content analysis of national ICT policies of selected SADC countries pur-

posively sampled. The content analysis stage coded the data latently to identify the underlying concepts within the policies. Following on this stage, theoretical sampling interlaced with snowball sampling was utilised to select additional documents and identify key informants who were interviewed, and the data analysed utilising the methods and techniques that are consistent with grounded theory. The outcome of this design was a theory grounded in the data and ready to be deductively falsified.

In conclusion, the chapter provided a perspective on the utilisation of grounded theory in the information science discipline, offering an example which would be able to both illustrate the potential for grounded theory in the discipline as well as referential material for researchers who require assurance in their efforts to implement a similar design.

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KEY TERMS AND DEFINITIONS

Coding: A process for analysing data as it is being collected through making sense and labeling a pieces of information irrespective of the form or medium the information is held.

Constructivist: A view or a person who holds the view that considers reality something created by people rather than being something objective and independent. In terms of this view, it is how people interpret things which shapes how they perceive them. As a result, people could derive different meanings for the same observed phenomenon.

Epistemology: A fundamental viewpoint that people hold to explain how knowledge is generated.

Interpretivist: A view or a person who holds the view that culture and history shape people's understanding of the world. Interpretivism and constructivism are closely related to each other. It contradicts the positivist view that argues that the world is objective and independent of the observer.

Memos: A product or record that a researcher generates in the process of their research. It is a deliberate effort to keep a trait of thoughts and activities that influenced to the research output. The process of generating these memos is called memoing.

Ontology: A fundamental viewpoint that people hold related to the nature of reality.

Theoretical Sampling: A sampling technique, mostly used together with coding whereby the researcher decides what additional data needs to be collected based on the data that has already been collected.

Theoretical Sensitivity: The ability of a researcher to perceive the concepts that are embedded in the data and how they relate to each other. It is this ability that distinguishes the researcher who can generate theory from the one who cannot.

Theory: An expression aimed at explaining a phenomenon with the purpose to describe how the different concepts within that phenomen relate to each other, or to predict its behaviour in different circumstances.

ENDNOTES

[1]   This journal is available online at http://groundedtheoryreview.com/

[2]   . Skype is the trademark of the Microsoft Corporation for a software application that enables people to communicate through video, voice, or chat utilising computers as well as other mobile devises.

Chapter 10
Shaping Policy and Practice in South Africa's Heritage Institutions Through Expert Opinion:
A Delphi Method Study

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ABSTRACT

This chapter seeks to ascertain whether the Delphi process can be effectively implemented to examine the extent to which policy and best practice pertaining to indigenous interests held in networked environments can address contestations regarding ownership. The chapter provides an overview of the Delphi research technique especially its design and administration. It also examines the possible bottlenecks which can undermine the proper application of the Delphi technique especially to indigenous knowledge research within the field of library and information science. Paying proper attention to these bottlenecks should ensure successful application of the method. The chapter concludes that the Delphi method can be a valid and reliable research technique in this field. The method has evolved as experience with it has accumulated, and its application to new areas of study continues to gain momentum.

INTRODUCTION AND BACKGROUND

In order to achieve the stated purposes of an indigenous knowledge (IK) related study, researchers in the field of library and information science (LIS) need to pay particular attention to reporting on the methods employed in the study than sometimes has been the case. This chapter proposes that the Delphi technique can be an efficient, transparent, and reliable method of reviewing complex issues in a specialised field of study such as IK. This methodology may be ideal for various peer reviewed processes within the field of LIS, particularly where there is limited access to local experts. The chapter is based on a Delphi

method study which examined the contestation of indigenous cultural rights pertaining to IK currently held in heritage institutions in South Africa. The South Africa Music Archive Project (SAMAP) was used as a case study.

The SAMAP initiative was conceived in order to respond to the absence of a coherent approach to promote indigenous music genres in post-apartheid South Africa. The project's objective was to network with different indigenous music collectors and donors in the country in order "to gather, preserve and make accessible through electronic services, South African indigenous music in digital form for research, teaching and learning" purposes (Chisa, 2012, p. 2). In that sense, the project endeavoured to facilitate the engagement of academic research with other systems of knowledge with a view to expanding research capacity in the field of IK in the country. The project was implemented within the context of an interdisciplinary National Research Foundation (NRF) initiative on indigenous knowledge systems. SAMAP created partnerships with the School of Music at the University of KwaZulu-Natal (UKZN) and other relevant heritage institutions such as the Digital Innovation South Africa (DISA) in order to achieve this goal (Chisa, 2012).

SAMAP also collaborated with various indigenous music collectors, indigenous music publishers and independent music labels whose materials had been identified for digitisation purposes. The aim was to "collect, protect, promote and produce South African … indigenous music that could previously not be heard within the mainstream record and broadcast industries" as the music was deemed "politically sensitive and subversive" during the apartheid era (Chisa, 2012, p. 2). The SAMAP project, therefore, would digitise and restore indigenous music from these "hidden years" as a resource for the future. Digitisation refers to the ability to capture, store, retrieve, display, process and disseminate records electronically using a variety of information and communication technologies (ICTs) (Chisa & Ngulube, 2017). Within the field of LIS, digitisation is seen as an extremely essential means to ensure the survival and sustainability of indigenous related material.

In this chapter, indigenous music will refer to music and lyrics, instrumental pieces and indigenous rhythms and songs created primarily by indigenous South Africans or based on the 'intellectual cultural property' of indigenous South Africans (Chisa & Ngulube, 2017). Indigenous music is an important means of expressing indigenous heritage. Indigenous heritage is enshrined in indigenous cultural and intellectual rights. However, under the existing IPRs regime, these rights are not always protected. This is why the use of indigenous cultural protocols such as customary law ought to be explored when digitising different aspects of IK (Lebaka, 2018).

The literature shows that although digitisation of IK is ideal for sharing, exchanging, researching and preserving indigenous cultures, it also creates numerous opportunities for illicit access to and abuse of indigenous material housed in various heritage institutions across the continent (Burtis, 2010; Chisa & Ngulube, 2017). The chapter, therefore, seeks to ascertain whether the Delphi process can be an efficient, transparent and reliable method to examine consensus or any emerging patterns regarding policy and protocol formulation with respect to access, ownership, preservation and dissemination of cultural heritage material at SAMAP.

STATEMENT OF THE PROBLEM

The intersection of IK, digitisation and IPRs in heritage institutions in Africa is still a complicated legal minefield (Chisa & Hoskins, 2015). There are numerous opinions regarding what the problems may be,

where they manifest and what needs to be done to address them. The literature shows that indigenous communities are increasingly agitating for legitimate rights to control, access and utilise their own knowledge, derived from unique cultural expressions, practices and contexts (Hall & Lebaka, 2018; Tandon, 2017; Tobin, 2013). So far, indigenous peoples have relied on the existing IPRs framework as a means to secure these ends.

However, there are many difficulties that play out at the interface of IK, digitisation and IPRs. The most significant being that IPRs have a unique Western derivation that ultimately inform their modes of classification, identification and operation (Mahoo et al, 2015). Moreover, IPRs promote particular cultural interpretations of knowledge, ownership, authorship and property. These do not necessarily correspond to indigenous peoples' understandings about the role and function of knowledge and knowledge practices (Setra, 2013). This means that studies relating to the documentation and research of IK have to be grounded on solid academic research. A conventional survey of ordinary respondents would not be appropriate given the complexity of the issues involved.

This chapter argues that the Delphi research method is well suited to this research because, on many current and specialised issues such as those relating to IK, digitisation and IPRs, there is a small pool of recognised experts scattered across the continent, whose knowledge and opinions are the only real guide to best practice regarding the specific issues of concern. Therefore, if the general status of IK from Africa is to be improved, this expertise must be tapped by LIS research, and its findings carefully documented and disseminated.

The chapter seeks to ascertain whether the Delphi process can be an efficient and reliable method to examine how policies and protocols regarding access, ownership, preservation and dissemination of indigenous related material at SAMAP were adopted and implemented.

RESEARCH QUESTION AND OBJECTIVES

The chapter seeks to answers this overarching research question: Can the Delphi method be effectively used to conduct research in the field of LIS from a multi-sectoral perspective in South Africa? Within that broad scope, special focus will be on the following objectives:

- To describe the Delphi methodology within the LIS context;
- To explain how the researcher in this study applied the Delphi technique to explore whether or not there is consensus or any emerging patterns regarding policy and protocols with respect to the access, ownership, preservation and dissemination of cultural heritage material at SAMAP; and
- To present the results of the Delphi study and discuss the implications of the findings.

LITERATURE REVIEW

It is necessary to situate this discussion within a global socio-political context regarding IK research in virtual environments in order to see the myriad subtexts of this topic and the extent to which indigenous interests in intellectual property are raising concern across a range of local and international forums. Thus, the literature review broadly covers the following topics:

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- Nature of the indigenous knowledge system in Africa;
- The concept of digitisation; and
- A general overview of the Delphi technique.

Typology of the Indigenous Knowledge System

Knowledge is a term with many meanings depending on context. However, it is closely related to such concepts as meaning, information, instruction, communication, representation, learning and mental stimulus (Sharma, 2005). A common definition of knowledge is that it is "the awareness and understanding of facts, truths or information gained in the form of experience or learning" (Bellinger, Castro, & Mills, 2004, p. 3-9). It is also an appreciation of the possession of interconnected details which in isolation, are of lesser value (Bellinger, Castro, & Mills, 2004).

Two main categories of knowledge systems can be distinguished worldwide and these are indigenous knowledge systems and western knowledge systems. While western knowledge is generated within universities, research institutes and private firms, indigenous knowledge is confined to specific areas and is mostly under-represented in most parts of the world (Kawooya, 2006).

According to Kawooya (2006), the definition of IK is contested amongst researchers. Sometimes referred to as "local", "traditional" or "rural people's" knowledge (Kawooya, 2006), IK can be described as "the systematic body of knowledge acquired by local people through the accumulation of experiences, informal experiments and intimate understanding of the environment in a given culture". Scholars writing on IK generally agree that indigenous knowledge is (Kawooya, 2006, p. 2):

- Unique and contextual, embedded in practices, institutions, relationships and rituals (Fetterman, 2006). It is, therefore, "defined by the economic, social, cultural and ideological belief system in which it is found" (Akubu, 2000);
- Passed down from generation to generation, often by word of mouth (Fetterman, 2006);
- Frequently the basis for local level decision-making in the community (Charyulu, 2007);
- Does not necessarily operate in the same cosmology as western knowledge, which is mostly documented (Lebaka, 2018; Chisa, 2012); and
- Develops and evolves over a period of time (Chisa & Ngulube, 2017).

Indigenous music is an important component of IK. In an indigenous tradition, music expresses cultural belonging. It is also part of ceremony, storytelling, celebration, mourning and telling of events in indigenous peoples' lives (Lebaka, 2018; Chisa, 2012). Indigenous music can embrace a range of music styles and forms including "pop, hip hop, disco, opera, rap, rhythm and blues, techno and many others" (Janke, 2005). Similarly, indigenous musicians use a variety of instruments such as guitars, drums, the piano and xylophones and more (Chisa & Ngulube, 2017).

In many instances, indigenous music has evolved as part of a collaborative process, created with non-indigenous people. For indigenous cultures, music and songs are central to identity, place and belonging. This means that indigenous music has an important place in the transmission and survival of indigenous cultures (Lebaka, 2018).

IK has two powerful advantages over western knowledge in that it is not labour intensive and it is usually readily available within the community. IK is also found to be socially desirable, economically affordable, sustainable and involve minimum risk to rural communities. In recent times, the use of IK

in development projects has been found to "ensure that the end users of … development projects are involved in developing technologies appropriate to their needs" (Chisa & Ngulube, 2017).

IK is commonly exchanged through personal communication and demonstration from master to apprentice, from parents to children or from neighbour to neighbour. In that sense, it is rarely documented. Unfortunately, these oral communication channels have now largely broken down as people are no longer staying in homogenous communities. In addition, indigenous children are increasingly being educated, and frequently formal western education has been found to lead to anti-IK sentiments (Kaniki & Mphahlele, 2002).

Thus, should the methods of preservation and perpetuation continue to be disrupted especially with the aging and death of those who have strong links to the past, there is a risk that within one generation, IK could be lost forever (Tsebe, 2005).

The ability to capture, store, retrieve, display, process and disseminate records electronically using a variety of information and communication technologies (ICTs), known as digitisation, is seen as an extremely essential means to ensure the survival and sustainability of knowledge (Langill, 2007). According to Mutiti (2000), digitisation can play a major role in the digitisation of many aspects of IK.

The Concept of Digitisation

Since IK is mostly stored in people's minds and passed on through generations orally rather than in written form, it is vulnerable to rapid change. Development processes like rural to urban migration and changes to population structure as a result of famine, epidemics, displacement or war may all contribute to loss of IK (Sithole, 2006).

Even in remote areas, the powers which push global content (such as formal education, electronic media and advertising to mention just a few) are stronger than those pushing local content (Greyling, 2007). Seen from that perspective, IK faces a bleak future unless it is properly documented and regulated. One step towards achieving this goal is through the conversion of indigenous analogue material to digital form using modern ICTs, a process commonly known as digitisation (Nyumba, 2006).

Digitisation is the conversion of analogue media to digital form and it has become prevalent in many heritage institutions in South Africa (Burtis, 2010). From the perspective of LIS, digitisation often increases demand for access to the original item, as awareness of what is held in a collection increases.

However, while digitisation may present opportunities to increase access to indigenous items, it also creates various opportunities for illicit access to and misuse of the knowledge (Burtis, 2010). Moreover, digitisation often raises expectations of benefits but without an effective regulatory policy framework, these expectations have the potential to put indigenous collections at risk (Britz & Lor, 2003; Chisa & Hoskins, 2016).

It is important therefore, that traditional owners be allowed to define and control the rights and access to their resources, in order to prevent the misuse of their indigenous heritage and receive proper compensation for their cultural and intellectual property (Mosimege, 2005).

It is essential also that indigenous communities should be able to describe and contextualise culturally significant collections in their own words and from their own perspectives (Charyulu, 2007; Langill, 2007).

In the study leading up to this chapter, the Delphi technique was deemed suitable to determine whether there were any patterns or consensus around issues raised by the research questions (Hsu & Sandford, 2007).

General Outline of the Delphi Method

The Delphi method is based on a structured process for collecting and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback (Buchson-Arbib, 2002). Hsu and Sandford (2007) observe that Delphi may be characterised as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem.

The distinguishing features of the Delphi technique are its use of experts and its methodology. Proponents of the Delphi method recognise human judgment as a legitimate and useful input in generating forecasts and therefore believe that the use of experts, carefully selected, can lead to reliable and valid results (Buchson-Arbib, 2002). In addition, the Delphi technique attempts to overcome the weaknesses implicit in other research methods such as relying on a single expert, a group average, or a round table discussion ((Buchson-Arbib, 2002).

Using a single expert puts too much weight on one person's opinion; the group average method is problematic because as Buchson-Arbib (2002, p. 397-408) notes, "the individuals consulted have neither the opportunity to provide their most thoughtful input nor the benefit of hearing other responses that might encourage a refinement of the contributions"; and the round-table approach is unreliable because some members of the group may unduly influence the decision.

The Delphi method addresses the latter concern by soliciting input anonymously so that influences such as the professional reputation of a respondent or the forcefulness of a respondent's personality are neutralised. Thus, all participants have equal stature in the process and their comments influence the other participants only through the logic of their argument, not their status or name recognition (Cabaniss, 2001).

The Delphi process traditionally incorporates two primary investigative phases (Hanafin & Brooks, 2005). The exploration phase characterises the first round of questionnaire distribution where the issues being investigated are explored by the participating panel members. The evaluation phase involves all subsequent rounds of investigation for the purpose of evaluating the issues identified in the previous exploration phase (Hanafin & Brooks, 2005).

Throughout this interactive process, it is important to remember that various features of the research protocol, such as questionnaire design, the use of measurement scales and the provision of feedback can influence the communication among panel members and the eventual outcome of the study. Accordingly, the survey instrument and administration must be subjected to rigorous pre-testing and the procedures for the provision of feedback should be carefully specified (Keeny, Hasson, & McKenna, 2001).

There have been some criticism of the Delphi method, especially what certain researchers consider to be Delphi's failure to meet some professional standards for questionnaire design, administration, application, and validation. Despite these misgivings, however, Yousuf (2007, p. 112) has argued that "if the [study] objective is the identification of content based on expert consensus, then the Delphi technique is an appropriate choice as it may enhance the significant contributions of the panel."

METHODOLOGY

The purpose of this study was to examine the manner in which policies and protocols pertaining to the access, ownership, preservation and dissemination of cultural heritage material at SAMAP were adopted and implemented. The Delphi method was considered due to the paucity of information in relation to the issues under investigation.

Typically, the Delphi method involves the circulation of three or four questionnaires consisting of a number of items pertaining to a specific topic of interest (Hanafin & Brooks, 2005). Statements regarding the topic are generated based on the available literature and the initial opinions of a carefully selected panel of experts. Members of the panel are asked to respond to each statement in questionnaire form in accordance with their own personal knowledge and perceptions.

The results of each round of anonymous questioning are summarised and shared with the intention that panel members reconsider those responses that deviate significantly from the group's overall mean ranking. Hanafin and Brooks (2005) observe that "during this interactive process - which can be repeated as many times as deemed appropriate - issues can be clarified, areas of agreement and disagreement identified, and an understanding of the priorities can be developed".

Given the very technical nature of the problem under investigation, the research instrument in this study was pre-tested on three experts in the field of library and information science. The experts were all attending the 2nd International Conference on Information and Knowledge Management which was held between 20-24 August 2018 in Nairobi, Kenya. They were, thus, competent enough to offer valuable input regarding clarity and the feasibility of administration. All the three sample members completed and returned the trial questionnaire.

Subsequent to the pre-test, some changes were made to improve the structure and content of the questionnaire. Questions deemed irrelevant were excluded, while more relevant questions were included. This is in line with the Delphi method's ultimate purpose: to facilitate an in-depth conversation among a group of experts, by providing them with opportunities to develop a more complete understanding of their peer's respective opinions, assessments, and forecast assumptions regarding a problematic issue (Yousuf, 2007).

Selection of the Delphi Panel

The selection of panel members is considered to be a critical component of the Delphi process and one that is directly related to objectives of the investigation. Unlike other survey research methods which rely on randomised sampling techniques, the Delphi method involves the purposeful sampling of a small group of participants upon whose expert opinions the results of the study are based (Skulmoski, Hartman, & Krahn, 2007).

The identification and recruitment of these panelists is the most important step in the Delphi process and critics have raised methodological concerns regarding a number of issues, including: the definition of the seemingly loaded term "expert"; the potential for researcher bias in panel selection; and the possible overstating of results due to the use of the "expert" label (Keeney, Hasson, & McKenna, 2001).

In the interest of avoiding these methodological pitfalls, Keeney, Hasson and McKenna (2001) advise researchers to adhere to a stringent protocol for identifying the pool of available experts. Delphi panel members are usually identified through literature searches and/or recommendation from other recognised experts in the field (Yousuf, 2007). It is strongly advised, however, that researchers in LIS adhere to a

specific set of inclusion criteria, rather than mere personal preference when selecting prospective experts to serve on the Delphi panel (Yousuf, 2007).

In compliance with the guidelines for panel selection discussed above, it was clear to the researcher in this study that the consideration of members for the Delphi panel is critical since effective selection will maximise the quality of the responses which in turn will enhance the credibility of the study (Keeny & McKenna, 2000).

The researcher started with a locally distributed list of professionals with the appropriate expertise in this field. The researcher then asked these experts to recommend other experts in the area under investigation who would be willing to be panel members. Identified participants were then contacted to confirm their willingness to participate. The experts included a respected digital archivist, academics, librarians and a copyright expert. The cumulative expertise was relevant and satisfied specific needs for this study.

The main concern in the selection of the Delphi panel, therefore, was to capture relevant expertise while at the same time ensuring representativity in the sampling process (Skulmoski, Hartman, & Krahn, 2007). In other words, the selection of panelists was tailored to suit the issues under investigation although the experts were drawn from various backgrounds within the subject area under review.

It is worth mentioning that indigenous people were not represented on the expert panel since most of them would not be able to navigate through the very complex issues under discussion. However, the absence of the voice of indigenous owners was compensated by the inclusion of panelists with relevant expertise and experience in this area. Secondary data was also used to corroborate panel responses to issues under investigation.

Initially, twelve potential panelists were identified for the study. Four declined to participate due to personal and professional reasons while eight agreed to participate. However, four panel members did not return their first round questionnaires, despite follow-up, and in the end only four of the anticipated eight panelists completed all the questionnaires. It is fair to say, the resultant panel size may raise questions regarding the validity of this study.

However, in a Delphi study conducted by Akins, Tolson and Cole (2005, p. 115-118), the researchers point out that there is "no clear agreement as to what constitutes a sufficient number of Delphi survey participants to ensure stability of results". Although Akins, Tolson and Cole (2005, p. 115-118) identified only a few Delphi studies in the Health sector with less than 10 participants, they argue that "sample size in Delphi studies has been researcher and situation specific, and more often than not, convenience samples have been chosen dependent on the availability of experts and resources."

No standards have been established in any methodologically acceptable way and current literature only puts forward empirical choices on Delphi expert sample sizes made by individual researchers, such as convenience, purposive, or criterion sampling (Hasson, Keeney, & McKenna, 2000).

Based on the results of their study, Akins, Tolson and Cole (2005, p. 115-118) advise that "the response characteristics of a small expert panel in a well-defined knowledge area are stable in light of augmented sampling". This advice is particularly relevant for conducting Delphi surveys of IK within the LIS field in most parts of Africa where there is still a very limited pool of qualified experts to draw from. Akins, Tolson and Cole (2005, p. 115-118) conclude that reliability in a Delphi study may be obtained with a panel of a relatively small number of Delphi experts and that "a small expert panel from a limited field of study may be used with confidence".

RESULTS

With the above in mind, what follows is a detailed discussion of the three iterations which were conducted in this study:

Delphi Round One

Once a target list of experts was finalised, round one was initiated. When the respondents' initial feedback was received, the researcher converted the collected information into a well-structured questionnaire. This questionnaire was then used as the survey instrument for the second round of data collection.

It should be noted that the Delphi round one questionnaire for this study was not above the recommended cut-off limit of 25 questions, which can lead to "panel response burden and fatigue" as noted by Snyder-Helpern, Thompson and Shaffer (2000).

Delphi Round Two

In the second round, the Delphi participants received a second questionnaire and were requested to review the items summarised by the researcher based on the information provided in the first round. The experts were then asked this question: on a five-point scale from strongly agree to strongly disagree, to what extent do you agree or disagree with each response? Hence, in this second round, each expert was able to evaluate the answers of his/her peers, which were listed anonymously (Ludwig, 2005).

The Delphi panelists were asked to state the rationale for their rating priorities among items. Each expert was also given the opportunity to re-evaluate and to revise his/her own responses made in the previous round. In the words of Ludwig (2005, p. 117), "areas of disagreement and agreement [were] identified as a result of round two". In this round, content analysis was used to categorise the panelists' comments (Hsu & Sandford, 2007), and consensus began taking shape.

Delphi Round Three

In the third and final round, each Delphi panelist received only the responses from the second round which required further consideration or clarification. All issues on which consensus had been reached were excluded as advised by Hsu and Sandford (2007). This round gave Delphi panelists a final opportunity to make further clarifications regarding both the information and their judgments of the relative importance of the items.

The degree of consensus reached indicated that three rounds had been adequate in order to gather the necessary data. This number of rounds is in line with Hasson, Keeney and McKenna's (2000: 101) advice that in any Delphi study "knowing when to stop is crucial – too soon will provide results that may not be meaningful, not soon enough may cause sample fatigue". However, it should be emphasised that the number of iterations depends largely on the degree of consensus sought by the researcher and may vary from three to five (Guest, Bunce, & Johnson, 2006).

Thus, while it was anticipated that at least eight panel members would participate in this study, data collected from the four remaining panel members was rich and varied and consensus was reached on the majority of issues. The number of local experts in the areas under investigation who met the study

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requirements was limited, and although a better response rate would undoubtedly have further enhanced the reliability of the study findings, this researcher was satisfied with the small number of competent panelists who were willing to participate in the study.

DISCUSSION

The Delphi panel's value judgments regarding the SAMAP digitisation initiative revealed key themes arising from the research question and objectives. This is in addition to the many critical issues highlighted in the literature review, pertaining to the digitisation of indigenous heritage. The key themes that consistently came to the fore are as follows:

- Existing policy framework at SAMAP;
- Access to the digitised indigenous material;
- Convergence of IPRs and culturally sensitive aspects of IK; and
- Moral rights of indigenous communities.

What follows is a discussion of each of the above issues as they pertain to the Delphi panel's comments.

Policies and Protocols

The reasons for implementing any digitisation project are varied as indicated earlier in this study. Specifically, the objectives of the SAMAP initiative have also been provided in the study. Ideally, each digitisation project should have a policy framework that can identify and discuss key issues involved in the conceptualisation, planning and implementation of the project, with recommendations for "best practice" to be followed at each stage of the process. Context of the project in question and the implication on users also need consideration (Chisa, 2012). It is very important for the project to be clear about its objectives, as the purpose will ultimately determine the process and the costs (Chisa, 2012).

In line with the above, SAMAP posted online policy standards and protocols relating to acquisition, access, dissemination and preservation of its indigenous holdings. During the course of this study, these protocols were readily available on SAMAP's website. For example, SAMAP's data-use agreements clearly warned that its database collections were of a non-commercial nature (Chisa & Ngulube, 2017).

However, some Delphi panelists were generally concerned by the lack of lucidity in SAMAP's core policy objectives because they did not seem to accommodate indigenous interests and concerns. For example, the project's stated objective was to "facilitate the engagement of academic research with other systems of knowledge with a view to expanding research capacity in the field of indigenous knowledge in South Africa" (Chisa & Ngulube, 2017).

In this regard, SAMAP acknowledged that the initiative was essentially an online database intended for an international academic audience. The core aim was to digitise and restore music from the country's "hidden years" as a resource for academic research. This implies that SAMAP's primary goal was not to cater for indigenous concerns regarding their intellectual property. This is evidenced by the fact that its database application included no functionality to restrict access to 'sensitive' material (Chisa & Ngulube, 2017). There was also no provision for indigenous beneficiation.

There was consensus amongst panel members, therefore, that policy formulations regarding the digitisation of indigenous material are confronted by vexing challenges (Chisa, 2012). This is in light of the dichotomy between the indigenous and Western worldviews and as a result of the competing expectations of indigenous communities on the one hand, and the digitising institution on the other. These complexities may also include the challenges posed by the need to accommodate different access conditions for indigenous material which contain sensitive material (Andrzejewski, 2010; Cameron, 2007).

Access to Digitised Indigenous Material

Panel members in this study observed that heritage institutions in the country did not seem to pay the required attention to the resurgence of self-determination by indigenous peoples, particularly their quest for access to and custodial rights for their heritage resources. For example, one panel member, who was closely associated with the planning and implementation of the SAMAP initiative, noted that the music arising from the SAMAP digitisation initiative had not been made accessible to indigenous communities. According to this panel member, SAMAP's music remained "hidden ... to many ordinary South Africans" especially those living in rural areas (Chisa, 2012, p. 170).

Relevant general literature has been growing in the LIS profession focusing on the digitisation of high demand indigenous collections for enhanced access and preservation (Mulrenin, 2002; Charyulu, 2007). The literature generally delineates a clear nexus between the socio-economic disadvantages experienced by indigenous communities and their ability to access information using modern ICTs (DiMaggio & Hargittai, 2009; Chisa & Hoskins, 2015).

These social disadvantages, directly linked to marginalisation and characterised by poverty and powerlessness, are reflected in measures of education, employment and income. Significantly, these social disadvantages also inform the 'digital divide' phenomenon. This means that although technology has increased the availability of more information to more people, it has, at the same time, made access to this information more difficult for marginalised communities (Chisa & Hoskins, 2015).

Legal and Cultural Sensitivities

The panelists in this study noted the lack of accommodation within the law for considerations of cultural integrity and preservation issues that are relevant to the indigenous worldview. This concern is consistent with most of the literature in the LIS field (Fetterman, 2006). The position of IK within intellectual property law has been documented in this study. Generally, the argument is that IK does not necessarily fit the forms of classification and identification required to determine intellectual property subject matter (Yunkaparta, 2006).

Thus, there is still uncertainty across many heritage institutions in South Africa when dealing with culturally sensitive issues. A big problem area is how to balance public access and use of indigenous materials within the ambit of IPRs, with responsiveness to the cultural needs and concerns which indigenous people express about materials relating to them (Barclay, 2005).

Unfortunately, as the Delphi panel unanimously noted, contested ownership and access issues relating to the material form of indigenous recordings continue to arise. Yet, presently, IPRs remain the only arbiter when the changing needs of indigenous people are addressed practically in relation to their cultural

heritage. The fact that the law is reluctant to openly address issues of 'culture', researchers, especially in the field of LIS, must serve as interpreters between the requirements of the law and the changing nature of the cultural material that they collect and study (Akubu, 2000).

Moral Rights of Indigenous Communities

Delphi panel members in this study were unable to provide convincing answers as to how moral rights can be applied to indigenous cultural productions, especially where copyright protection does not apply. This is not surprising especially because there is a lack of clarity in the literature on this matter as well. However, by developing reliable guidelines, digitisation initiatives such as SAMAP could allow far greater access to the digitised music, for a wider range of audiences, who would also be secure in the knowledge that access occurs under well informed parameters which respect moral rights, both legal and cultural (Chisa, 2012). Britz and Lor (2003) observe that people who deal with artistic works have a moral obligation to ensure that:

- The artist is attributed;
- The work is not falsely attributed to someone else; and
- The work is not dealt with in a way that is prejudicial to the artist's honour or reputation.

According to Britz and Lor (2003), an artist is entitled to legal recourse if any of the above "moral rights" is infringed.

In line with the above, panelists in this study discussed the importance of attribution and of maintaining the integrity of indigenous songs in a digitisation project such as SAMAP (Sunder 2006). The panelists agreed that the accuracy of the reproduction is of great importance, as inaccurate reproduction of a song, like any other art work, can cause deep offence to those familiar with the creation (Australia Council for the Arts, 2002).

This means that the introduction of the moral rights of attribution and integrity may further the interests of indigenous communities in South Africa. As Guivarra (2000) observes, moral rights include the inalienable personal rights of the creator of a work to: claim authorship of the work or song (right of attribution); and to object to any distortion, mutilation or other modification of the work that would be prejudicial to the creator's honour or reputation (right of integrity).

FUTURE RESEARCH DIRECTIONS

The intersection of IK, digitisation and IPRs in heritage institutions remains a very vexing issue on the continent of Africa. Yet, indigenous communities are desperately calling for legitimate rights to control, access and utilise their own intellectual cultural property, including restricting unauthorised access to their knowledge. So far, they have relied on the western IPRs framework to secure these ends.

However, IPRs have largely proved ineffective because of their alien mode of classification, identification and operation. Moreover, IPRs promote particular cultural interpretations of knowledge, ownership and property which are antithetical to the indigenous worldview. The researcher is hopeful that the results of this study will support and endorse the use of the Delphi technique for further research in this area within the field of LIS.

Future studies could explore whether customary law of indigenous communities should be formally adopted and accepted as law at par with the western derived jurisprudence. These studies could explore whether this law can satisfactorily be used by indigenous communities in Africa to protect and secure their own intellectual cultural property. The application of customary law may encounter implementation challenges. However well-grounded studies aimed at safeguarding indigenous cultural rights can engender the discovery of lasting legal and cultural solutions.

CONCLUSION

This chapter has shown that the Delphi method has a long tradition as a valid research technique. The method has evolved as experience with it has accumulated, and its application to new areas continues. Specifically, the chapter has shown that the Delphi method can be effectively used to conduct research in the field of LIS from a multi-sectoral perspective in South Africa. In many IK issues in the country, there is now a relevant body of expert knowledge held by a growing pool of recognised experts. It is important that this expert knowledge is continuously roped in, so that decisions on policies and good practice are not taken based simply on an estimate of uninformed citizens. The Delphi method can help to identify and tap this expert knowledge.

The chapter has also shown that the Delphi method is very flexible as there is no need for the respondents to be available all at the same time, let alone in the same place. Respondent anonymity also removes many of the weaknesses of other research methods. The Delphi research method was used in this study for the first time in South Africa to reach expert consensus about fundamental concepts on indigenous knowledge research within the field of LIS.

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Chapter 11

Towards an Understanding of Knowledge Sharing in Indigenous Communities of Practice:
A Phenomenology of Practice Approach

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ABSTRACT

Knowledge sharing is broadly an act of communication, and in indigenous communities of practice, knowledge sharing can be viewed as a cultural symbol making process. This process is facilitated by indigenous language as the communication tool. The characteristics of indigenous languages that include being dynamic, constantly changing as people adjust to their life circumstances and being personal, tacit, and experiential renders it closely tied down to the person who knows the language. Thus, the most appropriate way to understand the use and exchange of such knowledge, that is, the communication phenomenon of indigenous knowledge, would be to extricate the personal experiences of individuals involved in the use and exchange of the indigenous knowledge. This can be done using van Manen's phenomenology of practice.

INTRODUCTION

Phenomenology is one of the theoretical approaches that have influenced the way in which researchers in Library and Information Science (LIS) have sought to address issues of both practical and intellectual interest (Budd, 2005). As observed by Wilson (2002), there had been an increase in the number of LIS researchers opting for phenomenology. He attributed this to an increase in LIS researchers who had begun to adopt qualitative methodologies. However, the assertion by Wilson, is not supported in literature. For example, Ullah and Ameen (2018) found that only 2% of the documents the authors surveyed had used

phenomenology. The study was a systematic review that synthesized secondary data from 58 literature reviews published from 1980 to 2016, which included journal articles or pre-prints shared through social media or institutional repositories reporting empirical research in English. The authors found descriptive quantitative methodologies to be most popular. Similar results were reported in the previous year by Togia and Malliari (2017, p. 55, 56) in a review of 440 publications in five prominent LIS journals that included 343 empirical studies. Of the studies, 70% had used quantitative methodologies, 21.6% qualitative and 8.5% mixed methods. Among the studies that applied qualitative methodologies, only 2% had used phenomenological methodologies. Ullah and Ameen (2018) went on to conclude that while they had established the popular methodologies, it however was "also possible that researchers do not give enough thought to other possibilities, or are not aware of them … [The less popular methodologies could] inspire researchers to consider new approaches, especially when exploring new kinds of research questions" (p. 58). Ngulube and Ukwoma (2019) found that quantitative research methods predominated library and information science postgraduate research in Nigeria and South Africa between 2009 and 2015. None of the studies that were produced used phenomenology. Hence, the focus on phenomenology in this Chapter; specifically, the applicability of phenomenology of practice as a method of inquiry in knowledge sharing which is a phenomenon of human information behaviour.

The context within which knowledge sharing is discussed in this Chapter, the indigenous communities of practice, qualifies the subject matter to be treated as indigenous research. Thus, it can be studied using indigenous research methodologies. However, researchers in indigenous knowledge systems do not seem to agree on the standards for the methodologies for indigenous research. What is agreed upon is that indigenous knowledge paradigms are different from the western paradigms (Keane, Khupe, & Muza, 2016, p. 165); and observations are that most indigenous research "tend to follow a conventional academic format with underpinning scientific modes of knowledge validation, including contractual ethics, an objectivity stance and a distancing of the researcher". Hence, a call by Keane, Khupe and Muza (2016) for the inclusion of the researcher's voice because, together with the researcher, participants are co-creators of the research design and interpreters of the research data. Such a concern can be addressed by using interpretive phenomenology. Keane, Khupe and Muza (2016) concluded by advocating for participatory research that is embedded in a relational ontology (p. 165). Other researchers like Ngulube and Ngulube (2017) observed that "scholars who claim to indigenise research methodologies still base their knowledge claims on the western research tradition of constructivism and interpretivism … based on multiple worldviews and epistemologies [and that there is yet to be] developed a language and justification strategy associated with a purely indigenous paradigm". The authors recommended use of descriptive phenomenology in indigenous research. In view of the concerns on appropriated indigenous research methodologies, some of which are highlighted above, this Chapter, proposes the use of van Manen's phenomenology of practice in understanding the dynamics of knowledge sharing in indigenous communities of practice.

The main aim of this Chapter is to explore the extent to which phenomenology of practice can be considered as the best method of inquiry to understand how to explicate the essences of knowledge sharing experiences in indigenously-rooted informal business organisations, which are a common feature in developing countries, from a LIS point of view. The significance, as observed by Ullah and Ameen (2018), is that "knowledge of methods used in a particular discipline is invaluable for researchers who want to choose among appropriate methods in the conduct of reliable and valid research" (p. 54). Also, notes Wilson (2002) about the importance of adopting a method of enquiry in information science research when he states that:

… [a research] method without a philosophical framework that determines why a particular method is employed and what view of reality the researcher holds, is purely mechanistic.

This chapter starts by discussing the conceptual framework consisting of an analysis of the phenomena of knowledge sharing and indigenous communities of practice. This is followed by a brief history of the development of the philosophy of phenomenology, an outline of phenomenology of practice as a research method and a discussion on the application of the methodology in knowledge sharing and the future directions.

CONCEPTUAL FRAMEWORK

This section discusses the main concepts that constitute the subject matter for this Chapter. The thrust being to foster a common understanding.

Background on Knowledge Sharing

Knowledge sharing became a focal topic of study with the ushering in of a knowledge economy in the last two decades when knowledge came to be considered as a primary resource in the development of organisations (Ipe, 2003, p. 337). This consideration raised interest in the management of knowledge with a thrust on understanding the knowledge management processes and practices that facilitate knowledge creation, sharing and use.

The concept of knowledge sharing was borrowed from the social sciences to organisational studies (Bratianu, 2015) and has tended to be used interchangeably with knowledge transfer (Paulin & Suneson, 2012, p. 82) and knowledge exchange (Wang & Noe, 2010, p. 117). However, the terms are different. Knowledge transfer "implies focus, clear objectives and unidirectionality, while knowledge may be shared in unintended ways, multi-directionally and without a single specific objective" (King & He, 2011, p. 914). In addition, knowledge sharing tends to be used at individual level analysis whereas knowledge transfer is used when the focus is on groups, departments and organisations (Paulin & Suneson, 2012, p. 87). Knowledge exchange combines knowledge sharing and knowledge seeking (Wang & Noe, 2010, p. 117).

The conception of a phenomenon influences how that phenomenon is defined or perspective through which the phenomenon is viewed. In the case of knowledge sharing, it has been defined differently by different authors, and Savolainen (2017) notes that this has been due largely to the different definitions of the term knowledge.

Definition of Knowledge

A detailed discussion of the different definitions of the word knowledge is given by Bolisani and Bratianu (2018, p. 7). The definition adopted in this Chapter is by Davenport and Prusak (2000), which views knowledge as a:

… fluid mix of framed experience, values, contextual information and expert insight that provide a framework for evaluating and incorporating new experiences and information. It originates and is ap-

plied in the minds of the knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms (p. 4).

This definition "captures the main attributes of knowledge in an organizational context" (Bolisani & Bratianu, 2018, p. 13); and "covers such areas as tacit knowledge (expertise), implicit knowledge, explicit and procedural knowledge" (IFLA, 2014). Explicit knowledge is objective, impersonal, codifiable, context independent and easy to share. It is expressible in "formal and systematic language and shared in the form of data, scientific formulae, specifications, manuals and such like" (Nonaka, Toyama & Konno, 2000, p. 7). Tacit knowledge is unspecified, intentional, dynamic, personal, a-critical and fallible. It is highly subjective and difficult to articulate. It can only be identified, observed or learnt through experience. Tacit knowledge "underlies all knowledge and all skill" (Klein, 2008, p. 42), and that part of the tacit knowledge and skill which can be externalised through personal encounter is implicit knowledge.

Knowledge Sharing Perspectives

Broadly, knowledge sharing is viewed as a process of communicating knowledge with others or a process that helps individuals to generate their own knowledge (Klein, Connell, & Meyer, 2005). This view is associated with five knowledge sharing perspectives that include the communicative perspective, the knowledge creation theory, the learning perspective, the communities of practice perspective and the knowledge market perspective (Mod Zin, 2014, p. 65-67). In the communicative perspective, at the core of knowledge sharing is an exchange of ideas and thoughts unidirectionally and multidimensionally (Savolainen, 2017); in the knowledge creating perspective, focus is on operationalising the Socialisation, Externalisation, Combination and Internalisation model and treating the knowledge conversion processes as the facilitating mechanism for knowledge convergence. The learning perspective states that people have mental maps which direct how they behave than theories. The communities of practice perspective is grounded in learning. It views knowledge sharing as the movement of knowledge *in situ* and in networks of actants within and between communities of practice; and the knowledge marketplace perspective states that there should be costs for knowledge sharing.

The perspectives help structure an understanding of the subject matter. The perspectives considered most suitable in understanding the subject matter of this Chapter are the communicative and the communities of practice perspectives.

The Communicative Perspective

In the communicative perspective, knowledge is an object of communication, whose communication involves knowledge externalisation and knowledge internalisation processes (Savolainen, 2017). As pointed out by Eppler (2006), knowledge communication is:

… the (deliberate) activity of interactively conveying and co-constructing insights, assessments, experiences, or skills through verbal and non-verbal means … designates the successful transfer of know-how (e.g., how to accomplish a task), know-why (e.g., the cause-effect relationships of a complex phenomenon), know-what (e.g., the results of a test), and know-who (e.g., the experiences of others through face to face (co-located) or media-based (virtual) interactions.

The processes of knowledge communication are characteristic of knowledge sharing, meaning that knowledge sharing can be considered as human communication (Savolainen, 2017). This communication can be conceived from two main positions posited by Carey (1989), that is: the ritual model of communication and the transmission model of communication. This paper adopted the ritual model of communication.

Knowledge Sharing Defined

In the ritual model, Carey (1989) defined communication as "a symbolic process whereby reality is produced, maintained, repaired, and transformed" (p. 23). Most of the communicative acts are directed towards maintaining society in time and space. Emphasis is more on participation and interaction, and thus communication acts are viewed as rituals that bring people together through observing social norms and values, which constitute a culture of the group. Nothing new may be learnt by coming together, but a reaffirmation of a particular view of the world is done.

In explaining the meaning of the definition, Carey (1989) started by looking at symbolic production of reality. He stated that there is a real world out there of events, objects and processes which are visible to people; and that people create a language for naming the events, objects and processes. This means that the things out in the world are the signs of the words or names coined to them. Carey (1989) pointed out that this indicates that "reality is not given, not humanly existent, independent of language … rather, reality is brought into existence, is produced, by communication- by, in short, the construction, apprehension, and utilization of symbolic forms" (p. 25). He added that language affects people's perceptions of the events, objects and processes. As such, where there are distortions in the names that people create, it translates into a distortion of the reality. The distortion can arise in situations where different people have different perceptions of the same phenomenon.

Another tenet in the definition is on the displacement and productivity characteristics of symbolic forms. Displacement means that the symbolic forms can be discussed in their absence and productivity means that an infinite number of representations may be produced from each of the symbolic forms. Carey (1989) stated "as with language, so with other symbolic forms: a finite set of words or a finite set of phonemes can produce, through grammatical combination, an infinite set of sentences" (p. 28). Through productivity, reality is maintained, reproduced, repaired and transformed.

The other communication model suggested by Carey (1989) is the transmission model, which is viewed as the "transmission of signals or messages over distance" (p. 15) to induce change. This theory is rooted in Shannon and Weaver's (1949) linear model of transmission of information which states that the process of transmitting information starts with a source where the information is generated, and then transmitted through a channel which is a form of a medium to get to a recipient.

Focusing on the mechanisms through which the definition of communication as a symbolic process can be operationalised, it is important to highlight that the perspective encompasses the transmission model of communication. Equally important to note is that the communication takes place and is influenced by the context within which knowledge sharing takes place, which is the community of practice in this case.

Communities of Practice

The notion of communities of practice is included herein to demonstrate the dynamics of factors that influence the experiences of knowledge sharing. It is viewed by "researchers in the field of knowledge

management as a primary forum for, in particular, the sharing of knowledge between individuals" (Klein, Connell & Meyer, 2005, p. 106). The notion has gone through three phases in its evolution (Omidvar & Kislov, 2014, p. 272). The first phase consists of the situated learning theory, the second phase is marked by the introduction of the concept of communities of practice and the third phase by development of the knowledgeability concept.

Situated Learning Theory

The situated learning theory is a social learning process propounded by Lave and Wenger (1991), which "emphasizes the relational interdependency of agent and world, activity, meaning, cognition, learning, and knowing" (Lave, 1991, p. 67). It is based on the concept of learning *in situ* as a situated activity in socially organised practice settings, whereby "learning, … is neither wholly subjective nor fully encompassed in social interaction, and it is not constituted separately from the social world (with its own structures and meanings) of which it is part" (Lave, 1991, p. 64).

The situated learning theory explains learning on social, cultural and historical basis. It defines learning as:

… a social phenomenon constituted in the experienced, lived-in world, through legitimate peripheral participation in ongoing social practice; the process of changing knowledgeable skill is subsumed in processes of changing identity in and through membership in a community of practitioners; and mastery is an organizational, relational characteristic of communities of practice (Lave, 1991, p. 64).

The theory was developed from studies on craft apprentices where Lave and Wenger observed that the mastery of skill among the apprentices did not happen through school-structured didactic lessons, but when collaborating during work activities. During this process, the novice learns the skill of his trade alongside an expert undertaking less complicated work assignments in a concept referred to as legitimate peripheral participation. Gradually, over time, through these novice-expert interactions, the novice will gain expertise and an identity to the point of being considered a full member of the community.

Developments of the situated learning theory gave way to a second phase of the notion of communities of practice. The phase is marked by the introduction of the theory of communities of practice, which has come to predominate a perspective of knowing in action.

Theory of Communities of Practice

The theory of communities of practice is a social learning theory that highlights the situatedness of learning and knowledge acquisition through informal social participation in work settings, the communities of practice. The communities are defined as:

… groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly … [that is, they] engage in a process of collective learning in a shared domain of human endeavor: a tribe learning to survive, a band of artists seeking new forms of expression, a group of engineers working on similar problems, a clique of pupils defining their identity in the school, a network of surgeons exploring novel techniques, a gathering of first-time managers helping each other cope (Wenger-Trayner & Wenger-Trayner 2015).

Wenger-Trayner and Wenger-Trayner (2015, p. 1) further state that the nature of a community in a community of practice differs from other types of communities in terms of three main characteristics. These include domain, the community and practice.

Domain: means that members in a community of practice share a common domain of interest, that is, a joint enterprise. They have a commitment to the domain and share expertise in the domain that sets them apart from other people, attained by learning from each other. This bestows them with a common identity.

The community: members of a community of practice develop relationships as they collaborate on activities centring on their domain of interest, both at work and off the job. They "share their experiences and knowledge in free-flowing, creative ways that foster new approaches to problems" (Wenger & Snyder, 2000, p. 140), which is a learning act. The learning is not necessarily intentional, but can be incidental. Most of it takes place through informal expert to expert and novice to expert interactions where physical skill and cognitive frameworks embodied within the cultural and social contexts are shared, leading to a build-up of collective resources that include a common meaning based on a common language, a common understanding and a common identity.

The practice: when pursuing their domain of interest, members of a community of practice develop "a shared repertoire of resources: experience, stories, tools, ways of addressing recurring problems … a shared practice" (Wenger-Trayner & Wenger-Trayner, 2015, p. 2). These resources are for negotiating meaning among the members.

The notion of communities of practice is based on the apprenticeship model in which "learning is *becoming* a practitioner not learning *about* practice" (Brown & Duguid, 1991, p. 48). The attainment of an identity by an individual through learning socially means that the learning is not only a cognitive activity, but also involves the totality of all aspects of human experience in negotiations of making meanings (Wenger, 2010, p. 181). The negotiations entail that one should compromise between what is socially acclaimed competence and personal experience. The implications are that a person joins a community by being attracted by the community's competence. However, someone could have personal competence that may be adopted by the community through negotiations.

Another highlight of the second phase is the view that a community of practice can be used as a management tool. In this view, promoted by Wenger, McDermott and Snyder (2002), management can formally facilitate the emergence of communities of practice to bring about competitiveness.

Another highlight of the second phase is that "workers engage in informal groups both at work and off the job to share information and to develop new solutions for job-related problems" (Li et al., 2009, p. 4). This engagement can be within and across different communities of practice, resulting in the development of a concept referred to as community of communities. The community of communities is a maze of identity relationships within and across the different communities of practice that form part of an individual's networks in knowledge sharing. This networking of individuals gave way to the notion of knowledgeability in the third phase of the evolution of the notion of communities of practice.

Under the notion of knowledgeability, it is postulated that learning a particular practice produces boundaries of practice that correspond to a community of practice. Thus, the social world consists of a multiplicity of bounded practices, it is a landscape of practices. Within this landscape, the boundaries of the different practices offer fertile ground for innovation (Wenger, 2010, p. 183) and a person that traverses their identity across the boundaries, since a person can engage in multiple communities of practice, attains knowledgeability, but cannot claim competence in all the multiple communities.

However, the nature of the interactions in learning in communities of practice has assumed different interpretations as the concept of community of practice evolved overtime (Omidvar & Kislov, 2014, p. 272; Bolisani & Scarso, 2013, p 373) making it difficult to understand the concept. Aljuwiber (2016, p. 734) laments, pointing out that literature, especially business literature, has used various phrases like community of practitioners, knowledge communities, occupational communities, to mention but a few. This Chapter joins the fray by adopting the term indigenous communities of practice. However, in all this milieu "there is recognition that CoPs are structures that facilitate learning and knowledge sharing" (Bolisani & Scarso, 2013, p. 373).

Typologies of Communities of Practice

Knowing in action, as a perspective, has been instrumental in the development of a number of knowledge sharing strategies focusing on social practice, learning and knowing, which have been lumped together under the banner of communities of practice (Amin & Roberts, 2008). However, the characterisation of communities of practice has been changing since the proposal of the concept by Lave and Wenger (1991). Hence, the development of typologies of communities of practice.

Klein, Connell and Meyer (2005, p. 109) suggest four types of communities of practice as follows:

- **Stratified-Sharing Communities:** The community restricts knowledge sharing so that it should be from experts to novices.
- **Egalitarian-Sharing Communities:** Knowledge sharing is flexible and the seniors are readily willing to learn from the juniors.
- **Stratified-Nurturing Communities:** Knowledge sharing is meant to control the nurturing of members so that they rise from junior to senior.
- **Egalitarian-Nurturing Communities:** Experience is viewed as the best mode of gaining knowledge and the novice tends to be involved in specialised aspects that require expertise.

Another typology of communities of practice is offered by Amin and Roberts (2008, p. 356). It includes the following:

- **The Craft/Task-Based Practice Communities of Practice:** These resemble the original communities of practice thought modeled on an apprenticeship form of learning, denotes the sharing of physical skill and cognitive frameworks embodied within cultural and social contexts (Lave & Wenger, 2006). The sharing of skill and cognitive frameworks is based on the application of the situated learning theory. Work activities are not geared primarily at creating innovations but replicating and preserving the craft. Changes in the manner of operating and the products are evolutionary over time, in response to the environment and customer needs.
- **Professional Practice Communities of Practice:** Mastery of both explicit and tacit knowledge is important. Explicit knowledge is acquired through individual study and tacit knowledge is acquired through hands-on practice. Knowledge produced is authenticated using professional standards and disseminated in professional networks. Entry into the community is restricted by professional requirements.
- **Epistemic or Creative Knowing Communities of Practice:** Communities are purposely set-up to pursue the development of innovations. Members can be from the same location or across loca-

tions depending on the thrust of the community; and are brought together by their differences in expertise required for creativity.

- **Virtual Knowing Communities of Practice:** Characteristic of this community is that they have varied organisational structure, ranging from unstructured chat rooms to coordinated online communities. Generally, members do not know each other, membership life span is very varied and can be as short as a single contribution. Generation of new knowledge is rare except where the grouping is made-up of professionals or people with special interests. Communication among the members is very high, but unlikely to yield the same type of cohesion among members as would be if members were co-located.

Indigenous Communities of Practice

The term indigenous communities of practice is not widely discussed in literature. One of the few authors who have used the term is Medeni (2006) who used it in reference to Yaren Talks in Turkey, which is an institution for upholding the tradition of the Ahi principles and practices. Its purpose is educational, and through storytelling and conversation, it teaches young boys the socially good moral principles for the maintenance of social order. Medeni (2006) stated that the current version of the institution is an offshoot of the Ahi (Brotherhood) Organisation which was a guild of craftsmen in the Ottoman Empire.

The type of indigenous community of practice suggested in this Chapter consists of, in varying degrees, a combination of the characteristics of the craft/task based communities, epistemic communities and egalitarian nurturing communities. Indigenous communities of practice are an important source of livelihood in developing countries and their competitiveness is rooted, to a great extent, on the exquisiteness of their products. The exquisiteness is a product of use of indigenous knowledge which is transmitted through indigenous language. The main language used consist of cultural symbols which are indigenously rooted, but may have been transformed over the years due to environmental influences. Thus, have become endogenous; that is, have incorporated ideas and knowledge systems emanating from other cultures.

Factors That Influence Knowledge Sharing

The factors which have been shown to influence the extent to which one could be willing to share one's knowledge include motivation, both intrinsically and extrinsically; personality traits, the nature of knowledge, that is, explicit or tacit, or a combination of the two; knowledge management systems that include databases or networks; use of information technology, communities of practice. Factors within motivation include support by the organisation, reciprocity and agency (King & He, 2011, p. 915), nature of the knowledge, opportunities to share and culture of the workplace (Ipe, 2003), and trust (Savolainen, 2017).

Knowledge Sharing Tools/Platforms

Different knowledge types are shared using different tools. Tacit knowledge can be shared through discussion, stories and personal interactions. Klein (2008, p. 42-43) also highlighted how stories could be used in sharing both explicit and implicit knowledge. This could equally be done through collaborative relationships and interactivity that include teamwork, storytelling, meetings, workshops, networking and conversations, presentations of oral and performing arts and Medeni (2006, p. 354) added artifacts.

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Savolainen (2017) focusing on the virtual environment proposed sharing tools as groupware which include software for collaborative workgroups, wikis, blogs, social tagging and bookmarking.

Knowledge Sharing in Indigenous Communities of Practice

Knowledge sharing in indigenous communities of practice as a social learning process is described by Pyrko, Dörfler and Eden (2017) as a "transpersonal process of thinking together" (p. 390) centring on the acquisition and sharing of indigenous knowledge and indigenous knowledge systems. This means that an understanding of knowledge sharing in indigenous communities of practice should focus on studying the social processes of communicating indigenous knowledge "wherein significant symbolic forms are created, apprehended, and used" (Carey, 1989, p. 30). Indigenous knowledge is defined as "a set of ideas, beliefs, and practices (some of which have indigenous religious underpinnings) of a specific locale that has been used by its people to interact with their environment and other people over a long people (Mawere, 2015, p, 59). Its main characteristics are that it is personal, tacit and experiential. It is dynamic, constantly changing as people adjust to their life circumstances (Keane, Khupa & Muza, 2016, p. 164). Thus, the best way to understand how such knowledge is exchanged is to obtain the personal experiences of the people involved in the knowledge sharing activities. Phenomenology of practice is one of the ways of doing so.

PHENOMENOLOGY AS THE METHOD OF INQUIRY

Phenomenology is described by Kafle (2011, p. 181) as an overarching term for a philosophical movement and a range of research approaches. The author also stated that phenomenology provides a perspective from which all qualitative researches draw. Husserl (1859-1938) is considered as the founding father of phenomenology, but its origins in philosophical literature dates back to the eighteenth century, where it is associated with the writings of Lambert, Herder, Kant, Fichte and Hegel (Moran, 2000, p. 6).

The object of focus in phenomenology is a phenomenon, which can be described as "an emotion, relationship, or an entity such as a program, an organization, or a culture" (Lin, 2013, p. 470), or broadly, that which registers to the consciousness such that it is conceived and spoken about (Budd, 2005, p. 45). It is also referred to as a knowledge object.

There are different conceptions of phenomenology which can be attributed to the different orientations of phenomenology that evolved with the development of phenomenological thought overtime. Prominent philosophers, among others, are Husserl and Heidegger from whose work most types of phenomenological orientations have drawn (Gill, 2014, p. 119); and thus, have tended to provide the foundation for the philosophical thoughts that inform phenomenological orientations and their respective research methodologies. The research methodologies are a result of the extension and application of phenomenological philosophy into scientific methods of inquiry. Describing the infusion of phenomenology into the domain of research methodologies, Kafle (2011) noted that when "applied to research, phenomenology is the study of phenomena: their nature and meanings. The focus is on the way things appear to us through experience or in our consciousness where the phenomenological researcher aims to provide a rich textured description of lived experience" (2011, p. 181-182).

The different phenomenological orientations bear some similarities because of a common tradition, but "have distinct identities" (Budd, 2004, p. 45) due to different emphasis. Van Manen (2011) lists the

phenomenological orientations as transcendental phenomenology, hermeneutic phenomenology, existential phenomenology, linguistical phenomenology, ethical phenomenology and phenomenology of practice.

The orientations are modeled along three main approaches: 1) descriptive approach which emerged from Husserl; 2) interpretive approach which is associated with Heidegger; and a combination of the descriptive and the interpretive approaches which is exemplified in the works of van Manen. van Manen's phenomenology of practice is what has been adopted in this Chapter.

Husserl's Descriptive Phenomenology

Edmund Husserl conceived phenomenology on the principle of *presuppositionlessness* which, according to Moran (2000) is a "claim to have discarded philosophical theorising in favour of careful description of phenomena themselves, to be attentive only to what is *given* in intuition" (p. 8); that is, "to describe the essence of experiences" (Gill, 2014, p. 119). Hence, Husserl's phenomenology is described as descriptive phenomenology. Husserl's idea was to offer an understanding of the world that explains the role of an individual and context in meaning making; specifically, "the relation between consciousness and 'objects of knowledge' with an emphasis on the objects –'the things themselves' … how objects of knowledge are experienced and present themselves to human consciousness … a science of phenomena" (Sloan & Bowe, 2014, p. 1294). This stance, according to a number of writers, among them Lin (2013, p. 471) indicates a denial of the Cartesian dualism of reality in which reality is considered as objective, existing externally to a person. However, Paley (2014, p. 1521) and Wilson (2002) contend that Husserl's phenomenology embraces Cartesian dualism by focusing separately on consciousness which is subjective and the experiencing, which can be considered as an act of objectification.

In further describing Husserl's phenomenology, Moran (2000) stated that "phenomenology must pay close attention to the nature of consciousness as actually experienced, not as is pictured by common sense or by the philosophical tradition" (p. 6). By attending to the nature of consciousness, focus is placed on the essence of experience of the phenomenon. An essence is:

… a structure of essential meanings that explicates a phenomenon of interest. The essence or structure is what makes the phenomenon to be that very phenomenon. That is, the essence or structure illuminates these essential characteristics of the phenomenon without which it would not be that phenomenon (Dahlberg, 2006, p. 11).

Based on such an understanding of an essence, the thrust in phenomenological research is to identify and set apart the structures of essences and to extract the meaning that is given to the essences by the research participants when the participants are experiencing the phenomenon. Experience cannot be measured empirically. It is exchanged using cognition. As such, it is "through perception, intention, and cognition [that] we seek to understand the world, ourselves and others" (Budd, 2005, p. 45). To understand the experience of phenomena, according to Husserl, the thrust should be on scrutinising the essences of the lived experiences of the object/phenomena in the lifeworld, the *Lebenswelt*. This act of scrutinising the essences tends to be clattered by one's preconceived ideas and prejudgments which distort the meaning of the experiences. To attain the truth, Husserl suggested the adoption of "*the phenomenological epoché, or suspension of the natural attitude, …* [exhibited through] a number of methodological reductions and alterations of viewpoint (including the so-called '*eidetic*' and '*transcendental reductions*')" (Moran, 2000, p. 11).

The word reduction which means "returning ('*reducere*') to the original sources of people's experiences" (Heinonen, 2015, p. 35), refers to Husserl's descriptive method "which underpins the analytical process of several phenomenological methodologies" (Gill, 2014, p. 119). The reductions are of different types, and one such type is transcendental reduction. This type of reduction involves an *epoché* or bracketing in which a researcher stands "aside from both subjective experience and ego and view the world as a pure, essential consciousness" (Finlay, 2014, p. 122); and *eidetic* reduction occurs when the researcher steps aside so as to unearth "the *eidos* or essence, the *a priori* essential structures of subjective experience" (Gill, 2014, p. 120) of the respondents. Without the essences, it would be impossible to visualise or intuitively imagine an object.

Husserl's phenomenology is also referred to as transcendental phenomenology "because the observer could transcend the phenomena and meaning being investigated to take a global view of the essences discovered" (Sloan & Bowe, 2014, p. 1294). This position, however drew criticism from other philosophers. Among them is Heidegger whose query of epoché led him to develop his interpretive phenomenology. Another point of difference between Husserl and Heidegger is that Husserl considered phenomenology as an epistemology while Heidegger considered phenomenology as a study of 'being-in-the-world', which is an ontological position (Gill, 2014, p. 120).

Heidegger's Interpretive Phenomenology

Martin Heidegger (1889-1976) who was a student of Husserl, developed a version of phenomenology grounded in hermeneutic phenomenological epistemology. Hermeneutics is a theory of meaning, understanding and interpretation that began in the 19th century (de Vos, Strydom, Fouché & Delport, 2011, p. 8).

The theory of hermeneutic phenomenology focuses on the analysis of texts it involve thoroughly reading and analyzing the text so as to explicate the meaning borne in the text. The text can include a conversation, written words or pictures. Subjective experiences are used in the analysis, which effectively is an act of interpreting the text. Thus, a hermeneutical base in Heidegger's phenomenology meant that the methodological thrust to attain meaning is interpretative (Gill, 2014, p. 120). As a result, Heidegger's phenomenology is referred to as interpretative phenomenology.

Heidegger's subscription to interpretation made him question the concept of *epoche,* that is, the extent to which it is possible for a person to set himself apart from the processes of essence identification in the life-world where the person lives, as suggested by Husserl. His argument was that "we cannot bracket all the presuppositions and we are obliged to use words and we are bound to language … [thus, settled for] hermeneutics, to get a clear sense of the words" (Shahbazian, 2015). Hermeneutic phenomenology focuses on the "subjective experience of individuals and groups … unveil[s] the world as experienced by the subject through their life world stories" (Kafle, 2011, p. 186). This experience can be extrapolated through interpretation.

The hermeneutic and interpretative base of Heiddegger's phenomenology means that Heidegger disagreed with Husserl on how the life-world would be explored (Shahbazan, 2015). To Husserl, the object of focus in the life-world is about perceiving and understanding the essences of phenomenon in the consciousness. He thus, considered a human being as a knower (Shahbazan, 2015) and advocated for "radical autonomy, which … views people as 'free agents', uninfluenced by the environment and culture" (Matua & van Der Wal, 2015, p. 25). This is contrary to the life-world concept in interpretative phenomenology where the "subjective experiences are inevitably influenced by the social-cultural contexts; [where] knowledge generation [entails] explicating what individuals' narratives of their expe-

riences imply in their specific circumstances" (Matua & van Der Wal, 2015, p. 26). The embeddedness of individuals in their world is the basis of Heidegger's concept of the *Dasein*.

The *Dasein* means 'being-in-the-world' (Shahbazan 2015; Paley, 2014; Kafle, 2010); and by assuming the *Dasein* concept, Heidegger rejected both subjectivity and objectivity (Paley, 2015, p. 1522). This is because to Heidegger people exist in the world relationally situated in contexts and their understanding of the world is through interpretation of events and activities in which they as well as other people are involved in within the contexts. Thus, reality is constituted from an understanding of both individual experience and the bigger picture.

The concept of intentionality is another aspect that presents another point of departure between Husserl and Heidegger. Heidegger did not deny the role of intentionality, but denied that is was a mental act. In Heidegger's phenomenology, "intentionality refers to the different ways we comport ourselves toward, or behave in respect to, different entities" (Paley, 2014, p. 1523).

Van Manen's Phenomenology of Practice

A number of phenomenological orientations were developed after Heidegger. One such orientation is van Manen's (1990) phenomenology of practice – "the practice of living … [that concerns pragmatically] how to act in everyday situations and relations" (van Manen 2007, p. 13). According to Gill (2014, p. 124), the phenomenological orientation emerged from pedagogy and is both descriptive and interpretative; and is now applied to a range of fields including the information sciences.

van Manen (2007) defines phenomenology as follows:

… project of sober reflection on the lived experience of human existence–sober, in the sense that reflecting on experience must be thoughtful, and as much as possible, free from theoretical, prejudicial and suppositional intoxications. But, phenomenology is also a project that is driven by fascination: being swept up in a spell of wonder, a fascination with meaning. [It] offers … moments of seeing-meaning or "in-seeing" into the heart of things (p. 12).

From the definition above, it can be said that the concept of lived experience is central to van Manen's phenomenology. Lived experience is "simply experience-as-we-live-through-it in our actions, relations and situations" (van Manen, 2007, p. 16). This experience is obtained in the lifeworld, which is also referred to as modalities of experiencing. The concept of the life-world refers to the everyday experience as they are felt and not as conceived or theorized (van Manen, 1984, p. 37). The focus on experience means that what phenomenology seeks to find out is the very nature of a phenomenon, its essence. The essence, as described above by Dahlberg (2006, p. 11) is that which makes a phenomenon what it is.

Further, as the life-world concept was conceived by Heideger, a person's experience is specific to circumstances surrounding the person. Thus, to understand and interpret the meanings that a person attaches to the experience entails an understanding of the circumstances in the contexts in which the person obtains their experience. The situated meanings that emerge act as the base upon which researchers reflect on the participants' experiences in the participants' realities, which consist of time, space, relationships, body or culture (Matua & van Der Wal, 2015, p. 26). These participants' realities are referred to as existential themes of the life-world. The themes include lived space, lived body, lived time and lived relationships to others (van Manen, 1984, p. 67) and lived things and technology. The existential

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themes are always present as people live, but a different theme will dominate in different situations. The themes are detailed as follow:

- Lived space (spatiality) refers to the effect that a context has on the experiences that one gets about a phenomenon.
- Lived body (corporeality) means that the being of humans is exhibited in a human body. It is this body that relates with other bodies, experience has feelings and takes action.
- Lived time (temporality) refers to the subjective time and the "dimensions of past, present and future constitute the horizons of a person's temporal view (Heinonen, 2015, p. 37).
- Lived human relations (communality or relationality) stands for the experiences that emerge from living in relationships with other people. Focus is on shared interpersonal space.
- Lived things and technology (materiality) refers to people experiencing material things as they live.

Another crucial factor in all phenomenological research is reduction, which in van Manen's phenomenology is viewed as a reflective action exercised by a researcher so as to understand the participant's experiences. Reduction involves an acknowledgement of biases and is a type of bracketing in interpretive phenomenology. It is essential in attaining openness and in adopting a phenomenological attitude which in turn facilitates development of meaning and the uniqueness of phenomenon. Reduction can take different forms or levels depending on use and methodological needs (Adams & van Manen, 2017, p. 782). The forms include the following:

- Heuristic reduction: is bracketing that happens when a researcher's attentiveness is drawn towards a particular phenomenon and starts wondering about that phenomenon.
- Ontological reduction or 'otherness': involves the bracketing of the being.
- Phenomenological reduction (concreteness): this is bracketing of "all knowledge, all theory and all belief in what is real, and aims to evoke the concreteness of living meaning" (Heinonen, 2015, p. 36).
- Eidetic reduction (universality in contingency): reduction that seeks to explicate the essence of phenomenon.
- Hermeneutic reduction (openness) entails that researchers reflect on their own pre-suppositions and biases.
- Methodological reduction (flexible rationality) means that a researcher brackets out all other investigative techniques and rationally chooses techniques and methods that best suit the topic.
- Ethical reduction (alterity) requires reflecting on ethical issues.
- Radical reduction (self-givenness) is about focusing strictly on the phenomenon. One sets aside "subjectivity and agency of all senses … the person constituting the meaning of the world, by focusing only on 'the self that gives itself', to see things just as they are given to us" (Heinonen, 2015, p. 37).
- 'Originary' or inceptual reduction is about a person getting oriented to the beginning of the phenomenon.

The meaning that one adopts after reflection is a product of an interpretative understanding that one gains about a situation through language. Describing the importance of language, van Manen (1984)

states that phenomenological research is a poetizing activity, where "poetizing is a thinking on original experience and is thus speaking in a more primal sense. Language that authentically speaks the world rather than abstractly speaking *of* it is a language that reverberates the world" (p. 39). It should be noted, however, that not all experience can be best explained through language.

PHENOMENOLOGY AS A METHODOLOGICAL APPROACH

The use of phenomenology as a methodology, according to Sloan and Bowie (2014) was started in the field of psychology by Husserl, as stated before. Overtime, as different phenomenological orientations emerged, so did the "variations in the application of the methodologies of phenomenology" (Sloan & Bowie, 2014, p. 1296). However, Gill (2014) points out that the different methodologies constitute "a family of approaches" (p. 124).

The thrust in van Manen's phenomenology of practice is on using phenomenology as a human science approach with a focus on practice. A human science approach does not subscribe to the subjectivity-objective divide, but rather contends that the subjective is instrumental in constituting the objective (Gill, 2014, p. 128). The focus on practice follows the observation by van Manen (2007) that "in some sense all phenomenology is oriented to practice—the practice of living [thus] on pragmatic and ethical grounds a question arises of how to act in everyday situations and relations" (2007, p. 13).

van Manen (1984) describes the conduct of research as a "dynamic interplay" (1984, p. 39) of activities in that the activities should not follow any sequence, they are dialectical. A number or even all the activities can be worked on at the same time (van Manen, 1984, p. 41).

1. Turning to a phenomenon which seriously interests us and commits us to the world;
2. Investigating experience as we live it rather than as we conceptualize it;
3. Reflecting on the essential themes which characterize the phenomenon;
4. Describing the phenomenon through the art of writing and rewriting

The procedural activities are presented below in a methodological outline. Detailed descriptions of each set of activities are provided in van Manen (1984, p. 42-68).

1. Turning to the Nature of Lived Experience
    a. Orienting to the phenomenon
    b. Formulating the phenomenological question
    c. Explicating assumptions and preunderstandings
2. Existential Investigation
    a. Exploring the phenomenon: generating "data"
        i. Using personal experience as a starting-point
        ii. Tracing etymological sources
        iii. Searching idiomatic phrases
        iv. Obtaining experiential descriptions from subjects
        v. Locating experiential descriptions in literature, art and any documents.
3. Consulting phenomenological literature
    a. Phenomenological Reflection

4. Conducting thematic analysis
    a. Uncovering thematic aspects in life-world descriptions
    b. Isolating thematic statements
    c. Composing linguistic transformations
    d. Gleaning thematic descriptions from artistic sources
5. Determining essential themes
    a. Phenomenological Writing
6. Attending to the speaking of language
7. Varying the examples
8. Writing
9. Rewriting: (A) to (D).

Each of the aspects of the procedural activities in the methodological outline is detailed below.

Turning to the Nature of Lived Experience

When embarking on research, thought should focus on someone "a real person, who … sets out to make sense of a certain aspect of human existence" (van Manen, 1984, p. 40). The insights that will be gained will yield a single interpretation, which, however, will not exhaust all the possible descriptions which can be formulated from the interpretation.

Orienting to the Phenomenon

Central to phenomenological research is the adoption of an attitudinal disposition that fosters sensitivity. It is through such an attitude that a description of the essence is construed in a manner that gives a revelation of the lived experience in vivid form, which is "in a linguistic description that is both holistic and analytical, evocative and precise, unique and universal, powerful and eloquent" (van Manen, 1984, p. 41).

Formulating the Phenomenological Question

The phenomenological attitude helps in orientating the researcher on how to construct a phenomenological research question, which question centres on finding out what makes an experience to be what it is. The question should be filled with a sense of wonder, in Greek *thaumazein*, which is a disposition that should take the researcher into deep thought about the question; and should also be enduring so that it does not stall (Adams & van Manen, 2017, p. 783).

Explicating Assumptions and Pre-Understandings

Focus here is about how the researcher can best suspend or bracket off their presuppositions about a phenomenon. van Manen (1984, p. 46) suggests that when one is aware of one's presuppositions and biases, one can be able to guard against one's subjective influences during interpretation.

Existential Investigation of Experience as we Live it

The researcher should aim at explicating experiences as originally felt in the lived experiences, and not as the experiences may be conceived. Thus "the researcher actively explores the category of lived experience in all its modalities and aspects" (van Manen, 1984, p. 40). The modalities and aspects are the existentials mentioned above; and are some of the ways which can be used to facilitate reflecting, questioning and writing during the research process.

Exploring the Phenomenon: Generating Data

Data gathering should involve delving deep into the issue of focus. This is preceded by a reduction exercise. Reflective diaries should be kept for the duration of the study.

The target is to collect rich experiential detail, and not opinions, explanations or interpretations. Hence, study cases should be sampled purposively. Data can be collected through interviews and written protocols.

Data collection activity should also make the researcher sensitive to materials that could provide interpretive clues that include "one's personal experiences, the etymology of relevant terms, idiomatic phrases and expressions, other people's experiences, biographies or reconstructed life stories, experiential descriptions contained in artistic and literary sources" (van Manen, 1984, p, 50).

Using Personal Experience as a Starting-Point

When presenting the personal experience, it should be done without any interpretation or causal explanations. It should be noted that any person's experiences should be considered as possible experiences of any other person.

Tracing Etymological Sources

Finding the original meaning of a term often helps one to understand what is meant by the term. This is because, overtime, certain words tend to assume a popular meaning which may not depict the real meaning of the term.

Searching Idiomatic Phrases

Van Manen (1984, p. 54) observes that idioms are, by their very nature, phenomenological. This is because they are crafted out of lived experiences and vividly describe the phenomenon, by stating the characteristics of the phenomenon. He notes that "idiomatic language (as well as the language of writers and poets) is an inexhaustible source for phenomenological analysis" (van Manen, 1984, p. 55).

Obtaining Experiential Descriptions From Subjects

Personal accounts of lived experiences can be obtained through a number of ways. Some of these include requesting someone to write about their experience, tape recording conversations on life stories or participant observation.

Locating Experiential Descriptions in Literature, Art, etc

Literature is also used to understand the lived experiences which are depicted in the descriptions in the literature. Pieces of art are considered as literature.

Consulting Phenomenological Literature

Literature from phenomenological exercises is another source for data.

Phenomenological Reflection

Phenomenological reflecting means contemplating on the essential themes that emerge from the interpretations. This entails distinguishing "between appearance and essence, between the things of our experience and that which grounds the things of our experience" (van Manen, 1984, p. 41).

Conducting Thematic Analysis

The research proceeds by deducing themes from the data obtained. The themes are experiential structures and not conceptual formulations.

Uncovering Thematic Aspects in Life-World Descriptions

Themes are foci from where phenomenological descriptions can emerge. A theme is not a single statement but a description of the experience narrated.

Isolating Thematic Statements

Descriptions of lived experiences can be found in different places interviews, stories, diaries, drama, film, poetry, or novels.

Themes can be isolated through two main ways: the highlighting and line-by-line approaches. The highlighting approach entails underlining or highlighting statements reflecting the essence of experience. In the line-by-line approach, every sentence is scrutinized for the messages they carry so that sentences or phrases that will be commonly appearing will be captured.

Composing Linguistic Transformations

After the thematic statements have been captured, they should be rewritten in a phenomenological sense.

Gleaning Thematic Descriptions From Artistic Sources

When collecting data from artistic sources, one needs to be cognisant of how the reflection differs from the everyday experience.

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Determining Essential Themes

After capturing the thematic statements, one should then extrapolate the themes which will be the centre of the phenomenological descriptions.

Phenomenological Writing

Phenomenological writing is about translating thought into speech. Adams and van Manen (2017, p. 785) state that the writing should be "in a stream-of consciousness manner (avoiding theorizing, giving views or opinions, explaining, or otherwise interpreting the experience)". The writing can be pre-reflection and after reflection.

Attending to the Speaking of Language

Phenomenological reading entails capturing the nuances in speech and writing. This is because descriptions of events in the life-world are not always presented in a straight forward manner.

Varying the Examples

A theme that would have been chosen should be presented in its different forms.

Writing

There is no set structure in phenomenological writing. Any of the following structures maybe adopted, individually or in combination:

- **Thematic Structure:** Organising the write-up on thematic lines.
- **Analytic structure**: this is whereby a person focuses on a particular event and shows how it is misunderstood or reflectively shows the emergence of themes from "etymological and idiomatic sources, from examining experiential descriptions, literary and phenomenological material" (van Manen, 1984, p. 67).
- **Exemplicative Structure:** The writing is based on the different examples that emerge from a concept.
- **Existential Structure:** The writing is organised along the existential themes.
- **Exegetical Structure:** Emerges when the researcher adopts dialogical or exegetical thinking with the works of another phenomenologist.

Rewriting: (A) to (D), etc.

Writing and rewriting are central activities when conducting research. This is because the methodology "is more a carefully cultivated thoughtfulness than a technique [in which procedure involves] … various kinds of questioning, oriented to allow a rigorous interrogation of the phenomenon … requires a dialectical going back and forth among the various levels of questioning" (van Manen, 1984, p. 68).

APPLICATION OF PHENOMENOLOGY OF PRACTICE IN KNOWLEDGE SHARING IN COMMUNITIES OF PRACTICE

The proposal herewith is that phenomenology is the best methodology for understanding knowledge sharing, especially in communities of practice. The strength of the proposal rests on the following observation:

- Poetizing language: the thrust of using language to understand an experience fosters the unravelling of any issues which may be hidden in words. This is important in indigenous communities where figurative speech tends to be preferred since it may project a sense of respect.
- Use of all manner of sources, including non-scientific sources, when gathering data broadens the field from where a researcher could look for details. At the same time, can readily facilitate the aspect of triangulation of the data.
- Reduction, the phenomenological interview and interpretation may help elicit details of some subjective sharing experiences which may not be obvious to a researcher. Considering that sharing can be unintentional and will not necessarily result in some action, but may leave experiences that are worthwhile for future endeavours, which may be of interest to a researcher.
- The human science approach of the methodology allows it to be pragmatic. This is essential noting that knowledge resides in a human mind, and sharing of the asset rests on an interactive view based on communication in a context.

FUTURE RESEARCH DIRECTIONS

What is suggested in this Chapter is a proposal. The calls therefore for research that takes the proposal further to implementation. While information and knowledge are the objects of study in LIS, there however is need to adopt methodologies which allow some deep probing into the sources of the knowledge and information, the person, if LIS professionals are to make a meaningful contribution in the field of knowledge management and indigenous research.

CONCLUSION

In qualitative studies, philosophically grounded methodologies like phenomenology bear a logic that justifies procedure and authenticity. Hence, the suggestion in this paper for studying the phenomenon of knowledge sharing using phenomenology, which is all about human experiences.

Knowledge sharing is largely a communication act, which can best be understood from an explication of the experiences of the people involved in the communication. Coupled with the fact that language is the main vehicle of communication, means that the experiences are embedded in the language. This language in the lifeworld is available in a variety of sources like conversations, written works, pictures, artifacts and drama, among others, including the context within which the knowledge sharing will be taking place; and is constantly maintained and renewed through use. This way, old experiences are maintained and renewed and new ones developed. It is these experiences that a researcher aims to capture in research. Phenomenology is seen as a means of doing so.

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KEY TERMS AND DEFINITIONS

Endogenous Knowledge: A type of knowledge constituted from a combination of indigenous and exogenous knowledge.

Exogenous Knowledge: A type of knowledge that is foreign to a particular locality.

Identity: Bearing or exhibiting characteristics that set a person apart from others.

Identity Relationships: Interactions based on the characteristics that are specific to a person.

Learning: The process of acquiring knowledge, cognitively or through practical experience.

Network: A chain of relationships, which can take any form depending on the nature of the relationships.

Phenomenon: A knowledge object, abstract or concrete, which can be visualised.

Chapter 12

Understanding Traditional Healing Practices in the Limpopo Province of South Africa:
A Phenomenological Approach

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ABSTRACT

Phenomenology affords indigenous knowledge researchers the perfect opportunity to understand the lived experiences of indigenous communities from the participants' perspectives. Various studies have shown that indigenous knowledge is currently facing extinction. As a result, information professionals should play a leading role in recording and preserving it. Phenomenology helps indigenous knowledge systems (IKS) scholars to obtain knowledge from marginalised groups and record it without any influences as a result of prior knowledge or personal worldviews. This study demonstrates how phenomenology was applied to understand traditional healing practices in the Limpopo Province of South Africa and, furthermore, illustrates how phenomenology can be employed by information professionals as a qualitative method to conduct indigenous knowledge (IK) research.

INTRODUCTION

This chapter looks at the use of phenomenology as a research method to understand traditional healing practices in the Limpopo Province of South Africa. Traditional healing can be defined as the sum of the knowledge and practices, explicable or not, used in diagnosing, preventing or eliminating a physical, mental or social disequilibrium, and which relies exclusively on past experience and observation (World Health Organisation, 1976; Mokgobi, 2014). This knowledge has been handed down from one generation

to the next either verbally or in writing (Raseroka, 2002). The knowledge includes "health practices, approaches, knowledge, and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques and exercise, applied singular or in combination, to treat, diagnose and prevent illnesses or maintain well-being" (World Health Organisation, 1976; Mokgobi, 2014).

Information professionals, as custodians of information, have to ensure that indigenous knowledge is managed and preserved (Ngulube, 2002). There is consensus among scholars that IKS are crucial for economic development, especially in developing economies (Maluleka, 2017, Alabi, Oyelude & Sokoya, 2018). Despite its important role in national development, indigenous knowledge has been downplayed in the management of information (Tjiek, 2006; Maluleka & Ngulube, 2019). This has led to a growing interest in the preservation and management of this knowledge in the knowledge management environment (Ngulube, 2002). Nonetheless, indigenous knowledge still lies at the margins of science, because most scholars consider it as part of the informal market. The majority of the people in South Africa and in many other Third World countries, especially in poor communities, depend on indigenous knowledge for healthcare (Maluleka, 2017). Nxumalo (2010) also stresses rural communities' overreliance on IKS for healing and takes rooibos tea, which is supposed to ease indigestion, as an example. Trust, affordability and proximity are some of the reasons why traditional healing is the first choice for primary health care in rural communities. Popat, Shear, Malkiewicz, Stewart, Steenkamp, Thomson and Neuman (2001) argue that there is a mythical predominant view that herbal medicines are harmless and have no side effects because they are natural. Moodley, Sutherland and Oulanova (2008, p.154) opine that:

while the need to seek traditional healing is embedded in a cultural paradigm of cure seeking, the appeal for traditional healing is also based on the holistic nature of traditional approaches which seek to restore harmony and balance within the individual and between the individual and his or her environment.

Research suggests that there is a limited understanding when it comes to the healing practices of traditional healers (Ijumba & Barron, 2005; Denis, 2006; Truter, 2007). Maluleka (2017) argues that traditional healers in the Limpopo Province feel misunderstood and undermined by western medical doctors. This is ascribed to the difference in the training that traditional healers and western doctors receive. According to Sodi et al (2011), who the custodians of indigenous medical knowledge will be, is decided by the ancestors. Truter (2007) also maintains that becoming a traditional healer (sangoma) is not a personal choice; one is called by the ancestors. Only such a person of destiny is apprenticed to a qualified diviner for several months. The would-be diviner is first possessed by the ancestral spirits who make their presence known by inflicting on their host serious illnesses which are best understood by other sangomas experienced in the art of divination (Bojuwoye, 2005).

Summerton (2006) affirms that western practitioners have no knowledge of the traditional theories of disease and health. This causes mistrust between western doctors and traditional healers. Maluleka (2017) is of the view that scholars need to re-examine and reconstruct themselves, take into account non-western epistemologies and worldviews, and develop much needed cultural competency in order to become custodians of traditional knowledge. This can be done by conducting studies that do not invalidate other worldviews. According to Ngulube and Ngulube (2017), phenomenology offers indigenous researchers a method to investigate the real world without invalidating indigenous voices and the worldviews of indigenous people. This is because *phenomenology does not approach social reality with preconceived notions and procedures. The context of the research and the experiences of the participants and the subjective experiences of the researcher dictate how the phenomenon of interest is investigated.*

Lewis and Staehler (2010) define phenomenology as the science of the phenomenon; it investigates how a phenomenon manifests itself in nature. Van Manen (2007) argues that *phenomenology is a project of sober reflection on the lived experience of human existence in the sense that reflecting on experience must be thoughtful and, as much as possible, free from theoretical, prejudicial and suppositional intoxications*. Existing theories and worldviews should therefore not drive a phenomenological study. This is because phenomenology acknowledges that the foundation of knowledge is everyday life and society as both an objective and a subjective reality (Ngulube & Ngulube, 2017). Bryman (2012) explains that phenomenology as a research method is concerned with how individuals make sense of the world around them and how the investigator in particular should bracket out perceptions in his or her grasp of that world.

Bracketing is a central component of phenomenological research. Lewis and Staehler (2010) highlight the fact that bracketing is a shift in attitude which opens up a different perspective on the world. Bracketing involves suspending all preconceptions regarding the phenomenon and seeking understanding through active listening, interaction with study participants, and an analysis of their stories (Ngulube & Ngulube, 2017). Phenomenology is deeply rooted in western epistemologies and has proven to be a powerful way of understanding human lived experience from participants' perspective and interpretation. Babbie and Mouton (2011) affirm that phenomenological research supports the following premises:

- Data collection should not be confined to observable behaviour, and should also include descriptions of people's intentions, meanings and reasons.
- The phenomenological tradition supports an anti-naturalist conception of objectivity that stresses the idea of intersubjectivity, engagement and empathy.
- The theories should be congruent with the common-sense concepts and interpretations of the social actors themselves.

According to Ngulube and Ngulube (2017), there are various types of phenomenological methods: dialogical phenomenology, naturalistic constitutive phenomenology, existential phenomenology, generative historicist phenomenology, genetic and realistic phenomenology, descriptive (eidetic) phenomenology and interpretative (hermeneutic) phenomenology. This chapter will look at hermeneutic phenomenology used in a study to understand the traditional healing practices of healers in the Limpopo Province.

PURPOSE OF THIS CHAPTER

This chapter demonstrates how phenomenology as a research method can be used in a study of the traditional healing practices of indigenous healers.

PROBLEM STATEMENT

Various studies suggest that a high percentage of people in Third-World countries is dependent on indigenous knowledge (Ijumba & Barron, 2005; Denis, 2006; Truter, 2007). The World Health Organisation (WHO 1998) estimates that 70% to 80% of the population of developing countries depends on traditional medicines for their primary healthcare needs. A number of scholars (Ijumba & Barron, 2005; Denis, 2006; Truter, 2007; Maluleka, 2017) argue that the research world has a limited understanding of

indigenous knowledge practices. There is a clear divide between western and indigenous philosophies (Mokgobi, 2014). According to Sodi et al (2011), who the custodians of indigenous medical knowledge will be, is determined by the ancestors. That goes against western philosophies and methodologies that do not cater for traditional African beliefs and ancestral worlds (Ngulube & Ngulube, 2017; Maluleka, 2017). This study, therefore, looks at how phenomenology as a research method can be used to bridge the gap between these two worldviews. Phenomenology does not approach social reality with preconceived notions and procedures, but the context of the research, including the experiences of the participants and the subjective experiences of the researcher dictate how the phenomenon of interest is investigated (Ngulube & Ngulube, 2017). Even though phenomenology is deeply rooted in western epistemologies, it goes beyond the western methodologies that take things for granted and ignore local context and realities (Ngulube & Ngulube, 2017). The study therefore aimed to demonstrate how phenomenology can be applied to non-western epistemologies and worldviews to develop a much-needed cultural competency and take up traditional knowledge custodianship.

INTERPRETATIVE (HERMENEUTIC) PHENOMENOLOGY

The term *hermeneutic* is derived from the name "Hermes". Hermes was a Greek god who interpreted messages from the gods (Lopez & Willis, 2004). According to Ngulube and Ngulube (2017), hermeneutic phenomenology opens the lived experience to interpretation through language. This method shifts the focus from simply describing things that are observed to interpreting their meaning. It goes beyond merely describing human experiences by looking for meanings embedded in common life practices (Lopez & Willis, 2004). Furthermore, the expert knowledge of the researcher during the whole process plays a meaningful role. The following are some of the principles of hermeneutical phenomenology (Ngulube & Ngulube, 2017):

1. It seeks to understand the participants' world through immersion in it.
2. It makes explicit the immersion of the researcher in the hermeneutical spiral.
3. It maintains a constantly questioning attitude and points out misunderstandings and incomplete understandings to arrive at deeper understandings.
4. It encourages the active participation of participants in the research process, its implementation and interpretation.
5. It gains access to and makes explicit participants' understandings through their own modes of existence and engagement while remaining sensitive to one's own modes of existence, engagement and foregrounding.
6. It engages in the spiral task of hermeneutical interpretation in conjunction with participants.
7. It works with participants to see which points are salient.
8. It views interpretative phenomenology as an interpretation of the participants' interpretation.

A number of studies related to the current study looked at how phenomenology can be employed in different research areas. Sohn, Thomas, Greenberg and Pollio (2017) conducted a phenomenological study to establish why the graduation rate of black students was lower than that of their fellow students. The study captured the lived experience of students in a way that no other method could have done. The

researchers elicited the first-person perspectives of black students which could not be obtained through other methods such as questionnaires.

Matua (2015) looked at how phenomenology as a guiding philosophy can be used for nursing research. The study highlights the importance of scientific rigour and phenomenological validity in studies conducted in the nursing sciences. VanScoy and Evenstad (2015) looked at how interpretative phenomenological analysis could be applied in library and information science. The study suggests that phenomenology is an effective method for exploring experience among information professionals and for studying the reference and information service work of academic library professionals. It recommends that interpretative phenomenological analysis can be an alternative research method to the repertoire of qualitative methods used for LIS research.

THE RESEARCH PROCEDURE

Research procedures include sampling methods, procedures employed in gathering and processing data, as well as data analysis (see figure 1).

SAMPLING METHODS

According to Babbie and Mouton (2011), a (quantitative) sample should aim to be representative of a broader population. On the other hand, Neuman (2006) argues that, in qualitative studies, researchers should focus less on the sample's representativeness and more on how the sample illuminates social life. Neuman (2011) also stresses that, in qualitative research, a non-probability sample often fits the purpose of the study. Sarantakos (2013, p.181) affirms that qualitative researchers employ sampling procedures that are less structured and rigid than the techniques quantitative researchers employ. Neuman (2011) also mentions that non-probability sampling procedures that are used by qualitative researchers do not apply the rules of probability and the researcher does not have to worry about representativeness.

In phenomenological research, the focus is on selecting only those participants who share the experience of the phenomenon under investigation. According to Ngulube and Ngulube (2017), as with most qualitative methods, fewer participants examined in depth are the gold standard for phenomenological research. Traditional healers form a special group in their communities. When investigating such a group, the sampling frame is usually a challenge (Maluleka, 2017). Statistical information on the number of traditional healers practising in South Africa is not readily available (Denis, 2006; Truter, 2007; Maluleka, 2017) because healers are not properly regulated and because there are many bogus healers. For interpretative phenomenology, sample representation is not an issue because results are not generalised. On the other hand, sampling representation is required in descriptive phenomenology. Traditional healers regard their knowledge as personal. So, one must treat them with respect so that they can open up and trust you with their knowledge. Purposeful sampling and snowball sampling are very popular in hermeneutic phenomenology (Ngulube & Ngulube, 2017).

The first group of healers was purposefully selected and then snowball sampling was employed to get to their networks. The Limpopo Province is divided into five regions and the study covered all of them. The decision to visit all regions was motivated by the fact that traditional healing is not a homogenous healing system, but varies from culture to culture, region to region, and individual to individual (Mokgobi,

Figure 1. Research design (Adapted from Maluleka, 2017)
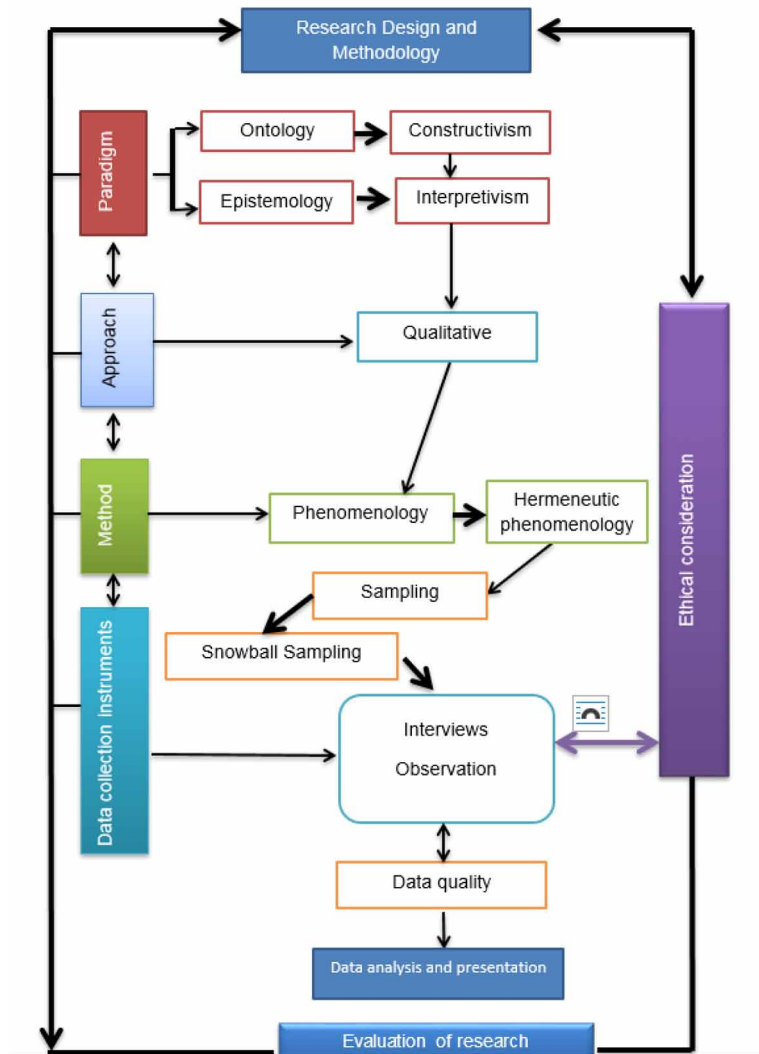
2014, p.28). The investigator established contacts in each region as a basis for the snowball sampling. In some instances, a healer from one region referred the investigator to a healer in another region.

Neuman (2011) defines snowball sampling as a non-random sampling technique in which a researcher begins with one case and then, based on information about interrelationships from that case, identifies other cases and repeats the process again and again. After every interview, healers were asked to recommend and introduce the investigator to other healers in their network who may agree to participate in the study. Healers were recruited until the investigator realised that no new information emerged from the interviews.

DATA COLLECTION

According to Ngulube, Mathipa and Gumbo (2015), the commonly used instruments to collect data are questionnaires, interviews, observation and document analysis. Usually, the research approach employed by a study influences the choice of the instruments used during research. The research instruments may produce either qualitative data or quantitative data. However, Ngulube, Mathipa and Gumbo (2015) indicate that instruments may be combined to achieve triangulation regardless of whether one uses a qualitative or a quantitative approach. Phenomenological studies have traditionally been associated with qualitative data collection instruments and methodologies. More so for a hermeneutic phenomenological study which insists on an interpretive understanding of meanings. To that effect, the study employed interviews and observations as instruments of data collection.

Interviews

Interviews are the most prominent data collection tool in phenomenological research because they help investigators to access people's perceptions and meanings, define situations and construct reality (Punch, 2014). Babbie and Mouton (2011) contend that qualitative interviews should be flexible, interactive and continuous. Unstructured interviews allow participants to set the agenda. The interview schedule should act as a mere guideline and the interviewer may choose to ignore some of the planned questions or ask additional questions, depending on the turn the discussion takes (Bryman, 2012; Sarantakos, 2013). The most important thing is for the investigator to allow the discussion to flow. The investigator should know which questions to ask without constantly checking the schedule which might disturb the flow of the discussion and impact on the answers of the respondents. Such interviews are sometimes referred to as discovery interviews because they are more like a guided conservation than a rigidly structured interview (Sarantakos, 2013).

Observations

According to Case and Given (2016), observations have a long history in the study of individual behaviour. Observations entail gathering data through vision (Sarantakos, 2013; Case & Given, 2016). Babbie and Mouton (2011, p.293) note that, in qualitative research, there are two types of observation, namely simple or non-participant observation and participant observation. The other significant difference in observation is the extent to which it is structured and standardised (Sarantakos, 2013). Structured observation has a strict design and control whereas unstructured observation has a more flexible design and no control (Sarantakos, 2013). Unstructured observations are ideal for phenomenological studies since the investigator records daily activities without interfering in what the participants do (Maluleka, 2017). This can be done by capturing images, taking notes and keeping track of events and important activities that may be of interest.

Data Quality

Bryman (2012) argues that reliability and validity are requirements for establishing and assessing the quality of quantitative research. However, in qualitative studies, quality is assessed through its trustworthiness and authenticity. To ensure the trustworthiness of a phenomenological study, the investigators

must make sure that the participants are credible and have the required knowledge. Data was collected from credible healers who have been practising for many years. To make sure that every detail was captured, a voice recorder was used. These recordings were used to correct the field notes if there were any discrepancies. The investigator further had several discussions with the respondents and continuously adapted questions according to the research agenda. Bryman (2012) affirms that, in order to ensure credibility, the results should be confirmed by the population to show that the investigator understood their social world correctly. This was done by revisiting the respondents once the data was analysed to check with them if the correct information was captured. Furthermore, the investigator triangulated the whole process by collecting additional data through observations. To ensure authenticity, the investigator went back to some of the healers and shared the captured material with them so that they could make further comments. Based on the interviews with healers, the investigator could interpret what they have contributed.

ETHICAL CONSIDERATIONS

In both qualitative and quantitative research, researchers face ethical issues during data collection in the field, and in their analysis and the dissemination of their research reports (Creswell, 2007). Welman, Kruger and Mitchell (2005) contend that informed consent, the right to privacy, and protection from harm are key ethical considerations to which a researcher should pay attention to. Before conducting interviews in a phenomenological study, participants need to be informed why they are invited to participate, that participation is voluntary, that they are free to withdraw at any time, and that anonymity and confidentiality will always be maintained.

DATA ANALYSIS

In qualitative research, data is collected to describe people, actions and events (Neuman, 2011). The data was collected in the form of interview transcripts and audio recordings obtained during interviews as well as notes made during observation. Neuman (2011) maintains that to analyse data is to systematically organise, integrate and examine it while looking for patterns or themes in specific details. This phenomenological study did a thematic analysis of the data. According to Ngulube, Mathipa and Gumbo (2015), thematic analysis is a method for identifying themes and patterns of meaning across a dataset in relation to a research question. Thematic data analysis procedures are related to qualitative methods and are generally suited for hermeneutic (interpretive) phenomenology (Ngulube & Ngulube, 2017). The following are the steps of thematic data analysis that can be applied in a phenomenological study:

- Transcribing the interviews
- Taking note of items of interest
- Coding across the entire data
- Searching for themes
- Reviewing themes by mapping provisional themes
- Checking for relationships between themes
- Defining and naming of the themes

To gather data from traditional healers, interviews were conducted in Tsonga, Venda and Pedi. The investigator listened to the recorded interviews and transcribed and translated them into English. Meaning could easily be lost in translation because a direct translation may not mean what the respondents said. To address that, the services of linguists or mother tongue speakers may be roped in. In addition to that, the transcribed data can be taken back to respondents to check with them whether it is a true reflection of what they said during the interviews. The notes taken during the interviews can be verified by what is captured in the recordings and necessary adjustments can be made where necessary.

CONCLUSION

This chapter demonstrated how information professionals can use phenomenology to conduct indigenous knowledge research. This was done by looking at the traditional healing practices of indigenous healers in the Limpopo Province of South Africa. Phenomenology allows information professionals to understand the healing practices of these traditional healers without making any judgements or assumptions about how they conduct themselves. Hermeneutic phenomenology is useful in the conduct of such studies because it brings out meanings embedded in human experiences. This chapter concludes that even though phenomenology is deeply rooted in the western epistemologies, it proves to be a powerful tool to conducting indigenous knowledge research that involves marginalised communities, especially in Africa. It is recommended that LIS professionals consider phenomenology as an alternative method especially in areas where traditional methods may not be suitable.

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KEY TERMS AND DEFINITIONS

Data Quality: The state of the qualitative data collected in terms of accuracy and trustworthiness.

Indigenous Knowledge: Is the knowledge that is community based transmitted from one generation to the next.

Interviews: A data collection tool where questions are asked by the researcher and answers given by the participants.

Observation: A data collection tool used in qualitative studies where the researcher watches participant behaviour over time.

Phenomenology: A research method that is concerned with how individuals make sense of the world around them.

Thematic Analysis: Identifying and recording qualitative data according to patterns that emerge.

Traditional Healing: Traditional practices used to diagnose and heal illnesses through the use of plants and spiritual therapies.

Chapter 13
The Research Process and Indigenous Epistemologies

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ABSTRACT

This chapter discusses the research process and indigenous epistemologies, specifically, what is involved in conducting research using indigenous epistemology. The dictionary definition of epistemology is that it is a philosophical theory of knowledge that studies the nature and what constitutes knowledge. In this chapter, indigenous epistemology is contrasted with other epistemologies, as an epistemology that seeks to advance the voices of "indigenous" people, or the marginalized. The contention is that dominant epistemologies have downplayed the role and importance of indigenous knowledge in research. Such epistemologies have not given voice to the researched communities yet purport to have an understanding of their social worlds. This chapter therefore places indigenous epistemology at the fore for carrying out research with rather than on communities and using indigenous knowledge to theorize research and inform the theories and constructs used in the conduct of research.

INTRODUCTION

Studies utilizing indigenous epistemology in information science are very few (Lilley, 2017). Although studies investigating the use of mixed methods research in Africa have been conducted (Ngulube, 2013; Ngulube, Mokwatlo, & Ndwandwe, 2009), there seems to be a dearth of research using indigenous or Afrocentric methods in information science. Not surprisingly and reflecting the history of information and library science in Africa, Bitso (2013) using an Afrocentric research approach, conducted a discourse analysis of LIS publications from and about Africa published between 2009 and 2012, and found that African LIS scholars drew their definitions of LIS from Western literature, rather than definitions informed by its practice and development in Africa. According to Dick (2006), LIS researchers in developing countries have largely been uncritical users of models and theory developed in the West. The question that researchers in developing countries should be asking themselves is, whose models are these? Under what context were they developed? How relevant and applicable are they in non-western contexts?

(Dick, 2006). These types of questions should lead researchers to reconsider the research paradigm and methodologies they use, and to recognize the role that indigenous epistemology and research paradigms might play in more in-depth understanding of LIS issues in developing countries (Dick, 2013).

The concept epistemology is defined as a philosophical theory of knowledge. It is a study of the nature of knowledge, the beliefs, values and methods that arise from how knowledge is perceived, viewed and approached. According to Scheurich & Young (1997) epistemologies are informed by social histories of particular groups, and because of that, different groups have their own epistemologies, but over time, one epistemology, the "Euro-Western" has become dominant (Chilisa, 2012; Hart, 2010; Rigney, 2001). However, the Euro-Western tradition we refer to is not homogenous. In that tradition, the scientific method of research, known as positivism was initially viewed as the one legitimate and valid way of generating knowledge. The scientific method was based on belief in objective reality (as opposed to subjective reality) that could be observed, measured, and quantified for analysis. It took social scientists in the Chicago School of Sociology in the United States of America to challenge the notion of objective reality and universal laws in the study of human behavior. They introduced qualitative approaches, associated with naturalistic research approaches. Other challenges emerged regarding the positivist approach and its conceptualization of science as seeking value free knowledge. For example, scholars from the Frankfurt School advanced critical theory that questioned the concept of value free research, and moved that research should focus on social justice and be transformative. The constructivism approach represented yet another response to the positivist and post positivist approaches, maintaining that realities are constructed from people's lived experiences, and for this reason, there cannot be objective reality. The indigenous approach goes further to question the reductionism of the Euro-Western paradigms, and their focus on a system of knowing that ignores or downplays other systems of knowing. A further discussion of this will be provided in the section on research paradigms. What is clear is that despite the criticism and emergence of other research paradigms of the Euro-Western ilk, the indigenous paradigm has emerged in opposition to the dominant, yet reductionist and patronizing research approaches. Indigenous researchers have questioned the motives of Euro-Western research approaches, and have called for decolonization of the research process (Chilisa, 2012). Decolonization can be manifested by the elevation of the role of indigenous ways of knowing in research and teaching – to be just as valuable as Euro-Western approaches (Held, 2019).

A discussion of epistemologies, would not be complete without a discussion of the politics of knowledge, specifically how they are tied up with colonialism and imperialism that have resulted in the marginalization and domination of the colonized cultures. The marginalization extended to the negation and denigration of the knowledge traditions of the colonized, denying the existence of their (African) philosophy (Hegel, 1956, cited in Adegbindin, 2015). The marginalization persists even today in the prevalent view of how knowledge is created, acquired or recognized. The knowledge of indigenous people for example, has not been recognized in any meaningful way because of its 'failure' to conform to the criteria of rationalism or objectivity. For this reason, it is research based on Euro-Western epistemologies and its theories that dominates the knowledge economy. According to Chilisa (2012), the dominant research traditions are informed by the culture, history and philosophy of Euro-Western thought, and this has led to calls to adopt indigenous epistemologies as a way of decolonizing research methodologies. One must note that the calls made for indigenous epistemologies are not limited to indigenous people, but other historically marginalized groups, such as women, the disabled, minorities, and the formerly colonized, etc., (Chilisa, 2012).

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This chapter explores the conduct of research using indigenous epistemology. The need for such an epistemology is premised on the effects of Euro-Western epistemology on the knowledge systems of non-Western societies. Thus issues of decolonizing research methodologies are touched on, as are considerations of what it means to be indigenous, and who is indigenous. The chapter explains what a research paradigm is and how different paradigms have their beliefs about reality, knowledge, methodologies and axiology (Chilisa, 2012; Wilson, 2001). A discussion of what an indigenous epistemology is, and why there is need for an indigenous research paradigm is provided. Lastly, the chapter then considers or responds to questions on how to conduct research using indigenous epistemologies, and what should be considered in conducting such research.

BACKGROUND

In order to understand what indigenous epistemology is, there is need to first consider what is meant by indigenous and who is considered indigenous. The concept of indigenous refers to something or someone originating somewhere. According to Mertens, Cram and Chilisa (2013), the question of who and what is indigenous is not easy to address, and has undertones of race, ethnicity, colonialization, and marginalization. People are said to be indigenous if they are believed to be the original occupants of a geographic area, such as for example, Native Americans in the US, the San of Southern Africa, Maori and Aborigines of New Zealand and Australia respectively. Indigenous people are also described as those that were found by invading or colonializing groups, and displaced from their ancestral lands or removed from their ways of life ostensibly as a way of "civilizing" them. Indigenous people exist all over the world, North America, Australia, Canada, New Zealand, Africa, Oceania (Akena, 2012). In the context of Africa, indigenous people are often referred to as those who were first on the land, as in other continents. However, indigenous or indigeneity also refers to the traditions, values, culture, knowledge and ways of knowledge of the continent's people, that were subdued and suppressed by the colonizers (Chilisa (2012), quoted in Mertens et al., 2013, p. 15). Hence, we talk of indigenous people, languages, cultures, values, and knowledge. The colonizing nations advanced their own traditions, values, belief systems, cultures, and knowledge as a way of subduing the colonized with the result that their knowledge systems have assumed a dominance that exists even today.

As Scheurich and Young (1997) have pointed out, knowledge and reality are constructed by communities, or arise from social histories of such communities. Hence, the previously colonized communities have their own views of reality and what constitutes knowledge, which, as stated earlier, are dominated by Euro-Western systems. Much of Western thinking, discourse, knowing and science is based on established laws, and posits that knowledge is rationally generated through scientific methods of observation and measurement to test hypotheses derived from theory or established laws. Thus, in this system, knowledge cannot be generated through intuition or through spiritualism. Knowledge is derived from empirical physical evidence and rationalism, based on scientific principles and measurement (Gill, 2001). It is this system of knowing that has dominated the research landscape the world over. However, it has not gone unchallenged both within the Euro-Western system, and by indigenous researchers, or researchers of indigenous descent.

As indicated earlier, within the Euro-Western system, the views of the positivist paradigm, which can be viewed as the classical Euro-Western research tradition, faced criticism from other paradigms within the same system, such as the interpretivist/constructivist, and the transformative. Challenges to

the broader Euro-Western tradition also emerged from indigenous researchers who queried their view of how knowledge and reality is derived. Specifically, that the Euro-western tradition perpetuated the notion that non-Western societies had no valuable knowledge and philosophies to offer (Louis, 2007). Further, the dominant system of knowing and its research methods was not able to provide answers to questions and problems experienced by the world's "marginalized groupings". Thus the major criticism of the Western knowledge system and its methods is that it privileges knowledge that can be measured and confirmed materially, and does not recognize any other forms and sources of knowledge unless validated using Western research paradigms.

According to Grincheva (2013) each culture, social context and its people develop their own epistemic culture. Epistemic culture is defined as shared socio-cultural norms, beliefs, traditions on what constitutes knowledge and reality (Grivencha, 2013). The epistemic culture of Western civilization is based on the ideas of a knowledge society and its epistemic traditions and emphasizes the scientific method as a way of generating and studying knowledge. Whilst this epistemic tradition has been dominant for a long time, challenges have emerged from feminist, post-colonial, and post-modern studies (Grincheva, 2013, p. 146). Indigenous epistemology has also emerged as one of the challengers of this epistemic culture for a number of reasons. Firstly, it is a means of asserting the existence of other ways of knowing, being and the value of indigenous knowledge. Secondly, it is a means of recognizing alternative ways of constructing knowledge. Thirdly, it can serve to challenge the power agenda of Euro-Western epistemologies. Fourthly, it enables the voices of researched communities to be heard through engaged participation in the research process, fostering research *with* communities instead of research *on* them. Finally, it ensures relevant and transformative research for the research participants and the researchers.

UNDERSTANDING RESEARCH PARADIGMS

The concept paradigm was popularised by Kuhn (1962) in his study of the structure of scientific revolutions – he described it as "a set of concepts and practices that define a scientific discipline at any particular period of time" (Kuhn, 1962). Hart (2010) defines a paradigm as a worldview. These definitions refer to one's way of viewing and interacting with the world around them, or sense-making. It is the lens through which one views and studies reality. Typically how we make sense of what we see differs because we filter the world and its information through our lived experiences and the effects of social systems around us. Clearly, because we have had different experiences, our worldviews will not necessarily be the same. A paradigm is further defined as a philosophical worldview that informs the research approach, research designs and research methods (Creswell, 2014). Wilson (2001, p. 175) defines a research paradigm as a set of beliefs about the world and about gaining knowledge that go together to guide your actions and how you're going to go about doing your research. For our context here, we echo the view of Kivunja & Kuyini (2017, p. 16), that in research, a paradigm describes a "researcher's conceptual lens through which the researcher examines the methodological aspects of their research project to determine the research methods that will be used and how the data will be analyzed". Research paradigms are informed by ontologies and epistemologies, which in turn influence axiology, and research methodology (Chilisa, 2012). According to Wilson (2001), these four aspects are linked and related and together make up a research paradigm. According to Chilisa (2012), the dominant research paradigms in the world are shaped by "Euro-Western" thought. There are a number of research paradigms, ranging from the posi-

tivist, postpositvist, interpretivist, transformative, and indigenous, each informed by its own ontology, epistemology, axiology and methodology.

Ontology is how one views reality or one's beliefs about reality. Ontology can also be described as one's world-view, which determines understanding of what exists (Wilson, 2001). Epistemology is the study of knowledge, and views about how knowledge is generated and acquired (Wilson, 2001; Dick, 2013). Methodology includes the research designs, methods, and analysis used to gain knowledge about reality (Wilson, 2001). Axiology refers to morals or set of ethics that a researcher holds regarding the conduct of research, the researched, and its implications on the researched (Wilson, 2001).

Research Paradigms

In this section, different research paradigms are considered, such as the positivist, post positivist, interpretivist or constructivist, critical theory or transformative, pragmatic, and indigenous research paradigms, which also include the Afrocentric research paradigm.

The positivist research paradigm represents the traditional view of research, based on the scientific model of conducting research. The ontology of positivists is realism, the epistemology is objectivist (Kivunja & Kuyini, 2017). The fundamental thinking is that there is objective reality that can be studied through observation and measurement, and tested against existing theory. In other words, there are existing laws, claims or theories that should be tested, verified and refined to improve our understanding of the world. Typically, the methodology of positivists is based on deductive logic, and relies on experimentation as a research design, where hypotheses are developed and tested through analysis of quantitative measurements (Chilisa, 2012).

The post positivist approach emerged as a criticism of the positivist paradigm position that reality exists independently of humans, and the scientific method can be applied just as effectively to study social phenomena, as it is to study nature. The position of post positivists is that due to the complexity of social phenomena it is difficult to claim a perfect understanding of reality; reality can only be approximated (Kivunja & Kuyini, 2017). This means that it is not possible as the positivists claim, to give cause and effect explanations. Further, that it is not possible for social phenomena to be studied objectively due to the possibility of the researcher's own beliefs and values affecting what is observed (Rehman & Alharthi, 2016).

The critical theory, also sometimes referred to as the transformative theory, or what Rigney (2001) refers to as an "emancipatory theory" is one of the responses to the positivist and post positivist approaches. This approach originates from the work of a group of scholars associated with the Institute of Social Research at the University of Frankfurt. They were critical of the positivist and post positivist belief in objective reality that could only be studied though scientific, positivist, and quantifiable methods. Whilst agreeing that reality exists, they believed that it could not be independent of human influence and that it is shaped by context or social systems/histories. To them, reality is fluid and dependent on a number of variables such as sex, culture and social class (Wilson, 2001). Unlike positivist approaches, the ontology of critical theorists is historical realism. They recognize the fact that the researcher brings their worldview to research and that this affects the outcome of research (Kivunja & Kuyini, 2017). The major belief of this approach is that research should have action agenda for reform or transformation. That is, research is not just about understanding phenomena, but also making a difference in people's lives in terms of furthering social justice and human rights (Chilisa, 2012; Rehman & Alharthi, 2016). The focus of their research is not only to understand social phenomena, but also to be change/transfor-

mation agents by addressing the issues of imbalances in power and control. The belief is largely that positivist/post positivist theories are rooted in the marginalization of individuals and therefore research should serve to redress this by understanding the realities of others (Chilisa, 2012). In their view, "post positivist assumptions imposed structural laws and theories that did not fit marginalized individuals in society, or issues of power and social justice, discrimination and oppression that needed to be addressed" (Creswell, 2014, p. 9). Researchers in this space believe in collaborative, participatory, action research; their epistemology is transactional (characterized by researcher's interaction with the research participants), their methodology emphasizes dialog, and there is respect of cultural norms of the researched (Kivunja & Kuyini, 2017). Critical theories include amongst others, feminist theory, critical race theory, queer theory, and post-colonial theory (Chilisa, 2012; Creswell, 2014).

The constructivist theory or interpretivism also represents critique of the positivist/post positivist dominance on the philosophy and ways of thinking about knowledge and reality. This theory maintains that there cannot be one reality that is independent of people living and experiencing it. Reality is socially constructed and therefore there are multiple realities (Chilisa, 2012; Creswell, 2014). The theory rejects the notion of researchers as objective observers due to the continual interpretation of reality as the researcher tries to understand it. Thus, the researchers adopting this paradigm do not seek to identify accepted knowledge and realities, but try to understand multiple realities. The aim of the paradigm is to understand phenomena through the eyes of the participant – to let them speak for themselves to enable an interpretation of their thinking and the meaning they ascribe to social phenomena. Their ontology is relativist, their epistemology subjectivist, and their methodology naturalist (Kivunja & Kuyini, 2017).

The Pragmatic paradigm advances the need to let the problem or phenomenon under study determine the research methodology (Creswell, 2014 citing Rossman and Wilson, 1985). Researchers who came up with this paradigm were dissatisfied with the use of solely quantitative or qualitative methods as a means of establishing the "truth". Kivunja & Kuyini (2017), Alise & Teddlie (2010), Creswell, (2003), and others argued that a paradigm should not dictate the methodology of study, but rather empower the researcher to decide on methods that could best describe behavior, beliefs, and consequences of the behavior of the researched as dictated by the research problem. This could result in any combination of methods taken from any of the other paradigms, known as mixed method use. Thus the ontology of this paradigm is non-singular reality, the epistemology is relational, the methodology employs mixed methods and the axiology is about conducting research that benefits people (Kivunja & Kuyini, 2017).

However, the indigenous paradigm holds the view that whilst the constructivists and the critical theorists accept that stories, beliefs, and spiritual experience are forms/sources of knowledge, they still operate in a Euro-Western milieu that views indigenous knowledge as exotic, hence the need for an indigenous research paradigm. The indigenous paradigm has been advanced by indigenous researchers, mostly educated in the traditions of Euro-Western thought, and finding contradictions between its methods and their own worldview. They critique Euro Western research paradigms for using methods that privilege a particular way of knowing, and not accepting that knowledge and reality is not only material but can be spiritual, sacred, and is tied inextricably to land and the environment (Mertens, Cram & Chilisa, 2013). The major tenet of this approach is that research "is linked to colonialism and oppression and must be decolonized" (Louis, 2007, p. 131). Wilson (2001) states that the one crucial difference of the indigenous paradigm is belief that knowledge is relational, it is a shared entity that belongs to "all creation", it comes from all creation. In this paradigm, knowledge is built from relationships between people, objects, the spiritual and sacred. Reality is intertwined with these relationships, and therefore research must be a holistic endeavor and not atomizing and decontextualizing as Western research para-

digms are (Louis, 2007). At the core of indigenous research paradigms are the relations formed between the researcher and the researched – not only must the researcher develop a clear understanding of the language, history, values and expectations of the community or group they are reaching, but they must be reflexive, that is, continuously reflect on their own world view and how it may impact on the research process and knowledge creation (Thomas, Eggings & Papoutsaki, 2016). Respect for the researched, their culture, language and knowledge (in all its forms) must take precedence and researchers therefore must think about their role and the position of the research participants in determining research agendas, research questions, methodology, data collection, analysis, and dissemination of the knowledge. In this approach, indigenous knowledge is seen as a valid source of theory and conceptual frameworks guiding the research. Methodologies used include "participatory, liberatory, transformative approaches that draw from indigenous knowledge systems" (Chilisa, 2012, p. 41). They are participatory as they seek to involve the research participants in all aspects of the research, and recognize their knowledge and the contribution it could make. The liberatory methodologies seek to "to legitimize the histories, worldviews, and ways of knowing, and experiences of the colonized and historically oppressed" (Chilisa, 2012, p. 41). Indigenous methodologies aim to be transformative in seeking to carry out research that will be empowering rather than just discovery (Kivunja & Kuyini, 2017).

Although we speak of an indigenous research paradigm, there are within this paradigm a number of research epistemologies, although others refer to them as paradigms such as the *Kaupapa* which determines and articulates principles for conducting research amongst the Maori (Chilisa, 2012); the Indigenist research paradigm for Australian indigenous people; and the radical Indigenism approach for American Indian scholarship (Held, 2019). In the context of Africa, writers such as Mkabela (2005), Chilisa (2012) and Owusu-Ansah and Mji (2013) believe in an Afrocentric research paradigm that is premised on the ethical concept of Ubuntu or Botho as one example of an indigenous research epistemology. Afrocentric paradigm is traced back to the work of Asante (1988a, 1988b, 1990), quoted by Chilisa, 2012), who identified Afrocentricism as a worldview that embodies African ways of perceiving reality, knowledge, values and methodology in research. "Afrocentricity is a paradigm that has at its core the understanding of the African identity as rooted, centered, and located in the African culture in all aspects – spiritual, social, political and economic" (Owusu-Ansah & Mji, 2013, p. 2). To understand African reality, one must engage with African culture and ways of knowing and the knowledge of Africa. This means that concepts and theories must be understood from an African perspective, and of course, researchers must be immersed in the African culture to be able to understand it and ask appropriate questions. It also calls for the research participants to be active collaborators in all aspects of the research. Afrocentric research paradigm is therefore in line with indigenous epistemology that places importance, and privileges the knowledge and experiences of the researched communities. Indeed, the common denominator amongst the various indigenous paradigms is that their ontology, epistemology, methodology and axiology are rooted in the land, in the local (Davis, 1999, quoted in Held, 2019).

INDIGENOUS EPISTEMOLOGY

Whilst ontology is about belief and what constitutes reality, epistemology focuses on the nature of knowledge, what constitutes knowledge, and how it is acquired/generated and validated (Rehman & Alharthi, 2016, quoting Gall, Gall & Borg, 2003). Epistemology represents "ways of thinking, understanding and approaching knowledge" (Porsanger, 2004, p. 112). It is how we think about reality (Wilson, 2001).

Methodology and methods of research are largely influenced by ontology and epistemology. Porsanger (2004, p. 111) states that, "epistemology, which deals with ways of knowing especially with reference to the limits and validity of knowledge, is indeed one of the most basic elements of indigenous methodologies". Thus, indigenous epistemology is about placing indigenous perspectives at the center of inquiry, recognizing that there are other ways of knowing that must be taken into account in research.

Louis (2007) acknowledges that there is no single definition of indigenous epistemology. Indigenous epistemology is simply a statement and a way of re-asserting the value of knowledge and reality arrived at using other methods that provide an alternative or even complement the dominant epistemologies that are exclusionary, and that do not provide the truth that they purport to provide (Louis, 2007; Chilisa, 2012; Mertens, Cram, & Chilisa, 2013). Those who advocate for indigenous epistemologies argue that western epistemologists and western methodologies have "Othered" indigenous people, and theorized them as problematic, ignorant, exotic and even savage (Janke, 1998 cited in Mertens, et al (2013). In this regard, Chilisa (2012) advocates a movement from deficiency theorizing to appreciative inquiry theorizing. That is, conducting research, not simply to identify deficiencies that in most cases buttress the colonial "Othering" narrative, but to identify the positive in any given situation and build upon this to distill the desired outcomes and how they might be achieved. Indigenous epistemology is described by Hart (2010, p. 8), as a "fluid way of knowing derived from teachings transmitted from generation to generation by storytelling…traditional languages, dreams and visions, and is intuitive and introspective". Indigenous epistemology embraces the derivation of knowledge from direct sentient experience, but also importantly, the spiritual through visions and dreams. Thus it is possible to obtain answers and solutions to situations through the practice of the spiritual, making reality a subjective and fluid phenomenon. This clearly is anathema to those schooled in an understanding of reality as objective and based on objective facts.

The key aspects of indigenous epistemology are relationality, the interconnectivity of the sacred and secular, and holism (Louis, 2007; Wilson, 2001). Relationality as already indicated refers to the fact that no one individual owns knowledge, and that knowledge is derived/informed by the relationships that communities have to each other, their objects, their places, and their rituals and spiritual beliefs, that is, knowledge is tied inextricably with the context. The interconnectivity of the sacred and secular simply emphasizes the notion of relationality and symbolizes the importance of the spiritual life in contributing to knowledge and reality. Holism describes the holistic nature of indigenous epistemology where experience, reality and knowledge are not compartmentalized for understanding as in Western traditions, but their connection to the cultural, spiritual, and physical is acknowledged and used to explain phenomena. Indigenous epistemology informs and is the basis of indigenous research methodologies. Conducting research using indigenous epistemology simply means a belief in the indigenous research paradigm and its methodology. To quote Louis (2007, p.133, indigenous methodology encompasses four principles: "relational accountability, respectful representation, reciprocal appropriation and rights and regulations". Relational accountability recognizes the belief by indigenous people in their relations and dependence on each other and everything around them. The researcher therefore becomes accountable not only to the research participants but also all other relations (Louis, 2007). Respectful representation refers to the obligation of the researcher to be aware at all times of how they represent themselves, the research participants, and the phenomena they are studying, and to exercise due respect (Absolon & Willet, 2004, quoted in Louis, 2007). Reciprocal appropriation refers to an understanding that research is appropriation and that it must therefore also benefit all parties concerned (Louis, 2007). Finally, rights

and regulations speak to research that recognizes the intellectual property of the researched participants, and is a collaborative process by the researcher and the research participants.

WHY INDIGENOUS RESEARCH PARADIGM

The indigenous research paradigm is a response to the "othering" of the system of knowledge of indigenous people – broadly defined. It is a response to the dominance of Euro-Western research paradigms that perpetuate their "logistics of inquiry" (Scheurich et al, 1997). Apart from the issue of using research to perpetuate a certain narrative about indigenous people or "Others", Euro-Western epistemologies have been critiqued for being reductionist, materialist, obsessed with counts and measures to test apriori theories, decontextualizing knowledge, and interpreting reality on the basis of cause and effect (Mazzocchi, 2006; Chilisa, 2012; Grivencha, 2013). All of these attempt to box or fit knowledge into a neat container and denies the messiness of social reality. They also try to fit the realities of others into their own notions of what reality should be. For example, identifying information literacy as being able to read and write, whereas other societies have different forms and types of information literacies. Hoppers (2017) rather dramatically refers to Euro-Western epistemologies as "labyrinth of myths, metaphors, methods, models, and techniques that science and modernity have created: the lattice-turned-paradigm that determines what is relevant and irrelevant, what one can see and not see, what one can say and not say, or dare not be heard to say" Hoppers, 2017, p. 5).

In the African context, indigenous research is about decolonizing research. This is because colonialization has led most Africans to look at knowledge purely through the western paradigm and to ignore indigenous ways and knowledge. It has distorted what is known of Africa and its history. However, this has not gone unchallenged by scholars such as Chilisa, (2012), Porsinger (2004) and others who called for indigenous research methods, informed by indigenous epistemologies. Western research, according to these scholars is linked inextricably to power and control. Using indigenous epistemologies is therefore a means of reclaiming that power and control, by recognizing others' experiences, collecting and analyzing such in a non-judgmental and open-minded way. Indigenous research paradigms recognize the differences between western knowledge systems and indigenous knowledge systems. Mazzocchi, (2006) articulates this difference between western science and what he calls traditional knowledge: firstly, that western science/knowledge and indigenous knowledge systems have different ways of creating and transmitting knowledge; secondly, western science is reductionist where indigenous knowledge is holistic; thirdly, western science does not recognize spirituality or the sacred as a source of knowledge, whereas indigenous knowledge also comes from the sacred and spiritual experiences; Fourthly, western science privileges the quantitative and objective, whereas indigenous knowledge systems champions the qualitative (oral literature, stories, folklore, etc.) and the constructed nature of reality and knowledge (subjectivity and intersubjectivity).

Adopting indigenous epistemologies need not necessarily be construed as to outright abandonment of Euro-Western research methodologies. On the contrary, it is recognition of their shortcomings and reflection on how best to study phenomena without expectations that things should be a certain way – enforced by theory that emanates from the Euro-Western tradition. For example, in studying how people acquire, generate, disseminate and use information, does one expect communities to do so in ways that theory in information science discipline tells us they should? What is information literacy in the context of say, communities in rural areas in Botswana? Does the concept really belong in that environment

or is it a concept coming out of the reality of the western world? These are questions raised by writers such as Sturges and Neil (1998) on the types of information services provided for African communities.

Some scholars believe that it is possible (although challenging) to bring Euro-Western (particularly, the transformative) and indigenous research approaches together; others maintain there is need to give indigenous research approaches their own space as they cannot and should not be combined or made to fit into Euro-Western approaches (Held, 2019). To this end, suggestions have been made for what Held (2019) calls a "third route for a new multiparadigmatic space created by both Euro-Western and indigenous scholars" (Held, 2019, p. 2).

RESEARCH USING INDIGENOUS EPISTEMOLOGIES

How do we position ourselves to conduct research using indigenous epistemologies? What should we be aware of, reflect on, and put into practice? This section intends to respond to some if not all of these questions.

Reflection on the Euro-Western epistemologies and their impact

First, there is need for us to acknowledge the dominance of the Euro-Western approaches to research. We also need to recognize the impact that such approaches have had on non-Western societies. Scheurich and Young (1997) assert that the epistemology, ontology, method and axiology of the Western civilization have become embedded in our psyche and affected how we conduct research on our communities. Development interventions driven by Western scientific research have failed or produced unpredictable results. Writers such as Escobar (1995) and Chambers, (1997) have ascribed this to research that ignores the extant system of knowledge held by the communities. There is need therefore to question theories and frameworks of the Western system of research that are used to conduct research on non-western communities.

To this end, many authors have advocated for the indigenization or decolonalization of Euro-Western research methodologies (Porsanger, 2004; Louis, 2007; Ormiston, 2010; Chilisa, 2012; Mertens Cram & Chilisa, 2013). This can be done, not only by critiquing and resisting the hegemony of Western knowledge systems, but by adapting Euro-Western research methodology through the inclusion of indigenous knowledge, languages and methodologies. In other words, appropriating Western methods to suit indigenous purposes. Indigenization is when the culture, language, knowledge, artifacts, etc. of the community being studied influences the research problem, the theories, the methods of gathering information from the researched, the analysis and the dissemination of the results of the research (Adair, et al, 1993). It can be done by considering the following questions raised by Smith (1999), cited by Porsanger (2004):

1. Whose research is this?
2. Who owns it?
3. Whose interests does it serve?
4. Who will benefit from it?
5. Who has designed its questions and framed its scope?
6. Who will carry it out?
7. Who will write it up?

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8.   How will the results be disseminated?

Such questions will help address not only methodological issues, but will ensure that research that is carried out is relevant and contributes to answering problems and challenges that are identified by the researched themselves. The first question concerns the origins and motivation behind the research; is this research being conducted for the sake of research or with a view to impact on the research participants in some positive way. The second question focuses on who owns the results of the research, is it likely that the research will become knowledge that the research participants own or does it belong to the researcher and funders of the research or even institutions that the researcher is affiliated with. The third question is linked with the fourth in the sense that it begs the question of who will benefit from the research and in what way they will benefit; it also questions the agenda behind the research, is it about helping communities or is it for other gains. The last four questions focus on the participation of the researched, specifically on whether the research is collaboration between the research participants and researcher and whether the participants were able to contribute in a meaningful way to the entire process of research.

In the field of library and information science, Dick (2013) has argued for LIS researchers and practitioners to "question the assumptions about valid knowledge and realities that are hidden from view in a selection policy, a classification scheme, an information seeking and retrieving model, or a research methodology, (Dick, 2013, p. 7).

Research for the Benefit of Communities

Nowadays, research institutions are urged to conduct research that will benefit communities and nations. Research needs to be transformative in intent, and according to Chilisa, (2012, p. 51), "place greater importance on people's existential realities, lived experiences, discursive practices, emotions, and cultural sensitivities". Research using indigenous epistemologies has a number of dimensions: it is informed by local phenomenon instead of Western theories to identify research problems; uses theory, methods and constructs derived from local research; is not averse to using Western theories and those derived from local research (Chilisa, 2012). Such research is grounded in issues of social justice and the righting of previous wrongs. According to Foley (2003, p. 50), "research must be emancipatory and not blanket clones of existing discourse". In research using indigenous epistemology, the focus of conducting research should be on understanding the issues from the point of view of the research participants, deriving "answers and solutions" from the research participants, and seeking a mutually agreed conclusion of what needs to be done next to bring about a transformation. It must be noted however that not all research participants may have the same point of view and that part of the research process is to enable dialog between perspectives. For example, when carrying out research on how rural women seek health information, the focus should not be on using western derived framework for understanding, but rather should let the women speak to how they seek information, what the various participants feel works and what does not, and what they would have improved or changed. Their information behavior should not only be studied through lenses of theories or models developed elsewhere. This has implications on the theories and methods used in research. Thomas, et al. (2016), describe how they used an indigenous research approach (*Kommuniti Tok Piksa*) to work with communities in Papua New Guinea to develop visual interventions to prevent the spread of HIV and AIDS. The approach entailed the incorporation of local narratives and indigenous knowledge during the research, with active engagement and participation

of the community in the whole process and development of strategies. Thus at the end, communities had a high sense of ownership of the resultant interventions, contributing to their success and sustainability.

The Role of Indigenous Knowledge

The scientific method requires that theory and methods be chosen to explain phenomena; however, in indigenous epistemology, there is need to examine such expectations and recognize that phenomena can be studied organically to develop indigenous theories. Doing so circumvents the temptation of using Western lenses to study local issues, resulting in a distorted view of what the local issues might be.

Indigenous research paradigms recognize the importance and role of indigenous knowledge in research, by giving voice to the research participants. This has implications on the language used. The language used during research mediates the research process, and therefore it is important to use the language of the participants as far as is possible. Language facilitates effective communication, the preservation of indigenous knowledge, and is a symbol of objects, events and experiences a community considers worth naming (Chilisa, 2012, p. 57). Conducting research using indigenous epistemology therefore requires the researcher to fully understand the role of indigenous knowledge in research. Chilisa, (2012) enumerates these roles.

Firstly, since indigenous knowledge is embodied in the language, artifacts, folktales, stories and cultural experiences, these can become a source of the literature informing research studies. Typically, scientific research must be grounded on a sound literature review, and in most cases, the literature that is reviewed is largely Euro-Western, and perpetuates that bias. For example, Chilisa (2012) reports on statements regarding Africans, their sexuality and HIV and AIDS, which went totally against what she knew about her own community. Yet, when researching on local communities, literature abounds in the stories, songs, sayings, and folklore. This form of literature must become an integral part of the research we conduct on local communities, because that is where the knowledge resides. Literature need not be necessarily that which is written and published in reputable journals and by publishers whose decisions on what to publish is informed by their own agenda and worldview. Second, indigenous knowledge can be a source of new topics, themes, processes, categories of analysis, modes of reporting and dissemination research. Third, indigenous knowledge can help unearth knowledge that was previously ignored, overlooked, or not valued; this can be achieved in a number of ways that include use of the researched persons' language, involving the research participants in the whole process of research, and taking into account what they know. Fourth, a positive impact of using indigenous knowledge driven methods can be the protection of indigenous knowledge from exploitation, and enable a validation of indigenous practices and worldviews; Fifth, the research participants can offer home grown solutions to their challenges, especially where methods such as appreciative inquiry (methods that use positive reinforcement to find ways of addressing issues) (Reed, 2006, cited in Chilisa, 2012). Appreciative inquiry is a method used in participatory research that seeks to move away from the problem-based approach that aims at discovering problems such as resource constraints, deficiencies, etc., to an approach that is change focused, and aims to identify strengths and affirm communities. Since indigenous paradigms are an effort to reclaim, reframe, and take control of knowledge and what is done with it (Louis, 2007), appreciative inquiry is very much in line with the paradigm. Sixth, indigenous knowledge driven methods can enable research to be carried out in a respectful, ethical way. Seventh, using indigenous epistemology may provide space for collaboration and partnership between the researchers and the research participants who become co-researchers.

Relational Research Approach

Indigenous research adopts a relational research approach, with its relational ontology, epistemology, and axiology where reality is collectively constructed, knowledge is based on the relationship between the people, the physical, spiritual and the sacred (sources of knowledge are varied and all valid), and ethics of research are about respect, reciprocity, and accountability to the research participants. Porsanger, (2004, p. 111) referring to the Maori epistemology of *whanaungatanga* states, "this particular research methodology is based on indigenous epistemology and ontology. It articulates a reciprocal relationship between the researcher and the researched who must become "a family": be interconnected in a reciprocal way in the frames of the particular research project with which they are involved". The relational research approach focuses on ways of making research a partnership between the researcher and research participants. This means that research can be initiated by the community rather than always by the researcher as in the Euro-Western tradition. Even where not initiated by communities, its trajectory from initiation to dissemination should be carried out through consultation, collaboration and meaningful partnership.

The primary consideration to be made by researchers should be the ethics and value beliefs of the community that is being researched, as these will determine the relationship and responsibilities of the researcher towards the research participants. These should then drive the research process in terms of what the problem is, how to formulate the research methods and questions, and the dissemination of the results. The researcher must adopt a 'learning' approach as opposed to one of being an expert who knows more than the researched. Indeed, "the researcher negotiates at all levels of the research design with the community participants in the implementation, data collection, and analysis to obtain cultural and political integrity in the research findings (Rigney, 1999 cited in Foley, 2003, p. 45). Thomas et al. (2019) mention the need for relational accountability, which is about the researcher building relationships with the researched and ensuring that there is a high level of reciprocity (give and take); thus negotiation throughout the research process is integral. Eady (2015) identifies the development of meaningful and reciprocal relationships with communities to be the number one consideration, and the second is collaboration, that is researching "with" rather than "on".

Research Designs

Researchers must be opened to a wide range of research designs, which are determined by the research problem and context of the researched in order to obtain a deeper understanding of the area/community under study – in line with the "thick descriptions" of symbolic anthropology as espoused by Clifford Geertz (1973). Research using indigenous epistemologies favors research designs that draw from indigenous knowledge that are qualitative and involve active participation of research participants. These include participatory action research, case studies, and ethnography (Chilisa, 2012). Below are two examples of research design to be considered.

Participatory action research is one research design that lends itself well to the notions of collaboration between the researchers and the research participants, where "together they define the problem, learn how to study it, design the research, analyse the outcomes, and design and execute the needed actions" (Greenwood, 2004). Basically, the research participants become co-researchers. Another variation of the participatory action research is the transformative participatory action research, which is linked with not just the participation of communities, but also their personal and social transformation (Chilisa, 2012). The aim of such research is to create awareness and consciousness of social, political and economic

contradictions, and to take action to address them: "the poor and the exploited are empowered to believe in themselves and to have the confidence and the will to conduct research on their own reality using their ways of knowing and to use the research findings to embark on positive social change" (Chilisa, 2012:, p. 235).

The pragmatic research paradigm with its mixed method approach offers a way that indigenous research methods could be integrated with Euro-Western approaches to develop a deeper understanding of phenomena, particularly in dualistic situations (Held, 2019). Chatwood, et al. (2015) presents an example of collaboration between Western trained researchers and indigenous knowledge holders, using mixed methods to explore the indigenous values underlying health systems stewardship. The method used, *Etuaptmumk* (two-eyed seeing) was an effort to integrate western research paradigms with the indigenous research paradigm in order to obtain more holistic results in health systems research.

Deficit Theorizing Versus Appreciative Inquiry

Criticism of Western informed research paradigms has also been on their focus on deficit theorizing. This is where negativity and stereotypes of communities is perpetuated in the literature, concepts, theories, and research questions. Deficit theorizing was a major tool used by the colonizers to justify their actions against the colonized (Chilisa, 2012). Accordingly, colonizers denied that Africans for example have their own valid knowledge system and theories that can contribute to the World's body of knowledge and theories. In this approach, research is problem focused, and seeks to identify the deficiencies, constraints, etc. (Chilisa, 2012). Research using indigenous epistemology should rather focus on appreciative inquiry – a change-focused approach to research that builds on the positive aspects of a situation. This approach has four dimensions: Definition, Discovery, Dream, and Design/Delivery (Chilisa, 2012). Definition is about choosing the positive to focus the research, by asking the research participants questions to highlight what is positive in their situation (Reed, 2006; Boyd and Bright, 2007; Chilisa, 2012). For example, research on the San in Botswana would benefit from understanding the life that the San live and what they value about their lives. The second dimension is discovery, which is about encouraging the participants to share their stories on exceptional positive moments and histories; they are also encouraged to highlight what they most value and would want to build or leverage on. The San therefore would share their stories in whatever form that depict their exceptionally positive moments and what they value. The third dimension is that of dreaming, where the research participants envision or imagine the future they desire. In this instance the San would be invited to brainstorm and agree upon the future they would like to have. The fourth dimension is that of design, which entails the researched sharing in the development of strategies to help realize their envisaged dream (Reed, 2006; Boyd & Bright, 2007; Chilisa, 2012). Thus, we see that research using appreciative inquiry may have a more positive outcome that involves a blue print of what can be done, whereas deficit theorizing would end up with a catalog of what is wrong or not working, and perhaps some recommendations of what might be done. Conducting research using indigenous epistemology challenges the notion and premise of communities being damage centered or depleted (Said, 201, p. 3).

Data Collection Methods

Other considerations of indigenous research methods include how data is gathered, and the questions asked. According to Oppong (2017, p. 249), "data collection methods should be interactive, performing

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or observing, thus applying techniques of role play, storytelling, observation, interviewing and ethnography". Chilisa (2012) asks in the case of using questionnaires to gather data – whose reality counts? The reason for this question is that usually questionnaires, especially structured questionnaires, are informed by some research framework or theory that determines the questions to ask, the options for the researched to respond to and uses language and concepts of the researcher. Thus the questionnaire becomes a tool for perpetuating the Euro-Western concepts and thinking. Questionnaires, as observed even by the interpretivist and pragmatic paradigm researchers, limit the possibility of understanding reality from the point of view of the researched (Chilisa, 2012).

Likewise, even in qualitative studies where interviews are used, the questions asked should be given great consideration. Indigenous research methods privilege the dialogic method encouraging interactions between researcher and the researched, where the researched are encouraged to speak through their stories, folklore, songs, proverbs, etc. The researcher in this case is a learner and must employ deep listening, and an ability to decode meaning from the stories, folklore, songs, etc. Further, research must move from making communities researched on, to being researched with, and for their benefit.

Analysis and Dissemination

It goes without saying that the analysis of data should also be a collaborative effort between the researcher and the researched. There are various ways that this can be done, one of which is the division of the participants into groups as one would in a workshop setting. Each group would be assigned a theme, which would guide what they should be looking for in the research data at their disposal.

The dissemination of the research should also be a matter to be agreed upon by all research participants, methods of dissemination may vary and include oral recordings, write-ups in the community language as well as in English (for wider dissemination). The research results must be owned by the communities.

Challenges of Research Using Indigenous Epistemology

As in all "new" things, there will be challenges involved in moving from Euro-Western to indigenous research methods. Many of these challenges face the researchers, who must continuously engage in reflection on the Euro-Western approaches and how they affect the research process. The researcher must in using such approaches, learn how to adapt them for indigenous research and to minimize their "othering" impact. Breaking away from a mode of thinking and doing will therefore not be easy, and there will be need to relearn many skills, the major one being learning to work collaboratively with communities and to practice relational accountability. There will also be a need to learn how to use stories, folktales, songs, rituals, proverbs, and peoples' lived experience to generate theories, concepts, and questions to guide studies. Approaching research as a "learner" rather than an expert armed with a "recipe" of how to conduct your study will not be an easy task. Gaining the trust of communities after so many years of them being researched on as opposed to with, may also be a challenge. All these challenges are not insurmountable, but do require a resolve to do research differently.

SOME EXAMPLES OF RESEARCH IN INFORMATION SCIENCE USING INDIGENOUS EPISTEMOLOGY

In this section, examples of research conducted using indigenous epistemology are provided. The first example is the study by Winschiers-Theophilus and Bidwel (2013) who reported an interactive design project in Namibia amongst the Herero people. An Afrocentric paradigm was used to develop a system for digitally documenting indigenous knowledge. Their standpoint was that using established pro-western human computer interaction (HCI) methods, privileges the views, assumptions, values, frameworks, representations and models in the design of user interfaces. They argued that the design of interactivity must take into account local practices and conceptualizations. The researchers immersed themselves in the Herero community in order to understand their history, language, philosophy and myths (as recommended by Mkabela, 2005), and from this understanding were in a position to develop an interface that was intuitive to the local community.

Okeke (2017) conducted a study on knowledge management (KM) in a Nigerian oil corporation using an Afrocentric lens. His study was on the challenges of adoption and implementation of a KM initiative as experienced by the knowledge champions in the corporation. The study used the "African/Nigerian socio-cultural view" to explore the narrative accounts of the knowledge champions (Okeke, 2017). The author wished to evaluate the implementation of KM in the organization, using the African/Nigerian socio-cultural view as a lens, rather than any of the western oriented frameworks or models of KM implementation. In so doing the author was able to understand the role of the African/Nigerian socio-cultural view on the knowledge champions' understanding of KM; how this view translated to their individual experiences and involvement in KM; and how the champions responded to the African/Nigerian socio-cultural influences that confront KM in the organization. His contention was that research into KM implementation in organizations in settings other than the Western, tend to assume a universal application that glosses over the impact of context and socio-cultural influences (Okeke, 2017). The study therefore was able to gain an understanding of how KM was experienced in the organization, how cultural context influence KM practice.

Manhibi and Tarisayi (2017) used Afrocentricim to study how an internet café in Masvingo, Zimbabwe facilitated values of Ubuntu such as caring, sharing, respect, compassion, and others by taking on the role of a Padare. According to the authors, Padare was a platform historically used by local communities to discuss critical family and village affairs, and share ideas (Manhibi & Tarisayi, 2017, p. 64). Whilst a study using a positivist or interpretivist paradigm might have just established what people used, how long, for what purpose, and so on, this study established that the café was a center for forging relationships and served as a meeting place where issues were discussed (Padare). This was possible as the Afrocentric research paradigm enabled the study of the lived experiences of the users/patrons of the internet café by a researcher who was immersed in the café (as an employee) and was trusted and knowledgeable to be able to engage the patrons.

Allard and Shawna (2015) used anticolonial and antiviolence feminist methodologies, which placed the experiences and knowledge of indigenous and sex worker communities at the center of the research process to in-build the goals and knowledge of marginalized communities into a digital archives projects through a participatory archiving process. This enabled active participation of communities in the archiving of their knowledge and experiences.

FUTURE RESEARCH DIRECTIONS

The topic of research using indigenous epistemology has been written about extensively in education, social sciences, and humanities. What is not clear is the extent to which research in Africa, and perhaps specifically in information science has been conducted from the vantage of an indigenous epistemology. Bearing in mind the concern that the dominance of the Euro-Western approach to research has silenced the voices of communities, particularly in Africa, and has propagated a narrative about them that may not necessarily be the complete picture, there is an apparent need to engage in the type of research that will bring out the voices, information, and knowledge that will aptly describe African communities. Future research directions could be directed at establishing the extent to which indigenous research epistemology has been implemented and the contribution they have made in the world knowledge system. Future research directions would involve documentation of research carried out in information science using indigenous epistemology. It is also recommended that information science researchers should seek to challenge some of the models, frameworks and theories on information, information behavior, information systems, and records management, etc., by conducting research guided by indigenous epistemologies such as Afrocentric research. In this way might they come up with new and exciting findings informed by local lived experiences and conceptualizations.

CONCLUSION

This chapter set out to explore the use of indigenous epistemology in research. This was premised on the need expressed by various authors to re-establish the voice of indigenous people that was silenced by the dominance of the western epistemologies and research methodologies. The chapter has considered research paradigms and classified them by their ontology, epistemology, methodology and axiology. It has demonstrated the challenges posed by the dominant Euro-Western research approaches to the knowledge and systems of knowledge of indigenous communities. It has identified ways that researchers might embark on conducting research using indigenous epistemologies, and has concluded by identifying some challenges that the researcher may face in doing so.

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KEY TERMS AND DEFINITIONS

Axiology: Refers to morals or set of ethics that a researcher holds regarding the conduct of research, the researched, and its implications on the researched.

Epistemology: The study of knowledge, focuses on the nature of knowledge, what constitutes knowledge, and how it is acquired/generated and validated.

Indigenous Epistemology: Is about placing indigenous perspectives at the center of inquiry, recognizing that there are other ways of knowing that must be taken into account in research.

Methodology: The methods that are used in conducting research. This covers, research design, data collection instruments, data analysis and presentation.

Ontology: How one views reality or one's beliefs about reality – typically, for the dominant paradigm, reality is objective, and can be quantified and measured. Ontology can also be described as one's world-view, which determines understanding of what exists.

Research Paradigm: A set of beliefs about the nature of reality and knowledge that go together to guide research methodologies and axiology (ethics and values) in the conduct of research.

Chapter 14

Exploring the Integration of Indigenous Knowledge Into Public Library Services With an Inclusive Intent Using a Critical Theory Lens

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ABSTRACT

Despite legislative and regulatory frameworks that have paved the way for transformation and inclusivity of public libraries in South Africa, there seems to be little or no integration of indigenous knowledge (IK). The exclusion of IK from public library services has potential to counteract efforts towards the provision of inclusive services. This chapter demonstrates how critical theory was used as a lens in a multiple case study that explored the integration of indigenous knowledge (IK) into services of public libraries in South Africa. Looking at the articulation of IK, services that are provided to ensure inclusivity, and issues that impact on IK integration in public libraries, semi-structured interviews were conducted from purposefully selected heads of provincial library services in South Africa. Thematic analysis was used. Using critical theory to frame the analysis, findings indicate understanding of aspects of IK including its oral nature. A paucity of engagement with IK as an aspect of inclusive service provision was noted.

INTRODUCTION AND BACKGROUND

Like many other African countries, South Africa was subjected to colonialism resulting in the marginalisation of indigenous communities. Things were to take a turn for worse when the Nationalist Party came into power and introduced apartheid (also known as separate development) in 1948. The ideal of apartheid was based on the notion that for communities to grow and freely participate in their religious,

cultural, linguistic and other practices they need to be separated (Prah, 2007). In pursuit of the ideal of apartheid people of South Africa were racially divided into Whites, Coloureds, Indians and Blacks. Service provision (including provision of library services) was also determined along racial lines resulting in poor or non-existent services to Blacks who were the worst affected by discriminatory policies (Mostert, 1999; Nassimbeni, 2014; Owens, 2002; Rodrigues, 2006; Witbooi, 2007).

One of the many changes introduced after the first democratic elections of 1994 was the establishment of new geographical demarcations. Nine, new racially integrated provinces replaced the initial four which were occupied by Whites. Each of the nine provinces differ immensely in terms of population numbers, poverty levels, wealth distribution and service provision requirements. Each province is mandated to provide library services as per Schedule 5 of the *Constitution* (Republic of South Africa, 1996)

As a young democracy, South Africa is a country that has to deal with historical marginalisation of a large section of society. The library and information services sector is also faced with challenges pertaining to transformation and inclusivity. As such, legislative and regulatory policies and frameworks were developed to guide inclusivity and transformation. Some of the legislative and policy frameworks that impact on libraries are briefly discussed.

Legislative Frameworks and Policies and Public Libraries

The *Constitution of the Republic of South Africa* (Republic of South Africa, 1996) guarantees everyone the right to use their language and to participate in the cultural activities of their choice. Additionally, the *Constitution* has put into place machinery such as the Human Rights Commission and the Commission for the Promotion and Protection of the Rights of Cultural, Religious, and Linguistic Communities (Republic of South Africa, 1996). These institutions are independent and tasked with ensuring that human rights are respected and protected.

In addressing the issue of human rights, the democratic government of South Africa recognised that social transformation was essential. To this effect, the *White Paper on Transforming the Public Service*, or, *Batho Pele White Paper* (Department of Public Service and Administration, 1997) was adopted by parliament. The framework is based on eight principles which were intended to guide the transformation process. The principles of the *Batho Pele White Paper* (Department of Public Service and Administration, 1997) were a beacon of hope for South Africans who envisaged a public service that puts them at the centre of service provision.

Another significant step taken by the democratic dispensation to transform society was the recognition and appreciation of the multicultural and multilingual nature of South Africans especially in view of their historical marginalisation during the apartheid era. In addressing multilingualism, the *National Language Policy Framework* (Department of Arts and Culture, 2002) was instituted as a guiding instrument in line with Section 6 of the *Constitution* (Republic of South Africa, 1996) which argues for the development, promotion, respect and tolerance of South Africa's linguistic diversity. The policy states that equitable use of languages will enhance participation by communities whose languages were previously marginalised, and help in the recognition of knowledge and expertise in these communities. It is therefore reasonable to expect public entities, including libraries to align their services to this policy.

The *Indigenous Knowledge Systems (IKS) Policy* (Department of Science and Technology, 2004) was adopted with the aim of promoting the recognition and appreciation of indigenous knowledge systems of various communities of South Africa. The *IKS Policy* was intended to be:

…an enabling framework to stimulate and strengthen the contribution of indigenous knowledge systems to social and economic development in South Africa (Department of Science and Technology, 2004, p. 9).

The policy explicitly acknowledges the important role that libraries can play in providing "essential services that promote an understanding of indigenous knowledge systems" (Department of Science and Technology, 2004, p.33). In view of this expectation, it is the responsibility of stakeholders in the LIS sector to reflect on the extent to which public libraries have responded and on whether there are initiatives that can be taken to facilitate such processes. Thus, not only do libraries need to explore ways in which they can facilitate this understanding, they also need to ensure that whatever methods they adopt are effective.

In the library and information services sphere, the establishment of National Council of Library and Information Services (NCLIS) in 2004, a national body that advises the Ministers of Education and Arts and Culture on matters relating to library and information service (Ralebipi-Simela, 2007) was an important historical milestone in South African librarianship. The Department of Arts and Culture and NCLIS commissioned a team to craft the *Library and Information Services (LIS) Transformation Charter*, which, after consultation with various stakeholders was released in 2009 and revised in 2014.

The point of departure for the *LIS Transformation Charter* highlighted the legacy of apartheid laws and policies which resulted in disparities in the provision of library and information services based on race and colour. The *LIS Transformation Charter* envisions a transformed library and information service which is within reach and freely accessible to all citizens (Department of Arts and Culture, 2009, p. xi). Furthermore, the *Charter* puts forward as one of the objectives of the library and information sector as the mainstreaming of indigenous knowledge systems by "collecting and disseminating it through books, audio and video formats" (Department of Arts and Culture, 2009, p.5).

One of the challenges facing the LIS sector according to the *Charter* is "insufficient information resources in indigenous languages" (Department of Arts and Culture, 2009, p. xx). The situation is aggravated by content that is not always appropriate for the intended users. The enormity of the situation is expressed in the *Charter* thus:

… LIS [library and information services] are probably viewed by most as irrelevant collections of books for the educated and middle class. The question confronting the LIS sector is: How can South Africans value something they have no access to and no use for?" (Department of Arts and Culture, 2009, p. xx).

Thus, the need for public libraries to initiate mechanisms that address concerns of accessibility and inclusivity becomes even more critical if they are to remain relevant as providers of information. Public libraries ought to be guided by the principles outlined in the aforementioned frameworks in order to ensure transformation and inclusivity as mandated by the *Constitution*.

The chapter is extracted from a larger project that argued for the integration of indigenous knowledge (IK) into services of public libraries in South Africa. The author uses critical theory (Horkheimer, 1972; Freire, 1972) to frame and examine how public libraries can address inclusivity in their services.

Specifically, the chapter uses a critical theory conceptual framework to address the following research questions:

1. How do public librarians articulate indigenous knowledge?
2. What services do public libraries provide to ensure inclusivity?

3.   What issues affect the inclusion of IK in public libraries?

The rest of the chapter is structured into the following sections: First, a brief outline of theory use in research is provided followed by a discussion of critical theory and its basic tenets. An explanation of how critical theory framed the project is briefly outlined. A review of literature pertaining to IK is presented followed by the study methodology. Framed by critical theory, findings are presented and discussed. Limitations of the study are outlined followed by suggestions for further research. A conclusion completes the chapter.

CRITICAL THEORY

Theory is the basis of research. Distinguishing between theory development and use, Kim and Jeong (2006) describe the former as research work aimed at building new theory while the latter refers to the incorporation of existing theory into research work. Thus, irrespective of whether the intention is to develop or to use theory, research is framed around theory (Budd, 2004; Howell, 2013). Highlighting the point, Budd (2004, p. 244) posits that even if theory is not concrete, researchers frame their observations and actions "according to a set of assumptions and connections that are consciously formulated." Ngulube (2018) notes the value of theory in developing and strengthening disciplines. Using Heritage Studies as a case in point, Ngulube (2018) notes with concern that as a discipline it seems to have a weak theoretical base, a fact that might hamper its development. Thus it becomes critical that both processes (development and use) be ongoing in order to strengthen and reframe thinking around disciplines because theory compels researchers "to reflect on their role in knowledge production and its value to their field" (Ngulube, 2018, p. 2). From the perspective of this chapter, integration of IK into public library services is framed by critical theory.

Critical theory constitutes a group of standpoint epistemological positions that embrace values, experiences and interests of marginalised groups. Stemming from the interpretivist paradigm, critical theory has a transformational agenda which seeks to address historical imbalances. Despite the array of critical theorists and their somehow different emphases, the basic tenet of critical theory is its focus on social institutions and how they impact on power relations among citizens. The agenda is social transformation with the ultimate aim of developing a just society. Critical theory argues for the emancipation of the oppressed and the marginalised. In its quest to challenge the *status quo* for the betterment and empowerment of the oppressed, critical theory engages in ideologically oriented investigations by mapping out social injustices, tracing their historical origins and making propositions on how to remedy them (Pickard, 2013; Server, 2012).

The choice of a critical theory framework was based on the perceived need for the library and information services sector to begin to critically question its research and practices. Questioning the contribution of public libraries towards inclusive services, critical theory was used to interrogate the notion of knowledge in the context of addressing historical marginalisation. The researcher's thesis was that public libraries still fall short of embracing non-western epistemologies leading to a perpetuation of the historical marginalisation of indigenous communities.

The provision of public libraries to indigenous South Africans has its roots in colonialism. Making public libraries relevant and inclusive through the integration of indigenous knowledge certainly challenges the historical colonialist foundations of these institutions in Africa generally and specifically

in South Africa. Affirming the need for critical theory in library and information science, Leckie and Buschman (2010), maintain that among its benefits is its ability to offer a range of possible approaches to interrogate large-scale societal issues and their possible impact on everyday library practices. Leckie and Buschman (2010, p. xiii) further contend that

…LIS is also very interested in the betterment of society, from the development of national information policies, to the provision of user-friendly and equitable access to information, the inclusion of diverse and/or marginalized clienteles, the support of citizen lifelong learning, the nurturing of the library community …

LITERATURE REVIEW

Historical, social and economic marginalisation of the majority of South Africans is still evident after more than two decades of a democratic dispensation in the country. Despite the huge strides made to date in an endeavour to transform libraries and address equity, access and inclusivity in South Africa, more work still needs to be done. There is evidence of an increase in the number of libraries (Department of Arts and Culture, 2015); however, there is a paucity of information regarding provision of indigenous knowledge (IK) as part of the services provided. This apparent gap has potential to inadvertently perpetuate the historical marginalisation of IK and continued exclusion of some communities, in particular, indigenous communities thereby negating any positive strides made towards provision of inclusive services. Public libraries as "local information gateways' (UNESCO/IFLA, 1994), need to explore ways of ensuring inclusive services. Integration of IK can enhance inclusivity of services.

Indigenous Knowledge and Public Libraries

The role of indigenous knowledge systems in various aspects of community lives is widely documented (see for example, Agrawal, 1995; Briggs, 2005; Chanza & De Wet, 2013; Gorjestani, 2000; Green, 2007; 2012; Lwoga, Ngulube &Stilwell, 2011; Nakata, 2002; Ngulube & Lwoga, 2009; Ossai, 2010; Sen, 2005; Shange, 2014; Sillitoe, 1998; Wilson, 2001). This acknowledgement of the value of IK highlights the critical role that public libraries can play in facilitating access to this knowledge as part of providing inclusive services. Inclusive library services imply providing relevant information in appropriate formats to all categories of communities serviced. Providing inclusive services demands that libraries be in a state of awareness and be able to adapt in line with changing user needs. However, it is of concern to note the paucity of evidence of IK in public libraries in South Africa despite the documented evidence of its value. This state of affairs could lead to the total demise of this valuable knowledge which in turn could perpetuate the historical marginalisation and exclusion of indigenous communities from libraries. It thus becomes important to examine issues around IK and obtain insight into what public libraries can do to ensure inclusive services.

Is Indigenous Knowledge 'true' Knowledge?

Some scholars have shown scepticism regarding IK as 'true' knowledge. For example, Horsthemke (2004, p.31) labelled IK "... an incomplete, partial or, at worst, a questionable understanding or conception of

knowledge." This determination of what constitutes knowledge is based on criteria of belief, justification and truth to which IK does not conform. Commentators have also pointed out the negative perceptions in notions of modernity where western knowledge is regarded as an appropriate tool while IK is associated with "traditional backward way of life" or being primitive (Briggs, 2005; Mawere, 2014; Reynar, 1999; Viergever, 1999). Elaborating on the colonial stereotyping of IK, Mawere (2014, p.102) argues that by drawing a distinct line between science (Western knowledge) and IK serves "to undermine the possible contribution of IK." Mawere goes further to posit that all societies have their IK which is "embedded in the respective cultural environments and histories of all people across the world…" (Mawere, 2014, p.103).

It is critical that librarians move out of their comfort zones of being bridges between users and information. As Lor (2004, p.53) asserts "One of the challenges librarians have to get to grips with is a broader and more inclusive concept of science and scientific knowledge". It is important that librarians demonstrate awareness of multiple epistemologies and reflect such understandings in the types of services they provide. Librarians need to make concerted efforts to ensure availability of and access to IK in the interest of inclusivity irrespective of their views on whether it is 'true' knowledge or not.

Oral and Contextual Nature of IK

Knowledge by its nature is implicit and cannot always be wholly documented. Dave Snowden (2003), in his Cynefin model, stated that with documented knowledge (information) the level of abstraction decreases because there might not be a context while in informal settings such as communities there is a very high level of abstraction because members share experiences, practices and values. However, orality of IK has implication for its integration into libraries. Libraries are drivers of literacy and reading therefore the oral nature of IK might seem to go against what libraries stand for. Nevertheless, libraries need to be cognisant of the appropriateness of media and formats in which information is made available. Public libraries rely on printed media which can sometimes exclude people with low literacy levels (Jiyane & Mostert, 2008; Leach, 2001). Nonetheless, for libraries to be inclusive, they need to find ways of addressing information needs of communities that do not necessarily rely on the written word for their information needs. The role of language in library service provision deserves some attention.

Language, Culture and Indigenous Knowledge

Orality implies high reliance on language thus emphasising the critical role of language in IK. Shava and Manyike (2018) point out that language provides access to epistemology because it embodies and is loaded with epistemology. Language and culture are integral mechanisms in the transmission of IK. The interdependence between indigenous knowledge, culture and language is discussed by various researchers (for example, Kuphe, 2017; Magwa, 2010; Motsaathebe, 2010; Monaka & Mutula, 2010; Odora Hoppers, 2002; Seema, 2012; Semali & Kincheloe, 1999).

Demonstrating the critical role of language in acquisition of knowledge and values among the Basotho, Seema (2012) argues that without a good understanding of language, valuable lessons, taught through proverbs are rendered meaningless. However, language issues become complex in multicultural and multilingual countries. For example, Monaka and Mutula (2010) report that a Botswana government decision to use language as a unifying tool by proclaiming Setswana as the official language left some communities with a sense of alienation and marginalisation, which was certainly not the intended consequence.

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In spite of the demonstrated value of language and culture in transmitting knowledge, scholars have lamented the predominance of English and French in the economic discourse in Africa (for example, Magwa, 2010; Odora Hoppers, 2002; Prah, 2007). Referring to the South African situation, Prah (2007) notes with concern that despite the adoption of the language policy and the establishment of the Pan South African Language Board (PanSALB) which was tasked with elevating the status of indigenous languages, English still dominates in business. This dominance is likely to affect efforts to develop other languages and by implication IK negatively. Similarly, in Zimbabwe, Magwa (2010) observed the dominance of English at the expense of not only the three official languages, but also many of the minority indigenous languages. He goes on to argue for a language policy that puts "indigenous languages at the centre" as a way for Zimbabwe to attain its "dignity [and] cultural identity..." (Magwa, 2010, p. 167).

The importance of English in facilitating global connectivity with the international community is acknowledged as noted by Odora Hoppers (2002) and Prah (2007), however, its potential to increase the risk of alienation locally can result in further marginalisation and even demise of indigenous languages and by implication indigenous knowledge. Librarians have an important role to play in this regard because by neglecting languages of indigenous people, they are inadvertently excluding the very communities they purport to serve. For example, in areas such as collection development and reference services, insight into community needs, based on their ontologies and epistemologies is critical. Public libraries need to be knowledgeable about their contexts including cultures and languages of their communities.

The brief discussion of some of the challenges surrounding indigenous discourse places demands on librarians because it has implications for inclusivity of library services.

METHODOLOGY

As indicated, the chapter is extracted from a larger project that adopted qualitative multiple case study design to explore the integration of IK into services of public libraries in South Africa. The population for the study were the nine provincial library services in South Africa. These provincial library services serve 1612 public and community libraries (Department of Arts and Culture, 2015). In addition to provincial library services, South Africa has eight metropolitan library services (at the time of writing) that service 281 public libraries within their constituencies (Department of Arts and Culture, 2015). However, metropolitan library services were not considered because of their diverse user groups which at times necessitate the use of languages other than indigenous languages. As indicated above, literature points to a strong link between language and indigenous knowledge, so metropolitan libraries would not have been likely to contribute to the purpose of the project because of their diverse user groups.

The researcher followed the prescripts of the *Policy on Research Ethics* (University of South Africa, 2014) by obtaining ethical clearance. With regard to participating libraries, the first port of call was the Department of Arts and Culture through the Director for Library Policy and Coordination where permission to conduct the study was sought. Arrangements with individual Provincial Library Heads were made as per their availability.

Table 1 depicts population size, predominant languages and distribution of libraries in each of the nine provinces.

As can be seen in Table 1, six out of the nine provinces have a high prevalence of indigenous languages. However, of the six qualifying provinces, two were not willing to participate in the research resulting in four cases being studied. Data was collected from the four Heads of provincial library services through

Table 1. Population, language and number of libraries per province

Province	Population size	Predominant language	% of language speakers	Number of public libraries
Eastern Cape	6 562 053	IsiXhosa	78.8	144
Free State	2 745 590	Sesotho	64.2	173
Gauteng	12 272 260	IsiZulu	19.8	234
KwaZulu-Natal	10 267 300	IsiZulu	77.8	174
Limpopo	5 404 868	Sepedi	52.9	74
Mpumalanga	4 039 939	SiSwati	27.7	111
Northern Cape	1 145 861	Afrikaans	53.8	253
North West	3 509 953	Setswana	63.4	102
Western Cape	5 822 734	Afrikaans	49.7	347
Total number of libraries				**1612**

Sources: Statistics South Africa (2012); Department of Arts and Culture (2015)

semi-structured interviews. Interviews were conducted over a six-month period in the four provinces by the author. With the permission of participants all interviews were recorded. Transcription of interviews was done by a third party, however, the author read each one to ensure accuracy. Transcripts were sent back to participants to ensure accuracy and integrity of data. Only one participant added some historical background information. Having considered the various data analysis approaches, the research question and the type of data collected for the study (Stewart, 2014), thematic analysis was used.

FINDINGS AND DISCUSSIONS

In accordance with ethical undertakings by the author, identities of participants are withheld. They are referred to as Participant A, B, C, D.

Freire's (1972) notion of 'concientization' and dialogue was used to frame the discussion. Arguing from a pedagogical perspective, Freire (1972) was critical of the banking model of education where teachers were 'experts' who deposited knowledge into minds of students. He argued that "the solution is not to "integrate" them [students] into the structure of oppression, but to transform that structure so that they can become beings for themselves" (Freire,1972, p.23). A similar parallel is drawn in interrogating the library model and services where knowledge and voices of indigenous communities are muffled. Findings for each research question are presented and discussed.

Understanding and Articulation of IK by Public Librarians

Participant A provided the following response:

Indigenous knowledge is knowledge in people's heads

Participant B responded to the question in the following words:

Indigenous knowledge is about the traditions, music, folklores, customs of chiefs and…everything that defines and tells of their history - where they come from and who they are…and that history must be in libraries.

Participant C's brief response alluded to history and culture and was expressed thus:

Research about, you know, about things such as kingdoms and customs and traditions.

Participant D provided a more elaborate answer in the following words:

To me IK is about how people have always done things. For example, our rituals, for example how to make (isinkwa sombila)[1], how we have always done certain things, not just African and others you know - Afrikaans people making biltong, like that. It's not just food. It's a lot of other cultural activities which in most cases is not recorded anywhere. So as far as I understand, it's making that knowledge that is out there in people's heads on how they do things, which is possibly documented or undocumented.

Concepts such as culture, traditions, customs, know-how, folklore and history were used by participants to articulate IK. The relationship between IK and culture seemed to be in line with Missions 7 and 8 of the *Public Library Manifesto* (UNESCO/IFLA, 1994), which states that public libraries should strive to "foster inter-cultural dialogue and favour cultural diversity" and "support oral traditions." Regarding its nature, participants in this study described IK as oral and undocumented and even referred to it as "knowledge in people's heads." Interestingly, none of the participants mentioned its contextual nature although their responses seemed to imply contextual influence. Reference to aspects such as oral history, customs and traditions of chiefs; arts and culture; cultural activities such as the reed dance, making maize bread and others seemed to demonstrate the link between participants' understanding and their environments. For example, the reed dance takes place in only one of the provinces.

Participants' reference to different aspects of IK confirmed the multi-dimensional nature, different applications and diverse understandings of IK as evident in extant literature (for example, Chanza & De Wit, 2013; Lindh & Haider, 2010; Mearns, Du Toit & Mukuka, 2006; Nakata, 2002; Ngulube & Onyancha, 2011; 2017; Reynar, 1999; Semali & Kincheloe, 1999; Sillitoe, 1998; Viergever, 1999). Furthermore, the diversity of understandings underscores the interpretive paradigm where the concept of multiple realities becomes evident. It is in light of this that multiple realities can be realised only through consultation and involvement of all role players. The adoption of multiple epistemologies would result in the provision of 'culturally responsive' services (Becvar & Srinivasan, 2009) which by extension would be inclusive.

Interestingly, none of the participants mentioned the spiritual aspects despite arguments put forward by some indigenous scholars (Battiste & Henderson, 2009; Chilisa, 2012; Kovach, 2009; Masango, 2013; Masango & Nyasse, 2015; Odora Hoppers, 2002; Wilson, 2001). Spirituality is an aspect of IK and needs to be acknowledged to "reveal the wealth and richness of indigenous languages, world views, teachings and experiences…" (Battiste & Henderson, 2009, p.5). The omission could be ascribed to the fact that IK has not entered the LIS practice discourse and therefore is yet to be 'accepted' as knowledge by this sector. Another presupposition was that, as heads of provincial library services, participants were not working directly with communities leading to possible constraints in their understanding of IK.

Participants seemed to view orality as problematic and as such less valuable than the printed word, a largely western tradition. This suggests that because IK is in 'peoples' heads' it is not necessary or even

important enough to be included into library services. Such characterisations could have been influenced by perceptions of what constitutes knowledge, which in the case of librarians, who by virtue of their training, subscribe to the notion of knowledge from a western perspective. The tension between orality and the printed word comes forth and, because of the apparent non-engagement of IK in the public library sphere, its marginalisation is likely to continue. Furthermore, this association with old people seems to undervalue IK in terms of its contribution to everyday modern lives of communities and sustainable development goals despite the myriad of documented evidence of its value. The inclination of associating IK with old people could be a result of the hegemony of knowledge where western knowledge is regarded as more valuable than IK as argued in the literature (Akpan, 2011; Busingye & Keim, 2009; Green, 2007; Roy, Hogan & Lilley, 2012; Teffo, 2013). The potential danger of such a stance would impede any efforts towards inclusivity.

What Services do Public Libraries Provide to Ensure Inclusivity?

Libraries provide a range of services in support of education. In terms of responses, learners seemed to constitute an important chunk of library users. Participants emphasised the need to provide inclusive services and to this end, services for different user categories including disabled users and preschool children were provided. Responses to the identified aspects follow.

According to Participant A, services included toy libraries,

…as an outreach thing for children to come to the library

Participant B response was:

People that are in townships, that are in rural areas, where there is no electricity, they are studying with UNISA, and in informal settlements, they need that comfort in the library.

When we built our libraries, in 2004 as a province, we introduced the government priority ECD - early childhood development. …and we say how do we integrate that into the library function? There are a lot of children that have got nothing to play with in the communities. They lack - you go to the early learning centres - they are poorly resourced and then we introduced the early childhood development.

Our reading festival is basically about us developing reading in our li… you know libraries… the basic purpose of libraries is to encourage communities to read and to inculcate their love for reading. So it started as such and then now we are also trying to get the children to learn to love reading in their own languages and spell in their own languages.

Indicating other possibilities for outreach, Participant B stated:

We must ensure that there, is an outreach service for old age homes, whereby they will loan books to the old age homes or reach out to patients in the hospices and books or to the crèches.

Participant C emphasised the need for inclusivity and stated:

The population that's using that library, it's so ... it's so mixed. It's diverse… and includes learners and adults. For the visually impaired in our library, we have a system that's meant for them. It's a computerized system where you can use talking computers.

Participant C raised the issue of relevance of services by indicating that at political level, there seems to be concern. She reported:

Our political principals whenever they visit our libraries, maybe it is a new library and they see our toy libraries that has always been their complaint that this toy library is one-sided. It's looking at one side. It's too European. It doesn't cater for Africans. Even the themes that we are using they are not African themes.

Participant D stated that due to the fact that they do not work directly with communities, she was not in a position to provide information regarding user groups and services. While it is understood that provincial library services do not necessarily deal directly with the public, arguably, there needs to be some level of understanding of operational imperatives such as user groups.

None of the respondents mentioned inclusion of IK into their services. Upon probing about services relating to IK, it was interesting that participants seemed to perceive capturing of information from indigenous communities as the role of archives. Pervasive suggestions for the researcher to contact archival institutions appeared to imply that librarians do not regard IK as knowledge that needs to be preserved for posterity. It is rather concerning that, despite the documented importance of IK in communities, libraries do not seem to regard integrating it into their services to be within their purview. The implication of this stance on the part of librarians was that in terms of role identification librarians do not seem to regard integrating IK as part of their responsibility, possibly because of it being associated with 'old people'.

What Issues Affect IK Inclusion in Public Libraries?

The issues identified as having possible effects on IK inclusion included funding, poor library usage and poor reading culture among indigenous communities and, finally, information and communication technologies. Responses and discussion follow.

Funding

Explaining how lack of funding is affecting services, Participant A contemplated:

If we can get more funding to appoint staff or transfer monies to the municipalities to appoint people it will be better…

In the same vein, Participant B stated:

Our progress will only be determined by availability of budget in the province. Currently it's not a language that is talked about where you are going to be asking for money and get it. There are more pressing matters.

With a sense of exasperation, Participant B continued:

Unfortunately, I don't have much control over there… departments experience budget pressures. Like now, we are doing adjustment budget. With adjustment budget we just….they have budget pressures and they want the department to contribute to that by giving eleven million from our already strained budget.

Participant C had this to say about funding:

In our province we haven't really experienced a situation where our money has been taken away from us and used for other things, but yes we are seeing a situation where our mmm...., equitable share budget[2] is shrinking, meaning now that the province has to carry most of the functions of the library services. I think a similar example will be of buying books. We used to have budget in the equitable share budget to buy books. Currently we are more dependent on the Conditional Grant[3].

Participant C further explained:

There is also another problem that causes us not to be able to address [provision of services] that is the fact that funds for libraries are becoming lesser and lesser. Because to build you need funds, you know, to appoint staff to manage that library you need funds and now every now and gain funds are being cut.

Confirming the prioritisation of other provincial imperatives, Participant D stated:

Besides the input from the community, we also look at the province, the picture of the province because we get numerous… I've got files this big of requests and we can't give everyone a library.

Poor Reading Culture and Poor Library Usage

Participants raised concern regarding reading culture among indigenous communities. Participant B made the observation:

[Reading culture] it's still not there in our communities. There is not a lot of reading mmm, books. I don't know. I think people visit libraries very… the numbers I think are very minimum. We see it with a lot of Afrikaans books very read… especially your fiction. Afrikaans community they read as compared to our mmm… reading is still a big challenge. [Name of indigenous language] reading pattern is basically not there. Probably the only time that the book is read it's when it's a set work you know… it's the learners that are using that book maybe at schools.

Confirming a similar situation, Participant C bemoaned:

There's a lot of Afrikaans literature though Afrikaners are smaller in population and even though Black people are speaking Afrikaans. But you know when it comes to reading, people are not reading. As library services we are transforming by promoting writing in [name of indigenous language] so that there can be more material in that language but then the usage of books comes back to not... there are

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low reading levels in our Black communities. You'll find that the most people who will want to use that library are the ones who will prefer English books.

Participant D also attested to the issue of low readership of indigenous materials in the following words:

Another thing… another challenge is, as much as we are buying it, you find that your [name of indigenous language] books - if you go into any library - people are not reading them, which is a pity because we have really gone an extra mile to make sure that each and every library we cater for our indigenous languages. But maybe the people who use the library are young Model C[4] school children.

Library usage among adult indigenous communities is cause for concern for complete inclusivity. Overreliance on print media seems to be perpetuating exclusivity and marginalisation of indigenous communities who prefer orality. The colonial library models that do not take into account oral African contexts need to be challenged as pointed out in the literature (Alemna, 1995; Ocholla, 2009; Minishi-Majanja, 2012; Sturges & Neill, 1998; Tise, 2010). By continuing to privilege the western conception of knowledge and disregarding orality in the context of transformation, libraries could be seen to be failing in their mission. Ironically, such a situation would be a perpetuation of the exclusion and marginalisation of indigenous communities leading to social injustice in a legislative context that strives for inclusivity and equality. Failure to address orality in libraries would attest to what Tise (2010) ascribes to the reluctance of public libraries to fully recognise IK because of their colonial origins leading to the so-called 'information famine' in Africa (Sturges & Neill, 1998; Tise, 2010). As Sturges and Neill (1998) have argued, Africa has a wealth of information; it is the hegemony of western knowledge that renders the continent information poor.

It is therefore necessary for libraries not only to tap into knowledge of indigenous communities but also to ensure that it is accessible and preserved for future generations. Libraries cannot continue to provide services that solely focus on the western conception of knowledge. This situation indeed highlights the futility of trying to integrate indigenous communities into public libraries instead of transforming the structure so that "they can become beings for themselves" (Freire, 1972, p. 23). The onus is on librarians to make libraries relevant even for communities that have a poor reading culture. Seeing libraries as relevant and useful institutions could ultimately inculcate the love for reading and enhance the culture of reading.

Information and Communication Technologies

The provision of information and communication technologies (ICT) was hailed as a positive move in improving access to information; however, participants also identified concomitant challenges. One such challenge is connectivity in some areas because of their geographical location.

Participant B had this to say

The one challenge is response time. The other challenge is our service providers because, we appoint the Internet service provider who will not be really managing how they are loading the data and whatever thing in the libraries. Then when you are out of data then you are in trouble with the politicians and mmm.... so it's a bit of a nightmare.

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Furthermore, Internet connections also affects access to library resources as Participant B explained:

The catalogue… it's an online catalogue but what we have noticed in the other libraries mmm.... we have never gotten to a stage where all the books are bar coded so that they are all captured. Therefore, you will find that part of their collection is not in the system which creates difficulty when you have to fully automate the library. Until we get our Internet connections 100%, we are going to have problems.

As pointed out by participants, one of the benefits of the conditional grant was that it enabled free Internet access for communities. Internet access connects communities to the world. While connectivity is vital in the knowledge economy, it is also important to be wary of the fact that access to Internet is not a panacea for provision of the information needs of indigenous communities in particular because, as argued, they do not see the relevance of libraries. Time has come for libraries to move out of their comfort zones to redefine their roles in content creation. Libraries need to play an active role in creating content and making libraries relevant and inclusive. Inclusion of IK is a possible contributor towards inclusive public library services.

RECOMMENDATIONS AND FUTURE RESEARCH DIRECTIONS

A limitation of this chapter is that participants were heads of provincial library services who do not necessarily work directly with communities. The exploratory nature of the project made it necessary to reflect on the progress made in implementing policies and frameworks that were intended to guide transformation before engaging with librarians and communities. It is therefore important that further research involving librarians and the indigenous communities they serve be conducted. Librarians need to redefine their identity and role in knowledge creation and dissemination. The apparent lack of engagement with IK as a discourse in the public library sector requires concerted efforts between library schools, practitioners and communities to ensure meaningful public library services.

CONCLUSION

The chapter presented a multiple case study that examined the integration of indigenous knowledge into library services with an inclusive intent. Using critical theory as a lens, the chapter sought to understand the articulation of IK, services provided towards inclusivity as well as issues that might affect the inclusion of IK in public libraries. An overview of the historical context of public libraries in South Africa, as well as legislative and policy framework that should guide library service provision was provided. An argument was put forward highlighting the link between language, culture and IK and advocating for public libraries to play a role. Findings were discussed using critical theory as a lens challenging public libraries to re-examine their services particularly the extent of their inclusivity.

By questioning the status quo in public library service provision and exploring possible inclusive scenarios, critical theory has potential to harness 'other' epistemologies and contribute towards inclusive services. To reiterate, the chapter was exploratory therefore could not exploit the full benefit of critical theory. Communities are critical stakeholders in IK therefore their participation cannot be overemphasised. The lack of engagement with the IK discourse in public libraries raises concern in terms of awareness

and willingness to transform and be inclusive. Libraries do not seem to be making efforts to move aware from the 'banking model' (Freire, 1972) and can thus be accused of failing the communities. The author is of the view that critical theory is a viable lens that can enable deeper understanding in the quest for accessible, inclusive and transformed public library services.

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KEY TERMS AND DEFINITIONS

Indigenous Communities: South African communities whose languages, cultures and religious practices were marginalised through repressive laws. Based on their ethnicity, these communities were restricted to specific underdeveloped areas within South Africa.

Indigenous Knowledge: Used interchangeably with indigenous knowledge systems to refer to the collective wisdom of communities, which has been transmitted from generation to generation through language, practices, and rituals.

Indigenous Languages: All official South African languages other than English and Afrikaans.

ENDNOTES

[1]   Translation: maize bread.

[2]   Provincial budget allocation (also referred to as equitable funding: Budget allocation from the provincial treasurer.

[3]   Conditional grant: funding allocating through the Department of Arts and Culture intended to supplement provinces to achieve their mandate to provide public library services.

[4]   Schools that were intended for Whites during the apartheid era. Majority of them use English as a medium of instruction.

Chapter 15

(Re)Considering Information Science Research:
Embracing Transformative Intent

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ABSTRACT

This chapter provides an epistemological and ethical justification for (re)considering information science in terms of its potential to contribute to the way in which "information" and "knowledge" become co-constructed in social life in view of social justice aims. The chapter refers to and extends arguments for viewing information science as an interdisciplinary and indeed transdisciplinary endeavor. This is discussed in relation to transformative and indigenous-oriented paradigms for social research considered more generally and also considered specifically in relation to information science (as a social scientific approach). The chapter provides a detailed example of how the transformative potential of information science might be realized. This example can serve as a resource for information science researchers and for information systems practitioners who may find that it has some relevance to their continued work. The chapter also offers suggestions for expanding the research possibilities (co-inquiry options) provided by the example.

INTRODUCTION

Information science (IS) has been variously defined, but it is "broadly, concerned with the creation, dissemination, and utilization of knowledge" (Zins, 2007, p. 336). Zins adds that within the discipline thus defined there are two sub-areas, namely,

- A wide-ranging concern with human and social aspects: information related behavior, organizational and social concerns; and
- A technical/engineering concern with the design and evaluation of information systems (2007, p. 336)

The concern with both of these sub-areas suggests that IS can be focused on what is sometimes called the "subjective" meaning that recipients of information assign to it (in various social contexts) as well as the way in which information systems become technically designed so as to ensure that recipients have access to needed information (as again defined in specific contexts). Some authors in the field of IS regard "information" as such as being neutral in content and as transmitting neutral messages which can "inform" our models of reality. As Capurro and Hørland indicate (2003, p. 355), this view of information is deployed in "empiricist philosophy", where it is taken that objects in the world in-form our senses and thus help us to come to grips with reality – for the purposes of creating better decisions in action than if we were ill-informed. Information science is then seen as primarily concerned with how needed information becomes stored and rendered retrievable in organizational and other contexts, and how the usefulness of the information systems for improving the quality of decision-making can be assessed (through IS research). (This position is associated with a postpositivist paradigm for social research, as expressed by authors such as Adams (2014) and Phillips & Burbules (2000).)

However, a more subjective and intersubjective definition of information suggests that as soon as "information" becomes "received" by recipients, it already harbors meaning (in contexts of action and interaction). Hence, Capurro and Hørland point out that in the first place "criteria for what counts as information are formed by sociocultural and scientific processes" (p. 395). This is because users of "information" are always situated "in concrete situations within social organizations and domains of knowledge" (p. 395). They give an example of a stone:

A stone on a field could contain different information for different people (or from one situation to another). It is not possible for information systems to map all the stone's possible information for every individual. Nor is any one mapping the one "true" situation. But people have different educational backgrounds and play different roles in the division of labor in society. A stone in a field represents typically some kind of information for the geologist, and another kind for the archaeologist [and another for lay actors deciding on its meaning for them] (Capurro & Hørland 2003, p. 395).

They argue that once we (as information scientists and indeed as lay actors) recognize the meaningful component of any information received, we are embracing a "hermeneutic view because the understanding is determined by the pre-understanding of the observer". They refer to the explicit "information hermeneutics" which has been developed by Capurro in earlier work. And they note that this approach has affinities "with the approach known as social constructivism (e.g., Frohmann, 1994; Savolainen, 2000)" (Capurro & Hørland 2003, pp. 395-396).

Capurro and Hørland are of the opinion that those engaged in IS research cannot avoid epistemological debates concerning the nature of information and knowledge. They believe that IS researchers should be equipped with:

broader knowledge of philosophy of science … and of principles of languages for special purposes. We believe that the focus of information professionals … implies a sociological and epistemological approach to the generation, collection, organization, interpretation, storage, retrieval, dissemination, transformation and use of information (Capurro & Hørland, 2003, p. 389).

The reason they believe that this "general knowledge" is helpful for IS researchers, is to avoid a collapse into a naïve understanding of "information" as neutral. They favorably cite Romm (1997) in this regard:

Romm (1997) shows that there are serious ethical implications involved in defining as something factual as opposed to defining it as something meaningful. To the extent that information is seen or presented and legitimized in terms of its supposed factual content, it authorizes a picture of the world rather than inviting debate on the construction and relevance of the picture. Conversely, insofar as information is treated as a product of specific world-constructing activities, it invites discursive inquiry as to its ongoing meaning and relevance (Capurro & Hørland, 2003, p. 387).

They thus plead for IS inquiries to take into account how information comes to be regarded (by different actors) as meaningful in various social contexts. They advocate for introducing as part of the field of IS – and with some expansion of it to include other "disciplinary" fields such as sociology and philosophy of science – this "sociological and epistemological approach". Their focus is on how IS – linked to sociology and epistemology – can study contestation over what counts as "knowledge" and "knowing" in the global knowledge society. They emphasize that according to the social constructivist epistemology which they advocate, we do not have access to "realities" independently of how we (through our language and our cultural resources) create "objects" of recognition; and they suggest that this is an important perspective for IS researchers to bear in mind, so that neither IS researchers nor lay people claim privileged access to reality.

The focus of this chapter is on extending the transformative aspect of their constructivist approach (for those "sending" and "receiving" messages). This aspect is summarized by Capurro as follows:

A message we send or receive is to be called information if, and only if, it entails the possibility of changing in a significant manner something of our previous ways of relating to ourselves, to other persons, to things and to situations in the world (Capurro, 1996, online, as cited in Myburgh, 2009, p. 91, emphasis added).

Myburgh relates this statement of Capurro's to a point that she makes regarding the possibility of IS researchers enabling research participants (who become participant researchers) to *think beyond the socially constructed context and its accepted norms*. She points out that this way of regarding IS studies permits people in society "to 'see' or understand things differently, and [to] change the ways in which things could be understood" (2009, p. 325). She argues that the processes of constructing and reconstructing knowledge are part of the proper domain of IS studies. Like other authors who recommend a transdisciplinary approach to IS – where IS research embraces other "disciplines" as well as a

relationship with various stakeholders in the broader society – Myburgh (2009, p. 324) too puts forward an argument for transdisciplinarity, in the context of discussing IS as potentially transformative. This chapter provides detail on what this might involve by considering in depth (and reflection further upon) a particular example that can be regarded as instantiating the way in which IS can become transformative by being geared to "transdisciplinarity". But first, the section below outlines some implications associated in the social scientific literature with a transdisciplinary stance towards undertaking research in the social realm.

TRANSDISCIPLINARITY AND ITS TRANSFORMATIVE POTENTIAL

As far as the distinction and relationships between interdisciplinarity in research practice and transdisciplarity are concerned, Dodig-Crnkovic et al. note, following Klein (2010), that we can make a distinction between "endogenous interdisciplinarity" where the focus is on the internal theory building between existing academic disciplines (with academics from different disciplinary backgrounds learning from each other in interdisciplinary co-operation amongst themselves), and "exogenous interdisciplinarity". The latter, they note, is "driven by real-life problems knowledge integration and could be identified with transdisciplinarity" (2017, p. 218). When interdisciplinarity becomes exogenous and is *driven by relationships with participants and stakeholders,* with their actively taking part in the research enterprise, it moves towards "transdisciplinarity". Here, as Dodig-Crnkovic et al. explain, the "deep interdisciplinary collaboration between academic research fields adds the factor of real-life relevance and stakeholder involvement" (2017, p. 218).

Considering definitions of inter- and transdisciplinary teamwork as used in the literature, Stokols remarks that often the terms interdisciplinary and transdisciplinary are used interchangeably. But he suggests that transdisciplinarity can be defined as involving the creation of "novel conceptual and methodological frameworks which transcend disciplinary perspectives" (2018, p. 323), and furthermore this kind of research implies that efforts are made among "scholars and community partners to translate research findings into strategies for *resolving community and societal problems*" (2018, p. 325, emphasis added). In similar vein to Dodig-Crnkovic et al., Stokols points out that transdisciplinary research creates richer understandings amongst scholars/academics from different disciplines as they learn from each other, while in addition this learning extends to develop mutual exchanges with "community partners", from which all parties can learn. The knowing endeavor is thus not isolated in the sphere of "academia" and indeed is not controlled by "academics".

Chilisa expands on this point when she suggests (in the context of considering knowledge co-production in "sustainability science") that a:

transdisciplinary research approach must seek to bridge the divides between academic disciplines, between producers of knowledge and end users (Brandt et al. 2013), and between an academic system that has been "created as the epicenter of colonial hegemony" (Shizha 2010) and indigenous knowledge [from participants in the field] (2017, p. 813).

Chilisa reminds us that within "disciplinary" thinking and even in thinking across disciplines (as in interdisciplinary research and presumed-to-be transdisciplinary co-operation), often conventional (Western-dominated) understandings of "doing research" lead to research becoming a top-down exercise,

which tends to undermine the knowledge/insights of participants in the field. Chilisa (2012) laments these practices, where professional researchers (still) control the way research questions are set, the way the research is organized, and the interpretation of "results". It is for this reason that she posits the importance of recognizing the value of Indigenous paradigms for research (e.g. Cram, 2009; Harris & Wasilewski, 2004; Kovach, 2009; Ndimande, 2012; Smith 1999), which are built on *relational knowing* as part of their epistemology, where all parties in the inquiry develop their "knowing" in interaction with one another. She notes that advocacy of an Indigenous paradigm (and attendant epistemological and ethical assumptions) does not exclude recognition of other paradigms of social research: she does not propound either/or thinking where one way of thinking (or way of doing research) excludes learning from other styles. But she does believe that thus far in academia there has been too much focus on research that is researcher-controlled and not sufficiently participatory or sufficiently geared to creating new (more relationally-inclined) ways of people knowing together as part of a knowing enterprise (2012, p. 3).

As far as the connection between Indigenous and transformative paradigms is concerned Chilisa concurs with Mertens (1999, 2009, 2012) who named the "transformative" paradigm for social research, where the focus is on (professional) researchers working with concerned participants and stakeholders to further social justice and also ecological justice (such that relations with all living and non-living things is taken into account – cf. Cram, Chilisa, & Mertens, 2013; Chilisa, Major, & Khudu-Peterson, 2017). The suggestion is that all too often the discourses that have gained prevalence in societies across the globe have disregarded the contributions generated within Indigenous cultural heritages. Researchers, it is argued, should be alert to this as problematic – so that the research enterprise itself does not reinforce this dominance. (See in this regard also Dei, 2012, Harris & Wasilewski, 2004, Lavia & Mahlomaholo, 2012, and Ryser, Gilio-Whitaker, & Bruce, 2017.) And, as importantly, the suggestion of Indigenous scholars is that as a matter of ethics, a relationship of reciprocity needs to be set up with research participants and concerned stakeholders in any context of research, so that the research becomes of benefit not only for "academics" for writing up in scholarly works, but also inputs constructively into the unfolding of the worlds of which the research is a part (rather than apart).

The argument developed in the course of the chapter is that it is important for IS researchers to be reflexive about their involvement in the field of study (in collaboration with other researchers and stakeholders in society), so that IS research becomes attuned to taking on board a variety of issues and concerns related to the quality of living/being in the context under consideration. The aim of IS researchers, then, is not as would-be professional "scientists" to try to examine in neutral guise how information systems function in various contexts of society, but to *work with participants and stakeholders to construct such systems in ways that are regarded as constructive and as enabling transformative possibilities*. Mixed methods (and inter-and transdisciplinary thinking) can then be used in IS research while involving participants in, as Cordoba and Midgley put it, "designing a whole system of inquiry that is adequate to the concerns identified in a particular context of application" (2006, p. 1073). In the case of the research facilitated by Corboda and Midgley, the context of application was a university in Colombia, where Cordoba and Midgley were concentrating on applying what they call principles of "critical systems thinking" to the research which they were undertaking in relation to information systems planning. The idea was to set up a "system of inquiry" as part of the research process.

This is akin to what Moggridge (2001) terms "possibilities for research and practice in developing community information systems when [this] is approached as human inquiry" (2001, p. 46). She uses the term "human inquiry" as an umbrella term to

embrace all those approaches to research which have at their heart a commitment to learning that is undertaken with and for people. To fulfil this commitment requires that research is conducted through the active involvement of participants for mutually beneficial practical purposes (2001, p. 46).

What is emphasized further by Cordoba and Midgley (2006) is that IS researchers need to reflect upon how they are catering for what Cordoba and Midgley call a "sufficiently diverse sets of concerns" when (co-designing) IS research projects, and also to bear in mind the "choice and combination of different methods to tackle emergent concerns" (2006, p. 1067). Cordoba and Midgley take up Moggridge's call to take into account the "political aspects of knowledge production" (2001, p. 48), which for them come into play when the research marginalizes certain people in the research process (by not including them) and marginalizes certain issues (which are not surfaced or not surfaced with sufficient strength). Hence, as will be seen in the discussion of their work as detailed below, they used the interviewing process (with carefully selected participants), the workshop process (with chosen stakeholders) and the design process (to design new information systems) by reflecting upon their own "boundary judgements" as to who to include and what issues to bring to the fore for attention. In this way, the research process as a whole arguably can be said to have been transformative, as spelled out in a later section of the chapter.

The example provided by Cordoba and Midgley (2006) offers an indication of how one can study and at the same time contribute to what they call "orderly provision of data and information within an organization" (Cordoba & Midgley, 2006, p. 1064), while paying attention to encouraging improvements of aspects of life within the organization and indeed in the wider society. By referring to this example, the chapter draws out and further explains how IS researchers can join with participants and concerned stakeholders in developing a *forward-looking research approach which is transformative in intent.* Attention is also given to how their research approach, which specifically exceeded "disciplinary" thinking (in terms of a singular academic disciplines, such as IS narrowly defined), was systemically geared in the sense of encouraging "whole systems inquiry", with participants and stakeholders becoming central agents in the inquiry process too. It is shown how the researchers invited this participation, while they themselves did not shy from offering as part of the discussion their perspectives (as critical systemic inquirers) and their values, such as the value of co-operation and the value of enhancing a sense of connectedness to others. (In this values-based inquiry, in keeping with transformative and Indigenous paradigmatic positions, Cordoba and Midgley carried such values into their inquiries – see also Romm, 2015, pp. 415-422, 2018, pp. 24-30 and Whitby, 2018, p. 24 for additional discussion on value-infused inquiry.)

Issues and Controversies

As can be seen from the discussion above, not all researchers or IS researchers would agree that professional inquiry permits the initiating researchers as facilitators of the inquiries to present themselves as "part of" rather than "distanced from" the inquiries. As noted by Tlale and Romm (2019, § 1), often "scientific" research is associated with what Siry, Ali-Kahn and Zuss (2011, §9) call "the normalcy of research/researcher distance as sound [research] practice". This tradition of research, which is embraced by postpositivist-inclined researchers and sometimes interpretive-inclined ones, suggests that researchers should seek to get as close as possible to "the truth" about reality through adherence to the principle of so-called "objectivity" (Hunter & Brewer, 2015). This position has been challenged within social constructivist approaches of the kind espoused by Capurro and Hørland (2003) and Myburgh (2009) in

the IS methodological literature, when they claim that constructions developed through inquiry practices are generated through a *relationship* between the (professional) researchers and the participants. In other words, their argument is that *it is through this relationality that constructions (meanings) become formed and re-formed*. The pursuit of "distance" also been challenged by IS researchers who consider that research is necessarily, as Midgley (2000) puts it, and as pursued further by Cordoba and Midgley (2006), *interventive* in the unfolding of social life. And it has been challenged by those who urge that research (and IS research) should be made more relevant through involving participants and stakeholders in the co-inquiry process (Dodig-Crnkoviv, 2017; Whitby, 2018.)

This chapter will not delve into the paradigmatic controversies as located by various authors in the social scientific literature (e.g. Chilisa, 2012, Dillard, 2006, Lincoln & Guba, 2003, and Romm, 2018), but instead will focus on *what is possible once an explicit transformative orientation is adopted by (professional) researchers/facilitators*. Readers can "enter" the continuing paradigmatic controversies by engaging with the arguments made in this chapter for a transformative-directed approach to be built into the inquiry process. The way in which this is handled in the chapter, is via detailed reference to an example, which, it is hoped, provides an illustration of possibilities for considering the value of research as linked to its transformative intent. Before this example is discussed, it is worth elucidating the "theoretical framework" that is being brought to bear in this chapter, namely, a theory (and attendant ethical position) for conceiving "triple loop learning", as outlined by Flood and Romm (1996a,b,c, 2018a,b).

POSSIBILITIES TO STIMULATE "TRIPLE LOOP LEARNING" VIA RESEARCH PROCESSES

As detailed below, it is being proposed in this chapter that Cordoba and Midgley's example – as they reflect upon it and as it is here further reflected upon – tallies with what Flood and Romm (1996 a,b,c, 2018a,b) refer to as triple loop learning (TLL), which can be encouraged within organizations and the wider society. TLL can be regarded as a theory that postulates, and at the same time encourages, the possibility of learning on three levels all linked to one another, namely, the level of "design", the level of "debate", and the level of recognizing "power relations" (2018a, p. 260).

Flood and Romm argue that when the concentration in any social context is overly focused on "design", then the defining of "ends/goals" is not deemed as problematic. So people (in organizations, such as in this case those designing information systems) become (too) task oriented and concerned only with the best means to meet the defined ends. The means are a search for "an implementation that produces the 'right way' of achieving the ends. The center of learning [simply] asks, "Are we doing things right?" (Flood & Romm, 2018a, p. 262). However, as Flood and Romm note, a focus on this "center of learning" isolated from other centers, implies that questions concerning "what is right" (as debated amongst various contending parties) and questions such as "is right defined by the more powerful to the exclusion of other voices and stakeholders in the discussion?" become precluded/marginalized as if these questions are less important or indeed unimportant (2018a, p. 262). The role of critical systemic researchers according to Flood and Romm (1996a,b,c, 2018 a,b), whose argument resonates with other critical systemic thinkers (e.g., Flood, 1999; Jackson, 2010; Midgley, 2000, 2001; McIntyre-Mills, 2006, 2014) is that it is important to bring to the fore questions arising from what they call the three "centers of learning" while working with (concerned) participants and stakeholders. This means that when doing IS research, critical systemic researchers, working in close connection with participants and stakeholders in particular

localities (who become co-researchers), deploy a variety of research methods with the intent to encourage "triple loop learning", which is marked by people's looping between the three centers of learning.

The research that was undertaken by Cordoba and Midgley (2006), who used a critical systemic lens to examine and at the same time transform information systems planning in the setting in Colombia, arguably offers an example of stimulating learning on all these levels. As Cordoba and Midgley note, when reflecting on the study, "this [research] approach "helped participants to uncover and address important human issues not usually seen as relevant by traditional approaches to information systems planning" (2006, p. 1064). In the following sections of this chapter more detail is provided on how they went about this research, including the methods that they used (and adapted in situ) and their ways of conceiving their relations with participants and stakeholders during the unfolding of the research. What is particularly noteworthy about this research is that – along with being oriented in terms of a critical systemic stance – the research also tallies with wider social scientific literature on the epistemological and ethical underpinnings of transformative-directed research, where the aim is, as expressed by Rajagopalan and Midgley (2015, p. 546), to "help people explore the scope of analysis and define the reach and focus of possible actions". (See also Romm, 2015, for further discussion around the connections between the transformative paradigm as a paradigm for social research and critical systemic and (Indigenous) relational lenses.)

TRIPLE LOOP LEARNING AND MAKING INFORMATION SCIENCE RESEARCH RELEVANT

The three dimensions of triple loop learning form an instructive basis for conceptualizing research design in the context of information science. The focus on the "design level" as presented in the TLL theory implies that the concern will be on providing access to information to the right person, at the right time and at the right price (i.e., functionality of the systems) at the expense of the level of "debate", and the level of recognizing "power relations" (Flood & Romm, 2018a, p. 260). The task-orientation perspective tends to reinforce the positivist epistemologies. The influence of the positivist knowledge claims is evident in the dominance of quantitative research methods in IS research over the past decades (Blake, 1994; Togia & Malliari, 2017; Ullaha & Ameen, 2018). The positivist stance focuses on confirming the status quo rather than challenging it. The approach tends to be conservative and does not give researchers the opportunity to investigate "wicked" problems. Wicked problems are "replete with social and institutional uncertainties" and cannot be resolved by traditional research processes (Mertens, 2015, p. 3). A transformative framework that is rooted in the "debate" and "power relations" levels of TLL theory provides strategies for investigating social phenomena in a holistic and comprehensive manner. In the context of information science, such an approach may facilitate the investigation of what Hashmi (2019) describes as the geographic situation (context of the information service), information services and community engagement.

The transformative framework challenges the status quo and has a potential to lead to social change and justice. Research that is done along traditional positivist lines, as it is largely the case with the current IS research discourse, is not capable of fully addressing societal problems. Its concern tends to be on maintaining that status quo and privilege. Confirmatory research epistemologies cannot go beyond that. The community is sidelined as it is not informed, consulted, involved and empowered. Involving all the stakeholders, as it going to be demonstrated later in this chapter, has the potential to build a trans-

formed, inclusive and better society. The transformative framework which is advocated in this chapter offers information science researchers the possibility of conducting research that fosters social justice and inclusivity. Quantitative research methods have limited transformative power. Mixed methods research that is described later in Chapters 20 to 22 and research that is informed by an interpretivist epistemology provide more adequate research methodological tools to address the transformative agenda. Such agenda places humans at the centre of information science research ahead of the functionality of systems (Cibangu, 2015). Researching and learning across all the three levels of TLL theory has the potential of providing an inclusive and more comprehensive discussion of social phenomena.

THE RESEARCH BY CORDOBA AND MIDGLEY (2006): NOT JUST A "FINDING OUT" ENDEAVOR

Cordoba and Midgley emphasize that the inquiry process as they conceived it was *not* aimed at trying to examine the way in which those responsible for information systems planning in the organization handle this, and/or to capture the meanings that such planners and others attribute to the information that is made available in the organizational systems. The aim was more to encourage those involved and concerned "to reflect on and review their own assumptions and values in relation to situations [as they perceive them]" (2006, p. 1068). Cordoba and Midgley state that one of the ideas (starting assumptions) that guided their research is that "there is the possibility of creating new understandings about a situation through conversations with others". They also started with a guiding value that informed their relations with participants that:

When we [anybody involved in conversation] encounter divergent views about a situation, we should assume an attitude of openness and respect for the concerns of others, and consider possibilities for creating new domains of action in which multiple concerns can be addressed (2006, p. 1068).

They highlight the importance of strengthening communication "as an integral aspect of [good] information systems planning" (2006, p. 1069). Certain literature in the field of information systems planning (especially literature that regards information as meaningful, as mentioned in the Introduction to this chapter) also refers to such planning as an "ongoing enactment of meaning between participants" (as Cordoba & Midgley, 2006, p. 1069, put it). Cordoba and Midgley point out that this literature questions the notion that information systems planning is a matter of "provision of information to serve organizational purposes" (2006, p. 1069). This is because the definition of "information" and of "useful information" (used to serve purposes) *depends on how people consider what is important for them*. Furthermore, what the "organizational purpose" is taken to be, *may be seen differently by different people in the organization and indeed in the wider society*. Critical systemic thinkers will be alert to "conflicts of interests and expectations" (2006, p. 1069) and will try to explore these together with the relevant participants and stakeholders, in an effort to encourage people to reframe what are important goals to pursue, such that the information systems can be designed accordingly.

In terms of Flood and Romm's theory (and practice) of TLL, if people in organizational contexts take as "given" (and keep circling around) a "design" loop of learning that is task directed to serving what are presumed to be organizational goals, these can become entrenched without sufficient discussion. Researchers should not be reinforcing this via the way they construct (IS) research investigations, without

also encouraging participants to enter the loop of learning that allows an engagement with alternative visions of goals (for the organization and for its role in the wider society) and the loop of learning which "corrects" for dominant discourses becoming unquestioned (by reconsidering the political aspects of knowing). Resonating with Flood and Romm's suggestion that social inquiries can be used as an opportunity to share ideas and concerns with participants and stakeholders, Cordoba and Midgley adopted a similar critical systemic perspective when going about the IS research. As Rajagopalan elucidates, when explaining Midgley's understanding of critical systems thinking (CST), this "wave" of systemic thinking advocates a critical stance in relation to taken-for-granted and socially pervasive meanings (2016, p. 78). What is also important within a CST stance, is that no matter what methods are used, they need to be used in such a way that they do not presume to present accounts of "realities" unmediated by processes of social dialogue, inviting discussion between all those involved in the inquiry process (including the contributions of those initiating the research) (Rajagopalan & Midgley, 2015).

METHODS USED IN THE RESEARCH PROCESS AS DIALOGICALLY GEARED

Interviewing Style as Dialogical

In order to activate a research process that could examine as well as extend the meanings of participants and stakeholders (who were brought in later), Cordoba and Midgley note that they started by setting up 20 interviews with participants. The people were chosen as follows:

In total, 20 personal interviews with a distinction orientation were conducted. The first 11 (six administrators, three academic staff and two project leaders) were suggested by our contacts in the University. This list was then extended in consultation with the first 11 interviewees (we added six more administrators, one member of the Jesuit community working at Javeriana, and two more academics). In this way the research team 'rolled out' the boundaries of participation (2006, p. 1072).

The interview style that they adopted when conversing with the participants did not amount to asking them to report upon how they have technically designed information systems and/or to talk about how they perceive the purpose hereof in the organization (and the place of the organization in the wider society). This "extractive" mode of interviewing is based on the notion that interviewers *should try avoid impacting on or influencing participants* during the interview situation and should simply "extract" their knowledge/views (cf. Kuntz's critical conception of this extractive mode of research, 2015, p. 33; and see also Romm's discussion, 2018, p. 322). The style of interviewing as used by Cordoba and Midgley was not intended to be "extractive" (as if one can ever extract participants' thoughts and feelings outside of contexts of human relations, such as in this case the relations between the research team and the participants). The style which the research team adopted was more in keeping with what Hamann and Faccer (2018) call dialogical interviewing, what Mitropolitski (2013) calls interactive interviewing, and what Tanggaard (2009) refers to as the research interview as a dialogical context. The idea here is that the interviewer cannot and indeed should not try to avoid influencing the way in which people consider their meanings and values. This concurs with Midgley's point (2000, p. 44) that the "subject" (in this case the researcher) always has some impact on the "object" (that which is being studied). Just as in quantum physics where it has become recognized that as we try to "measure" objects, so we exert impact on them

by virtue of our applying the measurement, so the same applies in the field of social life (cf. Bausch, 2016; Gergen, 2009, 2015; Lincoln & Guba, 2013; Romm, 2018). The discourses and ways of framing questions/issues as used during the process of research become part of the meaning-making repertoires of participants in the social world and are therefore not without social consequence.

Hence, acknowledging that research will always – wittingly or unwittingly – influence the way in which social life unfolds, the researchers chose to consciously introduce issues for participants to reflect further upon. As Cordoba and Midgley put it, during the interviews the researchers "surfaced [introduced] issues" that they felt might need to be discussed, given the context also of the wider society. In order to surface different issues, they drew on a technique used by Weil (1998) which involves taking newspaper clippings in relation to topical issues (and concerns) in the wider society and also on the international stage. As they state: "The pictures represented a variety of personal, community, national and international issues that we considered might be of potential concern for people living in Colombia" (2006, p. 1072).

In relation to the pictures Cordoba and Midgley asked participants to answer questions such as:

- *Why do these pictures matter to you?*
- *What do they represent in terms of your own concerns or desires?*
- *What personal values do you see reflected in the pictures?*
- *Are there any ethical conflicts that could be identified from the pictures?*
- *What about (related concern)? Do you think it is important?* (2006, p. 1072).

Corboba and Midgley state that this set of questions was intended to "tease out concerns and the ethical issues they could raise for the interviewees and for others" (2006, p. 1072). In this way participants became encouraged to consider more deeply their relationship to these issues and indeed to locate, with the help of the researchers, "blind spots" in their thinking. These blind spots relate to "people and issues that could be considered relevant but had not yet been identified" (2006, p. 1072). So the idea was to encourage them to at least consider these "people" (whom they may not previously have considered relevant in regard to information systems planning) as well as issues (that again they may not originally have considered relevant).

Cordoba and Midgley indicate that when interacting with the individual participants (and also later in the workshops when interacting with groups of participants), the researchers did not present themselves as "outsider" professionals trying to "observe" people from a distance (as if this is possible). They explicitly "presented ourselves as participants in the situation rather than observers of it" (2006, p. 1071). This is consistent with the deliberations of authors such as Dickson Swift et al. (2006), Meerwald (2013), and Tlale and Romm (2018, 2019) who point to the fuzzy distinction between "researchers" and "participants", as both become "researchers" as well as "participants". Cordoba and Midgley suggest that by presenting themselves in this case as indeed participants (in the mutual knowing process), this "gave us two explicit responsibilities: (i) to design the sweep-in process, ensuring that marginalized voices were included; and (ii) to contribute, but not privilege, our own concerns" (2006, p. 1071).

That is, they made it clear that as researchers but also as concerned participants they felt obliged to include marginalized voices (and indeed marginalized issues which have been marginalized in organizational and wider social discourses). And they also professed that at times they would share their own understandings of issues, but not with the intention of privileging them. This ties in with Msila's point, when discussing mutual learning in the African context, that sharing is an African obligation (2017, p. 57). Through the process of mutual sharing and discussing of ideas, mutual learning could occur – with

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research participants learning from Cordoba's and Midgley's input (and from the issues they brought up for attention) and vice versa.

Dialogically Geared Workshops with Stakeholders

Cordoba and Midgley indicate that:

In addition to the 20 individual interviews, six workshops were held. These basically used the same format as the interviews (choosing pictures, identifying concerns and discussing them using the trigger questions) (2006, p. 1072).

They point out that the idea behind setting up the workshops

was to significantly widen the boundaries of participation in the distinction phase, especially to stakeholders outside the University. We held workshops with students, business people in the community, and "citizens" more generally (2006, p.1072).

They note that the citizens' workshop drew in people from a variety of sources (and they refer to Cordoba, 2002, for more details). The idea of holding citizen workshops has also been discussed by Gregory and Atkins, in the context of their discussing what they call a "citizen science" (2018, p. 1111). Gregory and Atkins' research work has been inspired by the ideas of Ulrich (e.g. 1986, 2001), to which Cordoba and Midgley too refer. The quest to generate physical and digital platforms for citizens to "raise issues for discussion, report problems, and inform other citizens" so as to create what Kakoulaki and Christakis call a "greater 'image' of the issues discussed, along with discovery of roadmaps for issue-resolution" offers prospects for increased citizens' involvement in the interpretation and reframing of "information" through face to face and/or digital workshopping (Kakoulaki & Christakis, 2017, p. 449).

In the case of the research set in Colombia, Coroba and Midgley mention that their style of facilitating the various workshops was similar to the one-to-one interviewing style (in that both the interviews and the workshops were set up to encourage reflection on assumptions and mutual learning). However, in addition, Cordoba and Midgley note that:

For the workshops, the format of the individual interview was adapted. The participants were divided into subgroups of three people, and they rotate the roles of interviewee, interviewer and critical friend [with the latter offering critical commentary on the way people were phrasing issues, with a view to highlighting what was being left out in "blind spots"]. After everybody had been interviewed, the participants presented the outputs to the group as a whole. The researchers then summarized the main findings and also facilitated challenges to some of the assumptions being made regarding the way of life people either already had, or wanted to attain, both at Javeriana and in the wider Colombian society (2006, p. 1072).

The extensive quote above has been chosen here as it offers in interesting format (which can be used/ adapted by other facilitators) for dialogical workshopping which at the same time allows for challenging perspectives – as participants themselves, critical friends, and researchers, bring new issues to the fore. Cordoba and Midgley indicate that this mode of workshopping was fruitful in this case in that, as

a result of all the workshops being held, the following "shared" concerns (among all those involved) came to the fore as follows:

(1)   The urgent need in Colombian society to establish a culture of mutual respect, collaboration and solidarity. Situations of violence and civil war were seen as a manifestation of a lack of tolerance for diversity. Students in particular were concerned about the importance of generating values through education, which could help them to assist those people in need and restore confidence in the country, so that a nonviolent way forward can be found.

(2)   Adopting internationally recognized education standards and practices. There were concerns about the need for Javeriana to become accredited by international bodies so there could be new opportunities for international student exchanges, funding and collaborations.

(3)   Providing access to education for low-income groups (2006, p. 1072)

This does not mean that sharedness on all issues was accomplished, but without the workshops it is unlikely that the shared concerns would be have been identified.

Information System Design Exercise – Rooted in Issues and Concerns that had Been Discussed (With Provision Made for Ongoing Discussion)

Having held the interviews and the workshops, the information systems planning process at the University could now be (re)designed. Participants at the University took part in what Cordoba and Midgley call a "design exercise" to design an appropriate information system (p. 1073). During this exercise it was recognized (thanks to the previous phases of the research) that new ways of designing had to take place so that the focus was not on developing the planning in terms of managers' perceptions of how the "information" could best serve their pre-defined organizational goals, but so that the information system would be responsive to the variety of concerns that had been raised. The focus could be on those that had been newly discussed as "shared", but also taking into account other concerns that had not been "common". Also, provision was made for continuing ongoing discussion, along similar lines to the discussion format that had been used while the researchers were facilitating the inquiries.

The researchers offered as guidelines for the "design exercise" the following aspects that they proposed a "good" design should feature (following Ackoff, 1981), namely,

1.   Technological feasibility (no impossible technology should be proposed);
2.   Operational viability (the system should be sustainable in relation to its environment); and
3.   Adaptability (the system should be able to respond to changing circumstances).

Cordoba and Midgley point out that "in addition to these three conditions, we also proposed that any system should promote the general values of cooperation and continuous improvement" (2006, p. 1074). This extra proposal of theirs is consistent with Flood and Romm's advocacy of TLL as including not only a concern with *technological feasibility, operational viability, and adaptability*, but looping around the circle of "debate" (in terms of principles of co-operative learning) and looping around concerns with "improvement" (recognizing that visions of improvement are not politically neutral – hence considerations of how visions are developed should be accounted for). Cordoba and Midgley state the last-mentioned

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concern was encouraged by them in their own seeking to promote "a critical attitude concerning potential marginalizations that could follow from the implementation of plans" (2006, p. 1073).

FUTURE RESEARCH DIRECTIONS

The example that was provided in this chapter was not provided with the assumption that it can, or need be, "replicated" in the sense of other researchers trying to "repeat" the manner in which the research was handled in this case. Rather, it can be regarded as being relevant for readers and for IS researchers insofar as they treat it as what Gergen (2015, p. 301) calls a *"resource" that can be drawn upon and adapted in other research contexts* where researchers wish to apply methods with transformative intent. In future research it is, however, suggested that the following can also be given consideration during the research process:

- Further experimentation with questioning during the research process the divides between "academics" and "practitioners/research participants", so that "academics" can be seen as legitimately contributing as participants in the realm of social life, with the intention of stimulating co-production of insights that might be helpful towards addressing felt challenges in the social realm.
- Further experimentation with ways of encouraging feedback from research participants along the way, so that the research process can become an evolving one in the light of such feedback (as advised by Poth, 2018, p. 173).
- Further experimentation with working across different "ways of knowing" that may be brought to the table during the inquiry, without rendering superior any one of them – for example, more empirically based, more imaginatively based, and more spiritually based ways of knowing (cf. Gergen, 2009; Msila, 2017; Wane, Akena, and Ilmi, 2014).
- Further experimentation with encouraging empathy or a sense of connectedness between the participants who are party to the inquiries (as advised by methodologists who suggest that research can become transformative in nurturing a sense of connectedness – see, for example, Laouris, 2014).

Insofar as readers of this chapter activate and report on these proposed activities as part of the research process (as well as other ones identified by readers), the examples of such work too can function as additional resources for audiences (academic and lay), which in turn can be used to again guide further research work along these lines. In this way, a repository of examples of IS research practiced with transformative intent (and challenges identified in handling this, as well as deliberations around these) can become developed.

CONCLUSION

This chapter was intended to explicate a vison of IS research as potentially transformative in its impact. An understanding of IS as being "transdisciplinary" implies that its remit is linked to its engaging with practitioners involved with information systems development – through the way in which the research becomes conducted as a participatory endeavor. It was suggested that IS researchers can consciously and

unapologetically offer input into the unfolding dynamics of information systems development within organizational and social life. The chapter made this point by concentrating on detailing – and drawing out aspects of – the example of doing IS research which was facilitated by Cordoba and Midgley using an interplay of dialogically-oriented methods geared towards (constructive) transformation. The example was discussed also in relation to wider literature on ways of researching in the domain of IS.

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KEY TERMS AND DEFINITIONS

Critical Systemic Thinking: An approach to systems research where "knowers" admit that we do not have unmediated access to "the social world", and that we need to discuss, in dialogue with others, how we draw boundaries around issues to be explored and the range of participants to be included in the inquiry (as an ongoing process).

Information Science Professionals: Researchers committed to exploring (with others) the processes involved in the practice of (co)designing and (co)developing information systems, including the provisions that might be made in such systems for embracing a diversity of social concerns.

Interdisciplinarity: A research process wherein academics who bring disciplinary backgrounds to bear on the study are geared to learn from each other in interdisciplinary co-operation.

Transdisciplinarity: A research process wherein interdisciplinary collaboration between researchers extends to developing collaboration with participants and stakeholders outside of academia, so that researchers located in academia work alongside them in the knowing endeavor.

Transformative Paradigm: A view of the research enterprise which advocates that researchers should consciously use the research process to work with concerned participants and stakeholders to further social and ecological justice.

Triple Loop Learning: A mode of learning which appreciates the need to learn across three levels of learning all linked to one another, namely, the level of "design" (of organizational life), the level of "debate" (through dialogical encounter), and the level of recognizing (and trying to shift) "power relations" which impinge on the inquiry process.

Values-Based Research: A research stance where professional researchers strive to facilitate the development of some sharedness of visions in the social fabric, with a focus on also including marginalized visions towards developing social change which is experienced as increasing social (and ecological) justice.

Chapter 16
Whose Truth Is True?
The Use of Archival Principles to Authenticate Oral History

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ABSTRACT

African societies use memory to store valuable historical information. This memory is passed from generation to generation through oral history. This method uses oral testimony, oral tradition, and, to some extent, archival sources for evidence. This memory is in danger of being obliterated as the historical truth is not directly accessible, or, in some instances, the truth can be distorted to suit the griot. While traditional archival principles such as archival diplomatics are used to authenticate records, oral history is often characterised by deliberate distortion of facts. This chapter explores the use of archival principles to authenticate oral history. It was established that some elements of archival principles can be used to authenticate oral history. Written records and oral history can complement each other to provide the 'whole truth'. It is concluded that oral history fits the description of a record. The griot is no different from any medium of a record and is as reliable as any other medium.

INTRODUCTION

Many have undertaken to draw up an account of the things that have been fulfilled among us, just as they were handed down to us by those who from the first were eyewitnesses and servants of the word. With this in mind, since I myself have carefully investigated everything from the beginning, I too decided to write an orderly account for you, most excellent Theophilus, so that you may know the certainty of the things you have been taught. (Luke 1: 1-4)

A number of scholars and commentators in eastern and southern Africa, as observed by Tough (2011) have articulated severe criticisms of the resultant colonial archives, and many of the critics have advocated oral history programmes to fill the perceived gaps. Indeed, most commentators in South Africa in particular remain angered or at least disoriented by an exclusionary past and even more so by the seemingly bleak future for the inclusive archives that can cater for all of the rainbow nation as the country is known. This is so because the archival system in South Africa is based on the premises set by Western civilization which at times can limit the ability to deal with certain realities. Criticism of the Western way of archiving relates to the fact that such a system caters only for the elite and those who are in power. This has been the case in South Africa with the archival holdings reflecting colonial and apartheid realities. Despite the dawn of democracy, the archival scene in South Africa is still mainly the Western-dominated global mainstream. This is true to the assertion of the towering archival theorist, Ketelaar (1992) that "the cruel paradox in many revolutions is that what is left after the revolution resembles the past" (p. 5). Perhaps, put differently by Nadine Gordimer in her award-winning novel 'July's People, that 'in the interregnum, old habits perpetuate and entrench themselves in the so called new order'. Even when assigned the mandate to position archives to play an important role in redress, transformation and knowledge production through oral history that is relevant to the ordinary people, the archival situation still resembles apartheid in South Africa. Documentation of history of marginalized communities is almost non-existent and in cases where it does exist, it has many inaccuracies as it is recorded in a problematic way (Ngoepe, 2019). In a dialogue with Sello Hatang, and Verne Harris argues that even when presented with a powerful opportunity to 'transform, refigure and re-imagine archives', the practice in South Africa is still shaped and sharpened by the Western foundation (Harris & Hatang, 2000).

One way of transforming archival holdings is through conducting oral history, which is an important part of recreation and rethinking of the past, especially to those who had never had an opportunity in the past (Hatang, 2000). Oral history is one of the ways to integrate indigenous culture into the Western dominant archival discourse in Africa. However, in public archives, especially in South Africa, oral history is often seen as of secondary importance to records and may even be seen as a factor working against the practices of good record-keeping (Archival Platform, 2015). Many people consider truth only to be in recorded form while forgetting that the other way of indirectly accessing the past is through oral history. In both cases of oral history and records, what is regarded as truth entirely depends on the trust of the source. Duranti (2017) suggests that whose truth we are dealing with requires the use of traditional archival principles, concepts and methods, collaborate with technology experts especially when dealing with digital records. While traditional archival principles such as archival diplomatics are used to authenticate records, oral history is often characterised by deliberate distortion of facts emanating from the narrator or even those who do not agree with the narratives of the griot. In oral history, there are many small stories that feed the big stories, and some stories that lead nowhere, vanishing into the sands. These stories are told and retold thereby becoming fluid. It is sometimes difficult to authenticate such oral histories. This chapter explores the authentication of oral history using archival principles or concepts.

The Western way of archiving does not address the relationship between oral culture and written records. This is despite Tough's (2011) contention that Western archive is itself largely the product of a process of turning oral communications into written records. The point is also emphasized by Yeo (2019) when arguing that written records came into being as an attempt to overcome limitations of human memory. For example, in producing minutes of the meeting, oral deliberations are made until consensus is reached which results in recorded resolutions in the form of minutes. In other words, as Turner (2012) would attest, new information emerges orally before emerging in other formats, for

instance, minutes of meetings. This recorded memory was not necessitated by evidence but as an act to counter human forgetfulness. A further example is from the scripture quoted above from the New Testament, where Luke makes a statement that implies that the gospel was written through second-hand experience, that is, converted from oral tradition to written record. Katuu (2003), however, contends that converting orality into written record compromises its characteristics much like printing an e-mail, as it loses evidential weight. Indeed, as oral history is converted to records, it loses its saltiness (*oralness*) and cannot be oral history anymore except to be forgotten and trampled on by the communities, as it becomes a written record. Hence, Masuku and Pasipamire (2014) are of the opinion that "oral history, like ecosystem, naturally preserves itself and therefore does not need the interference of professionals such as archivists" (p. 117). However, Ngoepe and Setumu (2016) recommend the conversion of oral history to written records, but the communities should be encouraged to preserve their own heritage. The problem with leaving oral history to preserve itself naturally, as proposed by Masuku and Pasipamire (2014), is that it might lead to change of the narratives to the benefit of the griot. This may result in one story having two different versions as is the case with the story of the origin of the Malebogo nation in the north western side of Polokwane in the Limpopo province of South Africa (see Setumu, 2010). In this regard, it is difficult to confirm the correct version. Different versions of stories are most common in chieftainship squabbles. Therefore, it is essential that techniques of other fields of studies such as archival science be used to authenticate oral history. Archival science is relevant as the products of oral history are lodged in the archives repositories.

ORAL HISTORY AND ITS IMPORTANCE IN FILLING ARCHIVAL GAPS

The concept of oral history is concerned with capturing personal or 'eye witness' testimony (oral testimony) or chain of testimony (oral tradition) (Yap & Barsaga, 2018). In the former variant, oral history is about recording the life stories (or at least aspects of them) of living people. The latter variant deals with memories transmitted over many generations (Yap & Barsaga, 2018). Oral history, therefore, refers to "the method of getting historical facts or information through interview which has been used in the past and continues to be used now for the purpose of writing history" (Yap & Barsaga, 2018). It is used when one wants to obtain an idea not only of what happened in the past, but also what those memories meant to people and how it felt to be integral during those periods. While written sources tell what happened, oral sources go further to tell how people felt about what happened (Rafapa, 2011). The method of oral history uses oral traditions and/or oral testimony as a form of collecting evidence. Oral histories are usually gathered by historians/researchers through interviews, often using a tape recorder (Lekgoathi, 2014). While oral traditions refer to stories or narratives that have been transmitted by word of mouth beyond the generation that gave rise to them, oral testimony refers to an eyewitness or a first-hand account of an event or a situation that occurred during the lifetime of the person interviewed, hearsay or reminiscences about contemporary events (Ngoepe & Setumu, 2016). In oral tradition, accounts are no longer contemporary, for example, folktales, epics, genealogies, praise songs, and so on. (Lekgoathi, 2014). In the African culture, these oral traditions are often told and retold during the night when the moon is fat in the sky while casting shadows from trees and mountains. Usually, the griot would be an elderly man or woman who would be surrounded by girls and boys sitting together in a group around the fire. However, other oral traditions are narrated to the receiver on one-on-one basis depending on the nature of knowledge transferred. This can range from folktales, family praises, individual praises,

clan origins, rainmaking, astrology, and more. Therefore, oral history uses either of the two methods, that is, oral tradition or oral testimony. It should be noted that in the African tradition a witness is always needed when performing most cultural activities, for example, a person cannot negotiate lobola on his own without accompanying delegates.

Historically, since the pre-colonial period, most of Africa's knowledge was preserved orally, that is, by being transmitted from one generation to the next, as opposed to being written although there were some forms of writing such as murals on the stones. Indeed, oral history has been a significant source of information on the pre-colonial communities in Africa. Oral transmission of stories, histories and heritage ensured their preservation and conservation over centuries, from one generation to the other. Older members of the communities would orally transmit poetry, folktales, proverbs, idioms, legends, riddles, and all forms of educational content to the younger generations, who would in turn relay it to the generations coming after them (Setumu, 2015). However, contrary to popular belief, the written tradition of storytelling may be as ancient as the oral tradition. Early people also wrote their stories with pictures and symbols etched on stone, bones or cave walls (Setumu, 2015). It would seem such murals on the rocks were not considered writing in the Western standards. When the civilized Europe colonized Africa, the continent was considered backward, barbaric and clean slate. The colonisers failed to realize that African's pattern of political and social intercourse was oral in nature as the art of conversation was regarded very highly. This included the settlement of disputes, storytelling, exchange of different types of messages, training and announcements of births and deaths (Setumu, 2015). Similarly, Africans' code of customs, beliefs, laws and social ethics were transmitted orally from the learned/knowledgeable elders to the young thereby facilitating the transmission of their cultural heritage from one generation to another. As these were not recognised by the colonizers, oral history was or is still considered pre-legal (a period before the start of the law) and non-legal (not related to law or qualify for or phrased in the manner of the law) (Duranti, 1994). This is so because the Western canon has long been set up as universal true while oral history was never given a space to grow even though it is not limited by space like written records.

Orality was further challenged by the advent of new technologies. Although orality was not entirely obliterated, its credibility was cast in doubt in comparison to written record. As a result, African orality were excluded from the formal mainstream education presided over by the colonial masters. This led to the loss of much interesting African knowledge and many narratives because they were never recorded. Katuu (2003) emphasizes that orality has been virtually excluded from the curriculum in Africa. However, in the democratic South Africa, there is a growing emphasis on oral history in schools and broader society based on a genuine effort to recover the voices that were silenced by colonialism and apartheid (Ngoepe & Setumu, 2016). Indeed, oral history is experiencing an extraordinary renaissance parachuted by the need to transform archival holdings. This is also done for the purpose of filling the gaps in documentary evidence in archives repositories in South Africa (Ngoepe, 2019). Orality can be particularly effective in supplying information about relationships of personalities whose information is being collected, because how relationships function in practice is often different from how they are officially supposed to work.

One of the earliest uses of oral history across the globe was by archivists in an effort to augment the records that often focused on the elite (Setumu, 2015). Archives repositories and archivists have been in the forefront among the chief promoters and supporters of oral history, although Harris (2015) cautions that archivists are involved in a profoundly problematic way as their programmes are not planned but reactive to political needs especially in South Africa. However, oral history constitutes an important aspect in any archival institution and forms a major component of society's culture and history. This is the case in the Persian Gulf as Ahmed (2018) reports that oral history has come to be seen as a crucial

tool in documenting Arabian Gulf history albeit with little concern about the authenticity of the orality. It occupies a special place among historical sources, providing the basis for many written records. Therefore, the preservation of oral history constitutes a critical aspect of a nation's heritage (Kargbo, 2008).

According to Lekgwathi (2014) and Setumu (2010), oral history can serve many purposes such as: correcting biases and distortions in the official archives, helping to open up new areas of inquiry and discovering written documents which otherwise would have remained obscured. The Truth and Reconciliation Commission (TRC) process, for example, built on oral testimonies of victims and perpetrators of human rights violations under apartheid, highlighted the work of memory in healing and nation-building. The TRC extensively used oral history as a source of information, as well as the South African Democratic Trust (SADET) which compiled volumes on anti-apartheid political struggles, decade by decade, commencing with the 1960s. Once such piece of information is documented, Hatang (2000) advises that archivists should cross-refer in the finding aids that the story in the archives is not the only narrative, but also attributes to the source, which is the narrator.

Oral histories are important because, first they focus on individual experiences, interpretations, reactions and aspirations. It can help in the interpretation of documents in which it can give the researcher synoptic accounts of whole areas for which no overall evidence exists. Where documents frequently contradict one another, oral evidence can save time and clear the blockage (Setumu, 2015). Oral history might well be essential for providing missing facts to complete the picture. Despite the importance of oral history as alluded to, African scholars have raised several concerns over orality and the dominating Western culture. For example, Katuu (2003) contends that orality has not been given enough space within archival discourse. In the Persian Gulf, however, within the field of archives, oral history's "place" has been recognized to be in the realm of community archives, which are typically projects to counter mainstream historical narratives (Ahmed, 2018). This is also the case in Qatar where the growing prominence of community archives is attributed to the "rise of oral history" (Ahmed, 2018). Molobye (2014) laments that in South Africa, although community archives such as Royal Bafokeng Archives exist and are involved in oral history, they are not integrated into the mainstream national archival system. These oral history projects are not even included in the national register of oral history projects (Ngoepe, 2019). It is important that oral history products are integrated into mainstream archival system as they bridge the chasm in archival holdings. However, oral history is not without limitations and problems; hence it requires techniques for authentication.

LIMITATIONS AND SALIENT PROBLEMS OF ORAL HISTORY

Although oral history can be used as a tool to transform archival holdings, it has its limitations and salient problems. Setumu (2010) identifies three main areas of oral history with the first group being "unreliability of memory, deliberate falsification, unfairness through vindictiveness, excessive discretion, superficiality and gossip; over simplification, distortion of interviewee's role; lack of perspective, distortion due to personal feelings, self-consciousness, influence of hindsight and repetition of published evidence. The second group is categorised as unrepresentative sampling, biased questioning and bias towards interviews (Setumu, 2010). The third group is identified as influence of variable factor, failure of some people to communicate well in interviews, misinterpretation of what the interviewee has said, inability of oral history to be verified by others, interview transcripts missing the essence of an interview,

impossibility of true communication, and dependence on survivors and those who agree to be interviewed. It should also be noted that written records produced naturally also do reflect the worldviews and personal prejudices of their creators (Tough, 2011).

The biggest challenge with orality is that in most instances, chances are that the truth can be distorted to suit the griot or that forgetfulness can lead to the problem of chronology of events. As a result, this can compromise the reliability and authenticity of such knowledge as the oral evidence will be inconsistent due to different versions (Ngoepe & Ngulube, 2014; Setumu, 2010). However, it should also be noted that written records are open to alteration, manipulation and subjectivity and can be used to further the writer's own agenda as with their oral counterparts (Hatang, 2000). For example, perusal of many annual reports of governmental bodies in South Africa paints a picture of public organisations that are performing well contrary to what the Auditor-General South Africa found in the audit reports (Ngoepe, 2012). This shows that such reports are prepared to portray the positive image of the institutions. Nonetheless, institutions such as archives repositories exist to preserve written records as opposed to oral narratives which exist in the minds of individuals. On the other hand, Hatang (2000) argues that with oral history the advantage is that even after the story has been narrated, the storyteller still has control over his/her story. The griot can still share this story with others at his/ her leisure, thereby creating many copies, although non-identical as those people can further narrate the story but in a slightly different way. Indeed, oral narratives are unique, fluid and situated. Oral history works to create space for absent subjects and experiences while challenging and deconstructing traditional understandings of the active body (Adams, 2015). However, even written records can result in two non-identical original records. For example, Ngoepe and Netshakhuma (2018) provide an example of such records which are two non-identical copies of the Freedom Charter[1] created at a meeting attended by about 3000 delegates which was broken up by police on the second day; although by then, the charter had been read in full but not signed. The copies of the Freedom Charter were later circulated underground for signatures; hence, the order of the signatories is not the same in the two existing documents. Another example relates to the post mortem report of Steve Biko. In December 2014, the High Court in Johannesburg granted the interdict in the sale of Steve Biko's autopsy report of 1977 which contains certificates from pathologists, a certificate in terms of the Criminal Procedure Act, and a 43-page post mortem report. This report was given to Maureen Steele, the personal secretary of Dr Jonathan Gluckman, the pathologist appointed by the Biko family. Dr Gluckman was very concerned about the safety of such documents as his offices had been bugged and he had received numerous death threats. He therefore asked Mrs Steele to keep the copies of such documents. Steele passed away in 2014 and the documents went to her children, who did not want them. It was unknown if the children gave them or sold them to Westgate Walding which was auctioning the documents when interdicted by the Steve Biko Foundation which believes the documents belong to the Biko family. The case of ownership arises here even though it is a private matter. To complicate matters, the attorney representing the Steel siblings argued that the document was only a copy of the original report which has been in the public domain for 37 years. As it happens with oral history resulting in two different versions, it can also happen with a written record. Even though written records are preferred, there are areas and subjects with minimal and scant records with which to conduct adequate historical research and reconstruct the past (Setumu & Ngoepe, 2014). In this regard oral history can fill the gap. This also raises the issue of copyright. However, with oral history as in open source software the narratives can be 'copylefted'. Borrowed from open source software, copyleft is an arrangement whereby software or artistic work may be used, modified, and distributed freely on condition that anything derived from it is bound by the same conditions (Ngoepe, 2015). In the process the

product is made free in the sense that it is put in the public domain uncopyrighted. However, Maluleka and Ngoepe (2018) lament of communities missing an opportunity to make a living as oral tradition is freely available. The question is what can be used to authenticate oral history.

AUTHENTICATING ORAL HISTORY

For institutions such as archives repositories, the faithful, accurate and authentic reproduction of oral histories recordings is particularly important because these aspects could influence the meanings perceived by future researchers (Cocciolo, 2015). Records are often distinguished from oral transmission on the basis of their persistence and immutability. The written and print culture imposes stability on the transmission of memory and knowledge because written documents do not change and rewrite themselves with each reading or transmission. Countless studies of the transition from oral narratives to recorded stories illustrate how, once recorded, the stories become static and frozen because they are faithfully copied or replicated rather than evolve with each new telling. On the other hand, the fluidity of orality makes it liquid communication. The definition of liquid communication is captured by Mosweu and Ngoepe (2019a; 2019b) as the type of communication that can easily go back and forth between the participants involved and that is neither restricted by time or space, nor dictated by any type of social status, for example, e-mails, SMS, websites and social media content. As an example, a Facebook post can be shared many times by different users with their friends commenting beyond the control of the post originator. The major challenge with liquid communication is that one moment it is here, but the next moment it may be gone. If such content is not managed properly as a record, it can be lost and thus jeopardise the cultural and documentary heritage. This is also the case with oral history as the story can be told and retold differently. The stories are like small streams of water held in the memory of people. Many different voices in the stream bubble over the stones of the past. Therefore, it is necessary to have measures in place that the core message of the story is not lost even when the story is retold. Authenticating stories of the past may be a bit tricky as opposed to authenticating written records. Authentic records are generally described as those that are what they purport to be, that are genuine, not counterfeit, and free from corruption (Duranti, 2017). The interface between written and oral traditions has three dimensions: the meeting of cultures with and without writing; the encounter between oral and written traditions in societies that use writing to various degrees; and the interaction between the use of writing and speech in the life of any individual (Hedstrom, 2002).

Various projects have advanced different methodologies to address trustworthiness of records. One example of such is InterPARES² project which used modern archival diplomatics. Diplomatics has been used as one method for determining the authenticity of records by analyzing their origin, their relationship with the activity in which they participated, the persons involved in their creation (e.g. author, addressee and writer), the procedures from which they resulted and the administrative and juridical context in which they were created (Duranti, 2017). The process of decomposing records into their constituent components for analysis of the whole used by diplomatics to determine their authenticity is as applicable to digital records in the twenty-first century as it was to paper records of the seventeenth century (Jansen 2015). Archival diplomatics theory states that to demonstrate the authenticity of a given record, it is necessary to establish its continuing identity and demonstrate its integrity (Duranti & Jansen, 2011). The process and chain of custody play a major role in the authenticity of digital records, but the authenticity is also supported by analyzing and understanding its documentary form. The question is, "Can this be extended to addressing trustworthiness of oral history?"

One method of inquiry that has been proposed to address the authenticity of digital records is archival diplomatics (MacNeal, 2017). Its mode of analysis draws on an extensive and centuries old body of written reflection and experience about the nature of records in administrative settings. The primary purpose of diplomatics was to corroborate or refute the legal claims asserted in medieval charters issued by sovereign authorities in previous centuries. As digital technology has separated content and structure from form, people can no longer determine authenticity on the object-record, which is composite and permanently new, but must make an inference of authenticity from its environment. Record content, structure and medium are no longer inextricably linked (Duranti, 1994). The stored entity (content, form and composition data) is distinct from its manifestation, and its digital presentation has to be considered as well as its documentary one. When a record is saved, it is taken apart in its digital components, and when it is retrieved, it is reproduced. Therefore, as Duranti (2017) observed, "it is not possible to preserve a digital record, only the ability to reproduce or recreate it. Therefore, we can no longer determine trustworthiness on the object-record, which is composite (stored + manifested) and permanently new (re-production), but must infer trustworthiness from its environment of creation, maintenance, use and preservation".

As discussed earlier, oral history uses both oral tradition and testimony to establish the truth. Oral tradition refers to the acts of remembering and transmitting orally. In both the methods of oral history the information is stored and deemed worthy of retention by its creator for its own future reference. Just as the archivists appraise records for preservation or destruction, appraisal of remembering by those who have stories is important. As Duranti (1994) argues, the description of oral history fits the concept of a record. The concept of archival theory posits that, "to have records, we must have information (i.e. an understandable message) conveyed (i.e. created and used)" (Duranti, 1994). The remembrance is no different from any medium of communication and its storage function is as reliable as that of any other medium. Of course, the human memory is subjective but it is for its survival and adaptation as it cannot store all the information forever. Old information has to make space for new information just as repositories cannot store all records (Duranti, 1994).

As oral history is mostly transmitted in certain places (at night or in feast) in groups, therefore, another possible way to consider in authenticating oral history is by using the principles of blockchain technology. Blockchain is a document full of entries that is shared with a group of people and organisations (Pathak & Bhandari, 2018). It is best known as the technology that supports digital currencies (cryptocurrencies), but is already being applied in various other areas for a variety of purposes. This technology is by its very nature an authenticating technology because everything that is being recorded using it cannot be changed or deleted. In case of oral history, once the story is told to a group, or a family praise is recited in a feast, all the people attending the event could be regarded as a 'chain'. The word 'chain' in the blockchain is because all the previous witnesses are used in each transaction (event), making it increasingly harder to change the information because to do so there is a need to conspire with all witnesses. Therefore, all people available could be considered witnesses and they can always confirm the stories, the family praises or whatever is being shared. In this regard, as Duranti (1994) argues, narrating of oral history sitting beyond the fire or in the feast, together with displaying crests and performing songs, and family praises confirms the official history of the people. In this scenario, the process is a block and witnesses are chains. However, oral history scholars may argue that the principles of blockchain borrowed from oral tradition practices as this precedes blockchain technology.

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FUTURE RESEARCH DIRECTIONS

This chapter did not cover the issue of ownership and copyright on oral history. Future research directions should look at interrogating the issues of ownership, copyleft and copyright of oral history. Furthermore, the concept 'record' should be revisited to establish if it also includes oral history. This should take into consideration the bibliographical details and metadata requirements used in archival science. Furthermore, the rituals of oral tradition should be revisited and perhaps be divided into two groups, that is, for academic purpose as oral historians and scholars record the histories as a method; and as practised by communities in traditional feasts for storytelling, displaying of crests, performing of songs, family praises and so on. It should be noted that with the latter, oral history can be easily authenticated as every practice is witnessed by either a family, clan or community member.

CONCLUSION

This chapter highlighted the ongoing tension between written records and oral sources of memory. However, the two can complement each other to provide the 'whole truth'. Each has its own limitations. The story it contains can therefore be regarded as partial. Written medium has limitations in terms of space as it cannot cover everything that transpired. As Josias (2011) reckons, a written record does not have the same impact as those with first-hand experience of what happened, hence the court system in South Africa relies more on oral testimony than records (Ngoepe & Makhubela, 2015). It is clear that some elements of diplomatics and blockchain can be used to authenticate oral history, as preservation of both oral and digital memory depends on proactive effort to migrate from one carrier to another. Oral history should be seen as a complementary method but not as an exclusive source in the project of documenting history for the previously marginalised. Indeed, oral history is not a panacea for addressing historical distortions and exclusion of African voices, but can play a pivotal role in reclaiming and preserving disappearing heritage and thereby giving the voiceless a voice. Oral memory will last forever because it is always green and every time it is transmitted, it grows anew as the griot can add or remove some information. It has always worked and is assumed to be proven to have adapted as it does not have complicated mechanics like records, particularly digital records. The human voice, with all its intonation, inflection, and emotion, can convey so much more than the written page. Books teach about the past; oral histories give it a voice (Stevens & Latham, 2009). As there is truth in all things, it does not make it the whole truth, hence it is necessary for oral history and records to complement each other. The truth in records does not make it the whole truth and so is the truth in oral history. With oral history we can always ask why the story is told, who tells the story, where the story is told and when it is told.

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ENDNOTES

[1.] The Freedom Charter is the statement of core principles of the South African Congress Alliance, which consisted of the African National Congress, and its allies the South African Indian Congress, the South African Congress of Democrats and the Coloured People's Congress. It is characterised by its opening demand: The People Shall Govern! The Charter was officially adopted on 26 June 1955, at the Congress of the People in Kliptown. The meeting was attended by roughly three thousand delegates but was broken up by police on the second day, although by then the charter had been read in full. The crowd had shouted its approval of each section with cries of 'Afrika!' and 'Mayibuye!' (http://www.anc.org.za/kids/freedom-charter).

[2.] International Project on Permanent Authentic Records in Electronic Systems (InterPARES) was conceptualised in 1999 and coordinated by the University of British Columbia in Vancouver, Canada. A series of InterPARES projects 1, 2, 3 and the latest InterPARES Trust (2013-2018) in conjunction with partners from around the world in an International Alliance of 7 teams: North America, South America, Europe, Asia, Australasia, Africa and international organisations. The goal of the InterPARES Trust is to "generate the theoretical and methodological frameworks that will support the development of integrated and consistent local, national and international networks of policies, procedures, regulations, standards and legislation concerning digital records entrusted to the Internet, to ensure public trust grounded on evidence of good governance, a strong digital economy, and a persistent digital memory" (http://www.interpares.org/).

Chapter 17
Informetrics Research Methods Outlined

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ABSTRACT

This chapter provides a conceptual scope of informetrics by defining the concept and demonstrating its relationship with bibliometrics, scientometrics, webometrics, cybermetrics, and altmetrics. It demonstrates that informetrics is a quantitative research design that assumes a realistic ontology and objectivism as the epistemological perspective. Based on the data that was extracted from Scopus as well as a content review of selected calls for papers, the chapter highligts methods and areas of informetrics research as reflected in the literature that was published in the subject domain and its sub-domains between 1991 and 2018. The author-supplied keywords, which were the items of analysis, yielded 96 interconnected research methods and 361 areas in which informetrics research can be applied or undertaken. Finally, the chapter provides informetrics students and developing researchers with an outline of the elements that would constitute their research proposals and research methodology chapters of their theses and dissertations.

INTRODUCTION

The purpose of this chapter is to outline the research methods and possible research areas in informetrics. The chapter uses informetrics techniques, particularly content analysis of the author-supplied keywords in informetrics research published between 1991 and 2018, to determine research methods in informetrics as well as possible areas in which informetrics studies may be conducted. A total of 16 154 articles were extracted from the Scopus database and analysed using VosViewer software to identify the keywords that described informetrics research methods and focus areas of informetrics research. The chapter is organised as follows: firstly, it offers the scope of informetrics; secondly, it briefly discusses the development of informetrics research; thirdly, it explains informetrics in the context of research methodology;

fourthly, the chapter outlines research methods; fifthly, it outlines possible research areas in informetrics studies; and finally, it provides developing researchers and students of informetrics with an outline of how to design and structure an informetrics study.

SCOPING INFORMETRICS

Informetrics constitutes all quantitative measures of "patterns that show up not only in publications but also in many aspects of life, as long as the patterns deal with information" (Diodato 1994, p. ix). Hood and Wilson (2001, p. 294) observe that the term "comes from the German term 'informetrie' and was first proposed in 1979 by Nacke to cover that part of information science dealing with the measurement of information phenomena and the application of mathematical methods to the discipline's problems, to bibliometrics and parts of information retrieval theory, and perhaps more widely".

According to Egghe and Rousseau (1990, p. 1), informetrics deals with the measurement, mathematical theory and modeling of all aspects of information. The authors argue that informetrics largely "borrows tools (techniques, models, analogues) from mathematics, physics, computer science and other metrics". Informetrics is an umbrella term that encompasses bibliometrics, scientometrics, webometrics, cybermetrics and altmetrics (Björneborn & Ingwersen, 2004; Onyancha, 2014). Onyancha's (2014) graphical representation of the relationship between the aforementioned concepts, as shown in Figure 1, is an adaptation of Björneborn and Ingwersen's (2004) illustration.

Figure 1 demonstrates the distinct but intertwined and overlapping relationships among the concepts. It is not therefore uncommon to witness the interchangeable and synonymous usage of two or more of the concepts in literature. The concepts, however, have unique applications as exemplified in their definitions.

Figure 1. Overlaps between informetrics, bibliometrics, scientometrics, cybermetrics webometrics, and altmetrics (Source: Onyancha, 2014, p. 51)
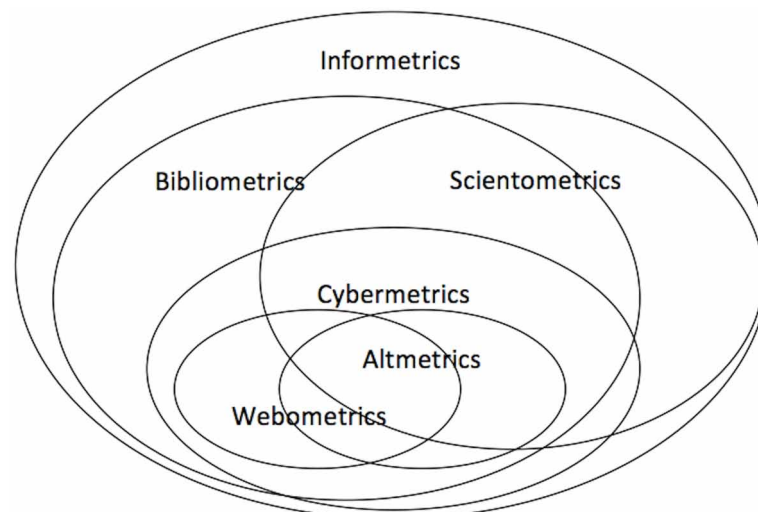
- **Bibliometrics** is defined as the "application of mathematical and statistical methods to books and other media of communication" (Pritchard in Hertzel, 1987, p. 153; Ikpaahindi, 1985, p. 163). Similar definitions have been proffered by different scholars who have placed emphasis on bibliometrics being the study of all forms of written communication, as it is patterned in its bibliographies (see Potter, 1981; Prytherch in Diodato, 1994; Wallace, 1989; Standerfer, 1998).
- **Scientometrics** is the "mathematical and statistical analysis of research patterns in the life and physical sciences" (Diodato, 1994, p. 145). It is often seen as the application of bibliometrics in the life and physical sciences. Hence, Hood and Wilson (2001:293) opine that scientometrics "includes all quantitative aspects of the science of science, communication in science, and science policy". Brusilovsky (as cited in Garfield, 1979, p. 313) argues that scientometrics can be applied beyond the measurement of scientific progress to include technological progress.
- **Webometrics** is often used synonymously with cybermetrics. Björneborn (in Björneborn and Ingwersen, 2004, p. 1217) defines webometrics as "the study of the quantitative aspects of the construction and use of information resources, structures and technologies on the Web drawing on bibliometric and informetric approaches". Webometrics is therefore the application of bibliometric methods to the World Wide Web (WWW). In essence, webometrics is restricted to the study of patterns of information production, storage, searching, retrieval, dissemination and use on the WWW.
- **Cybermetrics**, on the other hand, is defined by Björneborn (as cited in Björneborn and Ingwersen, 2004, p. 1217) as "the study of the quantitative aspects of the construction and use of information resources, structures and technologies on the whole Internet drawing on bibliometric and informetric approaches". Thus, cybermetrics encompasses all webometric studies and includes the statistical studies of "discussion groups, mailing lists, and other computer-mediated communication on the Internet" (Björneborn and Ingwersen, 2004, p. 1217).
- **Altmetrics** is the most recently coined metrics term among the six concepts in Figure 1. The term was coined by Jason Priem in a Tweet dated 28 September 2010. In the Tweet, he argues thus: "I like the term #articlelevelmetrics, but it fails to imply *diversity* of measures. Lately, I'm liking #altmetrics". Subsequently, Priem, Groth and Taraborelli (2012, p. 1) defined altmetrics as:

The study and use of scholarly impact measures based on activity in online tools and environments. The term has also been used to describe the metrics themselves–one could propose in plural a 'set of new altmetrics.' Altmetrics is in most cases a subset of both scientometrics and webometrics; it is a subset of the latter in that it focuses more narrowly on scholarly influence as measured in online tools and environments, rather than on the Web more generally.

The common feature in the definitions of the concepts is the *application of mathematical and statistical methods* to assess, evaluate, measure or analyse a variety of information-based aspects in different contexts, where contexts refer to information-based ecosystems. Whereas bibliometrics is limited to all forms of written communication as they are patterned in bibliographies, scientometrics is largely focused on life and physical sciences while cybermetrics and webometrics are focused on assessing the information in cyberspace and on the WWW, respectively and informetrics is applied in all contexts as long as the contexts deal with information. Given the degree or extent of the overlap among the concepts as illustrated in Figure 1, this chapter uses informetrics when it overlaps with bibliometrics, scientometrics, webometrics, cybermetrics, and altmetrics.

THE RISE OF INFORMETRICS RESEARCH

Informetrics studies are a relatively recent phenomenon. Ikpaahindi (1985) discloses that, although Pritchard was the first person to use the term "bibliometrics" in 1969, evidence shows that bibliometrics studies had been conducted prior to 1969, when Pritchard coined the word. For instance, Ikpaahindi (1985) states that Cole and Eales used bibliometric techniques in their statistical analysis of the literature of comparative anatomy in 1917. Since then, the uptake of informetrics studies in a variety of disciplines or fields, including library and information science, has been impressive. Researchers have witnessed the emergence of informetrics (in its collective nature) as one of the top ranking topics of LIS research (Chang, Huang and Lin, 2015; Onyancha and Majanja, 2017; Onyancha, 2018). This pattern is professed throughout the world. In Sub-Saharan Africa, Onyancha and Majanja (2017) noted that the term *bibliometrics* became more visible in the LIS literature between 2011 and 2015, where it ranked 20th among the most common subject terms used to index LIS literature. Worldwide, research reveals that bibliometrics was one of the major topics in LIS research before the 1990s (White 2010). White (2010) further reveals that the concept was the most cited topic in 1977 and 1989. The increased attention of scholars on informetrics research gained momentum in the mid-1990s and has maintained an upward movement in the last two decades (Chang, Huang and Lin, 2015). Evidently, bibliometrics appears the most in published research when compared to scientometrics, webometrics, cybermetrics, altmetrics and informetrics. This is clearly illustrated in Table 1, which provides the number of publications bearing each of the concepts between 1991 and 2018 as indexed in Scopus. The least common term is cybermetrics. Onyancha (2018, p. 464) has summarised the prominence of bibliometrics in LIS literature, where the term was ranked in position one in 2011-2015, thus:

Bibliometrics has emerged as one of the frequent keywords in the LIS literature, implying that it has become one of the most researched topics or applied methods in LIS research. A study conducted by Jarvelin and Vakkari ([1993]), for instance, revealed that bibliometric strategies had become increasingly more popular, with citation analysis recording a growth rate of 2.0% between 1965 and 1975 and 1.3% from 1975 to 1985.

It follows therefore that the majority of informetrics studies are bibliometrics in nature while cybermetrics studies are rare in LIS research. A search in Scopus for publications on each of the concepts as *keywords* in the Scopus database, and limiting the publication period to 1991 to 2018, yielded the results in Table 1. The prominence of bibliometrics however should not be construed to mean that stud-

Table 1. Most commonly researched and/or applied concept, 1991-2018

No.	Concept	No of publications	Percentage
1	Bibliometrics	13121	81.22
2	Scientometrics	1973	12.21
3	Altmetrics	416	2.58
4	Webometrics	324	2.01
5	Informetrics	277	1.71
6	Cybermetrics	43	0.27

ies based on the other metrics terms are not popular among informetrics researchers as it is common to find scientometrics studies being labeled bibliometrics studies or informetrics studies and vice versa. Scientometrics and bibliometrics are often used interchangeably and the distinction that existed between them has, of late, disappeared. Students of informetrics are advised to take note of this occurrence while appreciating the unique characteristics inherent in each concept as their use, when conducting research, may require clarification.

INFORMETRICS AS A RESEARCH DESIGN

Is informetrics a research paradigm, approach, design or method? It should be appreciated, from the outset, that different authors use the aforementioned terminologies, as they relate to research, to refer to different things. There is no consensus on the use of terminologies among scholars of research methodology regarding these concepts. We have noted that where some researchers would refer to approaches as designs and vice versa, others call them strategies, methodologies or methods. In fact, one scholar can use different terms interchangeably to refer to the same concept at different times. But, does it matter what label (i.e. paradigm, approach, design or method) is given to informetrics? Or, as Chu and Ke (2017) ask in their article: *Research methods: what's in the name?* Ngulube (2019, p. 87) points out that incorrect usage of terminologies associated with research methodology,

May mislead and confuse emerging researchers who might be trying to master the research procedures used in a subject field. There is a need for the accurate use of methodological terms, so that proper guidance on research methods is provided to novice researchers and other readers.

Moreover, each of the methodological terms portrays a specific meaning when researchers describe and/or explain the procedures followed to conduct their research. This is manifested in Creswell and Creswell's (2018) views regarding the abovementioned terminologies (i.e. research paradigm, approach, design and method) to describe the components of research methodology in the fifth edition of their book entitled *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. The authors offer the following definitions:

- Research paradigm (or worldview or philosophical assumption or ontological and epistemological foundation): "a basic set of beliefs that guide action" (Creswell & Creswell, 2018: Kindle locations 521).
- Research approach (or strategy): plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis. It involves the intersection of philosophical assumptions, designs, and specific methods (Kindle locations 5348-5350).
- Research design: type of inquiry within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures in a research study (Kindle locations 5351-5352).
- Research method: involves the forms of data collection, analysis, and interpretation that researchers propose for their studies (Kindle locations 5352-5353).

Several informetrics studies recognise informetrics as a research design, as reflected in the phrasing of the published papers' titles. Often, the titles of informetrics research papers consist of a name of one of the *metrics* (i.e. informetrics, scientometrics, bibliometrics, webometrics, cybermetrics or altmetrics) to explain the type of research conducted and/or design adopted to conduct the study. The phrases are placed either at the beginning or within the main title (e.g. *A bibliometrics or informetrics or scientmetrics analysis/study of…*) or expressed as a sub-title (e.g. *… A bibliometrics or informetrics or scientometrics analysis/study*) akin to such phrases as *A Case Study of… A Phenomenological Study of…* or *A Survey of…* etc.

However, there are those who view informetrics as a research method (see Chu, 2015; Chu & Ke, 2017; Ullah & Ameen, 2018) while others consider informetrics to comprise several research methods (Bar-Ilan & Peritz, 2002; Qiu, Zhao, Yang & Dong, 2017; Rahman, Guns, Rousseau & Engels, 2017). Those who hold the view that informetrics is a research method do not distinguish between research methods and research designs. For example, Chu (2015), and Chu and Ke (2017) lump together research designs (e.g. bibliometrics [including citation analysis, informetrics, & scientometrics], ethnography, experiment, and historical method, etc) with data collection methods/instruments (e.g. Delphi study, content analysis, focus groups, interview, observation, questionnaire, and research diary/journal, etc) under the banner 'research methods'. Järvelin and Vakkari (1990), Palvia, Pinjani and Sibley (2007), and Avison, Dwivedi, Fitzgerald and Powell (2008) have followed the same approach to develop a schema of research methods in their studies.

This chapter considers informetrics as a research design (plan or blueprint), with specialised research methods and/or protocols (see Qiu, Zhao, Yang & Dong, 2017), based on the foregoing brief description of the four methodological terms, as well as studies that have been conducted in the subject domain (i.e. informetrics in its broad scope) and the scoping of infometrics offered at the beginning of this chapter.

INFORMETRICS RESEARCH METHODS

Kothari (2004, p. 7) has defined research methods as follows:

Research methods may be understood as all those methods/techniques that are used for conduction of research. Research methods or techniques, thus, refer to the methods the researchers use in performing research operations. In other words, all those methods, which are used by the researcher during the course of studying his research problem, are termed as research methods.

Consequently, Kothari (2004, p. 8) classifies research methods into three categories, namely (a) methods concerned with data collection, (b) statistical techniques that are used for establishing relationships between data and the unknown, and (c) methods that are used to evaluate the accuracy of the results obtained. One can add sampling methods to the list of research methods. Informetrics methods and techniques span the aforementioned groups of methods. The choice of method to be used depends on the nature of the informetrics study being conducted. Informetrics studies can be descriptive (productivity count studies) or evaluative (behavioural studies) (Nicholas & Ritchie 1978; Diodato 1994). Whereas the former collects descriptive information about documents, the latter often involves the study of citations (Diodato 1994) and lately, altmetrics. Descriptive studies focus on the analysis of (a) bodies responsible for the production and transmission of the information; (b) form of transmission (e.g.

journal, monograph); medium of communication (e.g. article, letter); (d) nature of information conveyed – subject and language characteristics; (e) timing and frequency with which information is conveyed; (f) amount of information conveyed; and geographical origin (Nicholas & Ritchie 1978: 10). Citation-based studies, on the other hand, focus on documents as well as authors, sources in which the documents are contained (i.e. journals, books, magazines, databases, web pages, etc), the organizations or countries in which the documents are produced, and the purpose of the citations (Diodato, 1994, p. 33). Focus areas of evaluative studies may also include: what motivates an author to cite a particular work; the relationship between citing work and the works cited by it; works cited long after their publication and works cited while relatively new; heavily cited works, infrequently cited works and those that have not been cited at all; how citation practices and patterns differ throughout disciplines or families of disciplines; how citation practices and patterns can be used in the evaluation of information sources; how citation practices and patterns can be used to enhance information retrieval systems (Wallace, 1989, p. 18).

There are numerous methods and techniques used to carry out informetrics research. Some of these methods have become commonly associated with informetrics while others, such as statistical and data collection methods are multidisciplinary in nature. An analysis of the author-supplied keywords yielded the keyword maps shown in Figures 2 to 8 and Table 2. The analysis involved the setting of the threshold of word/term appearances at three, a threshold that yielded 2621 keywords. Several keywords representing research methods associated with one or more of the metrics terms that constitute informetrics were identified from among the 2621 keywords.

Figure 2 provides the terms that were thought to be reflective of the methods associated with the term *informetrics*. The most prominent term or research method is citation analysis. Other terms include content analysis, network analysis, text mining, co-occurrence analysis, author co-citation analysis,

Figure 2. Methods associated with the term informetrics, 1991-2018

discourse analysis, bibliometric mapping, and the three laws of bibliometrics – Bradford's law, Lotka's law and Zipf's law –among others. A total of 21 research methods were associated with *informetrics*.

Figure 3 provides 76 terms representing research methods that were associated with the term *bibliometrics*. The outstanding terms include citation analysis, content analysis, network analysis, social network analysis, document clustering, text mining, citation counting, cluster analysis, citation network analysis, discource analysis, density equalizing mapping, co-citation analysis, bibliographic coupling, information visualization, co-occurrence analysis, and the three laws of bibliometrics.

Webometrics yielded fewer author-supplied keywords that represented research methods in the sub-domain than *informetrics* and *bibliometrics*. There were 24 keywords that were associated with the term *webometrics*, including informetrcs, bibliometrics, cybermetrics, scientometrics, and altmetrics. Excluding these terms leaves 19 terms that can be considered as research methods associated with webometrics. Citation analysis featured prominently, together with network analysis, social network analysis, content analysis and co-word analysis. Other methods that fall within webometrics as reflected in Figure 4 include cluster analysis, thematic analysis, information visualization, web mining, clustering analysis, discourse analysis, hyperlink analysis, link analysis, and citation counts.

Cybermetrics was the least mentioned in the literature and as a result, it yielded the least number of author-supplied keywords when compared to the other metrics terms. Table 2 shows that cybermetrics was linked to 10 terms, including the five metrics terms. It follows therefore that there were five terms that can be considered as research methods associated with cybermetrics in Figure 5. The terms are social network analysis, thematic analysis, web mining, text mining, and discourse analysis.

S*cientometrics* was associated with 53 author-supplied keywords, including the five other metrics terms. The most prominent term, which therefore implies the most applied research method in scientometrics, is citation analysis. The other prominently visible methods in Figure 6 include network analysis, social

Figure 3. Methods associated with the term bibliometrics, 1991-2018

Figure 4. Methods associated with the term webometrics, 1991-2018

network analysis, content analysis, text mining, co-word analysis, and bibliometric mapping. Two of the three informetrics laws, that is, Lotka's and Bradford's laws, featured among the most visible methods in *scientometrics* literature.

An examination of the terms associated with *altmetrics,* as shown in Figure 7 reveals a growing sub-domain of *informetrics*. The terms that represented the research methods and which appeared in the a*ltmetrics* literature are citation analysis, impact analysis, text mining, factor analysis, correlation analysis, social network analysis, content analysis, citation counts, data visualization, co-occurrence analysis and citation count.

Respectively, Figure 8 and Table 2 provide a visual map and a list of the terms that were highly associated with the combined six metrics terms of informetrics, scientometrics, bibliometrics, altmetrics, webometrics and cybermetrics. The terms in Figure 8 and Table 2 represent the main research methods that are associated with informetrics in its broad scope or meaning. When ranked according to the occurrence weights, citation analysis tops the list of methods with a frequency of 792, followed by social network analysis (192), network analysis (133), content analysis (110), text mining (94), co-citation analysis (67), and Lotka's law (53), just to name the terms that occurred 50 or more times in the literature. In terms of their strengths of linkages with the rest of the terms (i.e. total link strength, implying the strength of association among the terms), citation analysis was in the second position (behind bibliometrics) with a total link strength of 733, followed by social network analysis (185), network analysis (113), text mining (100), co-citation analysis (88), co-word analysis (84), content analysis (76), and Lotka's law (71). The number of links in column 4 in Table 2 stands for the number of terms with which a given term is associated, including all the six metrics terms. The terms that recorded the most number of links include citation analysis (50), social network analysis (23), text mining (22), co-citation analysis (22), co-word analysis (21), network analysis (19), content analysis (17), cluster analysis (17), and bibliometric mapping (15).

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Figure 5. Methods associated with the term cybermetrics, 1991-2018

Figure 6. Methods associated with the term scientometrics, 1991-2018

Figure 7. Methods associated with the term altmetrics, 1991-2018

Figure 8. Methods associated with all metrics terms (or informetrics as an all-encompassing term), 1991-2018

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Table 2. Terms reflecting the methods of informetrics research, 1991-2018

No.	Label	Links	Total link strength	Freq.	No	label	Links	Total link strength	Freq.
1	bibliometrics	81	1379	3730	49	citation context analysis	4	8	6
2	citation analysis	50	733	792	50	citation studies	2	8	8
3	scientometrics	53	703	1278	51	discourse analysis	6	7	13
4	informetrics	26	206	174	52	author co-citation analysis	6	7	5
5	altmetrics	19	188	373	53	bradford's law of scattering	5	7	5
6	social network analysis	23	185	192	54	normalization	3	7	10
7	webometrics	24	162	257	55	fractional counting	3	7	8
8	network analysis	19	113	133	56	density-equalizing mapping	2	7	9
9	text mining	22	100	100	57	co-author analysis	5	6	5
10	co-citation analysis	22	88	67	58	mapping of science	5	6	4
11	co-word analysis	21	84	94	59	co-authorship analysis	5	6	3
12	content analysis	17	76	110	60	scientific visualization	4	6	12
13	lotka's law	11	71	53	61	bradford law	3	6	6
14	cluster analysis	17	50	44	62	hyperlink analysis	3	6	4
15	bradford's law	9	47	32	63	hyperlink network analysis	3	6	4
16	factor analysis	12	34	19	64	word cluster analysis	2	6	9
17	information visualization	13	33	29	65	document co-citation analysis	5	5	5
18	citation counts	10	33	24	66	citation mining	5	5	3
19	bibliographic coupling	9	31	29	67	subject analysis	4	5	6
20	author co-citation analysis	13	30	14	68	author ranking	4	5	3
21	clustering	12	28	24	69	network visualization	4	5	3
22	bibliometric mapping	15	25	40	70	word co-occurrence	4	5	3
23	cybermetrics	10	24	30	71	gender analysis	3	5	10
24	document clustering	6	24	10	72	bibliographic analysis	3	5	7
25	citation count	5	20	20	73	author name disambiguation	3	5	4
26	zipf's law	7	18	11	74	social networks analysis	3	5	3
27	Co-citation analysis	3	17	10	75	impact analysis	3	4	6
28	domain analysis	8	16	9	76	multivariate analysis	3	4	6
29	visualization analysis	7	14	11	77	coauthorship analysis	2	4	4
30	social network analysis (sna)	5	14	9	78	evaluative bibliometrics	3	3	7
31	data visualization	7	13	12	79	big data analytics	3	3	5
32	co-occurrence analysis	10	12	14	80	principal component analysis	3	3	5
33	thematic analysis	7	12	16	81	information mapping	3	3	3
34	correlation analysis	5	12	14	82	citation and co-citation analysis	2	3	8
35	web mining	5	12	9	83	co-words analysis	2	3	7
36	text analysis	9	11	9	84	author analysis	2	3	4
37	main path analysis	8	11	9	85	field-normalization	2	3	4

Table 2. Continued

No.	Label	Links	Total link strength	Freq.	No	label	Links	Total link strength	Freq.
38	document co-citation analysis (dca)	3	11	4	86	word frequency analysis	2	3	4
39	co-link analysis	4	10	6	87	citation analyses	2	3	3
40	bradford‚Äôs law	3	10	9	88	document analysis	2	3	3
41	clustering analysis	7	9	9	89	citations analysis	1	3	6
42	topic analysis	5	9	7	90	country ranking	2	2	3
43	citation network analysis	4	9	10	91	author keywords analysis	1	2	4
44	publication counts	3	9	6	92	gap analysis	1	2	4
45	author co-citation analysis (aca)	3	9	5	93	field normalization	1	1	6
46	density equalizing mapping	2	9	10	94	frequency analysis	1	1	3
47	bradford-zipf's law	5	8	3	95	bibliometric counting	0	0	4
48	citation content analysis	5	8	3	96	documental analyse	0	0	3

Evidently, there are a variety of methods that can be associated with informetrics in general, and its narrower terms in particular. A scan of some calls for papers for informetrics-oriented conferences provides further evidence of what is considered as informetrics methods. For example, the 14th International Conference on Webometrics, informetrics and scientometrics (WIS) and the 19th COLLNET Meeting (see Announcement and Call for Papers 14th International Conference on Webometrics, Informetrics and Scientometrics (WIS) & 19th COLLNET Meeting 2018) categorises informetrics methods into techniques for collaborative studies and quantitative analysis of S&T innovations, among others. A call for papers for the 17th ISSI (International Society for Scientometrics and Informetrics) outlines numerous methods including those associated with knowledge discovery and data mining (e.g. text mining), visualization and science mapping, and usage analysis methods (ISSI 2019). There have been calls for contribution in special issues of journals, with specific emphasis on focus areas that have included informetrics methods. The Journal of Scientometric Research (2019), for example, made such a call for papers whereby it identified, among others, three categories of informetrics methods as focus areas of the special issue. The Journal outlined the methods as follows:

- Text-based Methods (e.g. identifying themes and trends, topic modeling, burst detection, keyphrase identification).
- Citation Studies methods (e.g. co-citation analysis, citation networks, etc).
- Mapping and Visualization (e.g. visualization techniques, visualizing intellectual structures of disciplines, co-variates and graphical visualizations).

Qiu et al (2017) have authored a book entitled *Informetrics: theory, methods and applications* which provides a description of the informetrics methods and areas of informetrics applications. According to the authors, informetrics methods include:

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- Subject-specific methods such as methods of citation analysis, e.g. citation analysis of the main tools or sources of data, citation analysis of scientific journals and other units of analysis, citation network and cluster analysis, etc
- Computer-aided informetrics analysis methods, e.g. methods of computer-assisted documentary information metering analysis, namely (a) using computers to perform correlation and regression analyses and to count word frequencies and (b) utilizing mathematical expressions of bibliometrics and computer-assisted software to establish a mathematical model.
- Statistical methods – e.g. statistics of the literature, namely (a) direct statistics - counting various types of publications or directly counting literature and citation quantity from original journals and (b) indirect statistics – counting different types of documents using retrieval tools. Other methods would include performing regression and correlation analyses.

SUBJECT AREAS OF INFORMETRICS RESEARCH

There are as many areas of informetrics applications as there are "patterns that deal with information" (Diodato, 1994, p. ix). Many authors of the informetrics literature have attempted to highlight the areas in which informetrics can be applied. The scope and diversity of the areas are well captured by Egghe and Rousseau (1990, p. 3) who have pointed out that informetrics can be applied in library management, sociology of science, history of science, scholarly communication, and information retrieval. The application of informetrics spans many disciplines, which include mathematics (e.g. operations research, statistics, probability theory etc), physics and computer science, besides library and information science (Egghe and Rousseau, 1990, p. 3). Qiu et al (2017) offer two broad areas where informetrics can be

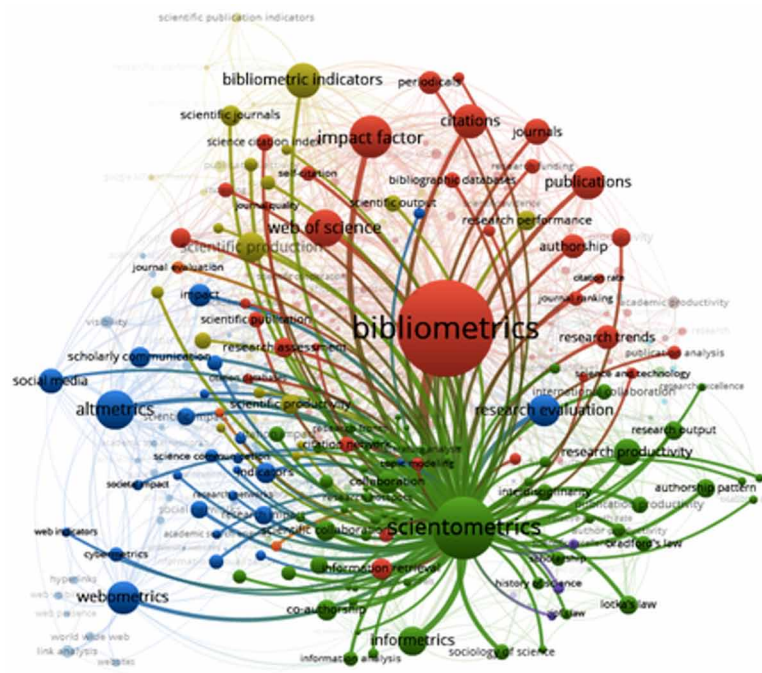*Figure 9. Terms reflecting areas of informetrics application, 1991-2018*
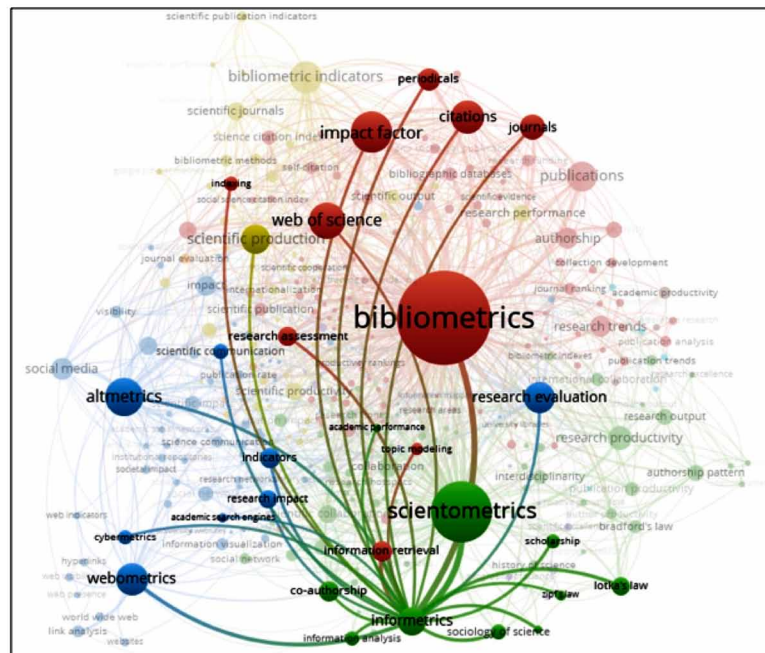
applied. The first one is application in information resource management and research and the second one is application in science and technology management and forecasting. These broad categories can be broken down to specific and narrower areas of informetrics research.

Figures 9 to 15 and Table 3 provide additional areas in which informetrics can be broadly applied based on author-supplied keywords that were analysed using VosViewer as explained in the introduction. Figure 9 reveals the terms that appeared three or more times in the *informetrics* literature. Informetrics research can be conducted or applied in research evaluation, information analysis, sociology of science, scientific communication, scientific performance, academic performance, and information retrieval as well as to study journals, periodicals, citations, impact factor, and indexing services. The terms representing the applications of scientometrics are presented in Figure 10 which consists of 210 terms, including the other five metrics terms. The most prominent terms, represented by the size of the nodes and fonts, include research evaluation, social media, research productivity, research trends, scientific production, research performance, bibliometric indicators, impact factor, citations, web of science, scientific collaboration and information retrieval.

Figure 11 is an illustration of the areas of bibliometrics application. A total of 296 unique terms were associated with bibliometrics thereby revealing the areas in which bibliometrics research can be applied. The areas that featured the most in the scientometrics literature ranked the highest with the most number of occurrences in bibliometrics research, thereby reinforcing the synonymous usage of the two terms. These terms include research productivity, social media, bibliometrics indicators, and research evaluation. Others are impact factor, citations, web of science, publications and journals.

Figure 10. Terms reflecting areas of scientometrics application, 1991-2018

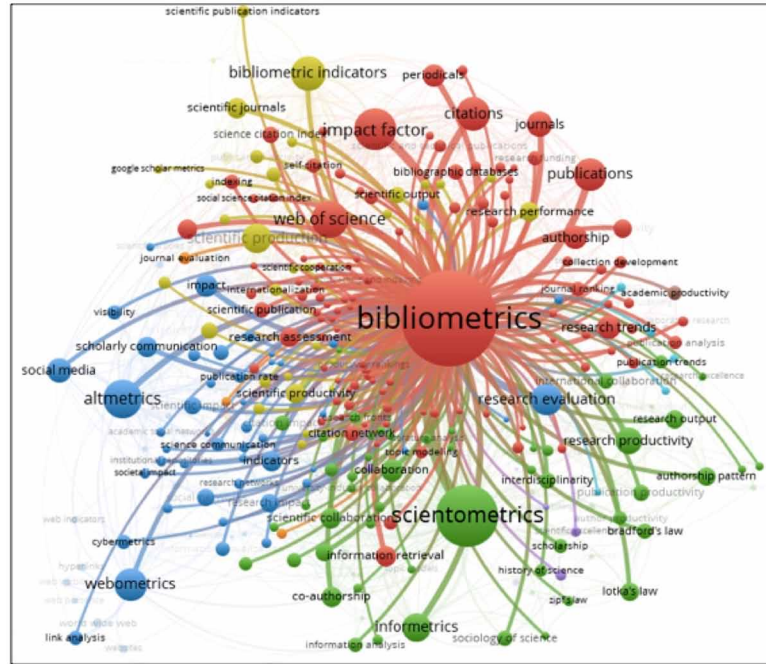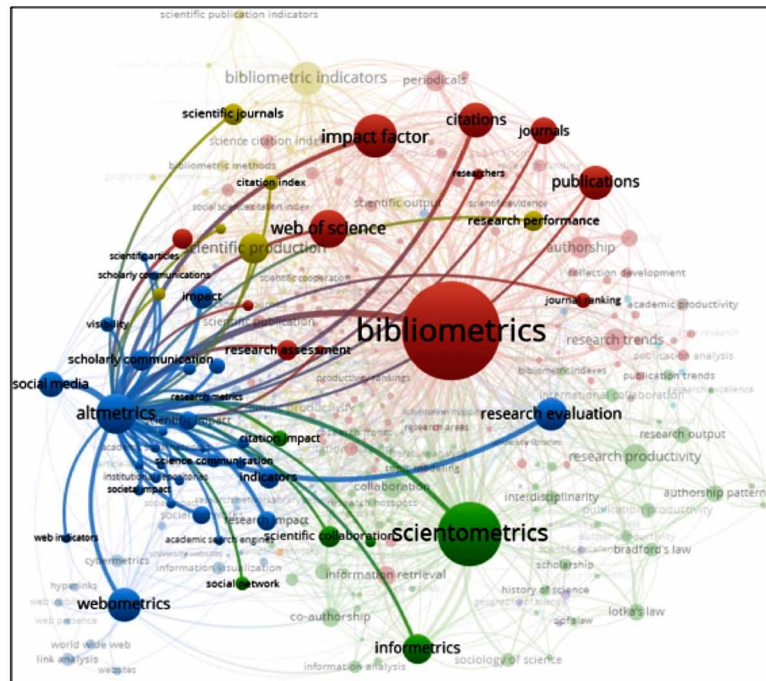*Figure 11. Terms reflecting areas of bibliometrics application, 1991-2018*

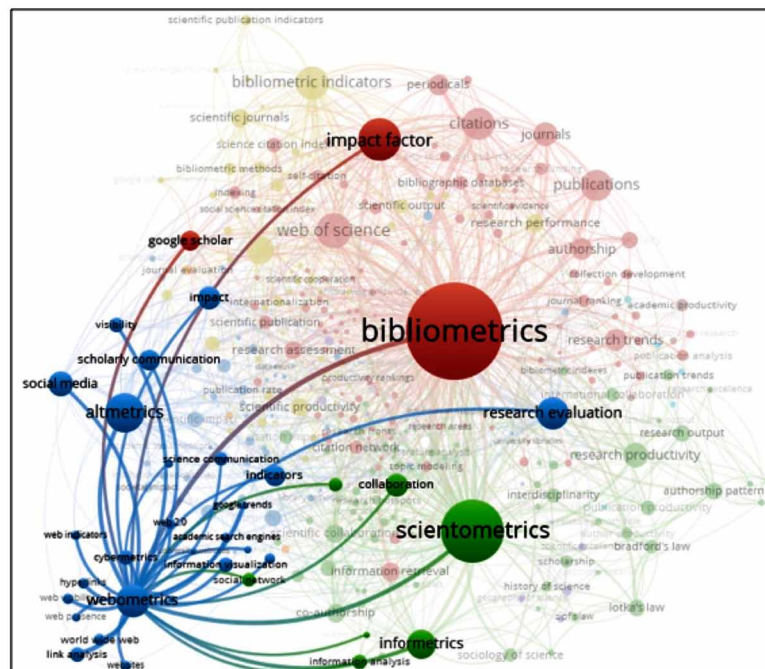*Figure 12. Terms reflecting areas of altmetrics application, 1991-2018*

According to the data presented in Figure 12, the term altmetrics was associated with 87 areas, with research evaluation, impact factor, citations, publications, web of science, social media, scientific production, scholarly communication, and journals leading the pack. Webometrics and cybermetrics applications are far limited in their scope of application. Whereas cybermetrics is largely associated with the study of social media, social networks and web indicators, as shown in Figure 14, webometrics has a larger scope in which it can apply as illustrated in Figure 13.

Figure 13 consists of 57 terms that represent the areas of webometrics application. The most outstanding terms, going by the sizes of the nodes and fonts, include research evaluation, social media, impact factor, indicators, Google scholar, scholarly communication, impact and visibility. The literature on the World Wide Web (WWW or simply the Web), yielded the following web-associated terms as some of the focus areas of webometrics research: hyperlinks, web 2.0, web citation, web impact, web indicators, web presence, web ranking, web visibility, and websites.

Figure 15 and Table 3 provide a visual map and list of research areas that were reflected in the literature published on the holistic informetrics domain, including the other metrics terms. The top ranked terms, according to the frequency of occurrence include impact factor, which appeared 469 times, followed by web of science (334), bibliometrics indicators (291), citations (266), publications (254), research evaluation (235), scientific production (190), research productivity (140), journals (127), social media (104) and research trends (101), just to name the areas that recorded more than 100 appearances. The same terms registered the highest scores in terms of the weight of links and total link strength, albeit slight divergences.

Figure 13. Terms reflecting areas of webometrics application, 1991-2018

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Figure 14. Terms reflecting areas of cybermetrics application, 1991-2018
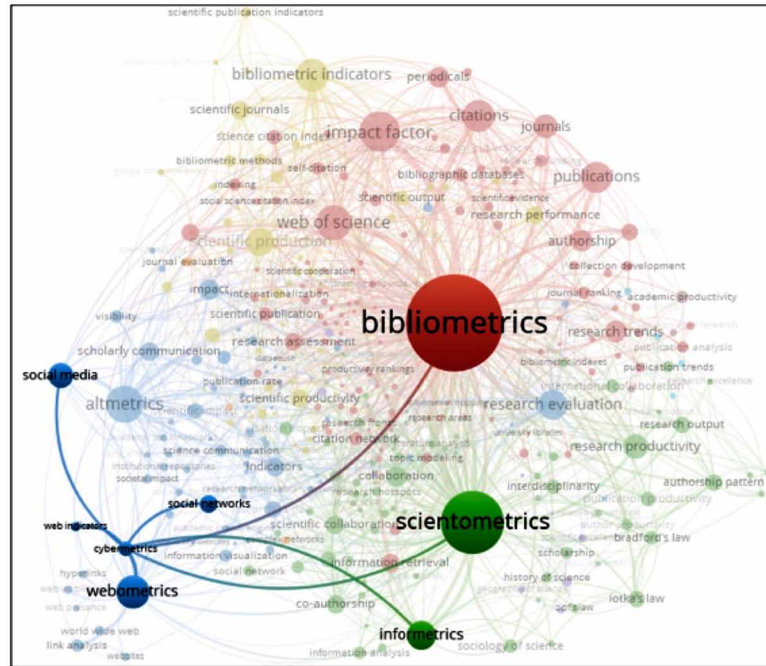

Figure 15. Terms reflecting research areas of the application in the combined metrics sub-domains (i.e. informetrics as an all-encompassing term), 1991-2018
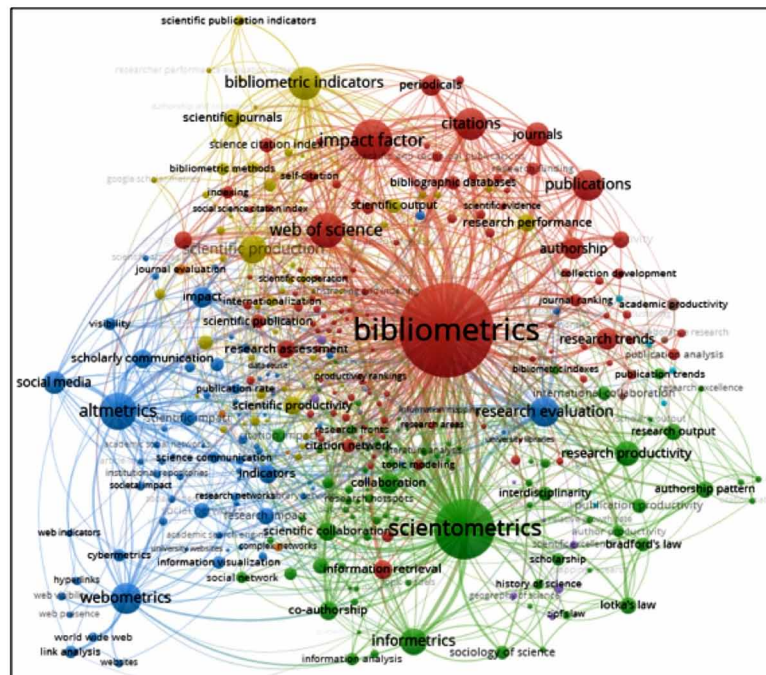
Table 3. Terms reflecting the topics/areas of informetrics research, 1991-2018

No.	Label	Links	Total link strength	Freq.	No.	Label	Links	Total link strength	Freq.
1	bibliometrics	303	3054	3730	182	research indicators	7	10	3
2	scientometrics	210	1346	1278	183	research fronts	5	9	13
3	impact factor	112	616	469	184	business intelligence	6	9	9
4	altmetrics	93	527	373	185	social science citation index	5	9	9
5	research evaluation	83	397	235	186	social impact	7	9	8
6	web of science	87	389	334	187	knowledge base	9	9	7
7	citations	78	382	266	188	scientific indicators	6	9	7
8	bibliometric indicators	105	327	291	189	authorship collaboration	5	9	6
9	publications	62	273	254	190	citation bias	5	9	6
10	informetrics	63	263	174	191	academic evaluation	7	9	5
11	webometrics	62	260	257	192	collection management	4	9	5
12	scientific production	54	209	190	193	institutional repository	6	9	5
13	research productivity	49	208	140	194	altmetrics indicators	8	9	4
14	journals	51	185	127	195	impact evaluation	9	9	4
15	impact	51	181	99	196	scholarly output	9	9	4
16	social media	32	150	112	197	author ranking	8	9	3
17	google scholar	51	144	67	198	bibliometric indices	7	8	15
18	scholarly communication	45	138	74	199	research hotspots	6	8	15
19	scientific collaboration	48	131	76	200	relative growth rate	5	8	9
20	authorship	39	130	104	201	citation distribution	7	8	8
21	periodicals	35	124	96	202	knowledge diffusion	5	8	8
22	co-authorship	39	124	73	203	faculty productivity	4	8	7
23	scientific journals	41	123	76	204	geography of science	5	8	7
24	collaboration	40	121	92	205	scholarly productivity	7	8	7
25	indicators	40	117	73	206	scientific evidence	3	8	7
26	research assessment	42	112	68	207	academic publishing	7	8	6
27	authorship pattern	36	110	52	208	collection assessment	5	8	5
28	research impact	40	109	57	209	publication performance	6	8	5
29	research performance	38	103	64	210	topic models	5	8	5
30	information retrieval	28	100	77	211	bibliometric distributions	6	8	4
31	lotka's law	25	99	53	212	citation indexing	6	8	4
32	scientific productivity	41	92	67	213	citing behavior	5	8	4
33	research output	35	90	56	214	literature based discovery	5	8	4
34	research trends	25	85	101	215	periodical index	3	8	4
35	research collaboration	37	85	51	216	research visibility	6	8	4
36	productivity	26	80	57	217	researcher performance evaluation systems	4	8	4
37	publication productivity	24	76	38	218	scientific influence	8	8	4
38	scientific impact	34	74	47	219	social networking sites	8	8	4
39	social networks	34	73	51	220	academic collaboration	7	8	3
40	sociology of science	21	71	32	221	institutional assessment	7	8	3

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Table 3. Continued

No.	Label	Links	Total link strength	Freq.	No.	Label	Links	Total link strength	Freq.
41	bibliographic databases	21	64	36	222	research and development	6	7	14
42	visibility	29	63	28	223	knowledge production	4	7	9
43	science citation index	29	59	38	224	research areas	4	7	8
44	scientific communication	31	56	36	225	international scientific collaboration	6	7	6
45	citation impact	30	56	33	226	academic performance	6	7	5
46	indexing	25	54	29	227	information sources	7	7	5
47	journal ranking	24	53	27	228	knowledge dissemination	4	7	5
48	scientific publication	27	52	36	229	research fields	6	7	4
49	bradford's law	15	52	32	230	scientific production indicators	6	7	4
50	interdisciplinarity	23	51	42	231	academic social networking	5	7	3
51	self-citation	22	51	30	232	country ranking	7	7	3
52	scientific output	21	50	43	233	data discovery	6	7	3
53	international collaboration	25	50	35	234	evaluation metrics	6	7	3
54	citation index	23	48	29	235	science indicators	5	7	3
55	citation network	16	47	36	236	scientific assessment	7	7	3
56	scholarship	15	44	29	237	scientific system	7	7	3
57	scientometric indicators	34	42	42	238	subject headings	6	7	3
58	research funding	20	42	30	239	university libraries	6	7	3
59	publication activity	18	42	25	240	bibliometric databases	6	6	7
60	link analysis	11	40	29	241	knowledge domain	4	6	6
61	information systems	22	39	23	242	data quality	6	6	5
62	scientific evaluation	21	37	20	243	institutional collaboration	6	6	5
63	cybermetrics	20	35	30	244	maps of science	5	6	5
64	information visualization	22	35	29	245	subject area	5	6	5
65	author productivity	12	35	24	246	faculty publications	5	6	4
66	information analysis	12	33	29	247	journal influence	4	6	4
67	internationalization	17	30	20	248	knowledge discovery	5	6	4
68	journal evaluation	17	30	17	249	research priorities	4	6	4
69	publication analysis	10	29	22	250	research themes	5	6	4
70	collection development	12	28	17	251	science and technology indicators	4	6	4
71	scholarly publishing	14	28	15	252	scientific periodicals	5	6	4
72	science and technology	8	28	14	253	web citation	5	6	4
73	citation indicators	20	28	12	254	academic networks	5	6	3
74	social network	15	27	24	255	authorship and co-authorship in scientific publications	4	6	3
75	knowledge mapping	11	26	30	256	collection evaluation	5	6	3
76	clustering	15	26	24	257	data reuse	3	6	3
77	history of science	10	26	18	258	evaluation of research	4	6	3
78	scientific publication indicators	9	26	18	259	impact measurement	5	6	3
79	university ranking	15	26	16	260	information use	4	6	3
80	academic search engines	14	26	8	261	quality of research	6	6	3

Table 3. Continued

No.	Label	Links	Total link strength	Freq.	No.	Label	Links	Total link strength	Freq.
81	societal impact	11	25	11	262	scholarly production	3	6	3
82	google scholar citations	17	25	8	263	scientific journals evaluation	5	6	3
83	prolific authors	13	25	6	264	term co-occurrence	2	6	3
84	academic productivity	11	24	26	265	web impact	5	6	3
85	science communication	13	23	21	266	abstracting and indexing	4	5	7
86	research quality	13	22	16	267	information dissemination	3	5	6
87	citation indexes	13	22	11	268	research capacity	4	5	6
88	science evaluation	13	22	11	269	research focus	5	5	6
89	google scholar metrics	13	22	6	270	community networks	2	5	5
90	citation pattern	10	22	5	271	subject categories	3	5	5
91	data sharing	9	21	13	272	citation prediction	3	5	4
92	web visibility	10	21	12	273	co-citation networks	4	5	4
93	collaboration networks	15	21	10	274	global research output	2	5	4
94	document clustering	7	21	10	275	innovation systems	2	5	4
95	web indicators	11	21	7	276	mapping of science	4	5	4
96	collaborative research	9	20	12	277	relative citation impact	4	5	4
97	citation databases	12	20	11	278	science metrics	3	5	4
98	researchers	10	20	11	279	scientific information systems	3	5	4
99	scientific quality	10	20	10	280	sociology of knowledge	3	5	4
100	international co-authorship	10	20	8	281	user studies	4	5	4
101	authors' productivity	4	20	5	282	academic ranking	4	5	3
102	bibliometric methods	16	19	27	283	complex systems	5	5	3
103	scholarly impact	11	19	19	284	data citation	5	5	3
104	journal analysis	6	19	14	285	information flow	5	5	3
105	scholarly journals	11	19	9	286	institutional analysis	5	5	3
106	scientific and technical publications	7	18	20	287	knowledge representation	5	5	3
107	topic modeling	8	18	18	288	quality of publications	3	5	3
108	institutional repositories	12	18	10	289	scientific documentation	5	5	3
109	journal quality	9	18	8	290	scientific field	5	5	3
110	authors productivity	8	18	5	291	scientific landscape	4	5	3
111	research excellence	11	18	5	292	scientific societies	4	5	3
112	world wide web	9	17	14	293	university-industry-government relations	3	5	3
113	academic journals	11	17	12	294	bibliometric measures	4	4	10
114	core journals	11	17	11	295	literature survey	2	4	8
115	scientific excellence	9	17	11	296	bibliometric rankings	4	4	6
116	zipf's law	6	17	11	297	co-citations	4	4	6
117	collaboration patterns	8	17	10	298	knowledge network	3	4	5
118	journal impact	8	17	10	299	science maps	4	4	5
119	scientific cooperation	10	17	9	300	author analysis	3	4	4
120	performance-based funding	12	17	6	301	co-occurrence network	4	4	4

Table 3. Continued

No.	Label	Links	Total link strength	Freq.	No.	Label	Links	Total link strength	Freq.
121	keywords	12	16	13	302	invisible college	3	4	4
122	scientific performance	10	16	11	303	literature productivity	3	4	4
123	academic research	12	16	10	304	network science	2	4	4
124	websites	8	16	10	305	productivity rankings	1	4	4
125	impact assessment	13	16	9	306	evaluation of research programs and tools	2	4	3
126	citation studies	9	16	8	307	inlinks	4	4	3
127	performance measurement	9	15	16	308	network visualization	3	4	3
128	publication output	6	15	16	309	performance assessment	2	4	3
129	databases, bibliographic	7	15	11	310	scholarly research	2	4	3
130	hyperlinks	5	15	10	311	text classification	2	4	3
131	internationality	11	15	9	312	thesaurus	3	4	3
132	research institutions	10	15	7	313	university websites	3	4	3
133	research metrics	8	15	7	314	webometric indicators	4	4	3
134	scholarly communications	12	15	7	315	research assessment exercise	2	3	6
135	scientific articles	12	15	5	316	scientific papers	3	3	6
136	publication bias	7	14	23	317	academic influence	2	3	4
137	web 2.0	9	14	11	318	mapping knowledge domain	3	3	4
138	complex networks	10	14	10	319	research development	3	3	4
139	publication patterns	7	14	10	320	research publication	2	3	4
140	academic social networks	9	14	7	321	scientific collaboration networks	2	3	4
141	publication counts	10	14	6	322	semantic networks	3	3	4
142	scientific visualization	8	13	12	323	bibliographic references	3	3	3
143	citation rate	7	13	11	324	citation behavior	3	3	3
144	research networks	10	13	10	325	country self-citation bias	2	3	3
145	knowledge transfer	12	13	9	326	impact of research	1	3	3
146	scientific communication and diffusion	6	13	8	327	individual research output	2	3	3
147	scientists	5	13	8	328	journal publishing	2	3	3
148	co-words	11	13	7	329	knowledge flows	1	3	3
149	scientific networks	7	13	7	330	performance-based research funding	1	3	3
150	knowledge creation	12	13	4	331	publication quality	3	3	3
151	quality assessment	5	12	15	332	publishing trends	3	3	3
152	serials	10	12	12	333	scholarly collaboration	2	3	3
153	essential science indicators	7	12	9	334	scientific workflows	1	3	3
154	research topics	8	12	8	335	social influence	2	3	3
155	library services	9	12	7	336	web ranking	3	3	3
156	research profiling	7	12	7	337	web of science database	1	2	7
157	article-level metrics	6	12	6	338	webometrics ranking	2	2	5
158	research ranking	7	12	5	339	citation context	2	2	4
159	mapping research	9	12	4	340	google trends	1	2	4
160	publication trends	6	11	23	341	scientometric databases	2	2	4

continued on following page

Table 3. Continued

No.	Label	Links	Total link strength	Freq.	No.	Label	Links	Total link strength	Freq.
161	publication rate	9	11	19	342	article characteristics	1	2	3
162	performance evaluation	6	11	13	343	document analysis	1	2	3
163	bibliometric indexes	7	11	12	344	information mapping	2	2	3
164	competitive intelligence	4	11	12	345	meta-analyses	2	2	3
165	literature analysis	5	11	10	346	national innovation system	2	2	3
166	co-authorship network	8	11	9	347	ranking of universities	1	2	3
167	research groups	7	11	8	348	research analysis	2	2	3
168	scientific community	7	11	8	349	research dissemination	2	2	3
169	hot topics	9	11	7	350	resource allocation	2	2	3
170	web presence	6	11	6	351	scientific literature production	1	2	3
171	scientific visibility	8	11	5	352	word co-occurrence	2	2	3
172	topic evolution	10	11	5	353	academic output	1	1	3
173	scientific mobility	10	11	4	354	cited journals	1	1	3
174	university research	8	11	4	355	media analysis	1	1	3
175	topic modelling	6	10	8	356	university research centers	1	1	3
176	university-industry collaboration	3	10	8	357	international journals	0	0	5
177	citation window	5	10	7	358	bibliometric networks	0	0	4
178	international research collaboration	6	10	7	359	authorship trends	0	0	3
179	research articles	7	10	7	360	bibliometric bias	0	0	3
180	knowledge sharing	8	10	6	361	theme evolution	0	0	3
181	scientific products	8	10	6					

A scan of the call for papers and special issues of journals provided another dimension of what can be considered to be the main research areas in informetrics research. For example, the ISSI 2019's call for conference papers listed fourteen main topics/themes, comprising of fifty-one sub-topics/themes. The topics/themes presented in the ISSI 2019 call for papers is by no means exhaustive but they nevertheless provide a better representation of what constitutes the main areas of informetrics research than most calls that were accessed online. Table 4 provides the ISSI 2019's main topics and sub-topics.

DESIGNING RESEARCH IN INFORMETRICS STUDIES

There are several design frameworks in quantitative research (see examples in Creswell & Creswell, 2018; Biggam 2015). The most common of these designs are experimental and survey. Leedy and Ormrod (2015) categorise quantitative research designs into descriptive research designs (e.g. observation research designs, correlational designs, developmental designs and survey designs) and experimental, quasi-experimental and ex post facto designs. Researchers often adopt any one of these designs to design their research or studies. As is the case with other quantitative research designs, studies in informetrics, as a research design, follow specific procedures, especially in situations where the study is for academic purposes (i.e. master's and PhD studies). This chapter provides such students and developing research-

Table 4. Informetrics research areas (Source: ISSI 2019)

Main topic/theme	Sub-topic/sub-theme
Informetric, scientometric, bibliometric, webometric, almetrics, datasources	Data quality, accuracy, completeness, disambiguation
	Web of Science, Scopus, Google Scholar
	Publication archives and repositories
	Research information systems
Electronic scholarly publishing: new developments, access modalities, costs	Open Access
	Bibliotheconomics
	Pricing of journals
	The role of electronic scholarly books
Full text analyses of scholarly documents	Computational linguistic techniques
	Citation context studies
	Novel indicators derived from full texts
Knowledge discovery and data mining	Big informetric data sets
	Novel models and algorithms
	Automatic topic clustering
	Search engines
Visualization and Science Mapping: methods and applications	Novel methodologies and software packages
	Emerging topics and research fields
	Informetric approaches to S&T forecasting
Usage analysis: methods and applications	Its potential and novel applications
	Patterns in full text downloads
	Article recommender systems
S&T indicators	Mathematical-statistical aspects
	Novel indicators
	Validation studies
	Novel applications
Assessment of higher education institutions	Author-level bibliometrics
	Indicators for early career scientists
	Authorship conventions
	Career paths
Scientific-scholarly internationalization, collaboration and mobility	International and national collaboration
	Brain drain phenomena
	The effects of internationalization
The science-technology interface	Authors and inventors
	Article-patent citations
	The science base of technology
Research integrity	Research integrity policies
	Misconducts in scholarly publishing
	Retractions

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Table 4. Continued

Main topic/theme	Sub-topic/sub-theme
Open science	Open data
	Reproducibility in science
	Open access
The application of informetric methods in other disciplines	Library and information science
	Sociology of science
	History of science
	Gender studies
Approaches to informetric and related studies borrowed from other disciplines	Econometric studies of efficiency
	Tools from the physics of complex systems
	Social network analysis
	Higher education studies
	Bioinformatics
	Computational linguistics

ers with a framework, consisting of elements that will assist them to design an informetrics study. The research methodology section of their dissertations and theses would also consist of a detailed description of these components. Below is a synoptic description.

1. **Paradigm:** This section provides a description of the paradigm the study adopts and the justification for the choice. A positivist or post-positivist paradigm informs informetrics studies, with objectivism as the epistemological perspective. The corresponding ontological perspective is realism.

2. **Approach:** Informetrics studies are quantitative in nature. In this part, therefore, students are expected to explain the adoption of the quantitative research approach.

3. **Design:** A description of informetrics (or scientometrics, bibliometrics, webometrics, cybermetrics or altmetrics) as a research design will suffice in this section. In addition, one may explain which one of the domain-specific methods (i.e. descriptive or evaluative informetrics methods) is followed to conduct the study. One may go further and explain a specific method (e.g. citation analysis, content analysis, co-authorship analysis, co-word analysis, Lotka's law, Bradford analysis etc).

4. **Target Population:** Wormell (1998, p. 257) offers one or two types of the target population in informetrics research when she points out that "informetrics involves exploring online databases not only to access documents or find facts, but also to trace trends and developments in society, scientific disciplines, production and consumption areas". The target population may constitute the units of analysis, which may include disciplines, institutions/organizations, fields of study, documents/papers, journals, countries, databases, citations, or web pages/sites, among others.

5. **Sampling:** Often this aspect is not explained in informetrics studies, as most of the studies tend to limit themselves to a given period of publication in studies that require demarcations according to the year of publication. It is advisable, however, that students justify the choice of the publication period in cases where certain items (sample) are selected from a pool of items (population).

6. **Data collection:** This section requires students to describe the nature of the data for the study and the methods or procedures followed to collect the data. Data can be qualitative (textual, pictures, etc) or quantitative. Informetrics data is often quantitative. Data collection methods or instruments in quantitative research include questionnaires, observation schedules, checklists, experiments, and structured interviews. Most informetrics researchers do not explain the method or instrument that they used to collect data. Rather, they describe the procedures followed to collect data (e.g. search query, setting limiters, and downloading, cleaning, and storage of data for analysis) and the data sources.

7. **Data Analysis and Presentation:** There are a variety of methods and techniques of analyzing informetrics data. Some of the methods and techniques are provided in Section 3 above. A description of the data analysis techniques should include a description of statistical methods or techniques, data analysis tools (e.g. software), and procedures followed in analyzing and presenting the data. An explanation on how the analysis and presentation of data aligns with the objectives of the study is equally important in this section.

FURTHER RESEARCH DIRECTIONS

The chapter has presented the informetrics research methods and focus research areas using author-supplied keywords in the informetrics research published between 1991 and 2018. The use of author-supplied keywords to explore research themes in a subject domain has been reported in the literature (e.g. Khan and Wood 2015; Liu et al. 2015; Chen et al. 2015; Neveol et al. 2010; Yang et al. 2016). Despite their wide use, author-supplied keywords have been faulted for a number of reasons such as the subjectivity associated with their generation by the authors. Onyancha (2018) argues that author-supplied keywords are not controlled vocabularies and therefore authors may conceptualise a theme differently. Onyancha (2018) adds that some journals do not require authors to supply keywords, although this practice is quickly disappearing. As a result, it is believed that further research focusing on controlled vocabularly such as subject terms as well as title words may yield deeper knowledge about informetrics research methods and research focus areas. Additionally, a content analysis of a large pool of the calls for papers for conferences and special issues of journals in the subject domain may provide additional insight on research methods and focus areas of informetrics research.

CONCLUSION

Informetrics studies, as they are known today, are relatively new. Although the term informetrics was first proposed in 1979 by Nacke, the development of the field, has its origin in bibliometrics which owes its rapid rise to the creation of the Science Citation Index (SCI) by Eugene Garfield in 1961 (Aksnes, Langfeldt & Wouters, 2019). The field of informetrics is still in its growth stage. The stage has witnessed an exponential growth of publications in informetrics and more particularly in bibliometrics and scientometrics. Altmetrics can be said to be in its infancy stage, despite the concept receiving increased attention since its inception in 2010, while cybermetrics and webometrics seem to be dissipating. It follows therefore that most informetrics research methods and research areas are associated with bibliometrics and scientometrics, and, of late, altmetrics. It was also noted that some informetrics methods

might actually constitute areas of informetrics research hence some overlaps between Table 2 and Table 3 as well as the corresponding visualization maps in Figures 2 and 15. This chapter has outlined several informetrics research methods and research areas. However, the list of the methods and research areas is not exhaustive as informetrics is still evolving.

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Chapter 18
Quantitative Data Analysis for Information Science Professionals

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ABSTRACT

The chapter presents general aspects of quantitative data analysis as they relate to information sciences. The chapter is based on a literature review. It begins with explaining the meaning of data and quantitative data. Kinds of quantitative data are presented. The meaning of data analysis and the reasons for data analysis are also discussed. Reasons for quantitative data analysis are also discussed. The 'what' and 'why' of statistics in general and for information science researchers in particular is also presented. The chapter also presents the main issues of quantitative data analysis. Steps in quantitative data analysis are also presented. Preparation of quantitative data analysis is followed by a presentation on quantitative data analysis methods. The chapter highlights the popular quantitative data analysis software. A brief presentation on how quantitative data are presented and interpreted is given. The chapter ends with a discussion on the advantages and disadvantages of quantitative data analysis.

INTRODUCTION

The chapter discusses basic aspects of quantitative data analysis as they relate to information sciences. It is based on the presentation and analysis of what is in the literature. It presents the following: background; the what and why of quantitative data analysis; fundamental concepts germane to quantitative data analysis; preparation of quantitative data analysis; quantitative data analysis methods; popular quantitative data analysis softwares; presentation of quantitative data; interpretation of quantitative data and advantages and disadvantages of quantitative data.

Quantitative data analysis skills are very necessary for an information science professional. The skills are necessary because the amount of information based on quantitative or statistical analysis is growing in our society (Geers, 2000) cited in Murtonen, Olkinuora, Tynjala, & Lehtinen (2008). Unfortunately,

social science students in colleges or universities tend to have challenges in comprehending quantitative methods and statistics courses (Gal et al., 1997) cited in Murtonen et al. (2008). The challenges may be attributed to previous bad experiences with mathematics leading to anxiety towards statistics. The social science students will struggle with quantitative data when they finally join the world of work. For example, Goertzen (2017) states that librarians face a challenge of making sense of all the wealth quantitative data sources available to them and use them (data sources) in a way that supports effective decision making. They thus, together with other information science professionals, need some exposure to the basic quantitative data analysis aspects presented in this chapter. Take note that a more detailed justification of the chapter is presented under the sub section on the what and why of quantitative data analysis as well as one on statistics you will encounter later in the chapter.

After reading this chapter, you should be able to:

- Appreciate the nature and place of quantitative data analysis in information science research;
- Appreciate the value of statistics in information science research;
- Differentiate between descriptive and inferential statistics;
- Carry out simple quantitative data analysis; and
- Present and interpret quantitative data.

BACKGROUND

Data is a general term with several meanings (Kerlinger, 1986). AED/TAC-12 Spring (2006) defines data as short hand for information or numbers, characters, images or other methods of recording, in a form which can be assessed to make a determination or decision about a specification. Data on its own has no meaning. It has meaning when interpreted and becomes information. There are two types of data, quantitative and qualitative data. The focus of this chapter is on quantitative data analysis.

Quantitative data are numbers, percentages and measurable figures. In other words, in the quantitative domain, data is used to describe things by assigning a value to them (Albers, 2017). Similarly, Bhat (2019) defines quantitative data as the value of data in the form of counts or numbers. Thus, quantitative data is data expressed in numbers (Chireshe, 2015). The data can be counted or expressed numerically. The data can be put into categories, measured or ranked. There are two main types of quantitative data namely, categorical data and continuous data. Categorical data is type of quantitative data that involves grouping things. Data must be placed into groups. An item cannot belong to more than one group at a time. Examples of categorical data are race and gender. We can have people categorised as blacks, whites or coloureds or as males or females. One cannot be both male and female. We can have categories of female and male library and information science (LIS) students. Goertzen (2017) talks of stakeholder groups to be served by a library, collection resources, financial resources, library personnel and facilities and equipment as examples of categories of information that a librarian can have. Continuous data is type of quantitative data where the values fall in a continuum and it is possible to have fractions or decimals. The numerical data is measured on a continuous range or scale. That is, values fall along a continuous scale. In continuous data, all values are possible with no gaps in between. Continuous data is usually a physical measurement (Albers, 2017). Examples of continuous data may include measurement of age, height or distance. In LIS one may measure library readership pattern on the basis of age.

Quantitative data is commonly used to answer 'how much' or 'how many' questions and is used to study events or levels of occurrence (how often? or to what extent?). In relation to LIS, Goertzen (2017) states that quantitative data allows librarians to learn about the demographics of their clients, measure how many clients use a service or product such as electronic collections, examine client attitudes and behaviours and document readership trends. Quantitative data also provides a baseline for future evaluation and evidence for when and how clients make use of a library service. Quantitative data is also central to cost data. In view of this, librarians need to have factual information concerning the cost of library materials, annual budgets allocations and general acquisition budgets (Goertzen, 2017). It is against this background on the what and why of quantitative data in general and in LIS in particular that this chapter is included. The next section defines and justifies quantitative data analysis in general and in LIS in particular.

THE WHAT AND WHY OF QUANTITATIVE DATA ANALYSIS

Quantitative data analysis involves the examination of quantitative data in order to understand it better and be able to draw conclusions from it (Akinyoade, 2013). The data is categorised, ordered, manipulated and summarised to obtain answers to research questions (Kerlinger, 1986). Morris and Fitz-Gibbon (1987, p. 10) state that quantitative data analysis assumes that "if it exists, it exists in some quantity and can be measured".

The main purpose of quantitative data analysis is to reduce data to intelligible and interpretable form so that the relations of research problems can be studied and tested (Kerlinger, 1986). Albers (2017) states that quantitative analysis aims at revealing the underlying patterns, trends and relationships of a study's contextual situation. For example, a researcher may ask if more positive attitudes about information science are associated with having received more information about it (Morris & Fitz-Gibbon, 1987).

Simply, quantitative data analysis is a way of evaluating things. It can be performed for various reasons like performance evaluation, measurement or evaluating the use of a thing in a particular environment. For example, evaluating the use of quantitative methods in information science research or evaluating the effectiveness of the most preferred teaching methods adopted by LIS lecturers in a university. It also helps in predicting real world events like changes in the use of technological equipment. The impact of social media on face to face social interaction may also be predicted through quantitative data analysis.

Quantitative data analysis enables you to make sense of data you will have collected. One makes sense of the data through describing and summarising it, identifying relationships between variables, comparing variables, identifying the differences between variables and forecasting outcomes (Oberhuber & Maurer, nd). Thus, it helps us see similarities, differences, associations and relationships between phenomena being investigated (Akinyoade, 2013). The data has to be organised, summarised and explored for it to make sense.

Borko (1968) view information science as a discipline concerned with the body of knowledge relating to the origination, collection, organisation, storage, retrieval, interpretation, transmission and utilisation of information. One works with or researches about or learns about the management of information in any form hence the relevance of understanding the what, why and how of quantitative data analysis. Literature points to the predominance of quantitative approach in empirical library and information science studies. For example, Ngulube (2013) found out that the quantitative approach dominated the qualitative approach in mixed method research. A related study by Ngulube and Ngulube (2015) on

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trends in research methods in *South African Journal of Economics and Management Sciences* (2003 to 2011) revealed that the quantitative approach was predominant. In a similar vein, Malliari and Togia (2017) state that literature reveals that a majority of empirical studies in library and information employ quantitative data analysis. The demonstrated predominance of the quantitative approach calls for the need for information research scientists to have an appreciation of quantitative data analysis for them to be able to understand and use the empirical studies. Similarly, the growth of information technology and the increase in availability of databases on all aspects in life makes quantitative data analysis skills a must have for researchers as they will enable them to analyse large bodies of data (Morris & Fitz-Gibbon, 1987). Survey design which is largely a quantitative research design is a predominant research design in LIS research (Malliari & Togia, 2017). As such, any information science researcher needs to be acquainted with quantitative data analysis and interpretation procedures hence this chapter targeting information science researchers.

CONCEPTS GERMANE TO THE FIELD OF QUANTITATIVE/NUMERICAL ANALYSIS

Quantitative data analysis requires familiarity with certain fundamental concepts germane to the field of numerical analysis. These include; variables, measurement, measurement scales, statistics, hypothesis, causality, generalisability and reliability (Akinyoade, 2013; Learn Higher & NMU, 2008). These fundamental concepts are discussed below.

Variable

A variable is a symbol to which numerals or values are assigned. Fletcher (2003) views it as an item that can be measured or observed while Spata (2003) cited in Akinyoade (2013) views it as any condition, situation, object, event or characteristic that may change in quantity and or quality. General examples are heat, motivation, intelligence, etc. In information science, researchers can talk of source preferences, use of information, type of information, geographical location, level of education, occupation, social status and gender as variables affecting information need. A variable is the opposite of a constant.

We have mainly three variables, namely, Independent, Dependent and Control variables. Independent variable, is the variable that is manipulated by the researcher. For example, if we are carrying out a study on the effects of a reading method on the academic performance of a LIS university class, the reading method will be the independent variable. We will have to expose the class to the reading method while the other class is not exposed to it. Dependent variable, is the variable that is measured to determine effects of the manipulation of the independent variable. In our example above, academic performance becomes our dependent variable. We will have to measure the academic performance of the two classes and compare the marks to see if the reading method had any effect. Control variables, are the variables that are held constant during the experiment. In our experiment above, the lecturer teaching the two classes will be the same as well as the teaching hours and venue.

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Measurement

Measurement is the assignment of numerals to objects or events according to rules (Kerlinger, 1986). A numeral is a symbol of the form 1,2,3------. A number is a numerical that has been assigned quantitative meanings. In measurement, values are made meaningful by quantifying them into specific units. Measurements act as labels which make those values more useful in terms of details. For example, instead of saying that the library has many new information science book titles, we can specify a measurement and specify that the library has 300 new information science book titles. Goertzen (2017) presents citation analysis as the measurement of the impact of an article based on the number of times it has been cited. Publication analysis is also presented as measurement of impact by counting the research output of an author. This may include the number of peer reviewed journal articles and frequency of publication.

Measurement Scales

Scales of measurement refer to ways in which variables/numerals are defined and categorised. The nature of data one is dealing with determines the category to which it (data) can be grouped and the kind of analysis that can be performed with such data. The extent of numerical content implied in numerical measurements determines the category the data is placed (Ahlquist, 2010 in Chireshe, 2015). The assignment of numerical values to observed events involves different levels of precision (Chireshe, 2015). There are four kinds of categories data can be grouped. These are nominal, ordinal, interval and ratio each incorporating the characteristics of its predecessor (Akinyoade, 2013).

Nominal Scale

It is a naming quality (Akinyoade, 2013). It involves determining the presence or absence of a characteristic and categorises to mutually exclusive groups. The groups are independent of each other. Differences between the groups are in kind and not degree. That is, qualitative difference and not quantitative. Nominal scale is also referred to as categorical measurement since naming involves categorisation. In this level of measurement, words, letters, and alpha-numeric symbols can be used. For example, if there are data about library sources belonging to two different categories, one may accord hard copies the number 1 category and soft copies the number 2 category. There cannot be 1.6 or 1.8 category. Another example, is classifying electronic media as E and print media as P. The scale assumes that all elements in the same group are equal. If we have religious and non-religious group, it assumes that the people are equally religious. Nominal data denotes discrete variables.

Ordinal Scale

The scale classifies and introduces ordered relationship into the data while keeping the features of the nominal scale. It involves ranking or otherwise determining an order of intensity for a quality (Akinyoade, 2013). For example, a book title that is most read for an information science statistics course would be assigned the first rank and the second most read book title for a similar course would be assigned the second rank and so on. An ordinal scale identifies the relative intensity of a characteristic, but does not reflects any level of absolute intensity (Akinyoade, 2013). For example, in a 5-point rating scale (1-strongly satisfied, 2-satisfied, 3-uncertain, 4- dissatisfied and 5- strongly dissatisfied), point 1 cannot

be said to be 4 times in dissatisfaction as point 5. In our example of ranked book titles, we will not have information about the difference between the textbooks. The book titles may be of similar significance or they may differ widely.

Interval Scale

The scale has a metric, that is, a regular and equal interval between each data point as well as keeping the features of ordinal scale (Akinyoade, 2013; Chireshe, 2015). It involves a continuum composed of equally spaced interval. A good example of this level of measurement is temperature in centigrade, where, for example, the difference between 70^0C and 75^0C is the same as the difference between 95^0C and 100^0C. Another example is calendar years. We can say as much time passed between 1980 and 1990 as between 2005 and 2015.

Ratio Scale

The ration scale is the fourth scale of measurement. It has all the features of internal interval scale and has a value of zero as well. It has a meaningful or true zero (Chireshe, 2015). Measures of length or weight satisfy this condition. In the ratio level of measurement, the divisions between the points on the scale have an equivalent distance between them.

Each scale of measurement has certain properties which in turn determines the appropriateness for use of certain quantitative analysis methods. For example, when working with nominal data, only frequencies can be used. Modes, median and percentages are used when working with ordinal data while the mean, standard deviation, coefficient of variance are used when working with interval and ration data (Chireshe, 2015).

Statistics

These are methods that have been developed for handling numerical data. Kerlinger (1986) views statistics as the method of analysing quantitative data obtained from samples of observations in order to study and compare sources of variance of a phenomenon, to help make decisions about supporting or not supporting hypothesised relations between the phenomena and assist in making informed inferences from empirical studies. Similarly, Diggle (2015) defines statistics as a branch of mathematics or science that deals with the collection, analysis, interpretation, presentation and organisation of numerical information.

According to Kerlinger (1986), the primary purpose of statistics is to manipulate and summarise numerical data and to compare the obtained results with chance expectations. Other purposes from Kerlinger are to:

- Reduce large quantities of data to manageable and understandable form. For example, it is impossible to digest 50 e-library sources for instance, but if a mean and a standard deviation are calculated, the sources can be easily interpreted by a trained person.
- Aid in the study of populations and samples.
- Aid in decision making. For example, if a librarian/ information scientist needs to know which of the available electronic data bases provides the most satisfaction to users, he/she can use statistics to help him/her gain this knowledge.

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- Aid in making reliable inferences from observed data. An inference is a generalisation derived by reasoning from evidence at hand.

Statistics provide information and data (facts and figures) as input for planning, monitoring and evaluation of programmes. For example, statistics can be used to determine the type and number of book titles that can be bought for a library by looking at the frequency of demand for certain book titles from the library issue desks.

A knowledge of statistics will enable one to effectively conduct research. One will be able to make decisions based on the data collected from a conducted study. Similarly, statistics is important for one to understand professional literature. An understanding of statistics will enable a person to read and evaluate articles in scientific journals (literature). Some journal articles are technically written. Without an understanding of statistics, the information contained in some of the journal articles may be meaningless. For example, a journal article may statistically present information on the frequently and reliably used methods of data collection in LIS research. An understanding of statistics will enable one to utilise the information and carryout sound research studies in LIS. In other words, lack of competence in statistics may result in one producing half-backed and poorly planned research projects.

Professionals in information science are concerned with the management of information/data in any form. Statistics provide a means to organise and interpret the data in a way that can be quantified. They provide rules and procedures to help summarise and describe data (Drummond, 2004) hence their relevance to information scientist researchers. Statistics also allows information scientists to understand the rationale behind researches in information science or in the social sciences. For example, a research on improving access to electronic data bases may have its rationale on the increasing incidence of complaints on un accessibility of electronic data bases. An information science researcher carrying out a study on predominant methods (approach, design, methods of data analysis) used and aspects studied in published library and information research would need an understanding of statistics to be able to analyse the available studies and present results that address the aim of his or her study. Furthermore, an understanding of statistics will enable an information scientist to apply statistics related to LIS. For example, turn away statistics. Turn away statistics is the number of clients denied access to a specific title (Goertzen, 2017). Given the increasing need for a scientifically literate society in today's complex world, statistics learnt at university will go a long way in meeting this demand (McGrath, 2014).

Statistics can be used to describe data, to generate hypotheses and to test hypotheses. Hypotheses are explained in the following section.

Hypothesis

A hypothesis is a reasonable guess or anticipated answer (Chireshe, 2015). We have two types of hypotheses. The null hypothesis (H0) and the alternate hypothesis (HA). Null hypothesis implies a statement that expects no relationship between variables while an alternative hypothesis is one that expects some relationship between variables. The null hypothesis is the hypothesis that is assumed to be true while the alternate hypothesis is assumed to be true when the null hypothesis is false. We test the null hypothesis. We will talk about hypothesis testing under inferential statistics. If a researcher wants to carry out a study on the level of use of statistics by information science researchers, he or she would say that: Information science researchers use a lot of statistics (alternate hypothesis). The null hypothesis would be Information science researchers do not use a lot of statistics. One will have to carry a study on the use of statistics

by information science researchers and get data to either support or fail to support the null hypothesis. We may also want to establish if there is a difference in research productivity between male and female LIS researchers. In this study, our alternate hypothesis would read as: there is a difference in research productivity between male and female LIS researchers. The null hypothesis would read as: there is no significant difference in research productivity between male and female LIS researchers. Hypothesis testing is discussed under inferential statistics later in the chapter.

Causality

Refers to the relationship between cause and effect. It is sometimes referred to as causation. Causal statements explain events, allow predictions about the future and makes it possible to take actions to affect the future (Brady, 2013). For example, we can say the increased use of relevant electronic data bases improves academic performance of undergraduate students. In future, one would provide more relevant electronic data bases to improve on their academic performance. Establishing cause and effect involves identifying variables which include independent variable (relevant electronic data bases), dependent variable (academic performance) and control variables. These variables have been explained under variables subheading.

Generalisability

Refers to the degree to which the findings of a study can be applied, extended or extrapolated beyond the sample to the larger population. It is sometimes called external validity or representativeness. The ability to generalise results allows researchers to interpret and apply findings in a broader context, making the findings relevant and meaningful. There are two aspects to generalisability: (i) population validity (ii) ecological validity. The first refers to the extent to which obtained findings can be applied to other people while the later is about the applicability of the findings to other settings. For example, can results on electronic data base usage by information science undergraduate students be applied to Engineering undergraduate students (population validity) or can results on electronic data bases availability in a developing country be applicable to developed countries (ecological validity). Quantitative data/research usually works towards producing generalisable findings.

Reliability

It has to do with the consistency and dependency of a measure. A reliable test should produce the same results on successive trails. It is sometimes called internal validity. The question under reliability is: to what level will the measure (instrument/test) produce the same results under the same conditions every time it is used. For example, to what extent does an information storage and retrieval instrument produce the same results under the same conditions every time it is used? Reliability is often examined by using a test and retest method where the measurements are taken twice at different times.

PREPARATION FOR QUANTITATIVE DATA ANALYSIS

According to Academy Resources (2018), the 1st stage of analysis quantitative data is data preparation. The aim of data preparation is to convert raw data into something meaningful and readable. Data preparation has three steps.

Step 1. Data Validation

Data validation aims at finding out whether the data collection was done as per pre-set standards without any bias. In other words, it addresses the issue of whether the data collection was conducted accurately and the data is free of fraud or bias. It helps to identify suspicious and invalid cases, variables and values in a set of data.

Step 2. Data Editing

Data editing is the process of cleaning collected data. In this step, the researcher has to check if the data does not include errors or omissions by either the researcher or the respondents. The researcher has to conduct basic data checks, checks for outliers and edit the raw data to identify and clean out any data points that may hamper the accuracy of the results. Having cleaned (edited) the data, the next step is to code it.

Step 3. Data Coding

The step involves grouping and assigning values or codes to responses from the study. Codes are numerical. For example, if the researcher collected data from 100 librarians, he/she may code their qualifications as: 0= Certificate; 1= Bachelors' Degree; 2= Masters' Degree. The researcher will then deal with simplified grouped qualifications rather than dealing with massive range of individual qualifications. The way the data is coded may depend on the measurement scale used and how the researcher intends to communicate the results.

QUANTITATIVE DATA ANALYSIS METHODS

Quantitative data is ready for analysis once the 3 steps of data presentation above have been carried out. Two commonly used quantitative data analysis methods are descriptive statistics and inferential statistics.

Descriptive Statistics

Descriptive statistics are also known as descriptive analysis. They are used to summarise and describe a set of data (Drummond, 2004). They are concerned with data enumeration and organisation. That is, they simply report what has been found using a variety of ways. No attempt is made to infer or predict population parameters. It is the first level of analysis which provides basic summaries of individual observations or measures in a sample (Fletcher, 2003). It helps the researcher summarise the data and find patterns. A researcher may easily summarise data about the predominant research methods in library and information science using descriptive statistics.

Data can be described either pictorially (tables and graphs) or numerically (ratios, percentages, correlations). The method used to describe data depends on the message and the characteristics of a particular audience. That is, the same data may be presented in different forms to different audiences depending on their understanding of statistical techniques. Before applying descriptive statistics, it is important to think about which method is best suited for your research question and what you want to show. For example, a percentage is a good way to show data bases preferences by undergraduate students of information science.

Descriptive statistics is mostly used for analysing single variables and is often called univariate analysis.

Descriptive statistics includes frequencies, percentages, ratios, measures of central tendency (median, mode and mean), measures of variability (range, standard deviation and variance), measures of relationship (correlation) and measures of relative standing (Z-scores and T-scores) (Chireshe, 2015). Some of the methods of descriptive statistics are explained below.

Frequencies

These describe the number of times a variable has occurred within a given interval or how many responses fit into a particular category (Taylor-Powell, 1996). Examples of frequencies include:

- Ten of the registered information science undergraduate students are international.
- A total of 40 male information science international post graduate students will graduate in 2021.
- Three quarters of studies published in credible information science journals focus on information service activities, information storage and retrieval.

Goertzen (2017) presents counts of client use of the catalog to access electronic full texts (catalog clickthrough) as an example of frequencies.

Frequencies are normally presented in a frequency distribution. They may serve as a base for calculating percentages (Taylor- Powell, 1996). Percentages are explained below.

Percentages

A percentage (%) is a part in relation to its whole (Chireshe, 2015). It is calculated by dividing a given number of units in a group by the total number in that group and multiply by 100. For example, in a group of 50 information science scientists, were 30 are females, the percentage of the female students would be 30/50x 100= 60%. Percentages are easy to interpret. For example, it is more understandable to say 70% of information science researches use quantitative data analysis methods than to say 40 of 57 information science researches use quantitative data analysis methods. Taylor-Powell (1996) states that percentages are a good way to show relationships and comparisons either between categories of respondents or between categories of responses. For example, 50 percent of the 2015 Zimbabwe information science post graduate students were male as compared to 2018 when 55 percent were male (comparing 2015 respondents to 2018 respondents). While 70 percent of the male students were over 50 years of age, 15 percent were below 35 years (comparing responses from the same respondents). Chireshe (2015) notes that percentages may be misleading when dealing with small sample sizes.

Ratios

Ratios show the numerical relationship between two groups (Chireshe, 2015). For example, the ratio of the number of final year information science students (100) to the number of computers for the final year information science students in a university (20) would be 100/20 or 5:1.

Measures of Central Tendency

These methods describe a quantitative variable in terms of its location (centrality). It involves the identification of the most representative score of a set of observations. That is, they are measures of the most typical value in a given set of data (Chireshe, 2015). They are summary measures. There are three most commonly used measures of central tendency, the mode, median and mean. A brief description of each is given below.

Mode

The mode represents the point of the greatest centration in a score distribution. It is the most frequently occurring score in a distribution. Consider the following distribution of information science undergraduate students' statistics scores: 50, 55, 60, 60,70,70,70,75,75 and 80. The mode is 70 because it occurs more often than any other score. A distribution can be (i) non-modal- no mode (ii) unimodal- having one mode (iii) bimodal- having two modes (iv) multimodal- having three or more modes.

The mode is often used as a quick measure of central tendency (Drummond, 2004, p.43) but is not often an accurate measure of central tendency. It is the easiest measure of central tendency to calculate. The mode can be applied to all the 4 scales of measurements (nominal, ordinal, interval and ration).

Median

The median is the middle value or observation that divides an ordered set of distribution scores into half (Drummond, 2004). The median is calculated by ordering the scores from one extreme to the other. For an odd numbered (N= 9) set of data, for example, 5,7,11,14,17,19,20,21 &25, the median is the middle score-17 with 4 scores smaller and 4 scores larger than the median. For even numbered (N= 10) set of observations, for example, our information science undergraduate students' statistics scores: 50, 55, 60, 60,70,70,70,75,75 and 80, the median is obtained by averaging the two middle values and is (70+70)/2=70. The median is not affected by extreme scores in a distribution. The median is appropriate for either ordinal, interval or ration data.

Mean

The mean is the arithmetic average (Drummond, 2004). It is used when one a research wants to represent a set of scores by using a single numeral (Morris & Fitz-Gibbon, 1987). It is the commonly used of the 3 measures of central tendency because it takes into consideration each score in a distribution unlike the mode and median. It is obtained by summing up all the scores in a distribution and dividing the sum by the total number of scores and this can be expressed as:

$$\bar{X} = \frac{\Sigma X}{N}$$

Where

ΣX = sum of scores
N = number of scores

In our information science undergraduate students' statistics scores, the mean would be:

$$\bar{X} = \frac{50 + 55 + 60 + 60 + 60 + 70 + 70 + 70 + 75 + 75 + 80}{10} = \frac{665}{10} = 66.5 \dots$$

The mean is appropriate for either interval or ration data.

There are 3 questions one should consider when working with measures of central tendency or summary measures. The questions are:

- How do the data converge or come together?
- What is a typical (average) score/value?
- Where is the middle (centre)of the distribution?

In a symmetrical distribution, such as normal curve, the mean, median and mode have the same score or value (Drummond, 2004).

Measures of Variability or Dispersion

Whilst measures of central tendency help us identify single typical score of a distribution, there is need to know how much scores differ for proper interpretation of data. Measures of variability (variance measures) are methods of quantifying how much scores in a distribution differ. The most measures of dispersion are the range, variance and standard deviation.

Range (R)

The range is the simplest measure of dispersion. It is simply the difference between the largest and the smallest values in a score distribution. Statistically it is expressed as R= Maximum value – Minimum value. In our information science undergraduate students' statistics scores, the range is 80-50=30. This measure helps us understand the extent to which the data varies. The challenge with the range is that it depends only on the extreme values. Thus, it does not always reflect the pattern of variation in the distribution of scores (Drummond, 2004).

Variance

It is a measure of quantitative variation reflecting the average dispersion in the distribution. It provides information on how widely spread or scattered, the scores are from the mean (Drummond, 2004). The formula for variance is:

$$S^2 = \frac{\Sigma\left(X - \bar{X}\right)^2}{N}$$

Where

S^2 = variance
Σ = sum of all scores
X = each score
$\bar{X}$ = mean of the distribution
N = total number of observations

In other words, the arithmetic mean is subtracted from each score, the difference then squared, summed and divided by the total number of observations.

Standard Deviation

This measure is the square root of the variance and the most commonly used statistics of dispersion (Drummond, 2004). Its size indicates the dispersion of the distribution.

The formula for standard deviation is:

$$S = \sqrt{\frac{\Sigma(X - \bar{X})^2}{N}}$$

S = represents standard deviation.

Questions to consider when working with variance measures include:

● How do scores differ?
● What are the differences between individuals in a group?
● What is the range of the outcomes?

As already mentioned, measuring variance demonstrates differences. Once the difference has been identified, one seeks an explanation for it and determine if it is significant.

With measures of variability, we were looking at how variables differ. Now we want to look at how variables relate to each other.

Measures of Relationships

These are statistical measures that describe the presence or absence of a relationship between two variables or sets of data. They show how the two variables are related to one another. However, the existence of a relationship/association or correlation does not mean causality. If two variables vary in such a way that they follow each other to some extent, we say that there is a relationship between the variables (Chireshe, 2015). For example, studying hard for an examination and passing the examination are statistically associated. According to Cohen, Manion and Morrison (2001), measures of correlation answers three questions about the two variables or sets of data. The 1st question is: is there an association between the two variables? If the answer to this is yes, then one would ask the following two questions: what is the direction of the association? and what is the magnitude of the association?

To describe the relationship or association between numerical variables, we use a statistic known as the correlation coefficient (Drummond, 2004). The statistic is represented by the symbol r and it provides answers to the last 2 questions above. That is assessing the strength and direction of the relationship (Cohen et al., 2001; Chireshe, 2015). The correlation coefficient ranges from -1.00 and + 1.00 (Drummond, 2004) and depicts the nature and degree of the relationship between the 2 variables. A correlation coefficient of 0.00 is an indicator of no association and a correlation coefficient of -1.00 reflects a perfect negative correlation.

When we have 2 continuous variables and data from the interval or ration scales, we compute the Spearman rank correlation test to demonstrate the relationship (Chireshe, 2015).

Measures of Relative Standing

These are measures that provide information about where a score falls in relation to other scores in a set of data (Chireshe, 2015). The measures show someone's relative position in a group by indicating how far the raw score is above or below the mean (Linn & Grounlund, 1995).

These measures are sometimes known as standard scores. A standard score is a raw score that has been converted from one scale to another. We convert raw scores into standard scores because standard scores are more readily interpretable than raw scores. With standard scores, the position of a test taker's performance relative to other test takers is readily apparent. Examples of standard scores are Z -scores and T- scores.

Z-Score

A Z-score is a statistical measurement of a score's relationship to the mean in a group of scores. Z-scores tell us whether a particular score is equal to the mean, below the mean or above the mean of a set of scores. They can also indicate how far a particular score is away from the mean (below or above) and by how many standard deviations (Morris & Fitz-Gibbon, 1987). A Z-score of 0 means the score is the same as the mean. The formula for a Z-score is:

$$Z = \frac{X - \bar{X}}{SD}$$

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Where

X = raw score of concern
$\overline{X}$ = mean of the distribution
SD = standard deviation of the distribution
$X - \overline{X}$ shows the deviation or distance of the score of concern from the mean

Z- score provides a convenient way to compare various raw scores within and between tests. The higher the z-score the better the performance. It helps us little to know that Peter's raw score on communication skills test was 24 and that his raw score in statistics was 42. It would be more informative and helpful to know that the z-score Peter achieved in Communication skills was 1.32 and the z-score in Statistics was -0.75. From just these data, we know that although Peter's raw score in statistics was higher than the communication skills one, he did perform better in communication skills.

If the z-score is negative, the performance is below average. if it is positive, the performance is above average. If it is 0, the performance equals the average.

T- Score

The Z- score carries with it, 2 characteristics that may be unfamiliar and uncomfortable to work with. That is, the negative sign and the decimal fractions. To minimise confusion arising from the use negative and decimals, we employ the T-score.

The T-score expresses the position of a given score in positive and integer terms. The formula for T-score is:

T = 50 + 10Z

Where

T= T score and
Z= Z-score.

T-scores are always rounded off to the nearest whole number.

Summary of Descriptive Statistics

The descriptive statistics measure one uses depends on what he/she wants to know/do/show (Chireshe, 2015) as demonstrated in Table 1.

The measures under descriptive statistics are simple. The chapter now moves to measures that are a bit complex.

Inferential Statistics

Descriptive statistics describe the set of data that is being analysed, but does not allow us to draw any conclusions or make any inferences about the data. Hence, we need another branch of statistics: *infer-*

Table 1. What one wants to know/do/show and the measure to use

What you want to know/do/show	Measure to use
Knowing the number of times, a variable has occurred	Frequency
Knowing the proportion of respondents who reacted in a certain way	Percentage
Knowing the arithmetic average of a set of data	Mean
Knowing the middle point in a range of a set of data	Median
Knowing the most frequently occurring score in a range of scores	Mode
Showing the difference between the largest and the smallest score in a set of data	Range
Showing the degree to which a score deviates from the mean	Standard Deviation
Showing the relationship between two sets of data	Correlation coefficient
Showing a test taker's relative position in a group	Z- score

ential statistics. To 'infer' is to draw a conclusion on the basis of evidence or facts available (collected data). Inferential statistics is a set of statistical methods used to draw conclusions or inferences about characteristics of a population based on data from a sample. That is, inferring from sample to population.

Inferential statistics involves methods of using information from a sample to draw conclusions about the population. One generalises the results and make predictions about a larger population. They are complex analysis that show the relationship between different variables rather than describing a single variable. After drawing conclusions from sample data, one defines subsequent action to be taken. For example, the conclusion that there is a significant difference in information science statistics module pass rate when it is taught by lecturer A than lecturer B may result in the university making lecturer A the permanent lecturer for the module.

Statistical inference is the process of making an estimate, prediction or decision about a population based on a sample. Thus, we can apply what we know about a sample to the large population from which the sample was drawn. For example, a researcher may predict the variables affecting information need of students at a university based on results from a sample of students in one faculty of the university.

The rationale for statistical inference is that large populations make investigating each member impractical and expensive. It is easier and cheaper to take a sample and make estimates about the population from the sample. However, such conclusions and estimates are not always going to be correct. For this reason, we build into the statistical inference 'measures of reliability' namely confidence level and significance level.

Confidence and Significance Levels

The confidence level is the proportion of times that an estimating procedure will be correct. It is the degree to which one can confidently say that the results are accurate and not due to chance. That is, if we found a relationship at 95% confidence level, then there is a 95% chance that there is a relationship. In other words, a 95% confidence level means that estimates or results based on this form of statistical inference will be correct 95% of the time. There is 5% room for an error or chance.

When the purpose of the statistical inference is to draw a conclusion about a population, the significance level measures how frequently the conclusion will be wrong in the long run. Levels of significance

are expressed as proportions. For example, 0.05; 0.1;0.025, etc. They give us some information about the proportion of risk an investigator is willing to tolerate in rejecting the null hypothesis. For example, a 5% significance level means that in the long run, this type of conclusion will be wrong 5% of the time. Statistical significance is the term used to indicate that difference between groups are not due to chance.

Hypothesis Testing

Testing hypothesis generally involves two hypotheses, the null and alternate hypothesis. The null hypothesis is assumed to be true and best supported by sample evidence and is therefore used to generate a sampling distribution. That is, in hypothesis testing, the information from a sample is used to judge the relevance or tenability of a hypothesis about a population.

Hypothesis testing is a "branch of inferential statistics that is concerned with how well the sample data support a null hypothesis and when the null hypothesis can be rejected" (Chireshe, 2015, p.119). You either support or fail to support the null hypothesis in light of the evidence gathered. When the null hypothesis is rejected, we say that we found significant findings. In inferential statistics, hypotheses are tested using statistical tests.

Types of Statistical Errors

Under hypothesis testing, we have said we reject or fail to reject a null hypothesis. There are 2 types of statistical errors that can be made. Type 1 error and Type error 2. With type 1 error, you reject a true H0 when you conclude that there is a difference when in reality, there is no difference. You believe that the means of the two groups are different when they are the same. Type 2 error represents the risk of accepting the null hypothesis when it is in fact false. You believe the means of the two groups to be the same when they are different.

The two types of errors are not independent. The smaller the Type 1 error, the larger the potential Type 2 error and vice versa.

Statistical Tests

There are two main groups of tests, parametric and non-parametric tests. Parametric tests are very powerful test that are performed on data that have a normal distribution. Parametric tests are used when the variance or spread of the scores within the two groups is equal. They are done on scores that represent an interval or ration scale. Non-parametric tests require neither a normal distribution nor equal group of variances. They are done on scores that represent ordinal or nominal scale of measurement. They are useful for large samples where the parametric assumptions are not met and can be used for very small samples.

According to Chireshe (2015), the statistical tests one uses depends on the aim of the study, the data collected and the way the data was collected. This is not a statistics chapter and thus, a brief explanation of a few statistical tests will be given.

t-Test

This is a test that is used to measure the statistical difference between two means. In other words, it is used to compare means of two sets of data (Chireshe, 2015). As an example, we can use the test to compare the difference in research methods and statistics performance between 3rd year information science male and female students. The t-test can tell us if the female students' mean score is significantly different from the males' mean score. The t-test cannot be used to measure performance differences among 2nd, 3rd and 4th year students. There are two categories of t-tests. The t-test for related or matched samples and the t-test for independent samples. A sample is related when scores are taken twice or come from the same individuals (repeated measures) and when individuals are matched on key variables like IQ, education, etc. If a researcher wants to compare library use between male and female university students, he or she may use a t-test for independent samples.

ANOVA (Analysis of Variance)

This is a statistical test used to compare means. It differs from the t-test in that with t-test, you can only compare two means at a time. With ANOVA you can compare multiple means at the same time. In our example on difference in research methods and statistics performance between male and female information science students, a researcher can use ANOVA to compute the difference in performance among 2nd, 3rd and 4th year students. There is a one-way ANOVA used when the researcher has one independent variable and a two-way ANOVA used when the researcher has more than one independent variable.

Chi-Square Test

The chi-square test is used to test the differences between two or more categorical variables. According to Morris and Fitz-Gibbon (1987, p.99), "a chi-square test compares the observed distributions with the distributions that would be expected if there were no relationship between the two sets of categories". If we want to test if there is a significant relationship between gender and performance in research methods and statistics among second year information science students, we can compute the chi-square test.

Factor Analysis

Factor analysis "is a collection of methods used to examine how underlying constructs influence the responses on a number of measured variables" (Chireshe, 2015, p.120). The technique is used to reduce a large number of variables into fewer numbers of factors which a researcher can cope with. Kerlinger (1986, p. 569) states that factor analysis "reduces the multiplicity of tests and measures to greater simplicity". In the same vein, Drummond (2004, p.50) sees factor analysis "as method that can systematically summarise a large matrix of correlations". With factor analysis, we are able to compute measures or factors belonging together and the magnitude of each. Factor analysis extracts maximum common variance from all variables and puts them into a common score. Kachigan (1986) cited in Drummond (2004) presents the following as some of the uses of factor analysis: identification of underlying factors making a large set of variables, screening variables for inclusion in future statistical analyses, reducing a number of factors necessary to explain a set of variables and selecting a small group of representative but uncorrelated variables from among a larger set in order to solve a variety of practical problems.

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Regression Analysis

Regression analysis "is a set of statistical procedures that are used to explain or predict the values of a dependent variable on the basis of the values of one or more independent variables" (Chireshe, 2015, p.121). For example, you may want to try and identify information science students who are at risk of failing the research and statistics module based on their scores on an elementary mathematics test so that be referred to tutors for help. You can administer the elementary mathematics test at the beginning of the semester and then match each student's score to their research methods and statistics module score. The data may show that elementary mathematics is significantly related to final research methods and statistics scores. One can then create a regression model to identify at risk students so that they are assisted in time to avoid failure. The strength of the correlation between the two variables (in our example, elementary mathematics score and final research methods and statistics score) determines the degree of accuracy of the prediction (Drummond, 2004).

You may consult any good statistics textbook for details about the tests presented in this chapter and for many more inferential statistics. The chapter just presented some basics so that you can analyse your data or understand the analysis that may be performed by a data analyst. The type of statistical test you choose depends on the level of data (nominal, ordinal, interval or ration), the number of sets of data (one, two or more) and whether the data was collected from related or independent samples (Chireshe, 2015).

Summary on Methods of Data Analysis

A researcher needs to know what he/she wants to do for him or her to choose the most appropriate data analysis method. If one wants to describe what happens with one's sample of participants, descriptive analysis will be appropriate. If one wants to generalise findings to a wider population, inferential statistics will be most appropriate.

POPULAR QUANTITATIVE DATA ANALYSIS SOFTWARES

There are three popular quantitative data analysis softwares namely, Statistical Package for the Social Sciences (SPSS), Microsoft Excel and Microsoft Access. These softwares enable researchers to calculate quantitative data with less energy and resources. SPSS is software product that is used for a wide variety of statistical analysis, that includes data compilation, preparation, graphics, modelling and analysis. It is one of the most widely used packages for survey and social science data (Morris & Fitz-Gibbon, 1987). It has programmes that help researchers to prepare and manage data and to compute descriptive and inferential statistics (Drummond, 2004). Microsoft Excel is an electronic spreadsheet programme that is used to record and analyse numerical data. The programme is used for storing, organizing, and manipulating data. It can create graphs or charts. Microsoft Access is an information management tool that helps you store information for reference, reporting and analysis. You need to read about when and how you can use each of these in information sciences. You also need to be familiar with the advantages and disadvantages of each of these.

PRESENTATION OF QUANTITATIVE DATA

Quantitative data is mainly summarised and presented in tables and graphs (Chireshe, 2015) depending on the type of data collected and the reason it was collected for. There are different graphs that can be used to present quantitative data. These graphs include: pie charts, bar graphs, histogram, line graph, scatter graph and frequency polygon. The type of graph used depends on the type of data being analysed, presented and its purpose. For example, a line graph is appropriate when one wants to illustrate trends over time (displaying time series data), a scatter graph is appropriate when one wants to depict or explore the relationship between two continuous variables, a histogram is appropriate when one wants to display the frequency of cases falling within defined columns and a pie chart is best for comparing one category or segment to the whole. That is, it is appropriate when the intention is to emphasise the proportional distribution of categories (Chireshe, 2015) or when working out the composition of something or comparing parts of a whole. Graphical and tabulation presentation of data helps researchers to organise and summarise important results. Graphs and tables enable readers to be able to easily visualise the results. That is, trends and relationships among quantitative data are easy to perceive from graphs and tables. Drummond (2004) notes that graphs clarifies and simplifies the presentation of the set of data.

The what and how to construct tables and graphs can be obtained in any quantitative data analysis text book. Chireshe (2015, p.128) suggest the following as key issues that have to be addressed when doing graphical and tabulation presentations:

- Tables and graphs should be self-explanatory;
- The presentation should be as simple as possible;
- The reader should be able to understand them without detailed reference to the text;
- The titles should be short, informative, indicating what, when and where the data were obtained;
- Give your graph or table a short title that clearly conveys the purpose;
- Rows and columns of tables or axes of graphs should be clearly labelled;
- Specify the units of measurement on the x and y- axes for graphs;
- The text should mention the key points in the table or graph; and
- Use footnotes to explain the essential features of the data for the correct interpretation of the graph or table.

The titles of tables are normally placed at the top of the table while those for graphs are normally placed at the bottom of the graphs. The total sample size (N) should be included at the end of the table or graph title for the set of data to be interpreted meaningfully.

INTERPRETATION OF QUANTITATIVE DATA

Any collected data is meaningless until it is interpreted. The shape of the distribution of scores, centrality of the scores and spread of the scores need to be considered when interpreting quantitative data. Chireshe (2015, p.130) presents the following questions which have to be considered when interpreting quantitative data:

- What patterns and themes emerge in the results?
- Are there any deviations from these patterns? If yes, are there any factors which might explain the deviations?
- Are the results making sense?
- Are there any interesting stories emerging from the data?
- Are the data significant? Are they meaningful in a practical way?

ADVANTAGES OF QUANTITATIVE DATA ANALYSIS

Quantitative data analysis has several advantages. Learn Higher and NMU (2008) presents several advantages of quantitative data. The advantages include: possibility of replication and generalisation of results, there is allowance for greater objectivity and accuracy of results and a high value of having easily measured numerical data collected from large populations. Kruger (2003) cited in Learn Higher and NMU (2008) states that quantitative data analysis allows researchers to summarise vast sources of information and facilitate comparisons across categories and over time. It is possible through quantitative data analysis to replicate a study on research skills of information science students from X university at B university. The results from X university may also to generalised to students from other universities. The research skills can be compared among male and female students and between universities X, B and Y.

Quantitative data analysis has its disadvantages. The disadvantages include: results may be limited as they provide numerical descriptions rather than detailed narrative and generally provide less elaborate accounts of human perception, the research is often carried out in an unnatural, artificial environment so that a level of control can be applied to the exercise. This level of control might not normally be in place in the real world yielding laboratory results as opposed to real world results, in addition pre-set answers may not necessarily reflect how participants really feel about an issue and in some cases might just be the closest match and the development of standard questions by researchers may lead to 'structural' bias and false representation, where the data actually reflects the view of them instead of the participating subject (Learn Higher & NMU, 2008).

FUTURE RESEARCH DIRECTIONS

There is need for empirical research on how information science researchers utilise quantitative data, the challenges they face in utilising the data and how they could be encouraged to embrace quantitative data. Such studies may help information science researchers to carry out robust research studies whose findings are generalisable. There may be need for research on how best information science researchers may be trained on how to quantify qualitative data. Given the need for transdisciplinary in conducting research, it is necessary to research on how both quantitative and qualitative methods can be applied in information science and other disciplines. Ngulube (2012) explored the use of mixed methods research (MMR) in articles published in LIS journals in Sub-Saharan Africa (SSA) (2004 to 2008) and established that LIS scholars in SSA did not frequently use MMR. In another related study, Ngulube (2013) states that blending of research method by LIS researchers in Africa is limited. Similarly, Malliari and Togia (2017) and Ngulube and Ukwoma (2019) lament that mixed methods have not yet gained enough recogni-

tion in library and information science research. Mixed method minimises the weakness of quantitative and qualitative alone and allows for a wholistic investigation of a phenomenon in LIS hence the need to research on their application in the discipline.

CONCLUSION

The generic aspects of quantitative data analysis which are useful to an information science researcher have been presented in this chapter. Quantitative data has been presented as numerical data. The chapter has also presented types of quantitative data. Fundamental concepts germane to the field of quantitative data analysis (variable, measurement, measurement scales, statistics, hypotheses, causality, generalisability and reliability) have been explained. Quantitative data analysis preparation, methods of quantitative data analysis and popular quantitative data analysis softwares have also been presented. Issues to consider when presenting and interpreting quantitative data and advantages of quantitative data analysis were also presented. The aspects discussed in this chapter are crucial for information science researchers as they largely deal with quantitative data. Contents of this chapter may be utilised to train researchers and university students interested in quantitative data analysis.

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KEY TERMS AND DEFINITIONS

Descriptive Statistics: Statistics used to describe, summarise, and organise data.
Hypothesis: A statement on the presumed relationship between variables.
Inferential Statistics: Applying conclusions made on a sample to a larger population.
Measurement: Assignment of numerical values to a phenomenon.
Quantitative Data: Data presented in terms of quantities and numbers.
Quantitative Data Analysis: Analysing data using numbers.
Statistics: A tool for creating an understanding from a set of numbers.

Chapter 19
Data Quality Matrix:
A Theoretical Perspective

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ABSTRACT

The objective of the study is to develop a data quality matrix, which can be used to measure the quality of data and response rate from respondents. The study is exploratory in nature, which applied the systematic review of literature extracted from different database. The study found that all the quadrants of the matrix (e.g., active, risky, and non-functional and deferential) have importance depending upon the nature of the study. The study further suggests that risky situation can be improved through enhancing the quality of data collected. The proposed matrix is very helpful in understanding the quantity and quality dimensions of the data in survey research. It helps to interpret survey results to fit between data representativeness and desired research outcomes.

INTRODUCTION AND BACKGROUND

The study was approached from the theoretical perspective where the matrix proposed the validation through investigating different scenarios of response rate with respect to quality of the data obtained during research investigation. The study explored the key-word search, "response rate" "Quality of data", "survey representativeness" and "matrix" from various search engines viz. Emerald Insight, ProQuest, Science Direct, and Google Scholar.

Response rate and quality of data are two sides of the same coin that increase the representation of data. In social sciences, researchers' relying on the survey, methodology is often confronted with a low response rate. Researchers have shifted their focus from higher response rate to the representatives of the survey (Schouten, Cobben, & Bethlehem, 2009). Over the past few decades, the length of the question-

naire, and the mode of administration errors were the significant factors as compared to assessing the quality of the data. Schouten, Cobben, and Bethlehem (2009) opined that "response rates alone are not good indicators of non-response bias". The higher response rate is meaningless if respondents simplify their task (Blasius & Thiessen, 2012).

The survey data in the current scenario is more prone to the numerous sources of errors. Errors including response and non-response bias, sample bias, researcher bias, and model bias can be minimized through rigorous control by the researcher (Blasius & Thiessen, 2015). Minimization of errors and assessing the quality of data is a primary aspect of social science research. Assessing the quality of the data includes three major sources that affect the trustworthiness of survey data: first the study architecture: second, institutional practices of data collection agencies (survey representative selection, adequacy of survey administrator training): third respondent behaviour (Blasius & Thiessen, 2012). Blasius and Thiessen (2015), propose that data quality assessment should be analyzed by looking into the fact of response simplification practices of data fabrication as well. According to Blasius and Thiessen (2015), data fragmentation is possible by understanding the signs of respondent task simplification behaviours and evidence of duplicated data that might have been fabricated simply through copy-and-paste procedures.

Previous studies suggest assessing the quality of survey data, independent of the survey mode often considered response rate and item nonresponse rates and subject silent factors(Groves, 2006; Groves, Presser, & Dipko, 2004; Biemer & Lyberg, 2003). Moreover, high response rates along with low item nonresponse are necessary for sample representation. The present study is an attempt to develop a matrix based on four quadrants which can highlight the issues related to response rate and quality of the data. The first section focuses on the item-response theory, the second section highlights the response rate, data quality process. The third section deals with the data quality matrix. The last section discusses the discussion, the golden rules followed, implications of the study, future research and conclusion.

Item Response Theory

The term *item* is generic, covering all kinds of informative item. "Item response theory models help to show the contribution of each question, to the variable being measured underlining construct. Further, it can also work as a powerful tool for developing scales shorter, reliable and targeted towards the phenomena being measured. It also helps researchers to validate "focus of the theory on each item"(Edelen & Reeve, 2007). Applying item response theory in questionnaire development guides the researcher to understand the missing values pattern, how outliers can be treated or analyzed. How best measures fit to generate consistency and accuracy of results to increase survey response rate and representativeness of data.

Response Rate

A meta-analysis study conducted by Anseel, *et. al.* (2010), found that response rate for organizational studies is closely related with respondent profile and lowest response rates for executive profiles highest for non-managerial profiles. The lower the response rate to a study, the greater the probability that the respondents may differ from non-respondents in their characteristics, which affects the precision (reliability) of the survey's population estimates, resulting in study bias, and weakening the external validity (generalizability) of the survey results (Bowling, 2005).

Data Quality Process

Data quality is a very broad term and there is a lack of explanation of the dimensions that define the quality of the data as shown in Figure 1. Different studies propose different types of dimensions to understand what constitutes data quality in quantitative and qualitative assumptions. It has been generally interpreted in terms of survey response rates, questionnaire item response rates, the accuracy of responses, the absence of bias, and completeness of the information obtained from respondents (Bowling, 2005).

MISSING VALUES

Missing values are the unavoidable factor in survey research and it creates inconsistency in survey results. According to Dasu (2013), "Missing data are instances where individual data values, entire records, and entire attributes disappear, due to a multitude of reasons: human error; malfunctioning software used for data collection, processing and storing; restrictive data entry interfaces; system errors." The way the researchers deal with it depend on how much data is missing and the kind of missing data viz. item nonresponse or missing sampled response. Identifying the pattern or frequency of missing values, analyzing reasons for the missing values and handling the missing values is important for addressing the quality of the data as shown in Figure 1. Ignoring or deleting without observation of pattern may result in serious biases in the analyses (Dasu, 2013).

Why Missing Values Will Occur

- If the respondent did not understand the question, or the question might not be having an option of selecting "I don't know" option.
- Subject silence or questions might cause social desirability bias.
- Unintentional skipping
- Data entry errors; and
- A researcher might fail to create respondent confidentiality to share the data.

Methods of Identifying and Imputing Missing Values

There is no clear explanation of the best imputation methods that make the least deviation from the true path. It purely depends on researcher analysis, which does afterwards. There are different methods to impute missing values in survey data. The widely followed approaches of replacing missing values are by a *statistical estimate* "mean, median, moving averages, smoothing or regression splines". Further, the opted method of imputation should be justified with the consistency of the results by checking values before imputation and after imputation of missing values (Sadiq, 2013).

OUTLIERS

In statistics, an "outlier is an observation point that is distant from other observations". According to Aguinis, Gottfredson, and Joo, (2013), "Outliers, or observations that deviate markedly from the rest,

often cause important changes in substantive conclusions". An outlier is an observation that appears to deviate markedly from other observations in the sample and it may indicate "data problem" that must be fixed. However, in some cases, it may lead to bringing novel contributions to the study (Aguinis et al., 2013). Dealing with outliers, the researcher needs to make sure that the substantive conclusions of the study does not depend upon the outliers. Whether outliers should be treated, eliminated, preserved in the data solely depends on the researcher's application of the data. Dasu (2013) suggests the procedure to tackle the issue of outliers by dropping, if not a common approach in statistics in "*Winsorization*", where "outliers are replaced with the nearest non-outlying value of the attribute"

Methods of Identifying Outliers

Statistical Methods

The statistical methods for identifying outliers vary according to the type of data, viz dichotomous/ categorical data and continuous data. For the dichotomous/categorical data, it is better to explore the extremely uneven distribution of the responses. For example, SPSS FREQUENCIES functions assist the researchers to identify the uneven split. The researchers can drop that particular variable from the study. Researchers argue that the Univariate data with very large standardized scores (z>3.3) are suffering from the Univariate outliers. This can be identified by using SPSS DESCRIPTIVES--->save standardized values as variables. However, the Mahalanobis distance method facilitates the researchers to explore the multivariate outliers in the data sets. *Analyse > Linear regression > SAVE > Click on Mahalanobis Distance > Click Ok >Then Calculate probability for Right Tail of the Variables using SPSS*

Graphical Methods

An outlier is an observation that lies outside the overall pattern of a distribution (Moore & McCabe 1999). The outlier is a point which falls more than 1.5 times the interquartile range above the third quartile or below the first quartile. Data visualization with the help of histograms, box plot and scatter plot can be used for the pictorial identity of the outliers in the survey data.

Accuracy

Accuracy is the vital aspect of data quality. It can be achieved by measuring standard error and margin of error. It asses the accuracy with which a sample represents the population under study. "Standard Error is the term used in statistics to estimate the sample mean dispersion from the population mean"(Lee, In, & Lee, 2015). It can also be interpreted as a sample mean deviates from the actual mean of a population; which is often referred to as the standard error. A low standard error depicts less spread in the sampling distribution. Standard Error is a method of measurement or estimation of the standard deviation of sampling distribution associated with an estimation method. The formula to calculate Standard Error is,

Standard Error Formula:

$$SE_{\bar{x}} = \frac{s}{\sqrt{n}}$$

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Where,

SE x= Standard error of the mean
S= Standard deviation of the mean
n=number of observation of the sample

Consistency

Consistency refers to the usability of the data for assessing the reliability of the construct. According to Cronbach (1947) "Internal consistency describes the extent to which all the items in a test measure the same concept or construct and hence it is connected to the inter-relatedness of the items within the test". Social sciences research relies on measuring the causal relationship between the endogenous and exogenous variables which may or may not be measured directly. These relationships are theory driven and survey methodologies are used to assess the internal consistency of this relationship. Further, for assessing internal consistency of measures, the widely used method is the one proposed by Cronbach in 1954 often referred to as "Cronbach's alpha".

The data collected through questionnaire will not be accepted if it contains the missing frequency, incomplete information; information provided by respondents who are not knowledgeable enough or does not qualify for the participation. (Farooq, 2018, p. 57)

DATA QUALITY MATRIX

Table1 illustrates a data quality matrix. The quadrants include active, risky, differential and non-functional.

Active

If the quality of the data is higher and the response rate is also higher (above 60% for organizational studies and more than 80% for individual-level studies) Active condition as shown in Table 1.

What if the Quality of the Data and the Response Rate is High?

The scenario indicates that the researcher followed a pre-determined procedure to design a questionnaire, sample selection criteria, and sample respondent selection as per the need of the study. Purpose of the research can be fulfilled when the representativeness of sample to population is generalized by assessing

Table 1. Data quality matrix

	Quality of data High low	
Response rate **Low High**	**Active**	**Risky**
	Deferential	**Non-functional**

Source: Author(s) compilation

the data quality dimensions of accuracy and consistency of the results (Schouten et al., 2009). Moreover, if the quality of the data and the response rate are higher, then the researcher must focus on reducing the bias and variance of the data. According to Groves (1987), "Bias denotes a fixed (over replications) departure from some underlying true value for the statistic" and Variance or "variable error is used to refer to departures from the true value that change direction or magnitude" across different replications". Replication can be denoted as consistency of results.

Risky

Higher the response rate and lower the quality of data indicates the low consistency of data and leads to *"Risky"* for interpreting the results accurately. The situation occurs because of researcher sample selection bias and higher variance in systematic random error and higher missing values with varied responses.

What can be Done to Increase the Quality of the Data When the Response Rate is High?

The sources of these errors must be recognized and need to be analyzed. Some of the errors can be discussed below:

1. The researcher may commit an error in sample selection and respondent selection error
2. Whether the respondent answered questions accurately and sample respondent selected from the right population. Or Issue may be with researcher measurement error (respondent do not understand the question but still answering). It is a task of the researcher to ensure and design the questionnaire to make its completion as easy as possible for the respondent and must ensure that questionnaires should not only suit the research and the researcher but also the respondents (Farooq, 2018; Rowley, 2014).

Deferential

If the response rate is low and the quality of data is low, it is called "Deferential" condition. It can be acceptable by understanding the trend of response rate, according to the nature of the study. The reasons for the low response rate may improve by implementing viz. survey monetary incentives, non-monitory incentives and follow up tools (Anseel et al., 2010).

Why There is a low Response Rate When the Quality of the Data is High?

The response rate is an important factor. However, the researcher goal is not only increasing the response rate and it also ensures the representativeness of the population. Moreover, the low response may create a bias to establish the accuracy and consistency of the results. Low response bias can be addressed by "classifying and testing with an assumption of late respondent behaves the same as non-respondents" using a simple t-test.

Non-Functional

If the response rate is low and the quality of data is also low is called "Not Working" condition. It may lead to deviate goals of survey research. It is not feasible to have a low response rate and low quality of the data to interpret the survey results. Thus, the researcher must focus on rectifying instrument errors and

need to revisit the extensive review of the literature to modify the research instrument (Rowley, 2014). To avoiding these phenomena, recent research study suggested conducting a pre-pilot test of research instrument with target respondents (Williams, 2003).

DISCUSSION

The aim of this chapter is to suggest a matrix based on the literature which studied the relationship between quality of the data and the response rate. Researcher has conceptualized various circumstances by considering the variations in response rate and the possible conditions where researcher need to re-check the research process for conducting survey research. The study found that response rate and the quality of data both need to be given major concern for improving the accuracy of survey research. On the other hand, assessing the relationship between the quality of the data and the response rate has several implications for the researcher in interpreting survey representativeness, data integrity, and survey generalizability. The present study proposes a few golden rules to generalize the survey results to the population being studied.

GOLDEN RULES

Defining Response Rate Criteria

Defining response rate criteria is a primary concern of the researchers. Academically, there is no clear explanation of what is an acceptable response rate of survey methodology to justify the survey results for generalizing the findings of the study? Anseel et al. (2010); Groves (2006), that acceptable response rates vary and influenced by the mode of administration and nature of the study.

- **Mail:** 50% adequate, 60% good, 70% very good
- **Phone:** 80% good
- **Email:** 40% average, 50% good, 60% very good
- **Online:** 30% average
- **Classroom Paper:** > 50% good
- **Face-to-Face:** 80-85% good

Previous studies concluded that response rate is highly dependent upon the survey administration mode, respondent profile, and topic silence errors and dispersion of scale being used. Further, the researcher needs to check whether keeping too many items in one question, taking more time to complete, whether the item or question proposed is too lengthy to read and understand. Moreover, collecting more information about respondent demographic details will also demotivate respondent response to complete the survey.

Length of the Questionnaire

Questionnaires are vitally preferred to collect data from sample to population representative studies. Respondent's response to the questionnaire according to their experiences, values, and beliefs, assuming

their world of knowledge (Farooq, 2018). Researchers study the impact of questionnaire length on response quality and response rate and conclude that the smaller the size, higher the response rate and quality of data. "A tight questionnaire: will be much easier and convenient for respondents to complete, and hence is likely to maximize response rate; will generate sufficient data for a new researcher to analyze; and, is easier to work with during coding and analysis" (Rowley, 2014). If a survey instruments length increased to more than 4 pages there is a likelihood of increasing premature termination, random responding and behavioural patterns which results in lower data quality (Farooq, 2018; Herzog & Bachman, 1981). Further, the length of the questionnaire may also be justified by the research questions proposed by the researcher and social or practical relevance of the research study being conducted.

Types of Questions and the Language Being Used

Understandability of the language, the sequence of the questions will enhance the coherence of the respondent responsiveness of the questionnaire. Designing a questionnaire with simple and clear language will enhance the response rate and quality of data(Biemer & Lyberg, 2003).

- Questions should be clear
- Questions should cluster under a theme or a section heading
- Each section or theme should follow a logical understanding
- Questions should not be merged
- Questions should not include double-barreled and ambiguity words

Major important aspects are the researcher should keep in mind that all the questions should reflect the purpose of the study. And it should be communicated to the respondent by ensuring data confidentiality.

Reduction and Item Purification of Items

"Just delete whatever is needed to get good results, and getting well results will be fine." The issue here is that if garbage is collected, garbage is churned out. Slightly in another term, if you have collected good quality data, you are not going to face the issues on deleting the items. Before even thinking of going after the statistical threshold, perhaps you need to re-look onto what you have collected and what is causing you to have this kind of the results. A few possibilities: The problem is not with the results. Researcher's perception to delete items to report well measures of items viz. AVE, Cronbach alpha, composite reliabilities. The problem is the data, and how the data was churned out?

Bias Mitigation, Content and Face Validity Errors

The validity concept was introduced by Kelly in 1927 and it refers to how exactly a conclusion, abstract, or concept of what is being tested. According to Anastasi & Urbina, 1997, **content validity** as a nonstatistical type of **validity** that defines "the systematic examination of the test **content** to determine whether it covers a representative sample of the behavior domain to be measured". The purpose of the face validity and content validity is to reduce the potential error variance, item design errors with an assessment instrument and to reduce the likelihood of error reduction in response bias and social desirability bias of the study. As suggested by Drost, (2011) researcher should address "statistical conclusion

validity, internal validity, construct validity, and external validity" to reduce bias in interpreting the cause and effect relations proposed by the researcher and it may reduce the bias mitigation in survey results.

The quality of response can be increased by introducing the purpose of the questionnaire, mentioning the researcher's affiliation, contact details and data confidentiality and usage of the data in a short paragraph at the beginning of the questionnaire. The advantage of the survey research is bringing a view of a large number of responses through questionnaire/schedule would generate findings that are more generalizable. If the researcher maintains transparency in methodology, consistency in results, clarity on selecting tools and techniques to draw meaningful insights of the data and visualization of the data to solve the focused research problem.

IMPLICATIONS OF THE STUDY

The data quality matrix developed can be very helpful for pioneers especially who wish to adopt the survey methodology for achieving the research problem of the studied phenomena. The researchers must focus on "trade-off between quality of the data and the response rate" rather than "higher response rate alone" i.e. high-quality of the data and higher response rate simultaneously by reducing the measurement error and error bias that will enhance the representation of the survey results. The present study will also suggest, few guidelines to move from a Deferential condition to Active. If a researcher is using survey methodology, the researcher may eliminate the questionnaire where more than 20% of the responses opted with a neutral response to increasing the quality of the data. Researchers should analyze the missing values pattern to impute methodologically sound imputation technique to reduce the measurement error.

Every quadrant proposed in the data-matrix should be considered to enhance the data representativeness. If the researcher survey data matching with" non-functional" condition quadrant characteristics, the researcher must re-assess the survey instrument and validation errors such as face validity and content validity errors to re-modify the instrument by following the guidelines of the questionnaire development procedure suggested by (Farooq, 2018; Rowley, 2014).

FUTURE RESEARCH DIRECTIONS

Based on the literature review piloted, researcher has analyzed some potential gaps in the current academic literature. The quadrant proposed are explored from the literature review. However, all of these circumstances may vary according to the nature of the research questions. Future research should empirically validate the matrix by experimenting variations in response rate and how it is influencing on data quality. Further, the golden rules proposed to improve the survey data need to be validated to what extent these recommendations will help researcher to improve the response rate and quality of data. The suggested data matrix is in elementary in nature which require extensive literature support to validate each and every quadrat proposed. Future research must validate by compiling literature from empirical papers which are published with varied response rates.

CONCLUSION

The present study is an attempt to develop a data quality matrix, which can be used to understand the process of measuring quality of data which is collected from the respondent. Further it will help researcher how response rate variations can influence the survey research. The quadrants proposed viz. active, risky, differential and non-functional will enhance the representation of survey representativeness. The study recommended five golden rules which can help to enhance the survey instrument development as well as reducing measurement error in survey research. The study found that quality of data and response rate has significant relationship seems to be given less important because of lack of research. The study highlights that managing response rate by analyzing quality of response rate is the need of the hour in the social science research to address the social research problems meticulously. In the era of the on-line survey procedures, yet the missing values are not a major arousal, the match between data quality and the response rate should be taken care.

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Chapter 20

Research Methodologies Used in Library and Information Studies Masters' Degree Dissertations at the University of Botswana

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ABSTRACT

Although universities have different models for their Master's degrees, most programmes consists of course-work and research-based components. The Master's degree of the University of Botswana's (UB) Department of Library and Information Studies requires students to carry out research and write a dissertation in the final year. Research methodology is an integral component of research, including in postgraduate research. Using the descriptive content analysis technique from a census of dissertations, this chapter examines the Master's dissertations submitted in the field of library and information studies at UB between 2008 and 2018 in order to determine the trends in the research methodologies used. The findings of the study showed that although DLIS Master's degree dissertations generally conformed to globally accepted research methods in humanities; most of them did not specify the research philosophy adopted for the studies. This study found that the most dominant research approach was combined qualitative and quantitative approaches.

INTRODUCTION

Undertaking research on trends in library and information science (LIS) is ever current and topical amongst the LIS research community and practitioners (Kawalec, 2013; Ngulube & Ukwoma, 2019). As an aspect of scholarly communication, research involving theses, dissertation, conference proceedings, books, patents, and journal articles has become significant. It is important to undertake the analysis of the research output in the discipline (Chakravarty & Sharma, 2016). Research trends in LIS have taken different forms. Some studies have analysed international and national trends in LIS research based on journal articles. Studies conducted in China, Finland, Australia, the United Kingdom, Spain and Turkey have compared topic distribution, subtopics, approaches and methods in national LIS research studies (Rochester & Vakkari, 2003). Some scholars have also conducted studies on trends in research methodologies in Africa. Ngulube (2005) investigated research procedures used by Master of Information Studies students at the University of Natal between 1982 and 2002 with special reference to their sampling techniques and survey response rates. Ocholla et al. (2012) conducted an informetrics study in eastern and southern Africa using content analysis. Similarly, Onyancha, Ngoepe and Maluleka (2015) undertook an informetrics analysis of the nature, patterns and trends of archival science research, including records management and training in sub-Saharan Africa. This chapter sought to describe the methodological trends from the masters' dissertation in Archives and Records Management, and Library and Information Studies, at the University of Botswana covering the years 2008 to 2018.

The Department of Library and Information Studies (DLIS) is one of the eleven (11) departments under the Faculty of Humanities at the University of Botswana. Having been set up in 1979, DLIS has made exceptional contribution to the education and training of library and information personnel in Botswana and the Southern, Central, West and East African regions (Jain & Jorosi, 2015). Although the Department initially started by training paraprofessional up to the diploma level, it currently provides the following programmes:

- Diploma in Archives/ Records Management
- Bachelor's Degree in Library and Information Studies (Single major)
- Bachelor's Degree in Library and Information Studies (Double major)
- BA (Library & Information Studies- double major)
- Bachelor of Information Systems (Information Management –single major).
- Masters' in Library and Information Studies (MLIS)
- Masters' in Archives and Records Management (MARM)
- A PhD. in Library and Information Studies
- A Ph.D. in Archives and Records Management (Jain & Jorosi, 2015)

The University of Botswana Masters' degree in Library and Information Studies was started in 1994 while a Master's in Archives and Records Management was started ten (10) years later in 2004 (Moahi, 2007; Jain & Jorosi, 2015). This was an effort by the University to address challenge of lack of archives and records management in Botswana (Katuu & Ngoepe, 2017). Additionally, Jain and Jorosi (2015) posit that the need to produce information professionals in Botswana who could fit in the labour market that was increasingly becoming technology driven led to the introduction of the masters' programme. Currently the normal minimum entrance qualification for the two master's programmes (MARM and MLIS) is a Bachelor's degree in any subject obtained from the University of Botswana or any other

recognised university or equivalent institution with at least a minimum of a second-class lower division or equivalent or a minimum of 3.0 GPA (University of Botswana, 2018). Apart from that, holders of a pass degree at undergraduate level in any subject with two years' relevant work experience are eligible for admission into the two master's programmes. The programme consist of coursework and Dissertation where in the second year students are required to carry out their research and write a Dissertation (University of Botswana, 2018). It has been argued by Katuu (2015) that graduate level education in African universities is plagued by low numbers of qualified staff, virtually non-existent research, poor quality of education materials and outmoded programs, education methodologies based on the model of rote memorisation that does not encourage critical thinking, problem solving, and creativity. A study undertaken by Moahi (2007) to consider LIS research that has been conducted in Botswana since 1979 when the library school at the University of Botswana was opened up to 2006 in an attempt to link the research and publication trends with the historical, social and cultural factors in Botswana identified some of factors that affect the LIS researcher in Botswana as follows:

- **Absence of a LIS research agenda** that may guide the focus of research within the country -Researchers in the LIS field were found to be researching for their own purposes and on their own interest, and there was no general research areas that have been identified as being important enough to warrant special treatment by all in the country.
- **Lack of research skills**- Historically, higher education curricula in countries such as Botswana focused on generating manpower for the new independent states and research was not given that much emphasis.
- **Non-availability of research funding**- LIS research in Botswana was supported by the University of Botswana for university staff members but it was not given special attention as it was funded in the same way and with the same conditions as other types of research
- **Research unfriendly environment** –The Botswana environment was identified as an environment that is not research or researcher friendly. This was linked with the fact that Botswana has a small research market in the sense that the same people are asked to participate in research as respondents resulting in their being over researched and therefore unwilling to give their time to researchers (Moahi, 2017, p. 12-15).

Noting these disturbing arguments, this study examines the master's dissertations submitted in the field of library and information studies (LIS) at University of Botswana between 2008 and 2018 to determine the trends in the research methodologies used. Studies have been undertaken in LIS training in Botswana, but no published research have been found that examined the research methodologies undertaken by LIS masters' dissertations at the University of Botswana.

CONCEPTUAL FRAMEWORK

Jabareen (2009, p. 51) defines conceptual framework as "a network of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena." According to Ngulube, Mathipa and Gumbo (2015, p. 8), just like the theoretical framework, "the conceptual framework is the golden thread running through good research – it should inform the research questions, methodologies and data analysis." It is used mostly by researchers when existing theories are not applicable or sufficient

in creating a firm structure for a study (Akintoye, 2015). A conceptual framework is important to show the relationship between concepts and their impact on the phenomenon being investigated (Ngulube, Mathipa & Gumbo, 2015). Besides, it has become increasingly important for researchers to use a theoretical lens or perspective in qualitative research as it provides an overall orienting lens for the study to shape the types of questions asked, informs how data are collected and analysed, and provides a call for action or change (Creswell, 2014). Miles and Huberman (1994, p.18) opine that conceptual frameworks can be 'graphical or in a narrative form showing the key variables or constructs to be studied and the presumed relationships between them.' The research concepts which have been adopted as this study's conceptual framework are presented and explained in the next section.

RESEARCH PHILOSOPHY

There are different philosophies within which researchers can situate their studies. The term research philosophy refers to a system of beliefs and assumptions about the development of knowledge (Saunders 2009, p. 124). Over the years, research has been built on several contending paradigms or philosophies and these are positivism, interpretivism and pragmatism (Weaver & Olson, 2006; Cranford, 2013; Ngulube, 2013; Creswell, 2014; Revez & Borges, 2018). In agreement, Creswell (2014) advises that larger philosophical ideas need to be espoused, as such information justifies the choice of a research design or approach chosen.

- **Positivist Paradigm**: It is a scientific method. It is also known as post-positivist research, empirical science and post-positivism. The term post-positivism challenges the traditional thought of positivism and its notion of absolute truth of knowledge. Post-positivism represents the thinking after positivism whereby there cannot be positivism about claims on knowledge while studying the behaviour and actions of humans (Creswell, 2014).
- **Interpretivism**: The view of interpretivism is that "individuals seek an understanding of the world around them by developing subjective meanings of their experiences towards certain objects or things socially and historically in life settings" (Creswell 2014, p. 37). Neuman (2014) indicates that by means of a systematic analysis of socially constructed meaning through an observation of people in their natural settings, one is able to arrive at an understanding of how people create and maintain their social worlds. This paradigm is seen as a typical approach to qualitative research (Williamson, 2013; Thanh & Le Thanh, 2015).
- **Pragmatist Paradigm**: This research philosophy is better suited for answering the "what" and "how" research questions. Unlike post-positivism that concerns itself more with antecedents, pragmatism arises out of actions and situations (Creswell, 2014). Its focus is the research problem and how it can be resolved, using various and applicable research approaches. According to Creswell (2009), pragmatism is usually associated with mixed methods research.

RESEARCH APPROACH

The choice of the research approach selected for a study is determined by the research problem, including applicable data collection methods and data analysis strategies (Saunders, Lewis & Thornhill,

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2007). Literature identifies three approaches to research and these are qualitative, quantitative and mixed methods research (Johnson, 2014; Ngulube & Ngulube, 2015; Teherani, Martimianakis, Stenfors-Hayes, Wadhwa, & Varpio, 2015).

- Qualitative research approach refers to the systematic inquiry into social phenomena in natural settings and which include, but are not limited to, how people experience aspects of their lives, how individuals and/or groups behave, how organizations function, and how interactions shape relationships (Teherani & Martimianakis, 2015).
- As for the quantitative research approach, it tests objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analysed using statistical procedures (Creswell, 2014). Quantitative methods employ deductive reasoning, where the researcher forms a hypothesis, collects data during the investigation of the problem, and uses the data from the investigation. This is followed by the analysis of the data and the discussion of the findings, in order to prove the hypothesis (Kothari, 2008). Normally, it utilises a survey design and the use of the questionnaire and experiments for data collection and data are tabulated in numbers (Fox & Bayat, 2007). According to Marshall and Rossman (2010), quantitative methods are employed to answer questions about relationships among variables with the purpose of explaining, predicting and controlling phenomena.
- Mixed methods research involves combining qualitative and quantitative research and data in a research study. This assumes that a mix of the two results in a more complete understanding of a research problem than either approach when used alone (Creswell, 2014). Some scholars regard it as the third methodological movement (Denzin, 2008; Venkatesh, Brown & Bala, 2013) that advocates for the usage of quantitative and qualitative approaches within a single study (Teddlie & Tashakkori, 2012; Ngulube & Ngulube, 2015). It lends itself to both quantitative and qualitative data collection methods. Notably, there has been some sort of confusion between multi-method ad MMR with some not making a distinction between the two while others differentiating between them.

In context of LIS research, the use of MMR is limited, owing to difficulties in differentiating between MMR and the multimethod (Ngulube 2013). Creswell and Clark (2011) argue that multi-methods provide more evidence for studying a research problem than either quantitative or qualitative research alone. Furthermore, it is practical in a sense that a researcher is free to use all methods possible to address a research problem. In essence, multimethod is just a triangulation of different data collection instruments for purposes of using the strengths of each to offset each's weaknesses, within a combined qualitative and quantitative realm (Ngulube 2019). Meanwhile, MMR is more than just combining quantitative and qualitative methods in a research study. Creswell and Clark (2011) indicated that with MMR, the point of interface between quantitative and qualitative approaches can be at the data collection level, data analysis level and at the data interpretation stage. In addition, there is the time factor such that the study can be sequential whereby one phase of a qualitative strand or vice versa follows another, or both can take place simultaneously, that is, being concurrent (Morse, 2003; Leech & Onwuegvuzie, 2007; Teddlie & Tashakkori, 2009). Better still, one approach may be dominant over the other or be used equally (Morse, 2003). The definition of Creamer (2018, p. 12), which looks at MMR as the type of research approach "where there is the intention to mix or integrate the qualitative and quantitative strands of study

throughout each of the stages or phases of the research process" fits in well in the context of this study and is thus the adopted for purposes of differentiating between MMR and multimethod.

RESEARCH DESIGN

Research designs are types of inquiry within qualitative, quantitative and mixed methods approaches that provide specific direction for procedures in a research study (Creswell 2014). Researchers define research design differently. Akhtar (2016) consider it as the structure of research such that like glue, it holds all of the elements in a research project together. For Kothari (2004, p. 31), "decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design." King, Keohare and Verba (1994) define research design as the strategy, the plan, and the structure of conducting a research. Basically, it is the blue print to be followed in the research process undertaken. Kothari (2004) summaries a research design as decisions related to the following questions:

- What is the study about?
- Why is the study being made?
- Where will the study be carried out?
- What type of data is required?
- Where can the required data be found?
- What periods of time will the study include?
- What will be the sample design?
- What techniques of data collection will be used?
- How will the data be analysed?
- In what style will the report be prepared?

Researchers identify research designs as case study research, action research design, causal design, cohort design, cross-sectional design, descriptive design, experimental design, historical design, longitudinal design, meta-analysis design, and observational design (Kothari, 2004; Rahi, 2017).

SAMPLING

It is often not possible to include all members of a study population, from a sample is chosen, to take part in a research study. A study sample is thus selected from a population. A study population refers to "the universe of cases and observation to which an argument refers" (Gerring, 2012, p. 431). Notably, not all individuals in the study population will be able to avail data as required by the researcher (Hanlong & Larget, 2011), hence Ngulube (2005) is of the view that prior to data collection, researchers should articulate their population very well, as an appropriate sample size will reflect the population as precisely as possible. Alvi (2016) defines a as a group of relatively smaller number of people selected from a population for investigation purpose. For Bhattacherjee (2012, p. 65), sampling is "the statistical process of selecting a subset (called a "sample") of a population of interest for making observations and statistical inferences about that population." There are probability or non-probability sampling strategies in research (Bhattacherjee, 2012). Probability sampling strategies include systematic, stratified, cluster

and simple random sampling strategies while examples of nonprobability sampling strategies are purposive, snowball, judgmental, quota and convenience sampling.

DATA COLLECTION

The research process is never complete without collecting data to provide answers for the research problem. According to Bastos, Duguia, Gonzalez-Chica, Mesa and Bonamigo (2014), the selection of instruments that will be used to collect data is a crucial step in the research process. In a research study, data can be collected through various means which include through interviews, questionnaires, observation and documentary reviews (Aina, 2002; Johnson & Christensen, 2008; Creswell, 2014). The type of data collection instrument used depends on the study research design (Yaya, 2014).

DATA ANALYSIS

Once data has been collected from the field, it must be analysed for it have meaning and be interpreted. According to Mouton (2001), whether the data collected from fieldwork is quantitative survey data, experimental recordings, historical and literary texts, qualitative transcripts or discursive data, the result is that is analysed and interpreted. By so doing, through analysis, it is broken into manageable themes, patterns, trends and relationships. Johnson and Christensen (2008) aver that data analysis involves the collection, sorting, organization and presentation of data in order to get meaningful insights from the data collected from respondents. The information collected is used to provide answers for the research questions (Creswell, 2009; Terre Blanche, Durrheim & Painter, 2006).

PROBLEM STATEMENT

Studies have shown that graduate level education in African universities is characterised by low or poor quality research among others as it does not encourage critical thinking, problem solving, and creativity (Katuu 2015). In Botswana much of LIS research has been more descriptive rather than empirical, raising questions on the training of LIS students to be able to conceptualize and undertake empirical research (Moahi 2017). This study examines the master's dissertations submitted in the field of library and information studies (LIS) at University of Botswana between 2008 and 2018 to determine the trends in the research methodologies used.

RESEARCH QUESTIONS

To document the methodological trends from the masters' dissertation in Archives and Records Management, and Library and Information Studies at the University of Botswana, the study adopted the following research questions:

1. Which are the most commonly used philosophical assumptions in the dissertations?

2.   What are the dominant research approaches in the in the dissertations?
3.   What is least and most common research designs adopted in the dissertations?
4.   What are the sampling strategies used in the dissertations?
5.   Which data collection tools are used in the LIS research dissertations?
6.   Which data analysis techniques are used in the dissertations?

RESEARCH METHODOLOGY

This study utilised content analysis to gather data. Content analysis allows the researcher to describe the characteristics of the document's content by examining who says what, to whom, and with what effect (Bloor & Wood, 2006). Krippendorff (2004, p. 18) defines content analysis as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use." According to Downe-Wambolt (1992), content analysis is much more than a counting process as the goal of the study is to provide some link between results and the context under which the results were produced. Although this study is qualitative, it adopted quantitative content analysis (Rose, Spinks & Canhoto, 2015) as reflected in the results section. Content analysis can be both a qualitative and quantitative method (Bengtsson, 2016). Elo and Kynga¨s (2007, p. 108) indicate that the "aim is to attain a condensed and broad description of the phenomenon, and the outcome of the analysis is concepts or categories describing the phenomenon."

This study thus examined the master's dissertations submitted in the field of library and information studies (LIS) at University of Botswana between 2008 and 2018 in order to determine the trends in the research methodologies used. Ngulube (2005) also investigated research procedures used by Master of Information Studies students at the University of Natal between 1982 and 2002 with special reference to their sampling techniques and survey response rates and used dissertations. Recently, Ngulube and Ukwoma (2019) examined methodological trends used by PhD theses in South Africa and Nigeria. The specific research methodologies to be examined are the research approaches, designs, sampling strategies, data collection tools and the data analysis techniques. The population of the study includes the masters' dissertation within University of Botswana's Department of Library and Information Studies since the inception of the MARM and MLIS programmes. Purposive sampling was used to select dissertations in terms of the period under study, which covers the years 2008 to 2018. The choice for the period under study was informed by the desire to document methodological trends from a recent period and 2018 was chosen as the cuff off point as the last graduation for both MARM and MLIS students was in 2018. In addition, the researchers were interested in observing such a trend over a period and 2008 to be some useful starting point, for a 11 year trend analysis. A list of the masters' dissertations was requested from the University's Library. According to Patton (2015), purposive sampling enables the researcher to select information-rich cases for in-depth study to satisfy the purpose of the study. It is also commonly used in qualitative studies as in this study, which is situated within such studies as Creswell (2014) posits that the idea is to select documents that will help a researcher understand the problem and the research question. The quantitative data collected was analysed statistically using Micro Soft Excel computing software and presented using tables and graphs. In order to establish coding reliability prior to data analysis, the researchers coded the data and where there any discrepancies, they were resolved through some discussion followed by consensus in line with the method of "reconciling differences via consensus" supported by Bradley, Curry Devers (2007), and Syed and Nelson (2015, p. 9).

RESULTS AND DISCUSSIONS

The results of the study are presented in line with the research objectives. The researchers requested a list of masters' degree dissertations submitted to the University of Botswana Library, covering the period 2008 to 2018. The list availed had thirty-nine (39) masters' dissertations, so the results are limited to the thirty-eight (38) masters' dissertations consulted. One (1) masters' dissertation could not be located in the University Library. This study established that some of the masters' degree dissertations completed within the period of review were not submitted to the University of Botswana Library. Nonetheless, the reviewed dissertations were considered adequate to draw conclusions for this study. In a review of the documents for this study, no published research guidelines by DLIS for postgraduate programmes in the department were found. The results are presented in the next section.

MOST COMMONLY USED PHILOSOPHICAL ASSUMPTIONS IN DISSERTATIONS

According to Ngulube (2019), knowledge claims are based on research paradigms, also called philosophical assumptions. This chapter adopted the latter term although can both be used interchangeably. The philosophical foundations have either interpretivist or positivist stance with all others found in a continuum between the two (Creswell & Plano Clark, 2018). For example, Postpositivism is a variant of positivism and uses quantitative methods while postmodernism maintains the interpretivist agenda. Pluralism is a compromise between the positivist and interpretivist worldviews (Creswell & Plano Clark, 2018).

The first research question sought to find the most commonly used philosophical assumptions in the dissertations. The results reveal that 30 out 38 (78.9%) of the researchers did not state the research paradigm guiding their study, none (0%) stated interpretivism while pragmatism was mentioned in 2 (5.3%) of the dissertations. The researchers could find any documented requirements for the inclusion of philosophical assumptions guiding the masters' projects. It is ideal to get that information from faculty, but that is for another study. Most of the dissertations did not state the research philosophy underpinning the study. The results of the study are presented in Figure 1.

The results also paint a notable trend for the dissertations whose research is guided by some research philosophy. For the six (6) that used some philosophy to guide the research study, the majority, and five

Figure 1. Research philosophy guiding the study
Source: Field data
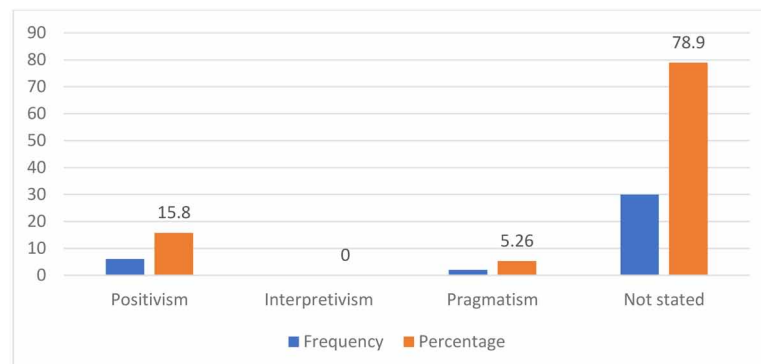
(5) were of the MLIS programme while one (1) belonged to the MARM (MARM). The result indicates that the most common, few instances as they are, positivism is the most commonly used research philosophy used in the dissertations. About the use of research philosophy, Žukauskas, Vveinhardt and Andriukaitienė (2018, p. 121) said the following:

Scientific research philosophy is a system of the researcher's thought, following which new, reliable knowledge about the research object is obtained. In other words, it is the basis of the research, which involves the choice of research strategy, formulation of the problem, data collection, processing, and analysis.

It would seem that research at masters' level within the University of Botswana's Department of Library and Information Studies does not put emphasis on masters' students framing their research within a particular research philosophy. At least the findings suggest that. It would be useful to hear from faculty their stand but that is another issue for another day. Notably, content analysis from some of the dissertations shows that for some of the students who did not state their research philosophy, viewed research philosophy as the same as research approach. An examination of dissertations and theses revealed great disparities in the use of philosophical underpinnings within social research studies (Nicholls, 2005). Even at doctoral level, some dissertations and theses do not refer at all to philosophy, yet philosophy must be the driving force that guides theses (Sefotho, 2013).

THE DOMINANT RESEARCH APPROACHES IN THE DISSERTATIONS

The second research question enquired about the dominant research approaches used in the dissertations. The results of the study revealed that the combined quantitative and qualitative research approaches were dominant as they were used in 15 out of 38 or 39.5%, followed by both the qualitative and quantitative research approaches used by 8 (21.1%) and 7 (18.4%) of dissertations. In addition, Mixed methods research (MMR) was not used in any of the dissertations while in 8 (21.1%), the research approach used in the study was not stated. MMR as a research approach or research methodology is still clouded in many controversies (Ngulube & Ukwoma 2019). In fact, some earlier studies have indicated that studies in LIS rarely use MMR in their enquiries (Fidel, 2008; Ngulube, 2013). This may suggest the reason for its non-use in the dissertations. Figure 2 presents the results.

The results indicate that in almost 40% of the dissertations, the dominant research approach is the combined quantitative and qualitative research approaches. The objective for combining quantitative and qualitative research designs is to preserve the strengths and reduce the weaknesses in both quantitative and qualitative approaches (Caruth, 2013; Creswell, 2012). As a result of this, it is common for researchers to combine quantitative and qualitative methods as that presents a more enhanced insight into the research problem and question than using one of the methods independently (Creswell, 2012; Frels & Onwuegbuzie, 2013). In addition, there is a fair distribution of the use of both quantitative and qualitative approaches individually. The use both approaches individually and as a combination is common in library and information science as evidenced by these LIS studies (Ngulube, 2003; Bwalya, 2011; Mosweu, 2014; Marutha, 2016).

Notably, none of the dissertations have used MMR as the research approach for their study. As a research MMR is controversial and as of yet, there is no shared understanding about the research ap-

Figure 2. Research approaches used in the dissertations
Source: Field Data
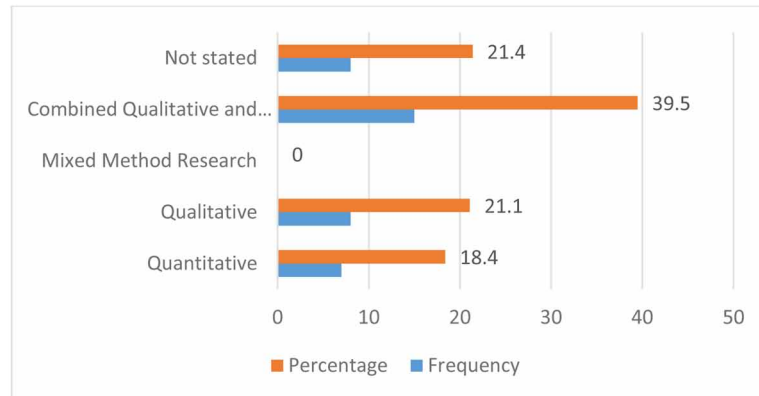
proach (Fidel, 2008; Teddlie & Tashakkori, 2012). However, according to Ngulube (2013), it has been embraced by many disciplines. Amongst these are LIS. It is difficult to comprehend why MMR was not used in any of the dissertations. One reason could be the one advanced by Creswell (2012) who opined that it is more advanced, time-consuming, extensive, and may necessitate the use of a research team.

THE RESEARCH DESIGNS USED IN DISSERTATIONS

The third research question asked about the least and most common research designs. The findings show that the case study design is the most commonly used in the research studies in the dissertations. It was used in 25 out 38 (65.8%) of the dissertations while the survey design was used in 12 out of 38 (31.6%) of the dissertations. In one dissertation (2.63%), the research design used was not stated. Table 1 presents the results as stated.

Case studies are commonly used in research. According to Yin (2009, p. 2), "case studies are the preferred strategy "when", "how" and "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context." Researchers are of the view that case studies are amenable to conducting research where there is evidence that can be collected in a variety of ways (Stake, 2000; Henning, 2004; Yin, 2009). This explains where in case studies, various data collection methods can be used or are applicable. Case studies are

Table 1. Least and most common research designs

Study design	Frequency	Percentage
Case study	25	65.8
Survey	12	31.6
Not stated	1	2.63
Total	38	100

Source: Field data

common with qualitative research. This study has already shown that qualitative research approach is the dominant research approach used in the dissertations. This is supported in literature (Hyett, Kenny & Dickson-Swift, 2014; Rapson, 2018).

SAMPLING STRATEGIES USED IN THE DISSERTATIONS

The fourth research question enquired about the sampling strategies used in the dissertations. The results show that both non-probability and probability sampling strategies were employed as part of the research process. Specifically, purposive sampling was used in 30 out 38 (78.9%) dissertations, 1 (2.6%) used systematic sampling, 3 (8%) used stratified sampling while the rest, 4 (10.5%) used a census. Clearly, the dissertations mostly used the purposive sampling strategy. The results of the use of the various sampling strategies are presented in Figure 3.

According to Babbie (2016), purposive sampling is a type of nonprobability sampling in which the units to be observed are selected based on the researcher's judgement about which ones will be the most useful or representative. It is commonly used in qualitative studies (Palys, 2008; Padilla-Díaz, 2015). The assertion by Palys (2008) conforms to the finding in this study as qualitative research was the preferred research approach in 21.1% of the dissertations consulted. This is over and above the fact that most (39.5%) of the dissertations also employed the combined qualitative and quantitative research approaches in their enquiry.

Figure 3. Sampling strategies used in the dissertations
Source: Field data
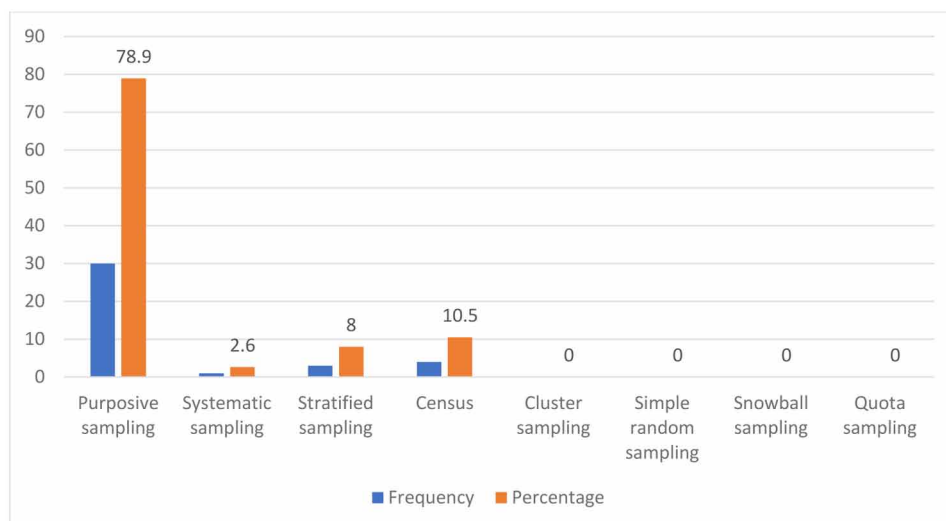
DATA COLLECTION INSTRUMENTS USED IN THE DISSERTATIONS

The research process is never complete without collecting data to provide answers for the research problem. According to Bastos, Duguia, Gonzalez-Chica, Mesa and Bonamigo (2014), the selection of instruments that will be used to collect data is a crucial step in the research process. In a research study, data can be collected through various means which include through interviews, questionnaires, observation and documentary reviews (Aina, 2002; Johnson & Christensen, 2008; Creswell, 2014). The type of data collection instrument used depends on the study research design (Yaya, 2014).

The fifth research question asked about the data collection instruments used in LIS research at UB, specifically for masters' dissertations. The results indicated that all the data collection methods such questionnaires, interviews, observations and documentary reviews were used in half, 17 (50%) of the dissertations, 6 (15.7%) used questionnaires and interviews, 5 (13.2%) used observations, questionnaires and interviews while 2 (5.3%) used interviews and observation. Another 2 (5.3%) used interviews, observations and interviews, and documentary reviews, interviews and questionnaires respectively. In addition, 1 (2.6%) used questionnaires while another 1 (2.6%) questionnaires, observation and interviews respectively. The results are tabulated at Table 2.

The results indicate that the available data collection instruments were used widely in the dissertations and the researchers tended to use all the four at once in their research studies. A review of literature indicates that in case study design, as is mostly the case in the consulted masters' dissertations, data is collected using multiple data collection instruments. This enables the case under study to be captured in its complexity and entirety (Yazan, 2015).

DATA ANALYSIS TECHNIQUES USED IN THE DISSERTATIONS

The sixth research question and the last scrutinised the data analysis techniques used in the dissertations. The study revealed that the data analysis techniques used in the dissertations included thematic analysis, statistical analysis and a combined thematic, and statistical analysis. The results show that statistic and thematic analysis was employed in 21 out 38 (55.3%) of the dissertations, 10 (26.3%) used thematic

Table 2. Data collection instruments used in the dissertations

Instrument used	Frequency	Percentage
Questionnaires, interviews, observations and documentary reviews	17	50
Questionnaires and interviews	6	15
Observations, questionnaires and interviews	5	13.2
Interviews and observation	2	5.3
Interviews, observation and documentary reviews	2	5.3
Documentary review, interviews and questionnaires	2	5.3
Questionnaire	1	2.6
Questionnaire, observations and interviews	1	2.6
Total	38	100

Source: Field data

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analysis while 7 (18.4%) used statistical analysis. By far, the most dominant data analysis technique was the combined thematic, and statistical analysis. In a study by Ngulube and Ukwoma (2019), and which analysed the cartographies of research designs in library information science research in Nigeria and South Africa, 2009–2015, the findings indicated that the dissertations used SPSS, STATA, MS Excel and Nvivo. The former is used for analyzing quantitative data while the latter is used for qualitative software. That said, the two researchers also used content analysis by reading the abstract or summary of the dissertation, methodology section in chapter 1, research design and methodology chapter, and the presentation of the results and categorised them according to the classification scheme adapted from Ngulube (2019) from a study that mapped methodological issues in knowledge management research for the periods from 2009 to 2014. The results are presented in Table 3.

Togia and Malliari (2017), in their chapter on *Research methods in Library and Information Science* noted that quantitative researchers usually analysed data using statistical analysis and interpretation of figures and numbers. This study has confirmed the assertion by Togia and Malliari (2017) as close to 20% of the dissertations used quantitative analysis, and this is in addition to the fact that over half (55.3%) of the dissertations utilized both statistical analysis together with thematic analysis due to the use of both quantitative and qualitative data collection instruments.

For qualitative studies, data analysis involves identifying common patterns within the data and making interpretations of the meanings of the data. The two writers cited the following as an array of data analysis techniques categories:

- Descriptive statistics.
- Inferential statistics.
- Qualitative data analysis.
- Experimental evaluation, and
- Other methods (Togia & Malliari, 2017).

The use of qualitative data techniques is fairly represented in the dissertations as 10 (26.3%) alone used thematic analysis over and above the one used in the studies that used both thematic and statistical data analysis techniques because more than half (55.3%) as they used the combined qualitative and quantitative research approaches and thus collected the same type of data.

Table 3. data analysis strategies used in the dissertations

Data analysis method	Frequency	Percentage
Thematic analysis	10	26.3
Statistical analysis	7	18.4
Statistical and thematic analysis	21	55.3

Source: Field data

RECOMMENDATIONS

This section presents the recommendations emanating from the findings of the study. It recommends the following:

- An emphasis by DLIS on their Masters' degree dissertation requirements on stating the research philosophy as it is important in the justification of a research design or approach selected for the study.
- An exploration to use MMR in DLIS research as this study revealed none of the dissertations reviewed adopted the MMR.
- Stricter, implementation of Master's Degree Research Methodology Guidelines for DLIS as this study revealed that in most cases, students got away with not specifying methods or approaches used in their study.
- Although described as demanding, MMR has been increasingly embraced by other disciples even in LIS (Ngulube, 2013). This study recommends that post graduate students should be encouraged to use MMR in research as it offers another angle of unearthing new knowledge in the research process.
- The study also recommends that deposit of completed dissertations of the LIS programme at the University of Botswana be compulsory as this study established that some of the research products by LIS students were not deposited with the UB Library.

FUTURE RESEARCH DIRECTIONS

The findings of this study have pointed out possible research directions. One such area is to find out the views of faculty regarding DLIS's stance on whether students at masters' level are required or not required to frame their studies within philosophical assumptions, including their views why they think students are generally not doing it. One other possible area of study is to get from the perspectives of masters' students why they seem not to prefer to situate their research studies within available philosophical frameworks. Lastly, another comparative study can be conducted to find out reasons why for the few students who frame their studies within some research philosophy, it is the MLIS students who do, and not MARM students.

CONCLUSION

The results of this study have shown that the University of Botswana's masters' graduates in the MARM and MLIS programmes undertake research at the level generally in conformance with globally accepted research methods in humanities and social sciences. One notable finding was that an overwhelming majority of the research studies are not framed within research philosophies except for a few. This is contrary to Ngulube (2018) who suggest that theory is fundamental to research and its use in research contributes to the growth and maturity of a discipline and connects the body of knowledge within the discipline to broader science (see chapters 2 and 3 in this book for further discussion on the issue). That said, the limited use of philosophical assumptions as shown in this study is not an isolated finding as

even at doctoral level, studies may not be framed by philosophical assumptions, yet philosophy must be the driving force that guides theses (Sefotho, 2013). Another finding that warrants a mention is the dominant use of a case study design and purposive sampling strategy. This is an interesting finding which may need to be further investigated and specifically hear from faculty why that may be the case. The study has given insights for practitioners and decision makers as well as insight into methodological aspects at DLIS in comparison with established research methodologies. Furthermore, the study helps in revealing the quality of LIS research at the University of Botswana.

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KEY TERMS AND DEFINITIONS

Data Analysis: This refers to the act of making sense out of the raw collected data from research, for purposes of resolving the research problem. Without data analysis, the data collected will remain data, and will not make sense and thus not provide answers to the research question.

Data Collection Instruments: The tools used by researchers to actually collect data in the research process. The common data collection instruments in research include interviews, questionnaires, documentary analysis and observation.

Research: Methods used to seek answers for problems arising from both natural and social causes.

Research Approach: The research plan and procedure made up of steps of broad assumptions to detailed method of data collection, analysis and interpretation. It is therefore, based on the nature of the research problem being addressed and the reasoning behind the choice.

Research Design: This refers to the plan that outlines how a study is to be conducted, including the blue print for data collection methods and procedures as well as data analysis.

Research Philosophy: The larger world view from whose lens researchers hold views about how data about a phenomenon should be collected, analysed, and used.

Sampling Strategy: It refers to the different ways in which participants or respondents in a study can be selected from the study population.

Chapter 21
Studying Medical Records Management in the Public Healthcare Sector of South Africa Using Multi-Method

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ABSTRACT

This chapter reflects on the lesson learnt from the application of multi-methods in a quantitative study that was conducted to study patient record management in the public healthcare sector. In this study, a questionnaire was the main data collection tool, which was supported by interviews, observations, and document/system analysis data. In conducting the study, triangulation of multi-methods data was performed at different stages of the study. Currently there is no clear framework in social science research about the application of multi-method, mono-method, and mixed method research, which the study intends to clear. The study revealed that quantitative data need to be augmented with some narrative/qualitative data to make an empirical conclusion and recommendations because alone, it may not be completely reliable. Triangulation of multi-methods eliminates bias and closes some gaps where data leave some questions unanswered. The study provides a framework to guide on research method based on methods ingredients.

INTRODUCTION AND BACKGROUND

This chapter focuses on the research methodology applied in conducting the study because "knowledge that is produced in any scientific field primarily depends on the methodology that is used" (Ngulube, 2015). Multi-method research played an incredible role in the study to ensure that everything is clear, understandable, makes sense, and is seen as valid and empirical. The study was more quantitative-focused. However, it was supported by multi-methods to make more sense, hence, most of the research elements from paradigm to analysis were more related to the quantitative method.

The worldviews or paradigm applied by the researcher in this study was a positivist paradigm. The positivist paradigm informed the application of the quantitative approach in this study. This is because its focus is on the measurements of respondents' attitudes and feedback or results, which are based on the objectives and problem statement. Generally, the focus was on assessing causes and effects to eventually recommend solutions (Babbie & Mouton, 2001; Creswell, 2009). The main research approach used in this study was the quantitative approach, which was supported with the triangulation of a limited scope of qualitative data-collection methods to close certain gaps or answer certain questions. This equates to be a multi-method quantitative research study.

Many researchers see the multi-method from different perspectives, define and apply it in many various ways. Some researchers do not see the differences between multi-methods and mixed-methods, particularly when it pertains to the definition and abbreviation. In some instances, they use the concepts interchangeably as if they are synonymous. Some also use the concepts multimethod or multi-method and not multi-methods. For instance, Guetterman, Fetter and Creswell (2015) used what they call the qualitative multimethod. This method uses interviews, observation and audio-recordings to collect and analyse more qualitative data in conjunction with limited quantitative data to support the interpretation of the findings by analysing patterns and characteristics. Mingers and Brocklesby (1997) also talk about several applications such as, multimethodology (more than one methodology is applied), and multiparadigm (more than one paradigm is applied). There are various methods that may be utilised or combined in social scientific research; however, these depend on how the researcher combines, deploys, and implements them in relation to one another (Hunter & Brewer, 2015). According to Hunter and Brewer (2015), multi-method research is the kind of study where the researcher utilises more than one method or style, that are not the same, to conduct the same study. This is not like mixed-methods research, where the researcher combines a variety of relevant methodologies.

If we are to understand the nature and potential of multi-method research, we must first pose fundamental questions about the interrelationships among methods, data, and research problems… Only once we have achieved a better understanding of the philosophical grounding of research strategies will the opportunities afforded by multi-method research be fully realised. Multi-method research design may be appropriate to some research projects but not to others, with appropriateness being judged in relation to the nature of the research question and the sources of information we have at our disposal to answer that question. Whether or not we should use multi-methods would thus be determined by the data sources already identified and the research questions already formulated (Graham, 2010, p. 76).

Many researchers find it difficult to differentiate between the multi-method and mixed-methods research. The difference for Hunter and Brewer (2015) is that multi-method research occurs when the researcher combines different kinds of methods in their study, regardless of whether they are quantitative or qualitative. They further state that mixed-methods research only occurs when the researcher combines qualitative and quantitative methods in their particular study and not in any other manner. They consider mixed-method research as a subset of multi-method research (Hunter and Brewer 2015). Meetoo and Temple (2003) also refer to multi-method as "complementary methods". It uses a wide range of possible sources to support statements in the research in cases where the different methods are triangulated to enhance validity in the study. Meetoo and Temple (2003), and Graham (2010) also refer to multi-method as "multiple method" research. It helps the researcher to gain confidence regarding the data from the audience, respondents or participants (McKendrick, 1999). It is further stated that qualita-

tive and quantitative methods may be used for cross-validation against each other on common grounds (Meetoo & Temple, 2003), and breaks the divide among different methods (especially the qualitative or quantitative methods divide) (Meetoo & Temple, 2003; Graham, 2010). McKendrick (1999) also refers to multi-method research as a multiplicity of methods that enables the researcher to explore issues. Schneider and Rohlfing (2013) also substantiate that multi-method research assists the researcher in comparing and validating results. This enhances confidence regarding the research results by showing, what they call, "multiple truth". For McKendrick (1999), multi-method research is necessary to enhance the way research has recently been conducted. However, the understanding of the concept and the way it is supposed to be applied, needs to be adjusted. Graham (2010) states that "if we are to engage fruitfully in multi-method research then we must at least be aware of the range of possible methods and how we might combine them".

The multi-method is utilised to ensure that the research methods address the question regarding empirical data, data relation to theories, bias in methodology, cause and effects relationships, generalisation of findings, and realism versus simplification. This may only be thoroughly addressed using multi-method research (Hunter & Brewer, 2015). "Indeed, before such questions are fully explored, debates concerning best practise in multimethod research seem premature." (Graham, 2010). Multi-method research may be designed on a micro-level where more than one specific know technique is combined for both data collection and analysis, while the macro-level of multi-method research design emanates from the discovery and application of new innovative techniques for data collection and analysis (Hunter & Brewer, 2015).

Hunter and Brewer (2015), Graham (2010), and McKendrick (1999) recognise that multi-method research is plausible because it recognises that all methods have significant strengths and critical weaknesses. Thus, integrating them leads to the upliftment in strengths and lowers weaknesses in the study. This results in empirically reliable results or findings.

Social reality is multi-faceted and perspective is all-important. Using different methods may allow a researcher to investigate the different ways that accounts are built up. Different methods may be used to verify each other, but they may also be complementary and contradictory. Complementarity does not imply that findings have to be identical (Meetoo & Temple, 2003).

Nevertheless, in the study, the research design and survey research emanated from the quantitative approach as fully applied by the researcher. There were four techniques that were used to collect data, namely: a questionnaire, interviews, observation and document analysis. The questionnaire was mostly used to collect quantitative data. Interviews, observation and document analysis were used to collect qualitative data that were to be used for clarifying questions in quantitative data gaps. Hence, the qualitative data was used to understand the quantitative data during analysis and interpretation. The data was also triangulated after collection to support the main technique, which was a questionnaire for the quantitative method. This was to ensure that gaps were closed or minimised to a reasonable or acceptable level. All the collection tools were tested and reviewed for validity and reliability. This kind of approach is considered by the researcher as a multi-methods research approach. Figure 1 illustrates the map of the research methodology for the study under discussion in this Chapter.

Moreover, the study was conducted under the ethical consideration of the university research ethical guidelines. The university issued an ethical clearance certificate, clearing the study. The researcher requested permission to conduct the study in the healthcare department and permission was granted. Therefore, ethical implications were observed throughout the implementation of the research method-

Figure 1. Mapping the research methodology applied to the multi-method quantitative study
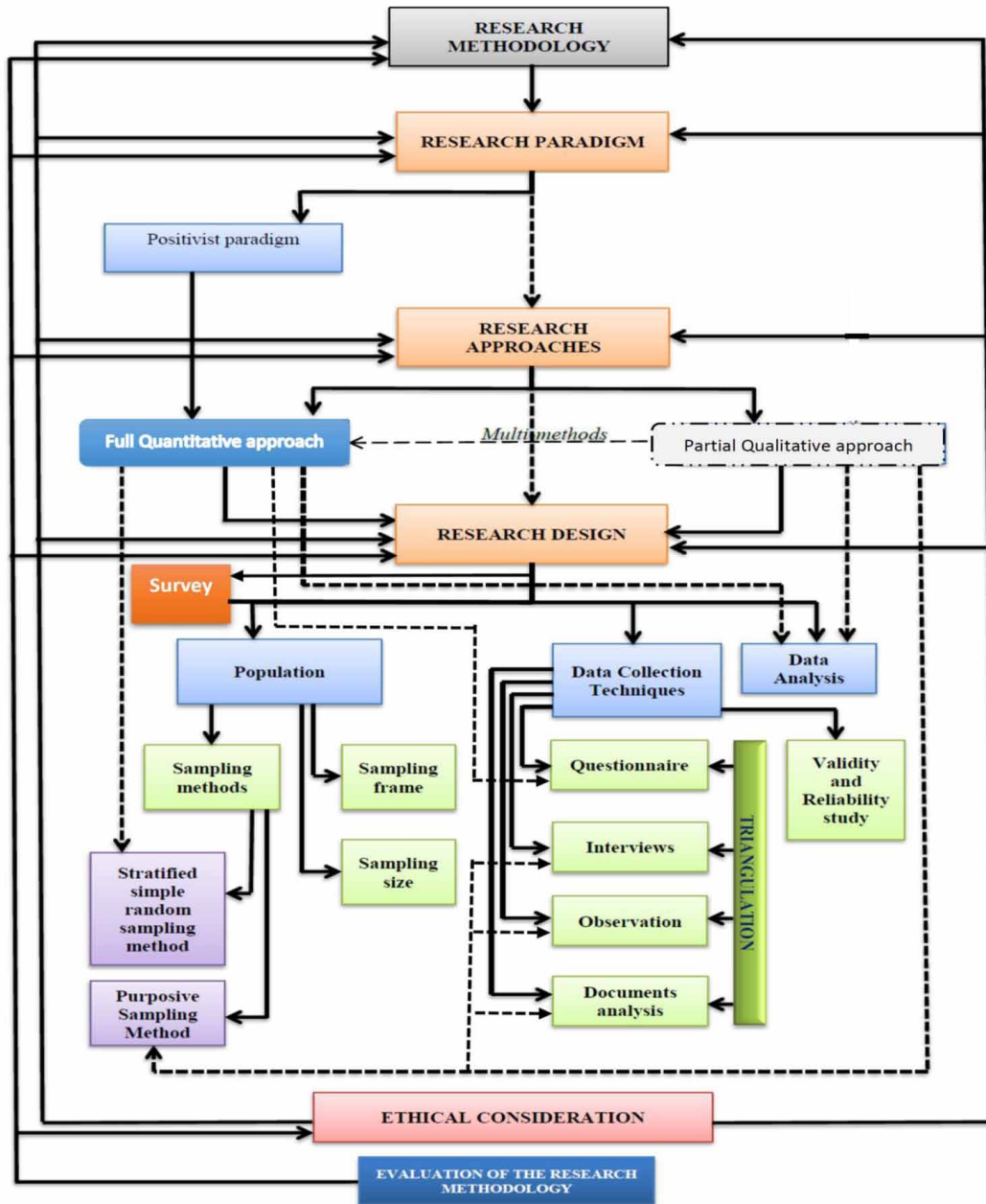
ology. Finally, the researcher evaluated challenges and barriers that related to conducting the research methodology, which also included the application of the research paradigms, approaches, design and methods. Barrier included but were not limited to: access to the population, applying certain data collection techniques, meeting certain research needs (such as participants' interests and permission required by the organisation of the study), and remedial action to deal with the barriers and challenges.

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RESEARCH PROBLEM

The problem that led to the writing of this chapter was that the author has learnt that social science researchers are still experiencing a lot of challenges when it comes to the application and naming of the research methods. For instance, in some studies researcher see mixed methods and multi-methods as similar things while other see them as different but describe them same way and in some instances contradictory to each other. Some researchers claim to be using single research method and when one check the application appears to be either mixed or multi-methods. It is also not clear whether by method one is referring to the data collection tool like questionnaire or interview or is simply the nature of questions covered by the tool or the nature of data to be collected. Again, how data is analysed also count to the issue of converting it to qualitative or quantitative. Hence, this study sought to share the lesson learnt in the study to which multi-method were applied.

PURPOSE AND OBJECTIVES OF THE STUDY

The purpose of this study was to share lesson learnt from the application of multi-methods in a quantitative approach to study medical records management in the public healthcare sector. The objectives of the study are as follows:

- To identify proper application of research methods in the social science research based on the lesson learnt
- To clearly give explanations of existing methods applied in scientific research based on the lesson learnt
- To provide a framework for all existing research methods applicable in the social science research based on the lesson learnt

RESEARCH METHODS

It is vital for the researcher to apply appropriate research methods to give effect to conceptualisation of the research problem and prescription to the phenomenon being investigated (Ngulube, 2015). Research methods are described by Creswell (2014) as the process under which the researcher proposes the mode of "data collection, analysis and interpretation" for their studies. Research methods pertain to the data collection tools utilised by the researcher to conduct the research study. Data collection methods entail procedures, techniques and tools applied in collecting the desired data from the participants, as sampled. The most popular and utilised data collection methods are qualitative and quantitative methods. Regarding the quantitative method, data is collected using statistical and mathematical techniques (Creswell, 2009; Ngulube, 2005a; Ngulube, 2015), because it is done by counting and scaling (Punch, 2006). Regarding the qualitative method, participants or small groups of a population are studied thoroughly and intensely (Ngulube, 2005a) by asking them questions using interviews or questionnaires, and watching them using observation, or a combination of some of the three activities (Punch, 2006). This study used a methodological triangulation in which both qualitative and quantitative data collection techniques were applied in collecting data (Cameron, 2009; Odera-Kwach, 2011). Triangulation was also used to integrate

multi-methods in an attempt to minimise biases and limitations to the study weaknesses (Fidel, 2008). Data was collected using questionnaires, interviews, document analysis (e.g. policies and procedures) and observation of the state of record management and record management systems (Mouton, 2002; Ngulube, 2015), to accomplish empirical and epistemological outcomes, by ensuring that these techniques close each other's weaknesses from their disadvantages by their diverse advantages (Mouton, 2002).

Questionnaires

Questionnaires are easy to create, and this is why they are used by most researchers (Black, 1999; Bless & Smith, 1995). The term 'questionnaire' can be defined as 'a research tool used to collect data in the form of statistics, in most instances, although it is also used to ask some open-ended questions or questions that need some explanation by participants'. In a simple definition, questionnaire is "a collection of questions" (Babbie, 2007). Mavodza (2010) also attests that by using a questionnaire, statistical information about sampled participants are studied. Questions covered include information such as age, income, opinions and other aspects of people's lives. The questionnaires are generally used by the researcher to collect data in a survey study.

Marshall and Rossman (2006) state that questions in the questionnaire are typically structured. It can also contain some open-ended questions to collect data about the population's characteristics, attitudes and beliefs. The content of the questionnaire also has to be examined and tested. This is done to check the quality of the questions to minimise, correct or improve bias, sequential order, validity, usefulness and reliability. This was achieved by conducting a questionnaire pre-test to ensure reliable results (Babbie, 2007; Leedy & Ormrod, 2005). This is very important since the questionnaire pre-test enhances understanding of respondents to the questions, question layout, font, arrangement and flow, which also improve the response rate due to its validity and reliability to participants (Mavodza, 2010). The participants' response rate is very important in questionnaires. Babbie (2007, p. 262), and Babbie and Mouton (2001), suggest that an adequate response rate for a questionnaire is 50%, 60% is considered to be good, and 70% is accepted as very good. They further emphasise that an acceptable response rate assists in ensuring that the total population is represented in the responses from a few participants since the results are to be generalised eventually.

In addition to the above-mentioned, Bernard (2013) provides guidelines on what he titled "fifteen rules for question working and format", which the researcher considered when constructing the survey questionnaire. The rules discussed include that the questions should be unambiguous to avoid different interpretations by different respondents. Another rule is that the questionnaire should be distributed to knowledgeable respondents who have the information required to answer the questions. The research surveyor should "make sure all the questions are important or useful for the survey and also provide for contingencies and filter questions to clarify certain responses." The rules also stipulate that the researcher should make sure that the scales are clear, package the self-administered questionnaire to quickly and easily obtain ample data, and avoid inappropriate respondents. The researcher should also "ensure that the questions are exhaustive and mutually exclusive" (Bernard, 2013).

Furthermore, the questionnaire survey questions must not be long. The survey questionnaire must also provide alternative answers for each question. The researcher must avoid loaded and double-barrel questions in the questionnaire to avoid leading respondents, and not construct questions that show emotion. To eliminate controversial issues, the researcher should try to specify the referent situation to ensure that respondents check as many circumstances as they deem appropriate. Lastly, the researcher must

avoid placing false premises on the questions (Bernard, 2013). Most, if not all of these rules were also discussed and supported by Babbie and Mouton (2001, pp. 234-238). Bless and Smith (1995) add that before constructing the questionnaire, the researcher must consider listing specific issues or problems of the study to be investigated, analyse the nature of data to be collected for investigating the problem of the study and eventually, formulate the questions that will specifically yield answers to the research question or prove the hypothesis.

The above-mentioned was considered in terms of to this study. Babbie and Mouton (2001), and Brewerton and Millward (2001), stipulate that aesthetics and layout of the questionnaire need to be carefully considered with the aim of making the tool attractive to respondents. They further guide that careful consideration should be given to: questionnaire instructions, the covering letter to participants, the length of the tool (too long or too short), the correct order of questions, spelling mistakes or grammatical errors, the readability of font type and size, density of the layout, and sufficient space provided for the responses (Babbie & Mouton, 2001; Brewerton & Millward, 2001).

Furthermore, this study followed most, if not all, of these guidelines in constructing the survey questionnaire. To assist the respondents, the researcher started with introductory information and guidance as to how they should complete their responses to the questionnaire questions, and under which category (such as gender and age) they fall, in order to establish their nature as also guided by Babbie (2007); Babbie and Mouton (2001). The researcher also ensured that the questions in the questionnaires were not too long to ensure that participants provided accurate feedback by reading all the questions thoroughly (Mavodza, 2010). However, questions were also spread out and uncluttered. The researcher avoided cramming questions into one line and abbreviating them. This was done to circumvent respondents from becoming demoralised and neglecting to answer certain questions properly (Babbie, 2007). In addition, questions were short, simple, clear and unambiguous. The questionnaire was professional and well-drawn up with guiding instructions at the beginning of the questions (Babbie & Mouton, 2001; Babbie, 2007; Mavodza, 2010).

For the purpose of this study, open-ended and closed-ended questions were structured together. However, closed-ended questions were central or dominant since it was mostly a quantitative study. The open-ended questions required respondents to explain their ideas in their own words or understanding. The closed-ended questions required respondents to answer questions by choosing answers from the provided lists of alternative answers (Babbie & Mouton, 2001; Babbie, 2007; Mavodza, 2010). For instance, some questions were answered by choosing "YES" or "NO" and others by choosing from multiple answers listed (Mavodza, 2010).

Babbie (2007) and Babbie and Mouton (2001) attest that the survey researcher must consider two structural requirements when constructing closed-ended questions for the questionnaire, namely, the exhaustive response category and the mutually exclusive answers category. The exhaustive response category encompasses the idea that questions must have room to accommodate all the relevant answers or responses from the respondents. For instance, some questionnaires provide space for more responses by placing the last option of answers as "Others, please specify_____", whereas the mutually exclusive answers category states that options for answers to questions must be structured in such a way that respondents are not compelled to select all of them to ensure easy analysis (Babbie, 200; Babbie & Mouton, 2001). Babbie and Mouton (2001) refer to these kinds of questions as "contingency questions". The closed-ended questions assist the survey researcher with the provision of uniform responses that are also very easy to analyse (Babbie, 2007; Babbie & Mouton, 2001).

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Likewise, Bernard (2013) discusses scales of questions in survey questionnaires, some of which the researcher applied to the study. The scales discussed entail a simple scale with single indicator, complex scales with multiple indicators, index (cumulative index), Guttman scales and Likert scales, which the researcher applied to this study. The simple scale typically is used to scale things such as people's ages, e.g. "How old are you?". In applying the complex scales, a single question is asked with many indicators to measure complex variables. An index is used for listing several answers that count the same as certain questions for researchers. The Guttman scale is used to measure the respondents' knowledge, competencies or skills about certain things, issues or tasks (Bernard, 2013). As supported or recommended by Babbie and Mouton (2001), Babbie (2007), Kumar (2005), and Powell and Connaway (2004), some questions were designed using a Likert scale frame to measure the respondents' attitudes. The Likert scale was formalised by Rensis Likert (Babbie & Mouton, 2001). For instance, the Likert scale frame requires respondents to choose whether they strongly agree, agree, are neutral, disagree or strongly disagree with a specific statement (Babbie & Mouton, 2001; Babbie, 2007; Bernard, 2013; Mavodza, 2010). The open-ended questions were not biased and did not limit answers from respondents as they could elaborate as much as possible, to the best of their knowledge in their responses (Powell & Connaway, 2004; Mavodza, 2010). This was because respondents used their own words without limitation[1].

The advantage of the questionnaire was that it gave participants time to plan and think about their answers, contained valid and consistence information for further reference during data analysis, and was used in the absence of participants; the respondents also completed questions independently without interference from the researcher (Bless & Smith, 2000). Bernard (2013) adds that the questionnaire eliminates the researcher's bias because questions are answered in his/her absence, and respondents all have similar questions to answers. In a self-administered questionnaire, respondents do not attempt to impress anyone since they are alone, and anonymity is strengthened (Bernard, 2013). The questionnaire was not costly; it required few resources and was used to cover a larger sample of participants (Brewerton & Millward, 2001; Leedy & Ormrod, 2013). The administration of the questionnaire resulted in travelling cost savings, and the respondents being more truthful and certain about their answers (Leedy & Ormrod, 2013). Bernard (2013) emphasises that the researcher can either distribute the questionnaire by delivering it to respondents and collecting it on another day, or by posting the questionnaire to the participants or organisation of the study. This meant that the researcher was indirectly assisted by the post office or the organisation of the study, depending on the method of distribution. For the purpose of this study, questionnaires were collected by the respondents when they visited their provincial office, and some were delivered by the researcher when visiting the participants' institutions for records management inspections and training. Respondents submitted the questionnaires to the provincial office when they visit it for the collection of hospital circulars and posts.

Some negative aspects of a questionnaire as a data collection tool are that it requires considerable time to compile, distribute and collect from participants. In addition, illiterate participants are not able to respond to a questionnaire and it is expensive to develop. For instance, the researcher needs a computer or typewriter, printer and paper to complete the project (Bless & Smith, 2000; Fink, 2013). Bernard (2013) highlights that with a self-administered questionnaire, the researcher has no control over how respondents interpret the questions and/or respond to them. Furthermore, the response rate is generally very low, being approximately 20% to 30%, as respondents know that the researcher does not know who responded and who did not. Another disadvantage is that the researcher may not be entirely certain whether the questionnaire recipient was the person who completed it, delegated someone to complete it

on their behalf, completed it by understanding the questions, or completed it without reading the questions (especially regarding the multiple-choice questions) (Bernard, 2013). The questionnaires usually expose illiterate participants, who may also affect the response rate by pushing it lower (Leedy & Ormrod, 2013).

Interviews

An interview survey is one of the alternative methods of collecting survey data (Babbie, 2007). Krathwahl (2009) finds interviews or interviewing to be a straightforward process of exchanging questions and answers between the interviewer and interviewee(s), during which the interviewer is the controller or the driver of the process. The interview may also be defined as the process whereby the researcher or interviewer arranges or initiates direct personal contact with the interviewee or participants, with the arrangement that the interviewee will answer questions posed by the interviewer during the data collection interaction (Bless & Smith, 1995). Typically, in a large population sample, the researcher resorts to appointing assistant interviewers to whom he/she delegates activities. In most instances, the researcher using an interview receives a very high response rate ranging from 80% to 85%, as compared to the questionnaire (Babbie, 2007: p. 264). The researcher developed, pretested and used the interview data collection technique (interview schedule) to collect qualitative data, by interviewing heads of clinical and nursing services, who are the key people affected by medical records on a daily basis when rendering healthcare services to patients. This meant they could provide quality information to the researcher (Creswell, 2009; Bernard, 2013; Leedy & Ormrod, 2005; Wamundila, 2008).

Furthermore, the interview was used to yield important information relating to facts such as participants' biography, feelings, motives, current and past behaviour, behavioural standards, and conscious reasons for feelings and actions (Leedy & Ormrod, 2013). However, Leedy and Ormrod (2013) also provide a guideline on conducting the interviews for a quantitative study. They state that the researcher must identify his interview questions in time and identify participants' cultural background influence on the study. Participants must be balanced in terms of representativity of the population, rapport must be established and maintained, and a suitable interview meeting place must be identified. Furthermore, the researcher must: avoid putting 'words into participants' mouth' during the exchange of questions and answers; capture responses verbatim during the interview; consider that facts are not necessarily obtained; think about quantification of responses and modification of questions as they proceed with the interviews; ask questions that can reveal qualitative data; pilot test the questions; restrict each question to a single idea; clarify certain responses, where necessary; and consider how the data will be best analysed as they proceed (Leedy & Ormrod, 2013).

The semi-structured interview schedule was used to ask open-ended questions to allow for the provision of more information being supplied by the participants. This was to avoid restricting participants from providing detailed information (Brewerton & Millward, 2001). In applying the semi-structured interview, the research was not holistically open ended, but followed the "standard questions with one or more individually tailored questions to get clarification or probe a person's reasoning" (Leedy & Ormrod, 2013). According to Brewerton and Millward (2001) "semi-structured interviews incorporate elements of both quantifiable, fixed choice responding and facility to explore, and probe in more depth, certain areas of interest". The interviews were conducted in different ways based on the proximity of the hospital or participant. Some participants were interviewed face-to-face or telephonically, whilst others were interviewed in groups, as guided by Creswell (2009). The other specific method used was focused group interview. Focused group interviews "involve the simultaneous use of multiple respondents to generate

data" (Brewerton and Millward 2001). In applying this interview method, the researcher depended on the availability of participants. The number of participants involved in focused group interviews usually range from a minimum of four participants to a maximum of at least 10 participants, as recommended by Ritchie and Lewis (2003). The researcher used the text recording method by making notes as the participants responded, since most participants did not prefer voice recording.

However, the interview technique, as also supported by Creswell (2009), has several advantages. According to Creswell (2009), the first advantage of the interview is that the respondents can participate without any personal or physical availability of the researcher or interviewer. For instance, telephonic interview or computer-assisted interview can be used. The interview technique makes it easier for the researcher to collect information relating to the respondents' or participants' historical backgrounds, since immediate probing is possible, and the researcher is also able to channel the mode of questioning (Creswell, 2009). Babbie (2007) and Bless and Smith (1995, 2000) state that with an interview, participants or respondents have the opportunity to ask immediately for further explanations from the interviewer, should they not clearly understand the questions properly. In doing this, the respondents would not give irrelevant answers based on the reason that they did not understand the questions properly, because incorrect interpretation of the questions will be clarified before any question is responded to. During an interview, there is no room for participants to plan or justify wrong answers or hide the correct or true answers due to the immediate demand for answers. It also allows participants to elaborate on their answers due to its unlimited space to provide information. The interviewer also took the opportunity to ask respondents to repeat responses where they were not clear and to state those answers clearly or in an understandable manner, which enabled proper recording of responses and an immediate understanding of the information provided (Bless & Smith, 2000). It provided for the elimination of irrelevant questions and correction of ambiguous questions. The researcher also has the opportunity throughout the interview to realise new aspects pertaining to the problem from the participants' responses. In addition, the interview enabled data collection from illiterate participants who were not able to read and/or write properly. It also enabled the researcher to include questions that collect data that was missing or not collected using other collection tools such as questionnaires and observation. Furthermore, the researcher had the opportunity to encourage participation to provide more information than required (Babbie & Mouton, 2001; Bless & Smith 2000; Leedy & Ormrod, 2013).

Other advantages are that, unlike distributed questionnaires, it is never easy for the participants to reject participation in the interview in front of the interviewer, as the interviewer may observe some characteristics based on the study when respondents participate or talk; the researcher also has the opportunity to probe for answers immediately (Babbie, 2007; Leedy & Ormrod, 2013; Bernard, 2013). Brewerton and Millward (2001) underscore that an interview provides for "rich data", since the researcher obtains the exact meaning from the respondents, is flexible to the extent that it can be utilised at any stage of the study, and can be applied in multi-methods with other techniques such as observation and related techniques (Brewerton & Millward, 2001). They further elaborate that an interview gives the advantage that the interviewer is available to probe more relevant answers, clarify complex instructions or questions to interviewees, and ensure "co-operation, rapport and confidence-building" (Brewerton & Millward, 2001; Leedy & Ormrod, 2013). Babbie and Mouton (2001) and Bernard (2013) emphasise that with an interview survey, respondents who are illiterate or non-literate, blind, bedridden, or very old, are also able to participate without any barriers. The researcher may cover or pose both open-ended and closed-ended questions in the same interview survey for each respondent. During an interview, the researcher can see who is responding, although he/she has to keep anonymity; likewise, respondents

can see or hear one question at a time, because they do not have the opportunity to see or read through all the questions before providing responses (Bernard, 2013).

Nevertheless, interviews, like other data collection techniques, have several disadvantages. Creswell (2009) states that the disadvantages of an interview technique are that it may be biased as it is based on the presence of the researcher, participants may not equally express their perceptions, and they may also give information according to their views, rather than the real situation in the field. Bless and Smith (2000) emphasise that participants may feel discouraged or shameful to express the real situation or their feelings. Bias may emanate from the researcher's poor recording of responses since incorrect information may be recorded due to misinterpretation and misunderstanding. The interviewee may not feel anonymity and privacy in terms of identification, since they will be in direct contact with the interviewer. Some questions, especially those that touch on private and confidential issues, may embarrass respondents (Bless and Smith 2000: p. 108). In some instances, participants can always avoid the interview by claiming to be too busy all the time (Leedy & Ormrod, 2013). An interview is also time-, energy- and money-consuming, since participants may be interviewed one by one at different geographical locations unless (Bless & Smith, 2000; Oppenheim, 1992). These costs can be minimised with telephonic interviews (Bless & Smith, 2000; Oppenheim, 1992).

Brewerton and Millward (2001) state that the other disadvantages include: the interview is expensive since interviewers need to be trained; it requires more logistical equipment and travelling, more time is needed for analysis of descriptive data and conducting it; accessibility of participants is not always easy due to scattered geographical locations, the interviewers' presence may lead to biased responses; and data may not be reliable due to bias incurred. Bernard (2013) underscores that a face-to-face interview is "intrusive and reactive" and it can be very costly and time-consuming if the researcher does not have assistant interviewers.

Observation

Observation is a data-collection technique whereby the researcher personally sees the events, actions and experience without any interference from the population or institution of the study (Ritchie & Lewis, 2003). Bless and Smith (1995) underscore that observation as a data-collection tool needs systematic planning that involves the question of what issues should be observed and how to observe them. The observation data recording should also be systematic, objective and standardised, through the maintenance of proper control and recording skills (Bless & Smith, 1995).

Furthermore, this observation technique is divided into participatory or participant observation, during which the observer forms part of the observed team by participating in their activities with them (Bernard, 2013; Brewerton & Millward, 2001). During Non-participatory observation, also known as simple observation (Bless & Smith, 1995), the observer sits back, observes and takes notes of what is happening or what participants are doing (Bless & Smith, 1995; Brewerton & Millward, 2001). Bernard (2013) and Bless and Smith (1995), state that the researcher may approach the observation task as a participant where he/she acts like a participant and not like a researcher in his/her interaction with the people involved, or as participant observer, where the researcher follows participants, and observes and records what they are doing.

Bless and Smith (1995) attest that both methods of observation have advantages and disadvantages. In applying simple observation, participants may change their bad behaviour and try to be smart, realising that they are observed. In this case, the information collected may not be realistic. Participant obser-

vation may result in the researcher acting emotional or sympathising with participants and becoming biased towards the outcomes of the study. Furthermore, recording will have to be done secretly during this process (Bless & Smith, 1995).

However, for the purpose of this study, the researcher used non-participatory observation. This technique is usually used as a last step where the researcher looks at the research environment while measuring what is happening (Babbie, 2007). The observation data collection technique was used to collect qualitative data by way of observing the state and the mode of record management operation in different hospitals in Limpopo (Creswell, 2009); observed behaviour was also quantified by counting occurrence, and rating the accuracy, intensity, maturity and other dimensions (Leedy & Ormrod, 2013). The semi-structured observation schedule was created and used as a reference source for the researcher to remember which observations were important to note. Creswell (2009) states that the advantages of this technique are that first-hand experience is acquired by the researcher, real information is recorded immediately, and the researcher can, eventually, detect topics suitable to discuss with participants. However, the disadvantages of this technique are that the researcher may be denied access as an intruder, some information may be restricted from reporting, and observation skills may be lacking from the researcher's point of view (Creswell, 2009).

Document Assessment/Analysis

Document analysis is about studying the created documents of the organisation that are available with the main purpose of understanding the content or details/information covered (Ritchie & Lewis, 2003). Bernard (2013) refers to document analysis as archival research in which archived records are studied. He also feels that this kind of data-collection technique is not reactive. The document analysis techniques were used to assess information in the policies, procedures, standards, reports and other relevant documents (Creswell 2009). As also supported by Ritchie and Lewis (2003), this kind of data-collection technique may also be used to collect data from documents such as reports, government papers, materials and procedural documents. This information was used to determine the quality of the guiding documents for medical records management in the hospitals and the state of records management as also reflecting in the reports, as also guided by Ritchie and Lewis (2003). Creswell (2009) states that document-assessment techniques have the advantage of being performed in a convenient time and provide thoughtful data and written evidence. Nevertheless, the disadvantages are: documents may be protected; access to documents may be denied, the researcher hardly has to search for the documents and documents may not be complete and accurate.

Data Analysis and Presentation

Data analysis is the process of identifying the patterns and themes from the data, after which the researcher comes to a particular conclusion regarding the study findings (Bernard, 2013; Mouton, 2002). After the researcher analysed data, he searched for data patterns and ideas about the existence and state of data collected (Bernard, 2013). During this stage of the research, data was interpreted to ensure that it makes sense to the reader (Creswell, 2013), particularly after it was edited, summarised, captured and error checked to eliminate or correct abnormalities and other weaknesses (Singleton & Straits, 2010). This assisted the researcher in obtaining the true meaning from the data analysis, as accurate data provides the true meaning from respondents. Data analysis assists the researcher in determining the meaning of

the data collected from participants (Johnson & Christensen, 2008), by converting the information or data collected into the answers to the questions of the study (Creswell, 2009; Terre Blanche, Durrheim & Painter, 2006).

Furthermore, during data analysis, data was reduced, displayed, transformed, correlated, consolidated, compared and integrated. The data was also logically arranged, examined, synthesised and lastly, generalised for the entire population of the study (Bryne, 2001; Wamundila, 2008). Analysing data also assisted the researcher in comparing the data collected with related theory, especially theory discussed in the background and literature review to test the hypothesis or answer research questions (Singleton & Straits, 2010). This brings about a better understanding in terms of social process operations to certainly interpret, conclude and recommend solutions or improvements at the end of the study (Ngulube, 2005a). Data analysis also assisted the researcher in detecting respondents' consistency on the data pattern, such as variables covariance consistency (Bless & Smith, 2000). The data analysis was conducted and presented using tables, charts, graphs and statistical summaries as supported by Ngulube (2005a: p. 138) and Bernard (2013) and used in the findings of Ngulube (2005b). The researcher arrived at this by using two data analysis matrices, namely, profile matrices to analyse the relationship of variables and proximity matrices to analyse proximity within variables such as similarity and dissimilarity (Bernard, 2013).

Furthermore, this study used a triangulation of multi-methods in analysing the data. This implies that the researcher incorporated, consolidated, compared and integrated both qualitative and quantitative data (Creswell, 2003). Among other things, the multi-method enabled the researcher to ensure that data was clean and that reviewed responses were valid (Greene, 2007; Mavodza, 2010). As alluded to by Terre Blanche, Durrheim and Painter (2006), the qualitative method assisted the researcher in realising ideas and arguments relating to the study problem. The quantitative data was analysed using the descriptive and inferential statistics (Bless & Smith, 2000; Creswell, 2009). "The end-product of the qualitative method is text that includes image and drawing, while a quantitative method output numbers as outcomes of analysis" (Fidel, 2008; Punch, 2006). Babbie (2007) and Bernard (2013) add that in quantitative data analysis, data is converted into a numeric arrangement and analysed in a statistical way. The qualitative methods were more focused on the nature and interpretation of the understanding of the situation in the study, such as population values, decisions, beliefs and actions (Ritchie & Lewis, 2003). The researcher differs from Bernard (2013), who says, that in qualitative data analysis, words are converted to numbers, while the researcher agrees with him by saying that in quantitative data analysis, the process of analysis is statistical and mathematical when dealing with data of a numeric nature.

However, according to Babbie and Mouton (2001), data analysis is usually preceded by activities such as the capturing of data into the computer that is installed with relevant data analysis software, and cleaning and categorising, or coding the data, in line with the data capturing system or database. Creswell (2014) recommends that the researcher should specify the kind of data analysis tools and whether he used a manual or electronic (software) mode of data analysis. In many scientific research studies, researchers popularly use software such as SPSS® data analysis software to analyse quantitative data (Babbie, 2007; Babbie & Mouton, 2001; Leedy & Ormrod, 2013), as was the case with the study conducted by Jayasundara (2009); Makhura (2005) and Wamundila (2008). The other statistical data analysis software mentioned by Leedy and Ormrod (2013) in their discussion about quantitative data analysis includes what is called SAS, SYSTAT, Minitab and Statistica. Word-processing software such as Microsoft Word® is normally used to analyse qualitative data, which includes organising and interpreting the data (Leedy & Ormrod, 2013).

Furthermore, Leedy and Ormrod (2013) underscore that for complex qualitative data, software such as Atlas.ti, Ethnograph, SuperHyperRESEARCH, Kwalitan, MAXQDA and NVivo may be applied for deep analysis, which includes storing, segmenting and organising the data. In addition to the above, Babbie and Mouton (2001) list other types of data analysis software such as ABtab, AIDA, A.STAT, BMDP, DAISY, DataDesk, CRISP, DATA-X, Dynacomp, INTER-STAT, MASS, MicroCase, Microquest, Microstat, Micro-SURVEY, Ministab, POINTFIVE, P-STAT, SAM, SAS, SNAP, STATA, STAT80, Statgraf, Statpak, StatPro, STATS PLUS, Statview, Survey mate, SURVTAB, SYSTAT, and TEGPACS, to name but a few.

Leedy and Ormrod (2013) recommend that the researcher can also Microsoft Office Excel spreadsheet software, or a sphygmic software spreadsheet, simple spreadsheet, spread32 and many more that are downloadable on the internet, free of charge. They elaborate that a spreadsheet also has significant advantages since it can help the researcher to sort data in rows and columns. A spreadsheet assists the researcher by: sorting data in many ways within rows and columns; recoding data by creating new columns or rows as required for analysis; creating formulas for the auto-calculation of captured data; and creating graphical reports from the data automatically (Leedy & Ormrod, 2013). Leedy and Ormrod (2013) further elaborate on how the Excel spreadsheet can best be utilised to: keep track of literature resources; record and recode data; reorganise data; conduct simple statistical analysis; create data set; provide descriptive statistics and inferential statistics computing.

Furthermore, Creswell (2014) supports the above statement stating that the quantitative data can also be captured into the spreadsheet or database for analysis. In this study, the researcher used Microsoft Office software such as Microsoft Word® and Microsoft Excel®. Microsoft Word was used to develop a tally sheet that was designed from the questionnaire design and questions. Using the tally sheet, every questionnaire returned from the participants was tallied immediately into the tally sheet. The tally sheet was flexible to be used electronically or manually as a printout using a pen to tally. The researcher had chosen to use both manual and electronic tally sheets to back up the data, in case the other tool got lost. When capturing completed questionnaires electronically, the researcher merely increased the numbers in the relevant block on the sheet as the questionnaires were returned from participants. On the manual sheet, he provided a tally using a pen; he crossed the tallies off after every five tallies to simplify counting the tallies towards the end. The Microsoft Excel spreadsheet was also used to develop a database for capturing data after counting the tallies from the tally sheet at the end of data collection and tallying.

Furthermore, the database was also designed in relation to the questionnaire design and questions to simplify analysis. The spreadsheet database was also programmed to automatically calculate the percentage for each response and give the percentage figure; and to automatically give a table or graphical illustration of the figures in different designs, as preferred and programmed by the researcher. For instance, graphs may be in a form of a histogram or pie-chart. Eventually, the researcher copied the graphs and tables into Chapter four, where the data was presented, described and explained, with the support of the qualitative data. This is because the qualitative data was also triangulated into the relevant questions to support the figures or numeric information as presented in Chapter Four under the table and/or graph. Generally, quantitative data was captured, cleaned, validated and analysed using an MS Office Word tally sheet and MS Office Excel spreadsheet, and presented using tables and graphs. Qualitative data was captured and analysed using MS Office Word and presented in the form of narratives, explanations and descriptions (Babbie, 2007) in relation to the quantitative information presented. In doing this, the researcher was also reporting on "how the results answered the research questions" and drew conclusion and inferences from the results or findings of the study (Bernard, 2013; Creswell, 2014; Fink, 2013).

Regarding the qualitative information or comments, analysis was carefully done by reading through the results to identify certain behaviours, attitudes and beliefs (Fink 2013). This is because the researcher had to attempt to obtain a resolution to the research problem and sub-problems by conducting a data intrinsic meaning (Leedy & Ormrod, 2013).

As also attested by Singleton and Straits (2010), in survey research, the data-analysis process includes data editing and summarising, which includes coding, data entry or capturing, and error checking (generally called data cleaning). This approach was used in this study. The data was eventually presented in the form of percentages based on the total sample or number of responses (feedback/returned questionnaire) because percentages "provide an explicit comparative framework for interpreting the distribution" of data (Singleton & Straits, 2010). Looking at the data analysis "In general, the intent is to make sense out of text and image data. It involves segmenting and taking apart the data (like peeling back the layer of an onion) as well as putting it back together." (Creswell, 2014).

DISCUSSION OF THE LESSONS LEARNT

There are lot of lessons learnt from the quantitative study. One fundamental issue is that quantitative data needs clarity in most instances for it to make sense, especially to the readers who do not have an idea about how the study was conducted and challenges that the researcher came across in concluding the statistical findings. Secondly, quantitative data without some clarification from qualitative data becomes predictive; hence the findings may be considered predictions. For instance, if hospital A receive 1000 outpatients' headcounts in June 2017 and hospital B received only 100 within the same province or district area, it may not automatically mean patients in that district prefer hospital A to hospital B, or that people around the sphere of influence for hospital A are always ill. The reasons may be either, or both in some instances. Another example is, if medical records in hospital A are poorly managed, and in hospital B, the state of records management appears good, it may not automatically mean officials in hospital A are not skilled and competent or are not provided with adequate resources. The reality might be either or both. Therefore, quantitative methods become more reliable with clarity or augmentation from qualitative methods to make clear conclusions and reliable recommendations.

The researcher also learnt that there is a lot of confusion and contradiction about what can be considered a multi-method and what one may refer to as mixed-method research. It is still confusing when talking about single methods, mixed-methods and multi-methods, whether researcher talk to that looking at the data collection instruments or questions contained in the instruments because any instrument can be used to collect any kind of data, be it questionnaire, interview, observation, content analysis, to name only few. Or are they referring to the method of analysis – because during data analysis, whether data was collected in a qualitative form, may still be quantified and comparable. It is always possible to quantify qualitative data but very difficult, if it is possible, to convert quantitative data to qualitative data. Some researchers are of the opinion that explaining quantitative data illustrated in graphs and tables, makes it qualitative. The researcher does not agree with this notion because it is a presentation of data collected; one could say, an interpretation, which cannot be labelled as data. It is a presentation of the researcher's understanding of the data collected and not data expressed in a qualitative form. For instance, questionnaires are popularly used for quantitative data collection simply because in quantitative study sample is more instantly very high to ensure that findings are possible to generalise but that does not mean it may not be used to collect qualitative data. The researcher may formulate explanatory

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open-ended questions for participants to fully express themselves. Interview, observation and content analysis are also popularly used when collecting qualitative data; however, it does not prevent the researcher from using these tools for collecting quantitative data. It depends on the design of the tool and the type of data to be collect. For instance, one may use a checklist for ticking interview responses or situations being observed or discovered in the content analysis such as system or documents analysis, which may eventually be quantified and interpreted. Therefore, to augment or clarify statistical data, one needs to include the 'how?', 'why?, 'when?' 'who?' and 'what?' questions. This may assist in validating the quantitative report, and will assist the researcher in providing appropriate recommendations that are reliable, trustworthy and not misleading. This will also give the researcher confidence in terms of his/her findings and report.

The key lesson learnt in this study is that in scientific research method, quantitative method alone may be used. However, it may be difficult to rely on it or trust the findings and interpretations because it will always leave the reader with many unanswered questions that need further research to be answered. Therefore, quantitative researchers always flush back to augment with a bit of qualitative data on the process of their study or in the middle of their study. Some studies state that a multi-method may comprise a combination of various quantitative methods, and therefore, one would be sceptical about the value added to the study because it will be a mixture of statistics. It is like asking one deaf-mute person to assist the other. This would not be possible because together they cannot hear or talk; rather ask someone with the ability to hear and talk to assist. Generally, it is very difficult to purely and independently apply quantitative methods, without the addition or support of some limited amount of qualitative data.

FURTHER RESEARCH STUDIES

Further studies may be focused on research issues such as research paradigm, and where there are still differences, confusion and frustration in the literature about what exactly the structure of paradigms in research is. Where does it start, what are the epistemologies and ontologies, what exactly is above or below the other, what comes first and what must be last, and how do these inform one another?

CONCLUSION AND RECOMMENDATIONS

Based on the lessons learnt and the literature studied throughout the research, the Chapter was able to formulate a framework that intends to guide fellow researchers on different categories of methods, which may be applied in social scientific research, and the names that may be applied to such methods. This may also serve as a benchmark for further studies in this area of study. Looking at the illustrative framework displayed in Figure 2, the framework structure is categorised into three major methods, namely: (A.) Mono-method research approaches, (B.) Multi-method research approaches, and (C.) mixed-method research approaches. The framework also shows ingredients for research methods illustrated with colour coded arrows; this shows the mixture of ingredients for each method. The ingredients listed in the framework are also colour coded as follows: full qualitative method, partial qualitative method, full quantitative method and partial quantitative method. The research methods A, B and C in the framework can be described based on the ingredients on the right as follows:

Mono-Method Research Approaches

Mono-method research in this study refers to either *qualitative method* or *quantitative method* that is applied in the social science research independently without data augmentation from any other method. This is the kind of research method that is applied independently without any support from any other method. For example, the researcher may choose to utilise only qualitative interview data collection instruments with all open-ended questions. Data may eventually be analysed, interpreted and discussed without any augmentation of data from any other method. This may be highly possible with qualitative method, but it may always be difficult should it be possible with the full quantitative method. This is because numbers or figures will always remain numbers until the researcher express interpretations, and the interpretation may not always be truthful. Interpretation without some support or confirmation from qualitative data in quantitative study, may at most, remain predictions that may be incorrect at times.

Figure 2. A framework illustrating a typical research method based on methods ingredients
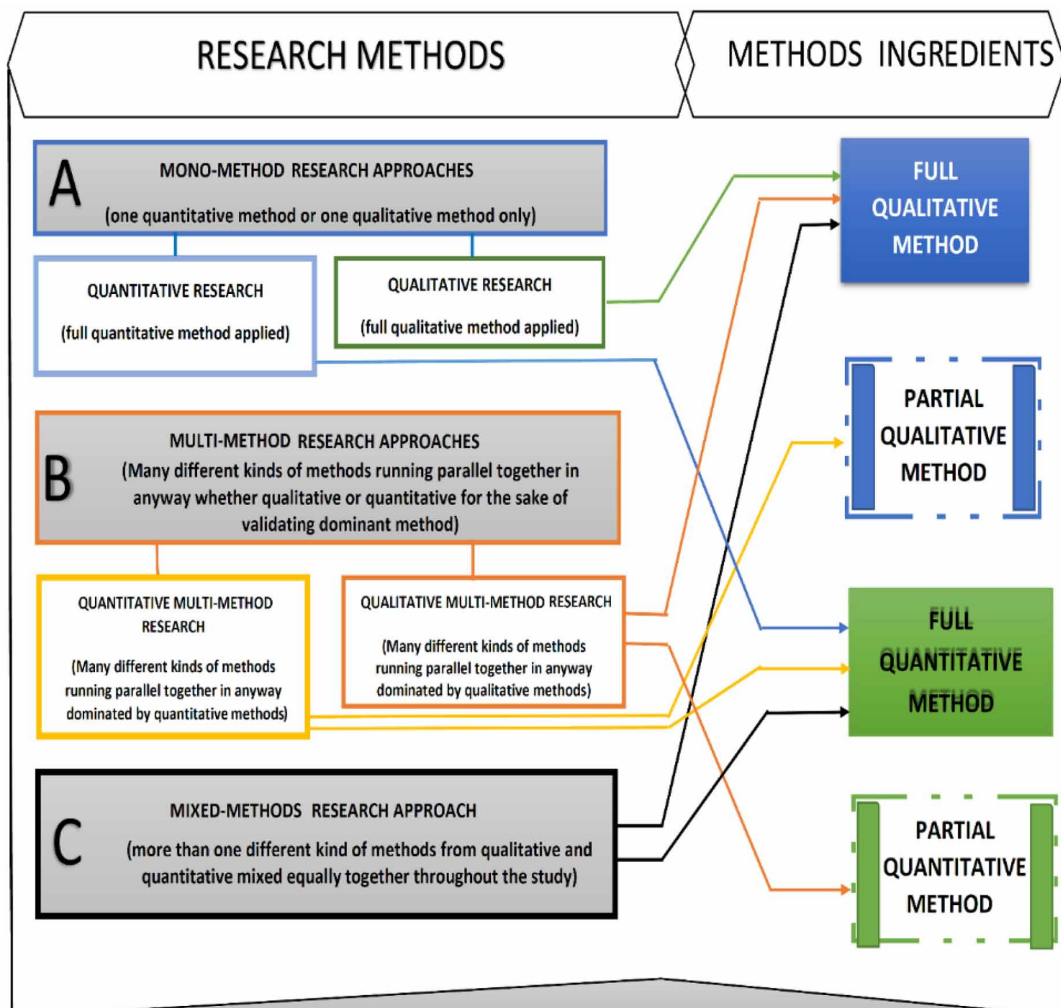
Multi-Method Research Approaches

The multi-method research approach refers to research where either a qualitative or quantitative method is fully applied in the study but with the partial augmentation from other methods. For example, a quantitative questionnaire with closed-ended questions or leading questions may be fully applied, but partially augmented with open-ended questions interview, observation or documents analysis methods. Similarly, full open-ended questions interviews may be partially augmented with closed-ended questionnaire. This may be applied with the use of different kinds of methods. This implies that a multi-method research approach may be applied in two different categories, which are the *quantitative multi-method approach* and *qualitative multi-method approach*, depending on which method dominates the research process.

Mixed-Method Research Approach

There is a lot of confusion, contradiction and frustration in the literature about what a mixed-method is, and what can be referred to as a multi-method research. The mixed-method research entails an equal mixture of more than one different method, which is quantitative and qualitative in form. For instance, a fully open-ended questions qualitative interview method mixed with a fully closed-ended questions quantitative questionnaire method, warrants a mixed-method research approach. Unlike the multi-method research approach, where the methods do not have to carry the same weight, in a mixed-method approach, the methods are opposite and carry the same amount of weight from the beginning. This means in a mixed-method approach, both methods are planned together from the onset, unlike the multi-method, where some gaps may be realised during the study and another method is initiated to close such gaps. Therefore, the mixed-method research approach is impossible to categorise into more than one approach, because it remains neutral by balancing both the qualitative and quantitative methods. Hence, it remains a mixed-method research approach and will never be divided into a quantitative mixed-method or qualitative mixed-method approach.

It is therefore hoped that this framework will assist social science researchers in clearing up confusion about what the research methods entails. It is also believed that there are still a lot of issues that need to be clarified in scientific research. This Chapter specifically focused on the categorisation of mono, multi and mixed social research methods. In some instances, a multi-method may not always mean the methods are mixed. It may be that methods may be applied together with the data collected and presented parallel and separately, and finally integrated during analysis for interpretation, discussion, summary, conclusion and recommendation.

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ENDNOTE

[1.] The key purpose of this chapter is to present the lesson learnt in the application of multimethod research from the author's PhD research project completed in 2016, supervised by Prof Patrick Ngulube and Prof Mpho Ngoepe as promoter and co-promoter respectively. In other words, information presented in this chapter was partially extracted from the study.

Chapter 22

The Movement of Mixed Methods Research and the Role of Information Science Professionals

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ABSTRACT

Mixed methods research integrates qualitative and quantitative research approaches in many or all phases of a study to comprehensively address a research problem by collecting quantitative and qualitative data concurrently or in phases with the aim to maximizing their inherent advantages while minimizing their disadvantages. Many disciplines are embracing mixed methods research. Library and information science research is lagging behind in the adoption and use of mixed methods research. That might be due to limited access to the literature on the subject or difficulties in dealing with the relative lack of consistency and incomplete coherence among mixed methods researchers. This chapter traces the common characteristics and designs of mixed methods research, its growth, and application in research. It provides a framework to design, execute, and evaluate mixed methods research studies so that library and information science researchers and researchers from other fields may play a role in its development and application.

INTRODUCTION AND BACKGROUND

Mixed methods research is gaining popularity as a result of its potential to investigate complex problems and provide a relatively comprehensive picture in instances where a single research method is unable to address the phenomenon. Consequently, many disciplines, including education, library and information science, management, health sciences, psychology and sport management are embracing it (Molina-Azorin & Fetters, 2016; Ngulube, 2013, 2016; Ngulube & Ngulube, 2015). Mixed methods research is

suited for complex research problems comprising many components, or people and contextual factors that cannot be fully addressed by using one methodology. Mertens (2015) throws wicked problems such as "climate change, terrorism and conflict, social inequities, healthcare, educational access, and poverty" (p. 3) into the mix. Wicked problems are "replete with social and institutional uncertainties" and cannot be resolved by traditional research processes (Mertens, 2015, p. 3). Mixed method approaches can address wicked problems because of its capability to bring together diverse researchers and groups, and give them a common language to use in their investigation (Gomez, 2014).

Mixed methods research also "offers opportunities for innovation and multiple perspectives and insights to a phenomenon" (Cameron, 2013, p. 51), and provides "a way to work efficiently with the nuances of present-day research" (Morse, 2010, p. 340). It is recognised as a "third methodological movement" (Tashakkori & Teddlie, 2010a, p. ix) along with quantitative and qualitative methodologies. In a nutshell, mixed methods research contributes to building a better world as it is envisaged in the 17 Sustainable Development Goals (SDGs) of the United Nations as it offers the potential for a complete methodological toolkit for researchers, integrates expertise from across diverse research methodologists, engages stakeholders and involve them in creating knowledge, produces evidence that resonates, and helps researchers to evaluate, demonstrate and disseminate the impacts of their research (Molina-Azorin & Fetters, 2019). However, "the developing world is not highly visible in publications regarding or involving mixed methods" (Tashakkori & Teddlie, 2010b, p. 33).

Although Creswell and Tashakkori (2007a) recommend that one should read the literature that has emerged since 1979, one should aim at reading the literature after 2010 due to the nature of the evolution of mixed methods research. The assumption is that the years 2000 to 2009 were the advocacy and expansion phase in the development of mixed methods research (Creswell & Plano Clark, 2011). That implies that issues such as nomenclature and basic definitions, methodological principles sampling, data analysis and drawing inferences, and the structure of mixed methods research were consolidated after that period. According to Creswell and Plano Clark (2018), the period reflected on the controversies and issues of concern in mixed methods research, mapped mixed methods literature and presented new paradigms for mixed methods (for example, Mertens, 2007, 2015). Works published earlier than 2010 must be read with caution, although they form a basis of understanding mixed methods research.

The adoption of mixed methods research has been limited in fields such as agriculture (Akimowicza et al., 2018) education, nursing, psychology and sociology (Alise & Teddlie, 2010), economic and management sciences (Ngulube & Ngulube, 2015), knowledge management (Ngulube, 2019) and organisational science (Gibson, 2016). The problem of the researchers' uncertainty about how to "actually do mixed method research" seems to be universal (Morse, 2010, p.340). That is partly due to the existence of inconsistencies and variations within mixed methods research (Denscombe, 2008, Creamer, 2018). Some researchers think that any study that involves both qualitative and quantitative methods is mixed methods research (Morse, 2010; Romm & Ngulube, 2015). It is going to be demonstrated later that mixed methods research is more than just including a bit of qualitative data with quantitative data in one study. Furthermore, the purpose for mixing and the type of mixed methods research design used should be clearly specified. In fact, Creamer (2018) avers that viewing mixed method research as merely combining qualitative and quantitative research methods, is failing to realise the full potential of the methodology. In other words, qualitative and quantitative research methods should be combined at all stages of the research process, including formulating the problem, reviewing the literature, designing the research analysis data and drawing inferences for a study to be different from a multimethod one as discussed later.

The uptake of mixed methods research in library and information science (LIS) research has been low due to various reasons, including difficulties in conceptualising the practice of mixed methods research. The difficulties of distinguishing between multimethods and mixed methods research, and using appropriate mixed methods research approaches can partly explain why the use of mixed methods research is limited in LIS research (Fidel, 2008; Ngulube, 2010; 2013; Ngulube & Ukwoma, 2019; Ukwoma & Ngulube, 2019; Ullaha & Ameen, 2018). However, Ma (2012) pointed out that LIS is a complex field that calls for the use of mixed methods to provide a comprehensive and "richer understanding of information and information-related phenomena" (p. 1866). It was in light of the low prevalence of the utilisation of mixed methods research in LIS research, and a need to shed more light on the essence of mixed methods research and support the third methodological movement whose time has come, that this chapter was conceptualised. This chapter gives guidelines on what constitutes mixed methods research so that information science professionals may play a role in its utilisation to get a comprehensive understanding of their information science environment.

The objectives of this chapter are to do the following:

- Provide different perspectives about the definition of mixed methods research.
- Distinguish between mixed methods research, multimethod research and quasi-mixed methods research.
- Illustrate the place of mixed methods research in the methodological landscape.
- Identify the common mixed methods research approaches.
- Outline the use of theory in mixed methods research.
- Describe sampling and data analysis techniques in mixed methods research.
- Advocate for the use of mixed methods research in LIS.

The remainder of this chapter is structured as follows. The following section looks at the genesis of mixed methods research up to the time it was considered a third methodological movement. Next, the common mixed methods research approaches, use of theory in mixed methods research, sampling in mixed methods research and conducting mixed analyses are outlined. The last section presents the role that library and information professionals can play in promoting mixed methods research.

GENESIS OF MIXED METHODS RESEARCH

The use of multimethods can be traced to the notion of multitrait-multimethod matrix of psychological traits espoused by Campbell and Fiske (1959). Webb, Campbell, Schwartz and Sechrest (1966) and Denzin (1970) further developed the concept of the multitrait-multimethod matrix into triangulation. Triangulation was the forerunner of mixed methods research. Gradually, many scholars recognised that qualitative and quantitative approaches were not diametrically opposed and divergent. Scholars such as Greene, Caracelli and Graham (1989) and Creswell (1999) occupy a special place in the timeline of the development of mixed methods research resulting in it evolving ''to the point where it is a separate methodological orientation with its own worldview, vocabulary, and techniques'' (Tashakkori & Teddlie, 2003, p. x). The 1950s to 1980s were considered the formative years of mixed methods research (Creswell & Plano Clark, 2018). Mixed methods researchers should be aware of the evolutionary stages of the methodology for them to use mixed methods terminology with hindsight.

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The 1980s through the 1990s witnessed the increasing challenge to the incompatibility thesis (Creswell & Plano Clark, 2018). Ridenour and Newman (2008) stated that to consider qualitative and quantitative approaches as distinct and distinguishable in practice was a "false dichotomy" (p. 2). On one hand, Creswell (2011) explained it as "a binary distinction that doesn't hold in practice" (p. 272). Increasingly, there was a growing acceptance that the two approaches were a continuum with overlapping points. This put paid the "science wars" (Morgan, 2007, p. 56), "paradigm wars" (Alise & Teddlie, p. 103), "paradigm debates" (Teddlie & Tashakkori, 2009, p. 15), or the great quantitative-qualitative debate and the incompatibility and *purist* debate. The purists viewed the two approaches as incompatible because of the philosophical assumptions upon which they were based (Creamer, 2018; Tashakkori & Teddlie, 1998).

The admission by research methodologists that quantitative and qualitative approaches intersected at the centre of a methodological continuum led to the weakening of the incompatibility debate (Creamer, 2018). This implies that the strength of both approaches merged at the intersection, and the value-added of mixed methods emerged. The reconciliation of the interpretivist and positivist logic of inquiry constituted a paradigm shift. The paradigm shift culminated in the emergence of mixed methods as a distinct third methodological movement in the late 1980s/beginning the 1990s (Akimowicz et al., 2018; Creamer, 2018). That ushered in an epoch of the development of procedures, typologies and the application of mixed methods research in specific disciplines. This was followed by the reflection and refinement period at the turn of the 21st century.

Tashakkori and Teddlie (2010b) raised nine questions during the reflection period while Creswell and Plano Clark (2018) raised eleven questions, which are:

- The definition of mixed methods research.
- The language and designs of mixed methods research.
- Core characteristics of mixed methods research.
- The use of qualitative and quantitative nomenclature in describing the methodology.
- The appropriateness of mixing paradigms and developing an acceptable paradigm.
- The dominance of the positivism and the marginalisation of interpretivism.
- The value-added of mixed methods research.
- The analytical techniques support limited integration.
- Making sense of the findings and credibility of conclusions.
- How a researcher becomes a methodological connoisseur.
- Maintaining a "core identity" of mixed methods.

Going back to the formative years, it is clear that triangulation was the last straw that broke the camel's back (that is, paradigm war). Triangulation enhanced validity between-or-across method comparisons (Denzin, 1978). Convergent validity is produced when two or more research methods or approaches produce comparable results. Within methods, comparison is closer to multimethod studies than mixed methods research. Within methods triangulation involves, for example using an experiment and survey to seek corroboration of results from the other approach. That can also apply to a qualitative environment where a case study may be used with phenomenology as an example to enhance the trustworthiness and credibility of the findings. Across-or-between methods comparisons are close to mixed methods research because it combines methods from both qualitative and quantitative research methods.

The legitimation of mixed methods research witnessed the emergence of a number of models used to categorise the purposes of mixed methods research. Rossman and Wilson (1985) described three

purposes of combining quantitative and qualitative research between research methods. They included corroboration, elaboration and initiation. Studies conducted for the purpose of initiation provoke further exploration of the phenomenon under study. The convergence of results from different research methods is achieved through the elaboration typology. The next framework was formulated by Greene et al. (1989) after analysing mixed methods research approaches used in 50 studies. They added two designs of mixed methods studies to those of Rossman and Wilson (1985). Their purposes of mixing included triangulation, complementarity, development, initiation and expansion. Complementarity is equivalent to elaboration in the typology of Rossman and Wilson (1985). On the other hand, Bryman (2006, 2007) came up with 17 reasons for mixing. Creamer (2018) stated that seven of the rationales of mixing given by Bryman (2006, 2007) can be grouped under the labels provided by Greene et al. (1989). Ridenour and Newman (2008) identified three mixed methods designs: sequential, simultaneous, and the interactive continuum.

Despite the existence of many design types, the framework of Greene et al. (1989) has remained popular along the typology of (i) Creswell and Plano Clarke (2011), which included explanatory, exploratory, convergent, embedded and multiphase designs and (ii) Teddlie and Tashakkori (2003), comprising six types of multi-strand mixed method and mixed model studies with procedures that are concurrent, sequential and conversion (Cameron, 2013). The typology of Creswell and Plano Clarke (2011) is discussed in detail before the conclusion of the chapter. Creswell and Plano Clarke (2011) dropped triangulation from their typology. However, triangulation that was popularised by Greene, Caracelli and Graham (1989) as a mixed methods research approach or design remained in the mixed methods research discourse until 2014. Fetters and Molina-Azorin (2017) confirmed in the prestigious *Journal of Mixed Methods Research* that triangulation was not an appropriate term to describe the mixed methods research approaches. That was partly because triangulation, "has multiple meanings and lacks sufficient clarity and precision" (Fetters & Molina-Azorin, 2017, p. 7). Morgan (2019), one of the forerunners of mixed methods research, agreed that it was high time that methodologists bade farewell to triangulation as an mixed methods research approach or design.

Mixed Methods Research in the Methodological Continuum

The placement of mixed methods research in the methodological landscape is given in the interest of methodological transparency and clarifying terms used in this rather slippery landscape (Ngulube, 2019). Methodological transparency promotes replication (Creamer, 2018) and a research audit trail. The methodological framework given in figure 1 provides shorthand to understand the terms used in this chapter. Borrowing from Ngulube's (2019) design, methodologies, approaches and research techniques represent different levels of conceptualising the research procedures (with the design being at the highest level, followed by methodologies and the approaches that fall under them and then the research techniques used that fall within a given approach. These terms are not interchangeable in this chapter and their distinctions can be helpful with respect to understanding the terms used in this chapter. When using these research methodological levels, whole systems of the methodological levels should be conceptualised as part of the overarching research design. Stated differently, the design include the key elements of the research process from "identifying the purpose to conducting the analysis and conclusions" (Creamer, 2018). Following Ngulube (2019), we use the term "approach" instead of "design" to refer to common mixed typologies described by Creswell and Plano Clarke (2018) as mixed methods designs (e.g., explanatory mixed methods design).

At the highest level, the design is influenced by philosophical assumptions, that is, assumptions about knowledge, including ontology, epistemology, axiology and methodology. Creamer (2018) stated that practitioners are not as worried about philosophical assumptions as methodologists. This may partly explain why methodology is no longer considered with the other foundation assumptions such as ontology and epistemology when discussing research paradigms. Philosophical assumptions are embedded in the research paradigm conceptualised by Kuhn (1970). It is important and "almost obligatory" (Creamer, 2018, p. 41) to discuss philosophical assumptions when discussing mixed methods research.

Firstly, mixed methods research emerged from the paradigm wars that were premised on the assumptions that realism and constructivism were different and incompatible when addressing research questions. Secondly, there are a variety of philosophical assumptions that may serve as a foundation of mixed methods research. For instance, Onwuegbuzie and Combs (2011) describe pragmatism and transformative-emancipatory as one of the existing mixed methods research paradigms. Thirdly, paradigmatic foundations of mixed methods research design was one of the topical issues in development of the methodology (Tashakkori & Teddlie, 2010b). There is also debate on the suitability of pragmatism as the philosophical foundation of mixed methods research. Some scholars have criticised the philosophy as too American and irrelevant to some other contexts (Creswell & Tashakkori, 2007b).

According to Ngulube (2019), realism, constructivism and pluralism are the major ontologies on which four elements of worldviews, (i.e. post-positivism, constructivism, transformative and pragmatism) presented by Plano Clark (2018) are based. Constructionism and transformative worldviews are variants of the ontology of constructivism. The difference between the two worldviews is that the latter is rather ideological and advocates the voices of the underprivileged underrepresented groups. The epistemology of a mixed methods researcher is pragmatism, although other authors such as Onwuegbuzie and Combs (2011) and Mertens (2007, 2015) stated that it was the transformative one. Pragmatism is best suited for the methodology (Ivankova, 2015; Tashakkori & Teddlie, 2003). Morgan (2007) confirms that position. The pragmatic stance distinguishes mixed methods research from traditional quantitative and qualitative methodologies. The pragmatic stance has distinctive ideas and practices that set it apart from positivism and interpretivism. Pragmatism put an end to paradigm wars and the incompatibility thesis, thus rendering the "quantitative versus qualitative" dichotomy redundant. It made research methodologists to realise that research methodologies operated in a research continuum rather than in distinctive compartments even if their characteristics differed. The development from the confrontational stance among the methodologies to a position of comprise is discussed in the next section.

In line with Figure 1, a mixed methods researcher needs to decide on the appropriateness of mixing and a specific mixed methods research once the philosophical assumptions have been established. All the research methods choices would be based on ethical considerations discussed in the other chapters.

Mixed Methods-Multimethods Debate

Mixed methods research emerged from the 1990s onwards and established itself as a third methodology along qualitative and quantitative methodologies (Denscombe, 2008). Although mixed methods research is gaining currency, there is no unanimity in the mixed methods research community as to what term to use to describe it; for instance, mixed methods research has been variously referred to as multimethod research, multiple methods, mixed methodology, blended research and mixed research (Tashakkori & Teddlie, 2010). The term multimethod "has been largely discarded in mixed methods research" (Tashak-

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Figure 1. Mixed methods research in the methodological landscape
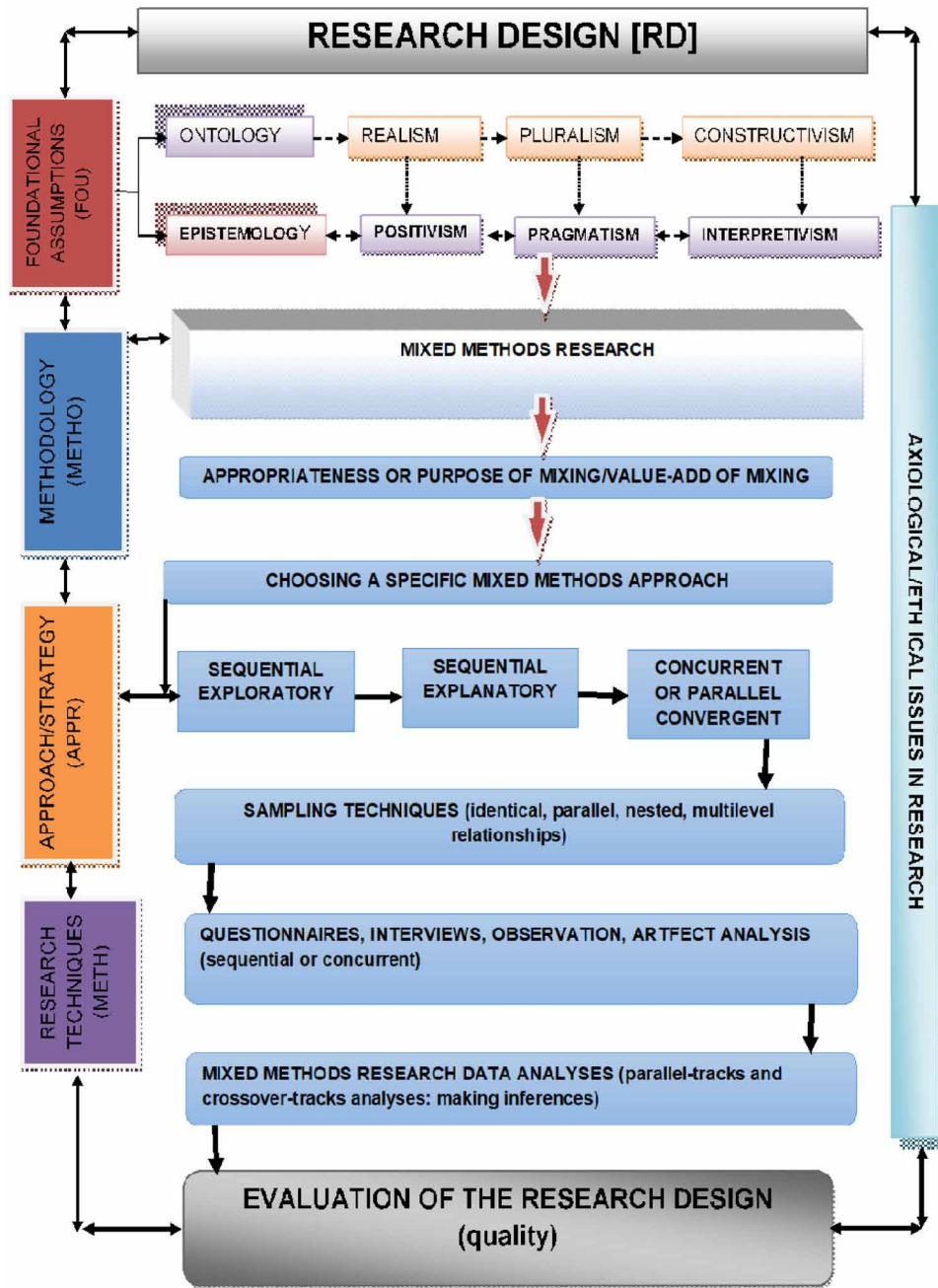
kori & Teddlie, 2010b, p. 21) as it has been superseded by approaches that recognise the paramountcy of the integration across the entire research process.

According to Creswell (2016b) and Creamer (2018), the difference between mixed methods research and multimethods research must be preserved because they are different. Indeed, there is a difference between mixed methods and multimethods. Multimethod research is the use of more than one method

involving multiple qualitative or multiple quantitative methods, or qualitative and quantitative methods in combination. Mixed methods research involves more than simply collecting two types of data. Studies that merely collect qualitative data without integrating the two databases from the qualitative and quantitative strands have been referred to as "eternally parallel" studies (Creamer, 2018, p. 18). Integration is the central characteristic of mixed methods research and it is a "distinguishing factor that separates mixed methods from all other methodologies" (Creswell, 2016b, p. 218). However, "while there seems to be strong agreement that some form of mixing is mandatory to meet any minimal definition, there is still a pull and tug of what this should look like and the strategies that can be used to execute it" (Creamer, 2018, p. 18).

Therefore, mixed methods research is a "distinct methodology, beyond the mere inclusion of both quantitative and qualitative methods in a study" (Mertens et al., 2016a, p. 2). The study should include and integrate a deductive and an inductive element in many phases of the research process for it to be considered to be mixed methods research. Creamer (2018) and Small (2011) distinguish between methods and methodology. The two authors warn researchers against falling into the trap of using the term method to distinguish qualitative and quantitative research because they are more than just a method.

Distinguishing between mixed methods or multimethods and mixed methods research is helpful for researchers initiating their first mixed methods study. Tashakkori and Teddlie (1998) suggested that the term Mixed Methodology was more appropriate than mixed methods. Precision and consistency in the use of terms is essential for an emerging field such as mixed methods research.

However, Creswell (2016b) warned that there should be flexibility in the use of terms as long as the distinction between the multimethods and mixed methods is made clear. It is important to not become rigid in the conceptualisation of mixed methods because: ''having the term not cast in stone is intellectually useful and allows for reshaping understandings'' (Guba, 1990, p. 17). While it is important to determine the taxonomy of the research design that the researcher uses for planning and conducting a study as advocated by many scholars, (for example, Creswell & Plano Clark, 2007, 2018), it may suffice to focus on a certain perspective and use it to justify the use of mixed methods research. It is important that researchers are clear about the perspective they are using right from the start of the conceptualisation of the study. The purpose of mixing and the approach or design used should equally be articulated and matched with.

Ultimately, the value-added of mixed methods research must be clearly stated as it relates to the study and the mixed methods research perspective of choice. Explicitly identifying the valued-added of mixed methods research contributes to methodological transparency (Creamer, 2018). In other words, researcher should clearly outline the insight gained by using mixed methods research at the end of the study. For instance, Xiao (2019) used a sequential explanatory mixed methods research approach in a study of the ways in which digital divides articulate status and power in China because neither a quantitative nor qualitative methods alone was going to provide "a satisfying picture of students' digital lives across such geographically, culturally, and socioeconomically diverse groups of students" (p. 5).

Perspectives and Definitions of Mixed Methods Research

The definition and conceptualisation of mixed methods research is fraught with controversies and contestations. Different definitions have been proffered, providing the answer to the question as to "what is exactly mixed" has remained elusive (Creamer, 2018, p. xix). It is evident from Table 1 that the perspectives on the definition of mixed methods research have continued to develop since it emerged as a third

methodological movement in the 1980s. That is partly due to differing perspectives on mixed methods research. These perspectives may disappear as the field matures.

Creswell and Tashakkori (2007b) identified four perspectives used by scholars when writing and discussing mixed methods research. They include the method perspective which emphases on the process and results of utilising both quantitative and qualitative methods and types of data. This perspective is close to methodological triangulation discussed in the previous section. The focus of this perspective is on the development and use of strategies for collecting, analysing and interpreting various types of qualitative and quantitative data. The foundational assumptions of research are not brought to bear in this perspective. The sole use of two types of data, or two data collection methods does not make these studies fully mixed methods research inquiries. Teddlie and Tashakkori (2009) described such studies as "quasi-mixed".

The methodology perspective views mixed methods research as a distinct and separate methodology that incorporates all phases of the research process including research questions, foundational assumptions, approaches, methods, ethics and conclusions. Several mixed methods research scholars advocate this perspective. It is the agenda of this perspective that should be put on the table if mixed methods research is indeed a third methodological movement on par with qualitative and quantitative methodologies. Tashakkori and Teddlie (2003) stated that mixed methods research is "a distinct third methodological movement" (p. 24), implying that the methodology goes beyond the use of qualitative and quantitative methods without the integration of the qualitative and quantitative datasets.

The paradigm perspective views several worldviews, or an overarching worldview as providing a philosophical foundation of mixed methods research. Morgan (2007), one of the proponents of this perspective, pointed out that pragmatism is the philosophical foundation of mixed methods research. Some other paradigm perspectives such as the transformative perspective with social justice ends (Mertens, 2007) have emerged owing to the fact that pragmatism is viewed as an American perspective with limited bearing on worldviews in other parts of the world. Creswell and Tashakkori (2007b) were surprised that the question of the use of paradigms was an issue. The question of paradigms should not be an issue because the worldviews may change during a study. For instance, in a sequential exploratory study, which we are going to discuss later, research moves from an interpretivist perspective to a positivist epistemology. Multiple perspectives are the foundation of mixed methods research.

Finally, in the practice perspective, mixed methods research is viewed as a set of procedures used in the conduct research. This perspective follows a "bottom up" style (Creswell & Tashakkori, 2007b). Researchers embrace new methodological approaches as they conduct their studies. They take a pragmatic approach to use what works.

It is apparent that various perspectives of mixed methods research address mixing at certain stages of the research study and others consider mixed methods research as a holistic perspective that integrates the qualitative and quantitative approaches throughout the research process, namely planning and design, data collection, sampling and analysis and drawing inferences (Creamer, 2018; Teddlie & Tashakkori, 2009). Researchers should guard against adopting a perspective that may limit the full potential of mixed methods research. Some perspectives may fail to give a holistic and comprehensive picture of the phenomenon under study at all stages of the research process. Whatever perspective the researcher uses, it is important to clearly state and reflect about the contribution of the qualitative and quantitative aspect to the study and why it was important to use both aspects. Researchers should familiarise themselves with the key methodological literature from the early adoption of mixed methods research to the recent times to ensure that they do not have conceptual problems in its application and how it has developed.

Table 1 illustrates the conceptualisation and definition of mixed methods research from various perspectives since the 1980s. Some of the definitions in Table 1 seem to be taking us back to the period of multimethods. They either sidestep the issues of paradigm or methodological strands. Consequently, Creswell (2016b) has some misgivings about the definition given by Mertens et al. (2016a), which includes the term "method". We agree with Creswell (2016b) as illustrated in the discussion of multimethods research and mixed methods research in the preceding paragraphs. There is a distinction between multimethods and mixed methods research. Although Mertens and colleagues (2016a, p. 4) advocate the use of "mixed methods" as the generic term for both multimethods research and mixed methods research with differing definitions depending on the context in which it is applied, it is clear that the level of mixing in the former is elementary than in the latter where integration takes the centre stage and occurring across many phases of the research process.

The more the studies integrate qualitative and quantitative approaches across the phases of the research process, the more the study may be regarded as mixed methods research rather than multimethod research (Yin, 2006). The study is likely to be multimethods rather than mixed methods research if the analytical strategy is not both deductive and inductive. At the end of the day mixed methods research studies should include a deductive (general to the specific) and inductive (specific to general) components. These are the minimum elements of a mixed methods research study (Creamer, 2018). The approach to data analysis should also exhibit these elements.

According to Creswell and Plano Clark (2011), mixing should occur in at least one phase. Creamer (2018) considered the way that Creswell and Plano Clark (2011) described integration as quite conservative (p. xix). On the other hand, Greene (2007) posits that mixing the qualitative and quantitative strands should occur at all stages of the research process. This view resonates with the position adopted by Teddlie and Tashakkori (2009). In agreement, Creamer (2018) emphasised the fully integrated mixed methods that involve the mixing of both the qualitative and quantitative strands throughout all the stages of the research project. Creamer (2018) cites the study of Durksen and Klassen (2012) as a good example of a fully integrated mixed methods research study. The reader is referred to the study as an illustrative example.

Despite the seemingly differing aspects of the definitions of mixed methods research among scholars, there is a consensus on core elements of a definition of mixed methods research (Creamer, 2018). There is agreement on the centrality of mixing or integration as a distinguishing factor of mixed methods research (Creswell, 2016b, p. 218) and the assumption that it is both a method and a methodology (Creamer, 2018; Creswell, 2016b). Notwithstanding that mixed methods research is still evolving, it is a methodological orientation "with its own worldviews, vocabulary, and techniques" (Tashakkori & Teddlie, 2003, p. x).

It is tempting to accept certain variants and imitations of mixed methods, but there is need to be cognizant of how mixed methods research has developed to be recognised as a third methodological wave in the development of the scientific method. There is nothing wrong with accommodating other variants of mixed methods, but the core characteristic of mixed methods research should always be maintained in the research process (see, Creswell, 2015; Creswell & Plano Clark, 2018). Following Creswell and Plano Clark (2018), figure 2 outlines five major features of mixed methods research practice.

Other mixed methods should exhibit these core characteristics to guard against going back to using mixed methods procedures, which were prevalent during the formative years of mixed methods research.

Table 1. Conceptualising mixed methods research

Definition	Mixed methods research perspective
Mixed methods involves combining or integration of qualitative and quantitative research and data in a research study (Creswell, 2014, p. 14).	Methods, methodology
Mixed methods designs are those that include at least one quantitative method (designed to collect numbers) and one qualitative method (designed to collect words), where neither type of method is inherently linked to any particular inquiry paradigm (Greene, Caracelli & Graham, 1989, p. 256).	Methods
Mixed methods designs combine qualitative and quantitative research methods in one study to address research questions (Moule, 2018, p. 79).	Methods
Mixed method includes the use of more than one method of collection, analysis, interpretation and reporting of data; it is a mix between the qualitative and quantitative approaches (Wiid & Diggines, 2015, p. 65).	Methods, methodology
Mixed methods is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis and the mixing of qualitative and quantitative approaches in many phases of the research project. As a method, it focuses on collecting, analysing, and mixing both qualitative and quantitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches, in combination, provides a better understanding of research problems than either approach alone (Creswell & Plano Clark, 2007, p. 5).	Methods, methodology, paradigm
Mixed methods research is an intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological paradigm (along with quantitative and qualitative research) (Johnson, Onwuegbuzie & Turner, 2007, p. 129).	Methodology, paradigm
A mixed methods way of thinking is an orientation toward social inquiry that actively invites us to participate in dialogue about multiple ways of seeing and hearing, multiple ways of making sense of the social world, and multiple standpoints on what is important and to be valued and cherished (Greene, 2008, p. 20).	Paradigm, practice
The term mixed methods has developed currency as an umbrella term applying to almost any situation where more than one methodological approach is used in combination with another, usually, but not essentially, involving a combination of at least some elements drawn from each of qualitative and quantitative approaches to research (Bazeley, 2008, p. 133).	Methodology
Mixed methods research is the type of research in which the researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (Johnson, Onwuegbuzie & Turner, 2007, p. 123).	Methodology
A fully integrated mixed methods research is "an approach to mixed methods research where there is the intention to mix or integrate the qualitative and quantitative strands of study throughout each of the stages or phases of the research process" (Creamer, 2018, p. 12).	Methodology
A mixed methods research design is a procedure for mixing both methodologies in a single study to obtain evidence needed to provide a deep understanding of the research problem (Baran, 2016, p. 67).	Methodology
Mixed methods combine qualitative and quantitative approaches in the methodology of a study (such as in the data collection stage), while mixed models studies combine these two approaches across all phase of the research process (such as conceptualization, data collection, data analysis and inference) (Tashakkori & Teddlie, 1998, p. ix-x).	Methodology
Mixed methods research is "practical" in the sense that the researcher is free to use all methods possible to address a research problem. It is also "practical" because individuals tend to solve problems using both numbers and words, they combine inductive and deductive thinking, and they (e.g., therapists) employ skills in observing people as well as recording behaviour (Creswell & Plano Clark, 2007, p. 10).	Practice
Mixed methods is the use of more than one method, methodology, approach, theoretical or paradigmatic framework and integration of results from those different components (Mertens et al., 2016a, p. 2).	Practice, method, methodology, paradigm
Mixed methods research is an intellectual and practical synthesis based on qualitative and quantitative research; it is the third methodological or research paradigm (along with quantitative and qualitative research) (Akimowicza et al., 2018, p. 162)	Practice, methodology, paradigm

Figure 2. Five major features of mixed methods research practice
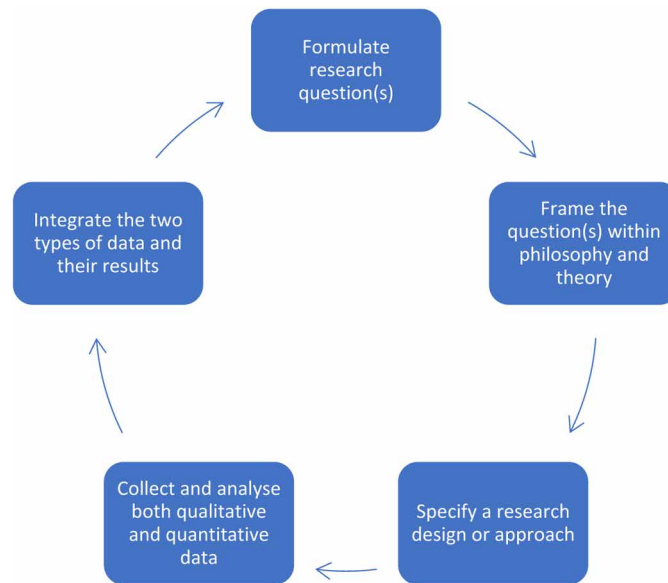
Rationale for Using Mixed Methods Research in a Study

Mixed methods research is not essentially superior to research that rely on a single methodology. The major advantage of mixed methods research is that it can answer the questions that other methodologies cannot (Teddlie & Tashakkori, 2003). Mixed methods research becomes useful when it best addresses the purpose for conducting the study or the research question(s) (Mertens et al., 2016a).

The research question is central to the research process and determines the specific methodology used to investigate reality. That partly explains why Tashakkori and Teddlie (1998) write about the "dictatorship of the research question" (p. 20). Research questions are the driving force for mixed methods research (Plano Clark & Badiee, 2010, p. 278). The question of how a mixed methods research question should be formulated remains unresolved (Tashakkori & Teddlie, 2010b), and so is its components and attributes. The purpose of a mixed methods study should indicate the need for and use of both quantitative and qualitative methods (Teddlie & Tashakkori, 2009). The researcher should have both exploratory and confirmatory questions. At least all mixed methods research studies include at least two questions – one qualitative, one quantitative (Teddlie & Tashakkori, 2009).

However, Mertens et al. (2016a) posit that research questions do not have to be mixed methods research from the onset because research questions do not always determine the research methods. This argument can be contested on the fact that research questions are derived from and extend a study's purpose (Ridenour & Newman, 2008). Admittedly, research questions may emerge from the results and interpretation of the findings. In sequential designs, subsequent phases are informed by the results (Teddlie & Tashakkori, 2009). Furthermore, unexpected or anomalous results may also lead to sequential designs. Research questions may shape and may be shaped by methods in this instance. However, it is logical that there will always be a research question to define and guide a study, although other questions may arise depending on the research design. In fact, "if you do not know what you want to know, you will not know how to find it out" (O'Leary, 2018, p.14).

When claiming to use mixed methods research, the key is to give a rationale or justification for why mixed methods research is more appropriate than qualitative or quantitative methodologies in addressing the phenomenon under study and the research problem (Creamer, 2018; Creswell & Plano Clark, 2018; Romm & Ngulube, 2015). Problems suited for mixed methods include those in which a single data source does not give sufficient answers. The mixed methods research community has suggested problems that may require mixed methods research (Bryman, 2006; Creamer, 2018), but Creswell and Plano Clark (2018, p. 8) have described the following as the major reasons:

1. A need to investigate a problem from more than one perspective to obtain more comprehensive and corroborated results.
2. A need to explain quantitative results.
3. A need to explore before developing an instrument.
4. A need to enhance an experimental study with a qualitative method.
5. A need to describe and compare different type of cases.
6. A need to involve participants, especially for the purpose of bringing change in their life.
7. A need to develop, implement and evaluate a programme.

Although many topics can be researched by using mixed methods research, there are instances where it might not be the suitable for a study. For example, instances where there is no match with the purpose of the study and the research questions calls for researchers to seriously reflect on the suitability of mixed methods research rather than forcing it into the project through the back door. Mixed methods research is not suitable for projects with a narrow focus, including confirmatory studies. Time and resource constraints should be considered before adopting a mixed methods research approach. Collecting and analysing both qualitative and quantitative data needs time, sufficient resources and expertise. Mixed methods research should be used with caution when a researcher is working alone as the quantitative and qualitative analytical expertise might pose some difficulties (Creamer, 2018; Creswell & Plano Clark, 2018; Romm & Ngulube, 2015).

COMMON MIXED METHODS RESEARCH APPROACHES

The study's goal, research objectives and research purpose are followed by choosing the appropriate mixed methods research design or approach. Design and approach are used interchangeably though the preferred term is approach as illustrated in figure 1. That was done to accommodate Creswell and Plano Clark (2018) who influenced the thinking behind this section. As demonstrated in the previous sections, there are a number of mixed methods research designs, or approaches, or strategies articulated in the literature. There have been numerous attempts to develop a framework for mixed methods research designs (Nastasi, Hitchcock & Brown, 2010). For instance, Tashakkori and Teddlie (2003) in their book alone described more than 30 mixed methods research designs. A lot of literature has been devoted to the conceptualisation of mixed methods research design typologies (Creamer. 2018; Creswell, 2015; Hesse-Biber & Johnson, 2015; Leech & Onwuegbuzie, 2009; Tashakkori & Teddlie, 1998, 2010b; Teddlie & Tashakkori, 2009).

Time orientation is the major distinguishing characteristic of mixed methods research designs. The designs may be executed concurrently, (i.e., the qualitative and quantitative strands are conducted ap-

proximately at the same time), or sequentially (i.e., the qualitative and quantitative phases of the study occur one after the other). Phases of the study that are conducted concurrently are independent of each other, while sequential ones are dependent on one another. The timing of the phases largely depends on the purpose of mixing.

Over time, Creswell and Plano Clark (2007; 2018) simplified researchers' design choices by developing the following typologies: sequential exploratory, sequential explanatory and concurrent or parallel convergent. These have been described as basic simple designs, while complex (Ivankova & Kawamura, 2010) or advanced (Creswell, 2015) designs include intervention, social justice and multistage evaluation designs. Creswell and Plano Clark (2018) pointed out that convergent, explanatory and exploratory designs are the core mixed methods designs. These are the signature designs that are emerging, and "at the heart of a mixed methods study" (Creswell & Plano Clark, 2018, p. 60). The advanced designs use the simple designs as their foundation. The choice of these core designs when conducting research largely depends on the research problem and the purpose of mixing. The complex design are beyond the scope of this chapter due to space limitations. Secondly, it is assumed that one has to master basic designs before thinking of employing complex designs.

Exploratory Sequential Mixed Methods Research Approach

This design is equivalent to the *initiation, development and complementarity designs* in the typology described by Greene et al. (1989). Each of these designs are used for instrument development and identifying a sample for data collection in the subsequent phases of the study. The categories developed during the qualitative phase are used as variables in the quantitative survey instrument. The aim will be to partly generalise the qualitative results to a larger population or to gauge the prevalence of the variables for a larger population or different groups. The design may also generate and test a theory or hypothesis. Data is collected sequentially, starting with qualitative data (this phase may be used to develop data collection tools) followed by a quantitative study (collect quantitative data in a typical survey). Participants for the two phases should be different. Nested and parallel relationship samples described in the next sections are best suited for this approach.

Therefore, the exploratory approach is appropriate when the research problem is qualitatively oriented, the researcher needs to develop a product "e.g., instrument, intervention materials, or a digital tool)" (Creswell & Plano Clark, 2018, p. 86) that is contextually relevant, the interest is in the "transferability and generazability" of a newly developed product, and the researcher has time and resources to conduct the research (Creswell & Plano Clark, 2018, p. 86). The difficulties in using the explanatory approach include time needed to complete the two phases, the need to tentatively specify in advance the quantitative phase, identifying the samples, determining what qualitative results to use, and requisite skills (Creswell & Plano Clark, 2018). Theory may be developed by using the before theory development placement strategy suggested by Alavi et al. (2018). The strategy has the following three levels and corresponding tasks: (a) developing concept(s), (b) developing statement(s) and (c) developing theory.

Example of an Exploratory Sequential Mixed Methods Research Approach

An example of a study that used exploratory sequential mixed methods research is that of Jayasundara and Ngulube (2010). In the exploratory stage, attributes and domain identification of service quality was

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carried out with a sample of 62 informants. Based upon the exploratory study, four provisional models were constructed and tested in the main study, using a sample of 1 840 respondents.

Explanatory Sequential Mixed Methods Research Approach

This design is equivalent to the *development and expansion designs* in the typology described by Greene et al. (1989). It is also known as sequential triangulation (Morse, 1991) and the iteration design (Greene, 2007). Sequential and quantitative data is collected first and qualitative data is then collected to explain the quantitative findings (follow-up with interviews to help explain, for instance, any deviations from the norm (e.g., outliers), significant or non-significant results). Surprisingly, quantitative results may necessitate an explanation by using qualitative methods. The qualitative phase follows from the quantitative results. The identical and nested relationship sampling described in the next sections is recommended for the explanatory mixed methods research design.

The purpose of the explanatory approach is to use qualitative results from a qualitative phase of a study to explain initial quantitative findings from the quantitative strand of a study. The problem, which is investigated by using the explanatory approach, should be quantitatively oriented, the important variables should be known and the researcher should have resources, including time, to conduct the research in two phases. While the explanatory approach is relatively straightforward, the challenges in using it include the extended time required for completion, that the qualitative phase cannot be fully specified in advance, the need to identify the quantitative results to follow up on and specify the sample that can best provide the explanation (Creswell & Plano Clark, 2018). Theory may be tested and developed in this approach in the first and second phases respectively.

Examples of an Explanatory Mixed Methods Research Approach

Wakeling et al. (2018) used a sequential mixed methods explanatory approach consisting of two phases. An online survey was distributed to interlending librarians and senior managers for the quantitative phase of the study and interviews with key stakeholders. The rationale of using a mixed methods research approach was not explained in both of the case studies. Wakeling et al. (2018) stated that the interview phase was aimed to generate detailed comments about the phenomenon. The question is: Why did they prefer mixed methods research to multimethods as multimethods could have generated detailed comments as well? Ngulube (2013) used a sequential explanatory mixed methods research approach to explore how researchers for LIS journals in sub-Saharan Africa (SSA) blended both qualitative and quantitative methods into their research. Content analysis was used to quantify (i.e., assigning numerical values to textual data) and to establish the patterns in the use of mixed methods. That was followed by a qualitative phase that used semi-structured telephonic interviews to collect data. The qualitative phase was initiated because the quantitative strand was not able to provide any reasons for the patterns in the research trends identified in the first phase. In other words, the statistical trends patterns in the data was explained by qualitative means. Content analysis is adaptable to a mixed methods approach and novice researchers are encouraged to use it (Creamer, 2018).

Convergent Mixed Methods Research Approach

The purpose of the approach is to "obtain different but complimentary data on the same topic" (Morse, 1991, p. 122). This design superseded the triangulation mixed methods research approach. The approach was earlier on referred to as the concurrent or parallel design (Creswell & Plano Clark, 2018). Sometimes it also called concurrent triangulation design or convergent parallel design. Data is collected concurrently and it cannot be collected sequentially to avoid possibly biasing any comparisons (Onwuegbuzie & Collins, 2007). Complementary qualitative and quantitative data is collected concurrently to have a deeper understanding of the phenomenon and for the purpose of validation, that is, (convergence or corroboration and divergence). Quantitative findings can be illustrated with qualitative results (or vice versa) by using the convergent approach. The two samples used for data collection can include the same or different individuals (Creswell & Plano Clark, 2018). All the four categories of sampling (i.e., nested, parallel, identical and multilevel relationships) discussed later, apply in the selection of the samples.

Ideally the qualitative and quantitative data must be analysed independently. However, difficulties may arise when trying to analyse data completely independently of each of the data types due to overleaping research objectives and other factors (Johnson & Gray, 2010). The solution is provided by crossover-tracks analysis that entails intertwining the qualitative and quantitative components of the data (Hatta et al., 2018). Ultimately, in the end the results should be merged and compared to bring out the weaknesses and strengths of quantitative and qualitative data. Researchers should be cognisant of difficulties in dealing with sample sizes, merging text and numerical data, and explaining divergence when comparing findings (Creswell & Plano Clark, 2018). Generally, theory is tested in this mixed methods research approach.

Example of a Convergent Mixed Methods Research Approach

Munyoro and Onyancha (2018) stated that they used the convergent mixed methods approach without describing the timing of data collection. The reader is left to infer from the data collection processes. When choosing mixed methods design typologies, it is important to show why, what, how and where the mixing was done. That is the case because integration is the hallmark of mixed methods research studies. A typical example in the information science environment where the convergent mixed method approach can be used to get a more complete understanding of a phenomenon, is when the researcher surveys the visually impaired users of their perceptions of the services they get from public libraries and also conducts focus group interviews on the same topic with the visually impaired users.

USE OF THEORY IN MIXED METHODS RESEARCH

Theory is one of the major pillars of research. The utility of theory in any research is well recognised (Ngulube, 2018). There is a need first to distinguish a theory from a worldview or paradigm. Unlike Henning, Van Rensburg and Smit (2004), Ngulube (2018) distinguishes between paradigms and theory. Paradigms are meta-theories and they operate on a broader perspective than theories. The misconception of terms related to theory is also evident in the use of conceptual and theoretical frameworks. The use of theory in quantitative and qualitative research in LIS is well-documented (Bates, 2005; Ngulube, 2018; Sonnenwald, 2016). On the whole, qualitative studies are theory driven as they test or verify theories rather than developing them (Ngulube, Mathipa & Gumbo, 2015). On the other hand, theories are used for the

preliminary understanding of the subject of inquiry in qualitative data resulting in theory expansion and development. Theories can also develop from the data as the case in grounded theory and case studies.

The use of theory in mixed methods research in the LIS field is still a grey area. Identifying and using a theory for both the qualitative and quantitative phases of mixed methods research has remained elusive. Mixed methods researchers tend to use theories as they are employed in the qualitative and quantitative traditions to develop and test theories. An explanatory sequential mixed methods research design, which is described later, can employ a theory in the quantitative stage as background to expanding it in the qualitative phase.

Creswell (2009) suggested a transformative lens as one of the theories that mixed methods researchers may use, but the lens does not apply to all mixed methods approaches. It seems the transformative lens is a moving target because it was earlier considered as a mixed methods research transformative design by Creswell and Plano Clark (2011) and Creswell (2014), but was dropped as design by Creswell and Plano Clark (2018) and elevated to a theory. Creswell and Plano Clark (2018) acknowledge that they have changed the names and mixed method research design over the years, which may lead to confusion. That implies that the earlier books by the same authors should be read with Creswell and Plano Clark (2018).

Social science theory and the emancipation theory that encompass the transformative lens seem to be more of meta-theories than theories to explain social reality. Although Creswell and Plano Clark (2018) suggest that they are applicable to mixed methods research, they seem to operate at a broader perspective than theories. They can be used to make a theoretical stance about the situation to be transformed but they may not explain the phenomenon. Creswell and Plano Clark (2018) concede that the transformative lens may operate at a paradigm level although it can be informed by theories such as critical race theory, indigenous theories (e.g., Ubuntu and Batho Pele theories in the case of South Africa) and those theories that explain the plight of the marginalised and under-presented groups.

SAMPLING IN MIXED METHODS RESEARCH

The process of sampling is important to qualitative, quantitative and mixed methods research. Probability sampling (random) is associated with quantitative research while non-probability (non-random or purposeful) sampling mostly relates to qualitative studies. Thus, non-probabilistic sampling techniques are traditionally linked to interpretivism. On the other hand, probabilistic sampling is associated with positivism. However, Onwuegbuzie and Collins (2007) pointed out that such a view is simplistic and constitute a false dichotomy as qualitative researchers may use probabilistic samples just like their quantitative counterparts. Generally, qualitative studies make "analytic" generalisations (Miles, Huberman & Saldaña, 2014) in contrast to "statistical" generalisations that are related to quantitative research.

Sampling is a process of selecting elements from a population that is representative of the whole (Onwuegbuzie & Collins, 2007). Sampling decisions are based on the sampling design, which is constituted by a sample frame, sample size and sample scheme (sampling techniques, or sampling strategy). Sampling decisions are more difficult and complicated in mixed methods research than in qualitative or quantitative studies. Onwuegbuzie and Collins (2007) were surprised that "the issue of sampling was not included as one of Teddlie and Tashakkori's (2003) six issues of concern in mixed methods research" (p. 307). The omission was addressed as a topical concern under the methodological interface within mixed methods research (Tashakkori & Teddlie, 2010a).

Mixed methods researchers are unclear as to how to address the complex nature of sampling employed in their research. The coverage of sampling in mixed methods research in the literature is relatively limited. Although there are some chapters in books (Creswell, 2015; Kemper, Stringfield & Teddlie, 2003; Onwuegbuzie & Teddlie, 2003) on the subject of sampling in mixed methods research, the articles of Collins, Onwuegbuzie and Jiao (2007), Onwuegbuzie and Collins (2007) and Teddlie and Yu (2007) remain instructive. Teddlie and Yu (2007) categorically stated that mixed methods research has unique sampling techniques.

On the other hand, Onwuegbuzie and Collins (2007) outlined the following seven linear steps in the mixed methods research sampling process:

- Determine the goal of the study.
- Formulate the research objective(s).
- Determine the research purpose.
- Determine the research question(s).
- Select the research design.
- Select the sampling design.
- Select the sampling scheme.

Mixed methods researchers should select samples for the quantitative and qualitative components of a study. Sampling in mixed methods research is mainly determined by the objective of the study. Johnson and Christensen (2004) identified four research objectives: exploration, description, prediction and influence. The objective is linked to the research goal, purpose and the research question. Mixed methods researchers may select from the available nonprobability and probability sampling techniques. Kemper et al. (2003) emphasised that researchers should be familiar with a wide range of sampling techniques to increase, "the likelihood of one's generating findings that are both rich in content and inclusive in scope" (p. 292).

The sample size needs to be determined after the sample scheme has been selected. Typically, the sample size is determined by the complexity of the phenomenon under study, the characteristics of the sample frame, available resource and type of the research approach being used (Creswell, 2016a). Samples between 3 and 50 are common in qualitative studies (Creswell, 2016a; Onwuegbuzie & Collins, 2007). The samples should be adequate to facilitate theoretical saturation (Strauss & Corbin, 1990), data saturation (Flick, 1998), or information redundancy (Lincoln & Guba, 1985). Saturation is reached when participants start to repeat the same information over and over again. Quantitative research use representative sample sizes based on the sampling statistical theory and tables for determining sample sizes of known populations (Ngulube, 2005).

Time orientation (i.e., sequential versus concurrent) and the relationship between quantitative and qualitative samples is important in determining sample size. Onwuegbuzie and Collins (2007, p. 292) conceptualised the following four relationships of samples that can use a sequential or concurrent time orientation:

- Identical relationship: the same sample members participate in both the qualitative and quantitative strand of the research; for example, administering a survey of the availability and utilisation of information and communication technologies (ICTs) in public libraries to visually impaired users (VIPs) in the Gauteng Province of South Africa that comprises closed- and open-ended question

items necessitating the simultaneous conduct of qualitative and quantitative phases of the study. The explanatory mixed methods approach uses this sampling technique as the individuals who contributed data in the quantitative phase are best suited to give more details about the results in the qualitative phase.

- Parallel relationship: the samples for the qualitative and quantitative phase of the research are different but are drawn from the same target population (e.g., a survey of the availability and utilisation of ICTs in public libraries to VIPs for the quantitative component and conducting in-depth interviews and observations examining the availability and utilisation of ICTs on a small sample of VIPs from other libraries for the qualitative phase). The convergent or parallel mixed method approach and the explanatory one may employ this sampling technique.
- Nested relationship: the sample members selected for "one phase of the study represent a subset of those participants chosen" for the other component of the study (e.g., administering a quantitative instrument on the availability and utilisation of ICTs in public libraries to VIPs for the quantitative component and conducting in-depth interviews and observations examining the availability and utilisation of ICTs in public libraries on those who rarely used and those who frequently used the libraries). The convergent or parallel mixed method approach may employ this sampling technique.
- Multilevel relationship: two or more sets of samples are drawn from different populations in the study. For example, the quantitative component might involve the sampling of VIPs within a library and the qualitative phase might involve the sampling of the librarians, and/or directors. Another example of a multilevel relationship is found in the study conducted by Munyoro and Onyancha (2018) in Zimbabwe. The study used members of parliament, the political leaders in constituencies and representatives of constituents in parliament and constituents who resided in a legislative constituency and the intended beneficiaries of parliamentary information for the quantitative component of the study. They constituted the probability sample although the authors did not describe their sample size and its rationale. On the other hand, officers of parliament, the Clerk of Parliament and his deputy, and the Parliamentary Program Coordinator at parliament participated in the qualitative strand. The sample for the qualitative component was purposively determined as was the selection of the geographic provinces that formed part of the study.

The two variables, time orientation and sample relationship can be used to determine the sample design and sample sizes for mixed methods research studies. The type and level of generalisation (i.e., statistical or analytical) required will determine the optimal sample size for the qualitative and quantitative phases of the study. The sample for the quantitative phase should be sufficient to yield adequate statistical power. On the other hand, the qualitative sample should yield enough data to facilitate a thick, rich description of the phenomenon (Creswell, 2016a; Miles, Huberman & Saldaña, 2014). Mixed methods researchers should evaluate their sampling designs for ethical appropriateness. Furthermore, they should make transparent samples decisions and, as declared by Curtis et al. (2000):

It seems essential to be explicit about these [decisions], rather than leaving them hidden, and to consider the implications of the choice for the way that the…study can be interpreted (p. 1012).

CONDUCTING MIXED ANALYSES

Onwuegbuzie and Teddlie (2003), Creswell and Plano Clark (2018) opine that:

Mixed methods data analysis consists of analytical techniques applied to both the quantitative and the qualitative data as well as the integration of the two forms of data (p. 218).

Methodological principles or frameworks for data analysis that distinguishes mixed methods research from traditional quantitative and qualitative methodologies is one of the topical issues in the development of this methodology (Tashakkori & Teddlie, 2010b). The field is not yet mature in relation to analysis. Indeed, analysing data is one of the most difficult tasks when conducting the mixed methods research process (Onwuegbuzie & Combs, 2010, p. 398). The difficulty becomes evident when one analyst has to rigorously analyse both qualitative and quantitative data. It is not unusual to have an analyst who is not competent in analysing both quantitative and qualitative data. The other challenge is in integrating qualitative and quantitative data to make coherent and meaningful meta-inferences or what Teddlie and Tashakkori (2009) describes as "inference quality" (p. 27). Inference quality depends on the extent to which the selected analysis procedures are aligned to the research questions, yield an adequate representation of data, fit together in an integrated and coherent manner, and appropriately and adequately answer the research question (Onwuegbuzie & Combs, 2010; Teddlie & Tashakkori, 2009).

A number of analysis strategies for mixed methods research data analysis have been suggested (Datta, 2001; Hitchcock & Onwuegbuzie, 2019; Onwuegbuzie & Combs, 2010; Onwuegbuzie & Hitchcock, 2015; Teddlie and Tashakkori, 2009). Although analytical frameworks exist they support limited integration (Tashakkori & Teddlie, 2010b). Caracelli and Greene (1993) describe four data analysis strategies for mixed methods that are not linked to any research paradigm: (1) data transformation; (2) typology development; (3) extreme case analysis; and (4) data consolidation and merging. Onwuegbuzie and Teddlie (2003) outline seven steps in mixed methods data analysis: (a) data reduction, (b) data display, (c) data transformation, (d) data correlation, (e) data consolidation, (f) data comparison, and (g) data integration. These typologies are not discussed in this chapter due to word-count limitations. Although there is no "single set of prescribed procedures for mixing methods" as suggested by Creamer (2018), the important thing to bear in mind is that the data analysis strategy must facilitate integration, "the centrepiece of mixed methods research" (Creswell & Plano Clark, 2018, p. 220). There must be a clear intent for integration, data integration procedures, representation of the integration results and interpretation of the integration results (Creswell & Plano Clark, 2018).

The strategies for analysis use quantitative research tools such as descriptive, exploratory, confirmatory, and inferential analyses. Domain analysis, theme analysis, taxonomic analysis, componential analysis and constant comparison analysis are employed in analysing data in various qualitative research approaches (Hitchcock & Onwuegbuzie, 2019). A combination of these data analyses schemes are used in mixed methods research to yield concurrent mixed analyses, sequential mixed analyses, multilevel mixed analyses, fully integrated mixed analyses and crossover mixed analyses.

Following Datta (2001), Teddlie and Tashakkori (2009) identified two types of mixed methods research analyses: parallel-tracks analysis, and crossover-tracks analysis. In parallel-tracks analysis, ''the analyses are conducted independently, according to the strands of quality and excellence for each method... and the findings are brought together after each strand has been taken to the point of reaching conclusions'' (Teddlie & Tashakkori, 2009, pp. 268-269). On the other hand, "findings from the various

methodological strands intertwine and inform each other throughout the study'' in a crossover-tracks analysis (Teddlie & Tashakkori, 2009, p. 269). Hitchcock and Onwuegbuzie (2019) describe crossover analysis as the practice of using data analysis techniques employed in quantitative research to analyse data from qualitative research and vice versa. The research question determines the extent of crossover analysis. Ultimately, multiple data analysis techniques are employed. This chapter advocates the parallel-tracks analysis, and crossover-tracks analysis.

QUALITY OF MIXED METHODS RESEARCH DATA

Strategies for establishing rigour in quantitative and qualitative studies are well-established. However, limited guidance exists for assessing the quality of MMR (Brown et al., 2015; Carayon et al., 2015). Rigour and the criteria of evaluating quality is a contested terrain in mixed methods research (Onwuegbuzie & Johnson, 2006; Tashakkori & Teddlie, 2010b). Tashakkori and Teddlie (2010c, p. 813) described the mixed methods research quality terrain as "chaotic" due to various reasons. Brown et al. (2015) found that the reporting of methodological rigour was inadequate in many mixed methods studies. Creswell and Plano Clark (2018) stated that while mixed methods research should meet both qualitative and quantitative criteria, it must go beyond that criteria. O'Cathain (2010) suggested that mixed methods research should be evaluated for transparency and clarity in reporting planning, design, data, interpretive rigor, inference transferability, reporting quality, synthesisability, and utility.

Although many quality evaluation frameworks for mixed methods exist, Creswell and Plano Clark (2018) stated that mixed methods research studies should be evaluated on the basis of how qualitative and quantitative data were collected, how both forms of data were intentionally combined, how the study is informed by a specific research design or approach and how it is framed by theory and foundational assumptions. Similarly, Creamer (2018) suggested a rubric for evaluating the quality of mixed methods studies: (a) transparency about the rationale for using mixed methods research, (b) the amount of mixing across the "four phase of the research process (i.e., design, data collection and sampling, analysis, and inferential phases)" (p. 150), (c) engagement with both the positivist and interpretivist perspective with a concern for "interpretive comprehensiveness", and (d) methodological underpinning or familiarity with the methodological literature.

PROMOTION OF MIXED METHODS RESEARCH BY LIS PROFESSIONALS

Library and information science research in the developing world is complex and intricate. The research also has to deal with wicked and social problems such as unequal access to information resources, digital divide, exclusion of the literature on indigenous people and other marginalised groups such as the physically challenged, lesbian, gay, bisexual, and transgender (LGBT) people in the LIS landscape, and unequal development. These problems require new tools for examining research problems and acquiring knowledge in addition to the dominant quantitative and qualitative methodologies. Mixed methods research also referred to as the third methodological movement (Tashakkori & Teddlie, 2003, 2010a) and third research paradigm (Johnson & Onwuegbuzie, 2004) has the potential combining qualitative and quantitative dichotomies to obtain better inferences and to comprehensively explore, describe, predict and transform the information science research environment.

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There is a need for LIS researchers and professionals to develop a competency in mixed methods research and become methodological connoisseurs. LIS professionals should promote dialogue across methodological and theoretical divides to create a knowledge and professional base that builds on similar and different strengths of the LIS profession while acknowledging the core characteristics and structure of mixed methods research. Specifically, they should harness mixed methods research in LIS research. LIS professionals should also provide guidelines for the adoption and use of mixed methods research, and motivate for funding for mixed methods research studies as envisioned in the five domains constituting the map of mixed methods research suggested by Creswell (2010).

Furthermore, there is a need to get beyond the dichotomous model, (i.e., quantitative versus qualitative), when conducting research by harnessing mixed methods research towards understanding social complexity and building "a practice of social and historical explanation, sensitive to structure but aware of contingency…by reconstructing the available tools of social science and social theory" (Unger, 1998, p. 24). The absence of such a practice partly denies LIS researchers "a credible account of how transformation happens" (Unger, 1998, p. 24). Embracing the "new star in the social science sky" (Mayring, 2007, p. 1) and espousing "multiple ways of seeing and hearing" (Greene, 2007, p. 20) has the potential of providing LIS professionals tools for reconstructing social theory and transforming their practice in recognition of the various changes affecting the provision of information to society. A field is "strengthened when its researchers show an awareness of the weaknesses and strengths of qualitative and quantitative approaches" (Rocco, Bliss, Gallagher & Pérez-Prado, 2003, p. 23).

FUTURE RESEARCH DIRECTIONS

Several questions remain unanswered at present. The affordances provided by digital technologies to mixed methods researchers is not fully known. Future studies on that topic are recommended. The mixed methods research typologies used in this chapter are mainly drawn from Creswell and Plano Clark (2018). The two authors admit that they have changed and adjusted the typologies since 2003, although they are now closer to the ones formulated in 2003. There is a need to continue to identify and compare the mixed methods research typologies in the literature in order to settle for the most elegant ones.

CONCLUSION

Mixed methods developed from multimethods to become a third research methodology that combines qualitative and quantitative approaches in one of the phases to investigate a research problem. The approaches should only be combined when there is a purpose and the specific mixed method approach or design must be specified. This chapter has traced the evolution of mixed methods research, situated the methodology in the research methods landscape, problematised the meaning of mixed methods research, and discussed the use of theory in mixed methods research, the data sampling techniques and data evaluation criteria in mixed methods research.

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KEY TERMS AND DEFINITIONS

Methodology: Strategies encompassing qualitative, quantitative and mixed methods research methodologies concerned with producing and explaining empirical knowledge.

Mixed Methods Research: Integration of qualitative and quantitative research approaches in many or all phases of a single study to comprehensively address a research problem by collecting quantitative and qualitative data concurrently or in phases with the aim to maximising their inherent advantages while minimising their disadvantages.

Multimethods Studies: Multimethods studies are equivalent to triangulation. These were the forerunners on mixed methods research.

Triangulation: The use of more than one data collection method, or theory, or approach (e.g., grounded theory and case study) in one research project.

Chapter 23

Integration in Mixed Methods Research Designs by Graduate Students at the University of Science and Technology

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ABSTRACT

This chapter reports on a study that investigated how graduate students in the Faculty of Communication and Information Science at NUST were approaching integration in their mixed-methods research dissertations. There has been a concern that lack of expertise of what mixed-methods research is restricts the integrative capacity. Using a research synthesis method, the study investigated three graduate programmes, namely Master's degrees in Library and Information Science, Records and Archives Management, and Journalism and Media Studies from 2016 up to 2018. A total of 95 dissertations were reviewed, and 40 employed mixed-methods research design. It was discovered that integration was commonly done at methods and interpretation levels. Integration of qualitative and quantitative data sets resulted in confirmation (83), expanding understanding (27), and discordance (31). Graduate students dealt with discordant findings by either ignoring the discordance (20), seek corroboration with existing literature (7), or give priority to the quantitative strand (4).

INTRODUCTION

There is an established body of knowledge about mixed methods research (MMR); discussing why this approach is used, how it can be used, and the challenges of using it in theory and in practice (O'Cathain, Murphy, & Nicholl, 2007). However, Fetters and Freshwater (2015) contend that a crucial aspect of MMR is the integration issue. Befittingly, the field of mixed methods has been moving towards the challenge of integration. Integration is where investigators intentionally combine or mix the quantitative and qualita-

tive elements rather than keeping them separate in order to bring new understanding of a phenomenon than either method alone can achieve. Fetters, Curry and Creswell (2013) cautioned that although there are many potential gains from data integration, the extent to which MMR studies implement integration remains limited. In health services for example, Tonkin-Crine et al. (2016) observed that mixed methods are commonly used however; data are not often integrated to explore complementarity of findings. Creswell (2009) opined that mixed methods researchers need to establish a purpose for their mixing, a rationale for mixing the quantitative and qualitative data in the first place.

The way graduate students in the Faculty of Faculty of Communication and Information Science (CIS) at NUST have been exploiting MMR has not been adequately studied. It is not known whether graduate students in the Faculty of CIS are harnessing the value integration in their MMR. Thus, it is appropriate and timely to reflect how students are approaching the MMR focusing on the integrating aspect. There is a sense in which the lack of expertise and/or understanding of what mixed methods is, which restricts the integrative capacity of students to appropriately use the method. Creswell and Plano Clark (2011) are of the view that prior to designing a mixed methods study, the researcher should develop a deep understanding of the method to recognise its essential characteristics and adequately justify its use.

Scholars point that researchers and students alike tend to conflate and confuse mixed methods design and triangulation of methods in a study (Ngulube & Ngulube, 2015; Denzin, 2012; Creswell, 2009; Greene, Caracelli, & Graham, 1989). This led to Sale, Lohfeld and Brazil (2002) to conclude that MMR is now being adopted uncritically by a new generation of researchers. Many researchers take qualitative and quantitative strands and call it MMR and rightly, Denzin (2012) cautions researchers not to confuse triangulation with MMR. In its original form Denzin (2012, p. 82) argues "triangulation referred only to the use of multiple forms of qualitative research methods, not the combination of quantitative and qualitative methods." Denzin further notes that triangulation reflects an attempt to secure an in-depth understanding of the phenomenon in question. MMR is "more than simply collecting both quantitative and qualitative data; it indicates that data will be integrated, related, or mixed at some stage of the research process" (Creswell, Fetters, & Ivankova, 2004, p. 1). This integration occurs at various stage(s) of the research process (Glogowska, 2011). To this end, experts intimated an underdevelopment and/or limitation in the way mixed method has been employed or applied by researchers. Creswell et al. (2004) note that the stage of the research process at which the data are combined illustrates the complexity of MMR and the need to be explicit about the model of inquiry being used. As a result, it was felt that graduate students in the Faculty of CIS were probably not maximizing the degree to which they are using this design "given the added resources, time, and expertise required to conduct a mixed methods study" (McKim, 2017, p. 202).

It is, therefore, the thrust of this chapter to review the application of MMR design by graduate students in the Faculty of CIS with a particular focus on integration. This is done as part in profiling the research practices in the Faculty of CIS and provides the Faculty with trends and patterns of research approaches being exploited by its graduate students. Alise and Teddlie (2010) make the point that "examining the prevalence rate of methodological approaches within the social sciences is a new line of research" (p. 103). Further, the study attempts to contribute to the knowledge of MMR as the field is dealing with the challenge of integration. Understanding how students were approaching integration in MMR in the Faculty can help supervisors, researchers and graduate students leverage the strengths of MMR and avoid the pitfalls, misconception and common fallacies associated with the method. The focus on graduate students is justified by the fact that this group of students has mastered research and can produce research with the potential of contributing to knowledge and development.

MIXED METHODS RESEARCH DEFINED

The phrase mixed methods research is known by various nomenclatures that include integrated method; combined methods; mixed methodologies; quantitative and qualitative methods (Guetterman, 2017). In this chapter, the term "mixed methods research" was preferred. Definitions of mixed methods research abound in literature (Wisdom & Creswell, 2013; Creswell & Clark, 2007; Tashakkori & Creswell, 2007; Johnson, Onwuegbuzie, & Turner, 2007; Tashakkori & Teddilie, 1998; Greene et al., 1989). Of note is that of Wisdom and Creswell (2013) who referred to MMR as an emergent methodology of research that advances the systematic integration, or "mixing," of quantitative and qualitative data within a single investigation or sustained program of inquiry. Creswell and Clark (2007) defined MMR as "a research design with philosophical assumptions as well as methods of inquiry; as a methodology it involves philosophical assumptions that guide the direction of the collection and analysis and the mixture of quantitative and qualitative approaches in many phases of the research process and as a method it focuses on collection, analysing and mixing both quantitative and qualitative data in a single study or series of studies" (p. 5). The MMR is also defined as "research in which the investigator collects and analyses data, integrates the findings and draws inferences using both qualitative and quantitative approaches and methods in a single study" (Tashakkori & Creswell 2007, p. 4). From the three definitions it can be gleaned that MMR contains essentials of methods, philosophy and research design. Thus, investigators deliberately integrate the quantitative and qualitative elements rather than keeping them separate throughout the research process.

The overall purpose and central premise of MMR is that the combination of both qualitative and quantitative methods proves to be a better way of understanding a research problem than either approach by itself (Creswell & Plano Clark, 2011). Additionally, the use of both qualitative and quantitative strands in a single study is generally understood to offset the weakness of a single method by the strengths of another method (Creswell & Plano Clark, 2011). Hurmerinta-Peltomaki and Nummela (2006) elucidated that studies that use a mixed methods approach to gain a deeper, broader understanding of the phenomenon than studies that do not utilise both a quantitative and qualitative approach. For the reasons above, it becomes attractive for graduate students to settle for MMR design in their studies.

INTEGRATION IN MIXED METHODS - A CONCEPTUAL FRAMEWORK

A MMR design as a product of both qualitative and quantitative aspects has several primary characteristics that should be considered during the design process (Schoonenboom & Johnson, 2017). As gleaned from Guetterman (2017), Saunders, Lewis and Thornhill (2016), Fetters et al. (2013), Bryman and Bell (2011), Mertens (2009), Creswell and Clark (2011), Creswell and Clark (2007), Teddlie and Tashakkori (2006) and Creswell (1999), integration in MMR occurs at **conceptualisation** level through the title, research questions, purpose etc.; **philosophical** level through ontological, epistemological, axiological and methodological assumptions; **study design** level through three basic MMR designs namely exploratory sequential, explanatory sequential, and convergent. Integration at the **methods level** occurs through connecting, building, merging, embedding. Integration at the **interpretation and reporting level** occurs through narrative, data transformation, and joint display. It can be observed from the above that integration in MMR occurs throughout the process of research. Table 1 summarises a conceptual framework of how integration occurs at the various stages throughout the research process.

Table 1. Integration levels (Researcher, 2018)

Integration level	Approaches	Description
Conceptualisation	●Title ●Statement of the problem ●Research questions ●Feasibility	**Title:** Wording alludes to mixed methods design- includes words mixed methods in title **Problem:** suitability for mixed methods design **Research questions:** must allude to mixed methods **Feasibility-** in terms of time, resources and skills
Philosophy of science	●Pragmatism ●Critical realism ●Transformative	**Four sets of assumptions** ● Ontology- nature of reality ● Epistemology- nature of knowledge ● Axiology- values ● Methodology- how one attempts to investigate
Design	**3 core designs** ● Exploratory sequential ● Explanatory sequential ● Convergent	●**Exploratory sequential**: Two-phase. Qualitative(Qual) ►quantitative (Quan) ●**Explanatory sequential**: Two-phase. Quan ► Qual ● **Convergent:** This involves collecting both quantitative and qualitative data in similar timeframe. Qual ↕→ Compare or relate Quan
Methods	●Quan-Qual: **Connecting** ●Qual-Quan: **Building** ●Both Qual and Quan at the same time: **Merging** ●**Embedding**: involve any combination of connecting, building, or merging	**Connecting:** one database links to the other through sampling. **Building:** one database informs the data collection approach of the other. **Merging:** the two databases are brought together for analysis. **Embedding**: data collection and analysis link at multiple points.
Interpretation and reporting	●**Narratives** ●**Data transformation** ●**Joint displays**	**Narratives**: There are three approaches – weaving, contiguous and staged **Data transformation**- transforming one form of data onto another form. **Joint displays**: integrate the data by bringing the data together through a visual means to draw out new insights

Research Question

The research question that informed the study was: Are graduate research studies employing MMR exploiting the full potential of the method as the field of mixed methods is moving towards the challenge of integration?

This broad question was addressed by five sub-questions stated below:

1. How prevalent is mixed methods research in the Faculty of CIS?
2. How is mixed methods research presented at a conceptual level by graduate studies?
3. How is the integration of qualitative and quantitative elements done at philosophical and design levels by graduate students?
4. What is the purpose(s) for integrating qualitative and quantitative methods by graduate students?
5. How is interpretation and reporting of results done by graduate students employing mixed methods research?

A REVIEW OF MIXED METHODS LITERATURE

Mixed methods research originated in the social sciences (Wisdom & Creswell, 2013). Mayring (2007) heralded it as "the new star in the social sciences sky" (p. 1). However, Ngulube, Mokwatlo and Ndwandwe (2009) find it very difficult to see the reason many scholars think that MMR is new if one closely looks at the typology of combining paradigms. They claim that all along, researchers have been combining research approaches, but the emphasis was not on using both qualitative and quantitative paradigms across all the stages of the research process.

Integration and the Mixed Methods Debate

Although it is ironclad that a mixed methods approach has much to offer to a researcher, there has been a raging debate about its use. According to Sale et al. (2002), the key issues in the quantitative-qualitative debate are ontological and epistemological. Creswell and Clark (2007) point to an incompatibility thesis that quantitative and qualitative research methods cannot be mixed in a single study as they have such different ontological and epistemological origins. Based on their paradigmatic assumptions, the two methods do not study the same phenomena (Sale et al., 2002). Methodological purists believe strongly in the dichotomy of worldviews and research methods (Creswell & Plano Clark, 2007) and therefore argue against the integration of quantitative and qualitative approaches. Guba (1987) clearly identified the extent of the dichotomy between the paradigms by stating how "the one precludes the other just as surely belief in a round world precludes belief in a flat one" (p. 31).

Reichardt and Cook (1979) disputed the incompatibility thesis based on the paradigm-method fit by suggesting that different philosophical paradigms and methods are compatible. This is supported by Mir and Watson (2000) who claimed that a researcher who is anchored in constructivist methodology may employ a variety of methods including statistical analysis, just as a researcher employing a realist methodology may use qualitative research. Further, the two paradigms are thought to be compatible because they share the tenets of theory-ladenness of facts, the fallibility of knowledge, the determination of theory by fact, and a value-ladened inquiry process (Sale et al., 2002). They are united by a shared commitment to understanding and improving the human condition, a common goal of disseminating knowledge for practical use, and a shared commitment for rigor, conscientiousness, and critique in the research process (Reichardt & Rallis, 1994). In the end, Sale et al. (2002), caution against the uncritical acceptance of MMR by a new generation of researchers who have overlooked the underlying assumptions and differences between the two paradigms.

Previous Studies on Integration and Graduate Students

Reviewed studies on integration addressed three critical areas regarding the nature of integration (Ngulube, 2013); triangulation as a protocol to achieve integration (Tonkin-Crine et al., 2016); and the challenges experienced by researchers in integrating qualitative and quantitative data sets (Bryman, 2007). In the field of library and information science (LIS), Ngulube (2013) looked at how researchers for LIS journals in sub-Saharan Africa (SSA) blended both qualitative and quantitative methods into their articles between the period 2002 and 2010. Using content analysis and semi-structured telephonic interviews the study found that the dominant research methods were survey and historical research. The study further found that 50 out of 793 articles integrated research methods and a few articles used the terms integrated,

or mixed, or blended, or combined methods in the abstract. It further records that authors chose to use MMR because it was trendy rather than for its ability to answer certain kinds of research questions. The study established that authors used MMR according to the triangulation purpose. The study notes that the three rationales for mixing approaches suggested by Collins, Onwuegbuzie and Sutton (2006), which include participant enrichment (for example, increasing the number of participants); instrument validity and reliability (for instance, pretesting and piloting the study); and treatment integrity (that is, assessing the reliability of interventions and programmes) were not evident in the articles that were analysed.

A study by Tonkin-Crine et al. (2016) using a retrospective triangulation protocol was carried out on mixed methods data collected as part of a process evaluation of a trial. Using three analysts, the study independently compared findings across four data sets: qualitative data collected via semi-structured interviews with (1) 62 patients and (2) 66 general practitioners (GPs) and quantitative data collected via questionnaires with (3) 2886 patients and (4) 346 GPs. Pairwise comparisons were made between data sets and were categorised as agreement, partial agreement, dissonance or silence. Three instances of dissonance occurred in 39 independent findings. The study concluded that a triangulation protocol to integrate qualitative and quantitative data can reveal findings that need further interpretation and also highlight areas of dissonance that lead to a deeper insight than separate analyses.

Bryman (2007) examined findings from 20 interviews with United Kingdom (UK) social researchers, all of whom were practitioners of MMR with view to identify barriers to integration. From these interviews, a wide variety of possible barriers to integrating mixed methods findings were discovered and these are summarised and listed below:

1. Perceptions of the expectations of audiences may cause mixed methods researchers either to write up one set of findings to the exclusion of the other.
2. Lingering affiliations to either a quantitative or qualitative research approach can inhibit the mixed methods researcher's inclination to combine.
3. A mixed methods project is set up in such a way that either the quantitative or the qualitative component provides the main point of orientation; it will be difficult to bring the findings together.
4. The quantitative and the qualitative components of a mixed methods study may get out of phase with each other, because of their different needs and rhythms.
5. Many researchers have specialised in their training in either a predominantly quantitative or qualitative tradition.
6. Researchers may feel that one set of data turns out to be more intrinsically interesting or striking than the other set.
7. Bridging ontological divides.

Bryman (2007, p. 21) concluded by advising that "if mixed methods researchers return to their grounds for conducting such research in the first place, they may be able to use their arguments as a platform for conducting an analysis that is integrative."

Studies that address the use of MMR by graduate students are limited. One notable study is that by O'Cathain et al. (2007) looked at how MMR is used. Other studies looked at the perceived value of MMR by graduate students (McKim, 2017; Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2003). O'Cathain et al. (2007) looked at how MMR is used in health services research. Using a documentary analysis method on proposals and reports of 75 MMR studies, the study found out that only 18% of the studies were noted as mixed methods. In the documentation, comprehensiveness was the main driver for

using MMR, with researchers wanting to address a wider range of questions than quantitative methods alone would allow. The researchers stated that the use of MMR design is driven by the apparent short-fall of quantitative methods. The researchers noted that the motivations for adopting a MMR approach were not always based on the intrinsic value of MMR for addressing the research question but strategic, for example, to obtain funding. The study concluded that MMR was driven by pragmatism rather than principle, motivated by the perceived deficit of quantitative methods alone to address the complexity of research in health care, as well as other more strategic gains.

METHODOLOGY

The study employed the research synthesis method with document analysis as the primary method. According to Sheble (2014, p. 5), research synthesis is a document-based empirical research method in which primary research reports are analysed with the goal of generating new knowledge or interpreta-tions. Sheble (2014, p. 6) further notes that research synthesis involves formulating a research problem, retrieving relevant literature, evaluating, analysing, and synthesizing data, interpreting results, and reporting and disseminating findings. Ngulube and Ukwoma (2019) used the same research method to analyse the methodological trends in dissertations from South Africa and Nigeria. Document analysis of mixed methods studies of graduate students in the Faculty of CIS was undertaken to explore how mixed methods studies were undertaken. The qualitative analysis of MMR facilitated the extraction of data using a form which included the elements provided in Creswell (1999)'s guidelines of how to conduct MMR. The worksheet recorded the nature of the titles, nature of the problems, nature of the research questions, the MMR designs, weighting of the qualitative and quantitative strands, reasons for using mixed methods, methods of interpretation and reporting, presentation of a visual model. Descriptive statistics were useful for the quantitative analysis regarding the mixed methods dissertations, numbers and percentages by type of priority (equal or dominant status), type of implementation (simultaneous or sequential) and purpose.

The assessment of fit of integration for the MMR dissertations was done by examining how the qualitative and quantitative data sets were reported and interpreted by graduate students. To achieve this, reported findings for each of the research questions posed by graduate students in the MMR dis-sertations were analysed for the purpose of discovering the outcome of data integration. The connexion between data sets was labelled as one of four categories: confirmation, expansion, dissonance and not applicable. Confirmation occurs when the findings from both types of data confirm the results of the other (Fetters et al., 2013). Expansion occurs when the findings from the two sources of data diverge and expand insights of the phenomenon of interest by addressing different aspects of a single phenom-enon or by describing complementary aspects of a central phenomenon of interest (Fetters et al., 2013). Discordance occurs if the qualitative and quantitative findings are inconsistent, incongruous, contradict, conflict, or disagree with each other. When a research question had single data set it was labelled not applicable because no convergence of data was possible. Statements that indicated the outcomes of data integration were recorded and quantified.

Search Strategy

According to Molina-Azorin and Cameron (2010), an important aspect related to the identification and prevalence of mixed methods articles is the search strategy used. To identify mixed methods dissertations and determine their main characteristics, a manual search of the graduate dissertations stored by the concerned academic departments was conducted. Ordinarily, a library would be the best place to get the thesis, however given the number of dissertations that were involved and the fact that these were not allowed to leave the NUST Library, the researcher had to work with dissertations requested from the respective academic departments. The titles and abstracts of all the dissertations from 2016 - 2018 were read and reviewed for the purpose of determining whether each dissertation represented a quantitative, qualitative or mixed methods study. After the dissertations were grouped, MMR dissertations were examined.

There were three departments offering Master of Science programmes in the Faculty of CIS at NUST at the time of the study namely Journalism and Media Studies (JMS), Library and Information Science (LIS), and Records and Archives Management (RAM). Students' registers were used to establish the sampling frame. Table 2 shows the total number of dissertations that were produced in the Faculty from 2016 up to 2018, organised according to departments.

RESULTS AND DISCUSSION

Overview

Ninety-five graduate research studies from 2016 to 2018 were availed by the three departments in question. A document review of these studies which involved reading all the titles and abstracts of the studies for the purpose of identifying the research design indicated that forty studies claimed to have used MMR constituting 42.1% of the total. Fifty-one were qualitative studies constituting 53.6% of the total studies. Four studies were quantitative constituting 4.2% of the total studies.

When the dissertations were organised according to departments, the study established that in 2016, LIS had a greater number of mixed methods studies accounting for twelve and Journalism had four. In 2016, RAM had just launched their MSc programme and no dissertations had been completed.

In 2017, only graduates in LIS employed the mixed methods design (12). JMS had a greater number of graduates who employed qualitative design twelve (12) and LIS had five (5).

In 2018, LIS had a greater number nine (9) of graduates employing the MMR albeit fewer than the past two years. RAM had three (3) studies that employed the mixed methods approach whilst JMS had none.

Table 2. Sampling frame

Department	Number of dissertations studies from 2016-2018
JMS	32
LIS	51
RAM	12

Table 3. 2016 graduate research dissertations

Department	Mixed methods Dissertations	Qualitative	Quantitative	Total
JMS	4	4	-	8
LIS	12	4	-	16
RAM	-	-	-	0
Total	**16**	**8**	**-**	**24**

Table 4. 2017 graduate research dissertations

Department	Mixed methods Dissertations	Qualitative	Quantitative	Total
JMS	-	12	-	12
LIS	12	5	2	19
RAM	-	-	-	0
Total	**12**	**17**	**2**	**31**

Table 5. 2018 graduate research dissertations

Department	Mixed methods Dissertations	Qualitative	Quantitative	Total
JMS	-	12	-	12
LIS	9	6	1	16
RAM	3	8	1	12
Total	**12**	**26**	**2**	**40**

Taken together, it was computed that most graduate students 53, 6% (N=51) in the Faculty of CIS at the NUST used qualitative research design. Qualitative research was popular in JMS, having produced 28 dissertations out of the 51 qualitative studies in the Faculty. Mixed methods accounted for 42.2% (N=40) of the dissertations whilst quantitative accounted for 4.2% (N=4).

A scrutiny of the results revealed that a larger proportion of the studies that attempted to use MMR 81.8% (N= 33) came from LIS. JMS and RAM held a negligible 10% (N=4) and 8, 2% (N=3) of the dissertations respectively. Of the 51 LIS dissertation, more than half (N=33) of the LIS graduate students (N=51) attempted to use the MMR in their dissertations since 2016. The prevalence of mixed methods in LIS could be attributed to the fact that LIS is a multidisciplinary and interdisciplinary field. It also follows that "the research is multidisciplinary in nature, and it has been heavily influenced by research designs developed in the social, behavioural, and management sciences and to a lesser extent by the theoretical inquiry adopted in the humanities" (Eldredge, 2000). Hjørland (1998) opined that LIS has evolved in close relationship with other fields of research, especially computer science, communication studies, and cognitive sciences.

The connection of LIS with professional practice, on one hand, and other research fields on the other has influenced its research orientation and the development of methodological tools and theoretical perspectives (Åström, 2007). For example, Togia and Malliari (2017) noted that methods used in information retrieval research have been adapted from computer science. In JMS, the four (4) recorded MMR studies

were conducted in 2016 and since then no MMR was conducted. All the studies in 2017 and 2018 were qualitative in nature. Creswell and Plano Clark (2011) revealed that MMR requires additional time due to the need to collect and analyse two different types of data. For a nascent programme, three MMR out of the twelve studies conducted in RAM demonstrated that the Department was inclined towards qualitative research with eight dissertations recorded. Only a single study was recorded as quantitative in RAM.

Conceptualisation Level

Conceptualisation includes the formation of research purposes and questions. Mixed methods titles, research questions and the nature of problems should demonstrate the intent of the study at the conceptualisation level. An analysis of the MMR in the three-year under review shows that graduate students in the Faculty of CIS failed to meet the conceptual requirements of the MMR when omitted words "mixed methods" in their titles. According to Guetterman (2017), mixed methods titles should include the words "mixed methods" and the titles should be short and precise. According to Guetterman (2017), a typical mixed methods title would read:

In their own words and by the numbers: A mixed methods study of Latina community college presidents. (Munoz, Community College Journal of Research and Practice, 34(1-2), 153-174.)

Those studies that alluded to methods aspect in their titles generally made reference to a case study, which is a as a strategy of inquiry not MMR. One such example was from a LIS dissertation and reads: *"The dissemination of agricultural research information to selected wards in Matobo district: a study case of Matopos research station"*

Another example from RAM reads*: "Use of E-learning resources at Zimbabwe Open University Harare campus"*

Further the studies used directional words such as 'exploring'. Creswell (2015) cautions against using terms such as 'explore' etc., in an MMR study. One such example was from JMS and reads: *"Exploring the relationship between science communication and university image and reputation: A case study of NUST"*

Creswell and Plano Clark (2011) noted that research problems suited for mixed methods are those in which one data source may be insufficient, results need to be explained, exploratory findings need to be generalised, a second method needs to compliment a primary one, a theoretical stand needs to be employed and an overall objective can be addressed with multiple phases or projects. It was also found that the problems that were stated in all the studies (N=40) were suitable for mixed methods design. One study was concerned with how the media organisations are tapping into online advertising as a measure to remain viable and from this, it was deduced that the MMR was suitable in the sense that the results of the quantitative content analysis of online adverts required to be explained by in-depth interviews regarding the benefits yielded by the organisation from online adverts.

Creswell (2007) as cited by Schiazza (2013) noted that there are three approaches to writing MMR questions. The first one is to provide only a MMR question. The second one is to provide both a quantitative and qualitative research question, followed by a MMR question. The third approach is to provide qualitative and quantitative research questions but no MMR question. According to Schiazza (2013), this approach de-emphasizes the integrative aspects of the study by focusing on only the individual

quantitative and qualitative components of the study. From the review of graduate studies, the second approach was favoured by the students. However, the students failed to categorise their‚ research questions as either qualitative or quantitative and did state a MMR question afterwards. Categorisation of the research questions is important because if a study is sequential, the research questions should allude to the component being addressed first. Research questions in mixed methods studies are vitally important because they, in large part, dictate the type of research design used, the sample size and sampling scheme employed, and the type of instruments administered as well as the data analysis techniques (i.e., statistical or qualitative) used (Onwuegbuzie & Leech, 2006).

Graduate dissertations were found to mix both the 'how' and 'what' questions without any particular order and it was very difficult to know the design in use. However, the use of how and why and what questions was found to be consistent with the dictates of mixed methods. According to Creswell (2003), mixed methods focus is on the 'how' and 'what' questions. This is buttressed by Saunders, Lewis and Thornhill (2009) who state that a pragmatic approach is a better process of answering the 'what', 'what' and 'how' research questions. However, another challenge in the use of MRR was identified where in some instances students would ask "what' questions only or 'how' question only. This kind of questioning demonstrated that the researchers failed to consider integration at conceptualisation when the questions were excogitated. Bryman (2007) perceives the poor development of MMR questions as a possible barrier to integration.

However, an analysis of graduate dissertations revealed their MMR was compromised by lack of time and financial resources needed. According to Creswell and Plano Clark (2011) mixed methods requires extensive time, resources and effort on the part of the researchers. All the reviewed studies (N=40) mentioned time and financial resources as the major challenges. It was established that the studies were completed in a period ranging from three to four months period. For example one study stated "the study was conducted in a limited period of time (from January to April 2016)." It was further discovered that all the studies were self-sponsored, meaning that students were limited financially to ensure that all the required resources to develop a complete MMR study. McKim (2017) puts it: "researchers typically require additional funding for added supplies, extra space to interview participants or administer a survey, and assistants to help with data collection and data analysis."

Integration Through Research Philosophy

Research philosophy is conceptualised in terms of four sets of assumptions related to ontology, epistemology, axiology, and methodology (Saunders, Lewis, & Thornhill, 2016; Bryman & Bell, 2011; Creswell & Plato Clark, 2007). The major philosophical approaches that can be used to underpin MMR are pragmatism, critical realism transformative. Pragmatism as a research philosophy asserts that there are many ways of interpreting the world and undertaking research, that there is no single point of view can ever give the entire picture and that there are multiple realities (Bryman & Bell, 2011, p. 32). Critical Realism adopts and supports characteristics from both quantitative and qualitative approaches (Creswell & Plato Clark, 2011). The critical realist is of the view that there is no way in which the investigator can claim to have absolute certainty regarding the findings of their investigation. Key differences between pragmatism and critical realism can be found at "the epistemological level in that critical realism understands reality as a single reality that is probabilistically true and independent of the mind whilst pragmatists view reality as containing elements that are accessible and independent of the mind as well as elements

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that are constructed and therefore dependent on the mind" (Darracott, 2016). From an epistemological perspective, pragmatism already leans more towards MMR (Darracott, 2016). Equally, critical realism is well suited to MMR because of the admission that research is undertaken to develop deeper levels of exploration and understanding (McEvoy & Richards, 2006 in Halcomb & Hickman, 2015). A transformative perspective suggests an orienting framework for a mixed methods study based on creating a more just and democratic society that permeates the entire research process, from the problem to the conclusions, and the use of results (Mertens, 2009).

Findings of the study indicate that all 40 graduate students who elected to use MMR mentioned pragmatism as their research philosophy. The reasons given for adopting pragmatism were rooted in the methodological set of assumptions. All the 40 graduate students did not reflect on the nature of reality (ontology), nature of knowledge (epistemology) and values (axiological) beliefs to justify pragmatism in their studies. These findings are similar to those of Bryman (2007) who discovered through interviews with U.K social researchers that MMR seem not to dwell on epistemological and ontological issues. The silence on the other sets of philosophical assumptions by students was perhaps done to "avoid clashes in the philosophical assumptions" (Tonkin-Crine et al., 2016, p. 2) that underlie the methods. However, within the methodological set of assumptions addressed by students, pragmatism was advanced on the basis of flexibility and eclecticism. For example, one study mentioned "pragmatism was selected as the philosophical basis for the study to enable the researcher to be flexibility in the choice of research methods…" and another study stated, "Pragmatism gave the researcher leeway to integrate methods within this study." Another study justified pragmatism in terms of the methodology by stating that "it fits well with my research strategy- case study- chosen". Another claimed, "the researcher opted for pragmatism because it can be underpinned in mixed methods design…" However, justifying the use of different methods in a study through pragmatism was criticised by Denzin (2012) because "pragmatist focus is on the consequences of action, not on combining methodologies" (p. 83).

Additionally, pragmatism was justified on the basis of practicality because it focuses on the problem or research question, for example, one study noted that "pragmatism view takes a practical orientation to a problem and finds a solution that fits a particular context" and another study stated, "pragmatism was necessary for this study because it does not focus on the data collection used but rather it pays attention to the problem." Another study stated "pragmatism generates solutions which are fit for purpose." However, students did not elaborate or make a follow-through on the nuances that are necessary to link problems and methods together. Hesse-Biber (2015) observed that just how the research question or problem enters into the MMR project remains woefully unarticulated. By focusing on "what works" approach, students were able to sidestep the hard ontological and epistemological issues surrounding the mixing of more than one paradigm in a single study. Such a framing of pragmatism by graduate students in MMR was criticised Hesse-Biber (2015) because it delinks pragmatism from its philosophical roots. From the study, findings it was therefore difficult to see how multiple realities advanced by pragmatism affected their studies or how ways of knowing intersected with their researches. Some students failed completely to justify the use of mixed methods in their studies and would just highlight the advantages and disadvantages of pragmatism from various scholars without linking the same to their own studies. For example, one study listed advantages and challenges as outline by Creswell (2003) without elaborating and contextualising them in their study.

Integration Through Design

The integration of the qualitative and quantitative strands in mixed methods studies of graduate studies at the design level was partially done in a predominantly concurrent manner. Of the fourteen dissertation that reported their integration at the design level, twelve (12) used the concurrent design. These results differ from those of Molina-Azorin and Cameron (2010) in management research community where sequential implementation of data collection was the most common implementation pattern. The prevalence uses of the concurrent mixed methods design by graduate students could have been informed by the research questions as noted earlier on by it could be due to constraints in time and resources. Usually, sequential designs demand more time and resources due to the phases involved. All the MMR studies mentioned time and financial resources as major constraints in their studies. A majority (N=26) of the mixed methods studies did not specify their integration preferences at the design level. Table 6 shows the results. From the analysis of graduate studies, it is noteworthy that all the graduate studies that did not indicate their MMR design were also silent about the priority of the qualitative and qualitative strands in their studies.

Visual Models for the MMR Designs

A visual model which depicts a mixed methods procedure in a study is usually given to help the reader understand the whole in a single effort. An analysis of the LIS graduate studies revealed that all the studies did not include a visual representation of the mixed methods design adopted as suggested by Creswell (1999). An example of a visual display as provided by Guetterman (2017) is depicted Figure 1.

   A visual display in Figure 1 shows a convergent mixed method design where qualitative data and quantitative data are collected and analysed at the same time frame for the purpose of comparing or relating. The lack of such visual models to characterise the MMR in the analysed dissertations of graduate students demonstrated the lack of craft competence and knowledge needed in developing a mixed method design.

Integration Through Methods

One of the key principles of a MMR design is to identify the reasons for mixing quantitative and qualitative methods within a study. Mixed methods can be used for building, connecting, merging or embedding. Integration at the methods level was reported by thirty-six out of the forty dissertations and described

Figure 1. An example illustrating a visual display (convergent mixed methods design) Source: Guetterman, 2017

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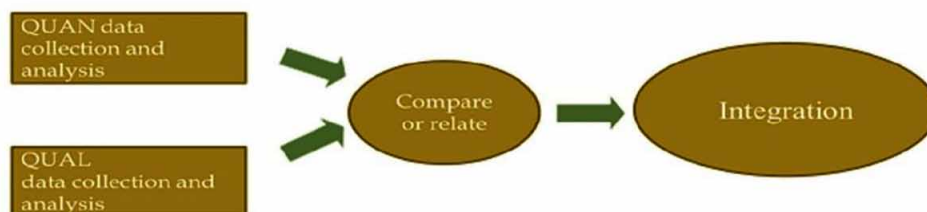
their reasons for mixed methods. Twenty-eight of these studies employed mixed methods for *merging* purposes where both qualitative and quantitative strands were combined simultaneously. *Merging* was done through comparison where qualitative and quantitative data results on common themes were brought together iteratively to determine the extent to which the two forms of data confirm, contradict, or expand (this is demonstrated later in the chapter under fit of data integration). The merging of the two databases simultaneously was consistent with studies that chose the concurrent mixed methods design. Mixed methods researchers can give equal priority or weighting to both quantitative and qualitative research or prioritise qualitative or quantitative strands. The equivalent status/simultaneous design: QUAL+QUAN was favoured in the reviewed dissertations. The merging, as recorded in the dissertations, was done to increase the "… extent to which findings may be trusted and inference made" "credibility of results", "triangulation", "corroborating research findings", "relating results" "reduce bias", and "to compare". O'Cathain et al. (2007) in their studies found comprehensiveness as the reason for mixing methods. To achieve this, studies commonly employed questionnaires, interviews, and observation. Employing MMR for the reasons outlined above is nothing short of triangulation of data and methods to confirm results and not to generate new findings as is the case with triangulation in mixed methods (a section on fit of data integration demonstrates this). MMR goes beyond a mere superficial combination of data from quantitative and qualitative methods (Ngulube & Ngulube, 2015). Ngulube and Ngulube (2015) gleaned from several scholars who supervised graduate research that there is a lot of confusion around 'triangulation' as a concept used in social science methodology and 'triangulation' as a research design in MMR.

Four graduate dissertations integrated qualitative and quantitative strands for the purposes of *connecting* one database with another. To this end, the most common connection integration approach was to use qualitative data to support quantitative findings. In this case Equivalent status/ sequential design: QUAN→QUAL was preferred. Two studies identified *embedding* as the reason for using the mixed methods design where data collection and analysis link at various levels. Two studies used mixed methods for *building* purpose that is the studies started with a qualitative phase followed by the quantitative phase. Four studies were silent on the reasons for employing MMR.

Integration Through Reporting and Interpretation

Integration at the interpretation and reporting level was achieved through the narrative approach by most of the dissertations (N=38). Results were connected to each other thematically, and the qualitative and quantitative data weaved back and forth around similar themes or concepts. Further analysis revealed that quantitative and qualitative findings that were synthesised through narrative both in the results, and discussion sections used weaving (N=27); contiguous (N=8) and staged (N=2). The weaving approach which involves writing both qualitative and quantitative findings together on a theme-by-theme or concept-by-concept basis was common with students. Figure 2 illustrates this weaving approach in one of the dissertations examined.

The use of the weaving approach at the reporting and interpreting level demonstrated that the students were concerned more about relating and comparing results for the purpose confirming and validation and this was seen to be consistent with the goals of triangulation. The contiguous approach which involves the presentation of findings within a single report with the qualitative and quantitative findings reported in different sections was employed by studies that chose sequential designs. An example of a study that used contiguous approach looked at the factors that affected the use of an e-learning platform at a secondary school. The study distributed questionnaires to school pupils and conducted interviews

Figure 2: Example illustrating a weaving approach
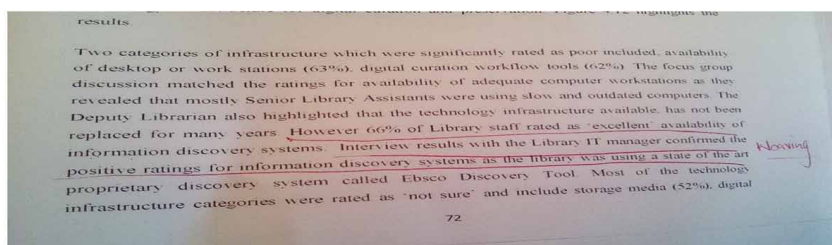
with teachers. In reporting and interpretation of finding the study started by the quantitative findings derived the questionnaires and then presented qualitative findings from the interviews thereafter. Another integration approach which was rarely employed by the students is data transformation where one form of data is transformed into another form. In the two studies that employed this technique, qualitative data was transformed into quantitative data.

Fit of Data Integration in the MMR Dissertations

The fit of data integration refers to coherence of the quantitative and qualitative findings (Fetters et al., 2013). The assessment of the fit of integration leads to three possible outcomes namely confirmation, expansion, and discordance. Forty MMR dissertations of graduate students were examined to establish the fit of data integration. Research questions posed by graduate students were used to track on how data was reported and interpreted. To this end, 160 research questions were recorded from the forty MMR dissertations with each dissertation averaging 4 research questions. The reported and interpreted findings for each research question were analysed to establish the outcome of integration between the qualitative and quantitative data sets. Statements that represented the possible outcomes of integration were recorded and quantified.

It was established that 83 statements represented a confirmation outcome where findings from both types of data confirm the results of the other. In most cases, students would use interviews as a method to confirm findings from questionnaires. Twenty-seven statements represented an expansion by describing complementary aspects of a central phenomenon of interest. In most cases, the qualitative data provided more detail regarding issues addressed in quantitative data. These findings support the argument by Giddings in Hesse-Biber (2015) who noted that mixed methods will only serve to strengthen the positivistic paradigm and qualitative approaches remain just "added and stirred" into a general "positivistic" methodological approach. Thirty-one statements indicating discordance where qualitative and quantitative findings contradict, conflict, or disagree with each other were recorded. Seventeen research questions reflected instances where single data set was reported and analysed and therefore were recorded as not applicable. Table 6 shows these findings and provides few statements of the range of recorded statements in dissertations describing the fit of data integration in terms of confirmation, expansion, and discordance.

Often, discordant results are of concern to MMR researchers who seek integration of qualitative and quantitative data sets. According to Fetters et al. (2013), investigators may handle discordant results by gathering additional data, re-analysing existing databases to resolve differences, seeking explanations from theory, or challenging the validity of the constructs. Graduate students dealt with discordant findings by either ignoring the discordance (N=20), seek corroboration with existing literature (N=7) or

Table 6. Fit of data for integration

Fit of data integration	Number of students	Example of statements
Confirmation	83	"this was echoed in interviews with…." 'Interviews results with IT manager confirmed the positive rating" "through analysis of different circulars and memoranda, the researcher also noted this aspect" "Results from the questionnaire also revealed this aspect" "to validate the findings the researcher also noted through document analysis
Expansion	27	"Interviews with IT librarian explained that….." "Focus groups revealed low confidence…." "Some participants went further….."
Discordance	31	"In contrast to the survey findings…" "Contrary findings from the interviews…" "These results contradicted comments from…"
Not applicable	17	Single data set was reported and analysed

give precedence to the quantitative strand of the data (N=4). It was, therefore, inferred that students used these strategies because they were the most convenient because of limited time and resources and probably that students did not know what else to do with divergent data. In any case, the strategies used by graduate students did not benefit or add much value to the qualitative and quantitative findings in order create a "whole which is greater than the sum of the parts" because they did not lead to new findings or a richer understanding. An example of a study that had a questioned that ignored the discordance of findings is shown in Figure 3. The question asked by the student was to do with the effectiveness of training methods employed by NUST Library. Trainees were not satisfied with the effectiveness of training methods whereas trainers rated the training as effective. Although the researcher acknowledged the self-bias reporting inherent in the findings, nothing was done to solve the disagreement and instead made a neutral conclusion.

An example of a research question that sought corroboration from literature after discovering discordant findings looked at the transfer of training to the job at NUST Library; it looked at whether trainers informed their subordinates of the forthcoming training activities in time. This question generated incongruous results and the investigator was quick to seek corroboration from literature in order to neutralise the disagreements between data sets. Figure 4 illustrates this phenomenon.

An example of a research question that generated dissonance results and gave precedence to the qualitative strand had to do with the use of online reference services. The investigator wanted to know whether the use of online reference was related to gender. The investigator dealt with the challenge by

Figure 3. Example of a question that ignored the discordance in findings
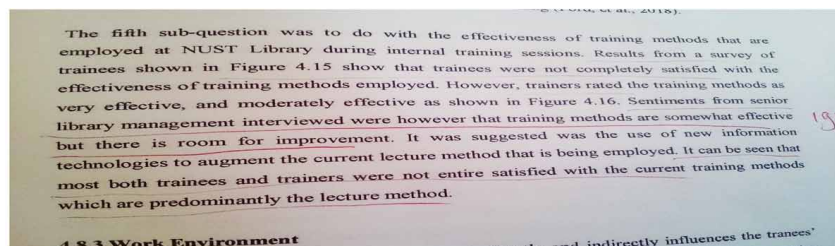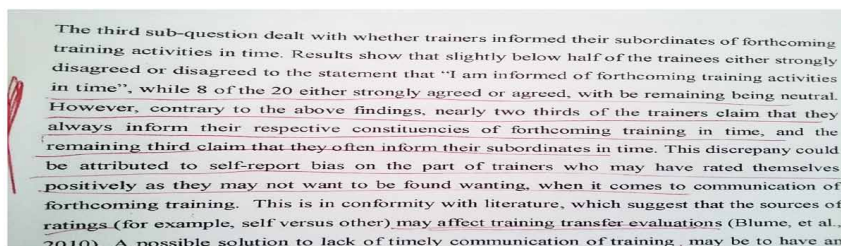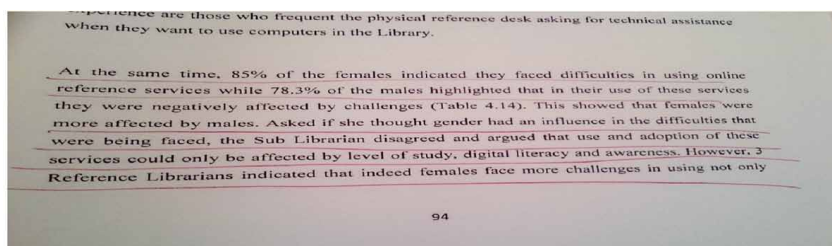
Figure 4. Example illustrating corroboration from literature

Figure 5. Example illustrating investigator giving precedence to the quantitative data set

giving precedence to the quantitative strands and concluded that woman had challenges in the use of online references than their male counterparts despite the fact that interviews with respondents produced divergent results. This suggests that the investigator believed that acquiring knowledge through measurement was more superior to people's meanings and as a result discredited the results from the interviews. Figure 5 illustrates this phenomenon.

In the final analysis, 14 (35%) of the 40 graduate studies who used the mixed methods design could be classified as MMR because they managed to include some aspects in all the levels of integration although these studies did not fully meet all the requirements of MMR. Important missing information was the categorisation of research question as either qualitative or quantitative information; incomplete titles, type of analysis used to answer each of the research questions; if more than one type of methods were used for a given research question. The remainder, 65% (N=26) were underdeveloped because they lacked critical components or features that identify a MMR such as design, methods and justification for engaging MMR at philosophical, method and data integration level. Further, integration was done for the purpose of triangulating results one type of data sets, that is, qualitative data confirming the findings of the quantitative one. The way students dealt with discordant result further demonstrated that they did not benefit much from the integration of qualitative and quantitative data sets. Tables 7 summarises findings using the conceptual framework developed for the study.

FUTURE RESEARCH DIRECTIONS

The study discovered that MMR was widespread in LIS in the three years under consideration compared to JMS and RAM. An empirical investigation as to why JMS and RAM students were not commonly using MMR in their studies would be of interest because the new direction in research is the interplay of

Table 7. Level of the study where the integration was done

Integration level	Approaches	Description	Studies
Conceptualisation (N=40)	●Title ●Statement of the problem ●Research questions ● Feasibility	**Title:** should contain the words mixed methods	0
		Problem: suitability of mixed methods design	Suitable =40
		Research questions: must allude to mixed methods	0
		Feasibility- in terms of time, resources and skills	0
Philosophy of science(N=40)	●Pragmatism ●Critical realism ●Transformative	**Four set of assumptions**	
		Ontology: nature of reality	0
		Epistemology: nature of knowledge	0
		Axiology: values	0
		Methodology: how one attempts to investigate	40
Design (N=14)	**3 core designs** ● Exploratory sequential ● Explanatory sequential ● Convergent	●**Exploratory sequential**: Two-phase. Qual ► Quan	2
		●**Explanatory sequential**: Two-phase. Quan ► Qual	0
		●**Convergent:** This involves collecting both quantitative and qualitative data simultaneously Qual ↕ →Compare/relate Quan	12
Methods (N= 36)	**Purpose** Quan-Qual: **Connecting** ●Qual-Quan: **Building** ●Both Qual and Quan at the same time: **Merging** ●**Embedding**: involve any combination of connecting, building, or merging	**Connecting:** one database links to the other through sampling.	4
		Building: one database informs the data collection approach of the other.	2
		Merging: the two databases are brought together for analysis.	28
		Embedding: data collection and analysis link at multiple points.	2
Interpretation and reporting (N=40)	**Style** ●Narratives ●Data transformation ●Joint displays	**Narratives**	
		Weaving	27
		Contiguous	8
		Staged	2
		Data transformation- transforming one form of data into another form.	2
		Joint displays: integrate the data by bringing the data together through a visual means to draw out new insights	1

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methods in generating knowledge. In the same vein, it would be of interest to know why JMS and RAM students predominantly use qualitative research in their studies. Is it something to do with the nature of their studies or it is a shortfall?

CONCLUSION

It can be concluded that MMR in the Faculty of CIS has not gained roots across departments save for LIS department which had been consistent in applying the method since 2016, albeit uncritically. The study found that majority of the MMR 81.8% (N= 33) came from the department of LIS. JMS and RAM held a negligible 10% (N=4) and 8, 2% (N=3) respectively. Qualitative research still dominates the research methodologies in the Faculty of CIS as it was established that 53, 6% (N=51) of the dissertations in the Faculty of CIS at the NUST used qualitative research design. Graduate students lacked the requisite skills to conduct full MMR as most of the studies were underdeveloped and lacked details about integration. For example, pragmatism was chosen as a research philosophy however it was not adequately justified in the dissertations. The integration of qualitative and quantitative aspects at methods and analysis level sets up students to confuse and conflate triangulation with MMR. Integration of qualitative and qualitative findings was primarily done to confirm the results of the other and in most cases the qualitative aspects were used to confirm the quantitative findings. This approach to integration did not lead to new findings or a richer understanding and in most cases graduate students dealt with discordant findings by seeking corroboration from literature and in some cases ignore the discordance or give precedence to the quantitative results.

It can only inferred that the limited time students operated with to complete their dissertation meant that was impossible for students to gather additional data, challenging the validity of the constructs, or re-analysing existing databases to resolve differences as suggested by various scholars (Tonkin-Crine et al., 2016; Pluye, 2014; Fetters et al., 2013). The fact that students did not acknowledge the challenges of integration buttresses the point that they had insufficient understanding of the method. Additionally, the paucity of practical examples of how integrated can be achieved leaves students without examples of best practices to inform their own practice (Bryman, 2007). Given the above, it is recommended that graduate students should use this method with caution because quantitative and qualitative findings were either not integrated or integrated to only a limited extent. Further, the Faculty should develop a mechanism that ensure those students who wish to use the method gain enough knowledge and experience before they are thrown into the deep end.

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KEY TERMS AND DEFINITIONS

Dissertations: Is a philosophical treatise addressing a knowledge gap and/or practical problem through research and is usually done for an advanced academic degree.

Graduate Students: A graduate student is someone pursuing a post-graduate degree in a particular field.

Integration: Is a deliberate, calculative joining of quantitative and qualitative elements in a single study for the purposes of casting new light to a phenomenon under scrutiny.

Mixed Methods Research: Is a research design that combines both quantitative and qualitative elements throughout the research process, from the world view assumptions to the analysis and reporting of data.

Paradigm: A paradigm is set of belief systems underlined by ontological, epistemological axiological and methodological assumptions.

Qualitative Research: Is one which a researcher focuses on the meanings participants ascribe to a social phenomenon.

Quantitative Research: Is an investigation where the researcher relies on measurement and highly structured observation to discover cause-effect relationship between phenomena.

Chapter 24
Research Data Management Among Researchers in Higher Learning Institutions of Sub–Saharan Africa

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ABSTRACT

Advancement in information and communication technologies has made it easier for researchers to capture and store myriad data at a higher level of granularity. Higher education institutions (HEIs) worldwide are incorporating research data management (RDM) services to enable researchers to work with their data properly. This chapter focuses on creating awareness amongst researchers on how researchers and HEIs can form strategies, design and restrict data management plan (DMP), integrate research data life cycle, and ensure quality data sharing, as well as integrate with developed RDM policies and guidelines to curb challenges prohibiting the practice of RDM in HEIs.

BACKGROUND AND INTRODUCTION

Tanzania is among Sub-Saharan Africa (SSA) countries which are currently practicing research data management (RDM) services. However, RDM is still at the infancy stage in most of SSA. Onyancha (2016, p. 227) found that only 20 out of 50 SSA's countries had produced one or more data records in the Data Citation Index (DCI). The highest level of data-sharing in the region is done by South Africa. RDM based training programs occupy a significant part in South Africa. Matlatse, Pienaar and van Deventer (2017, p. 301) identified five data science-related degrees in South Africa, that is MPhil in digital data curation from the University of Cape Town (UCT) in Cape Town, Master's degree in Information Technology (Big Data Science) from University of Pretoria (UP) in Pretoria, BSc Honours in the field of Big Data Analytics from the University of the Witwatersrand (Wits) in Johannesburg, and Bachelor of Science Degree in Data Science from the Sol Plaatje University in the Northern Cape Province. Short courses in RDM and continuing professional development also provide the concept of RDM in SSAs. During designing institutional RDM policy in Tanzania the authors observed there were more than 10 RDM centres which were established to manage research data based on health, geospatial, and environment and migration data.

In addition, government bodies in Tanzania which were practicing RDM included the National Bureau of Statistics (NBS), National Identification Authority (NIDA), the Immigration Services Department, the Tanzania Airports Authority (TAA), Ministry of Home Affairs, Tanzania Revenue Authority (TRA), Tanzania Investment Centre(TIC), Tourism, Labour and Public Services, Tanzania Open Data Lab (DLab) and the International Organization for Migration (IOM), other organizations such as Tanzania Employment Services Agency (TAESA), the Export Processing Zones Authority (EPZA), and Tanzania Trade (TANTRADE) also store digital and hence, they are kept as MS Word or Excel files instead. In HEIs in Tanzania, only the University of Dar-Es-Salaam (UDSM) has established a data-sharing service, known as Tanzania Open Data Lab (DLab), under its College of Information and Communication Technologies (CoICT). UDSM also developed a system called the Research Information System (RIS), which is used to store information concerning research data and outputs.

This chapter explores why RDM is essential in HEIs and its implications for researchers. Traditionally, researchers experience challenges in managing data, such as data loss, poor storage due to limited awareness on (RDM). The advancement in information and communication technologies integrating RDM services has made it easier for researchers to capture and store a myriad of data for re-use and sharing. RDM has proven to provide a flexible working environment for researchers integrating types of data and data format to incorporate both research paradigm such as positivism (quantitative), and interpretivism (qualitative).

Nevertheless, there is a lack of linkage and networking through the use of ICT for data sharing which creates challenges and hinders the accuracy and quality of data usage. Institutions in developing countries still use alone technologies such as MS Word, Excel and accessing data becomes limited. Hence, considering structured designed of data creation, processing and dissemination strategies will increase the quality of data hub and assist accurate decision making for researchers examining RDM.

Therefore, the chapter explains the essence of RDM, data management plan (DMP), research data life cycle (RDLC), and RDM policy for researchers.

RESEARCH DATA MANAGEMENT (RDM)

RDM is part if the research process aims to make the research process as efficient as possible and meet expectations and requirements of the university, research funders, and legislation. It is concerned with the organisations of data, from its entry to the research cycle through dissemination and archiving of valuable results. Thus, RDM is understood by defining data. Data are items of recorded information considered collectively for reference or analysis. Kaye, John, and Bruce (2017, p. 301) state that data can occur in a variety of formats that includes, but are not limited to:

- Documents, spreadsheets
- Laboratory notebooks, field notebooks, diaries
- Questionnaires, transcripts, codebooks
- Audiotapes, videotapes
- Photographs, films
- Test responses
- Slides, artefacts, specimens, samples
- Collections of digital outputs
- Data files
- Database contents (video, audio, text, images)
- Models, algorithms, scripts
- Contents of an application (input, output, log files for analysis software, simulation software, schemas)
- Methodologies and workflows
- Standard operating procedures and protocols

However, among the forms mentioned above of data such as laboratory notebooks, ice-core samples and sketchbooks are recommended to be digitised following appropriate procedures.

RESEARCH DATA CAPTURING TECHNIQUES FOR QUALITATIVE AND QUANTITATIVE DATA

Research data, unlike other types of information, is generated, collected, categorised, analysed and reported to produce original research results. Thus, researchers must be well informed and guided during the project write up by providing a research management plan which becomes basis for understanding how various types of data and techniques can be captured, collected, categorised and analysed. Research data is collected and used in scholarship across all academic disciplines, and consists of numbers in a spreadsheet, and it takes many different formats, including videos, images, artifacts, and diaries. Research data also comes in different types and is gathered using a wide variety of methodologies. For example:

Observational Data: Data obtained in real-time, and is usually irreplaceable, for example, sensor data, survey data, sample data, and neuro-images.

Experimental Data: Data obtained from laboratory equipment, which is often reproducible, but this can be expensive. Examples of experimental data are gene sequences, chromatograms, and toroid magnetic field data.

Simulation Data: Data is obtained from test models where model and metadata are more important than output data. Examples are climate models and economic models.

Derived or Compiled Data: Data transformed from pre-existing data points. It is reproducible if lost, but this would be expensive. Examples are data mining, compiled databases, and 3D models.

Reference or Canonical Data: Data which static or organic conglomeration or collection of smaller (peer-reviewed) datasets, most probably published and curated. For example, gene sequence databanks, chemical structures, or spatial data portals.

Researchers, once they have known the preliminaries, the next stage would have to see the data management plan.

Data Management Plan (DMP)

DMP comprises the process of laying down strategies to assist the researcher in the process for data creation, organising, accessing controlling and sharing data. Increasing data credibility, funders requires and promotes DMP integrated to research activity plan. According to NC State University Library (2019) has mentioned elements for developing DMP which includes:

- Roles and responsibilities,
- Types of data, data formats,
- Metadata and access,
- Sharing and privacy,
- Policies and provisions for re-use and distribution,
- Data storage and preservation,
- Costs and DMP tool: create ready to use plans.

Notably, DMP should be well outlined on how project data should be findable, accessible, interoperable and reusable (FAIR) (Kruce & Boserup, 2018, p.4). DMP becomes a prerequisite for RDLC for researchers.

RESEARCH DATA LIFE CYCLE FOR RESEARCHERS (RDLC)

The DMP, as it is said, is the prerequisite for RDLC. RDLC explains the lifespan of research data generated by the researcher and providing data authenticity on the re-use by other researchers. Thus well organised, well documented, preserved and shared data are valuable to advance scientific inquiry and to increase opportunities for learning and innovation. Research data should, therefore, be integrated into the researcher's activities and managed to the highest standards throughout the research data lifecycle (Whyte & Tedds, 2014, p. 1). The sequential steps for RDLC for researchers are presented by Oregon State University as shown below

The boxes above, each represents a stage in the research lifecycle for a given project. Transitions connecting the stages linking project data indicated by solid black arrows are susceptible to data loss. These phases are often concurrent with shifts in responsibility for the data (e.g. from data collector to data analyst, or from graduate student to Project Investigator (PI), which makes transitions significant for active data management. Data loss may occur in various ways, with numerous reasons: data may

Figure 1. RDLC (University of Oregon State University 2019)
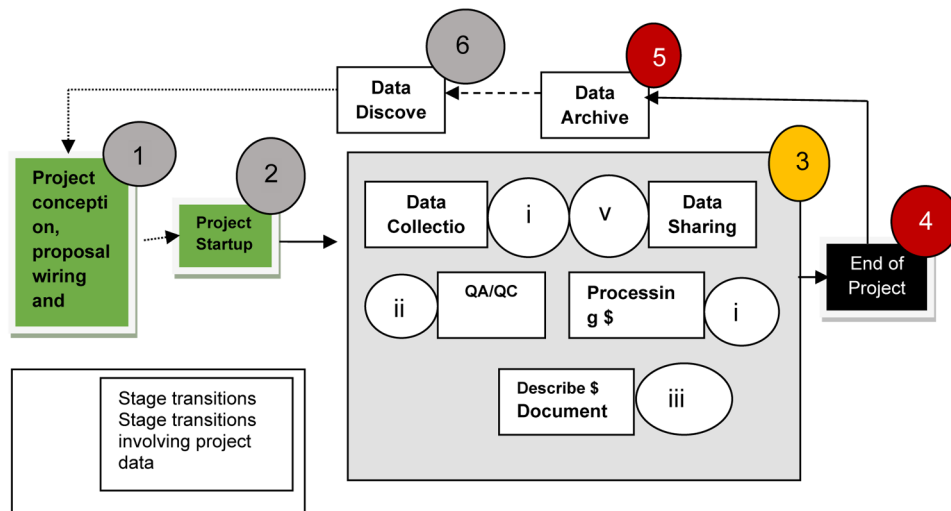
be unused due to lack of necessary background details such as insufficient documentation/metadata); failure to process data into the next phase and reaching to end preceding to systematic preservation; data may be physically misplaced. The lifecycle model is used to provide the context in describing data management activities that should occur throughout a research project.

RESEARCH LIFE CYCLE STAGES AND DATA MANAGEMENT ACTIONS

1. **Project Planning:** Project ideas are developed and fleshed out in a proposal. Review existing datasets. Determine where you will archive the data (your funder may have a required location), and consult with the archive about metadata and data formatting requirements. Plan consent for data sharing, if needed. Determine costs related to data storage and archiving.
2. **Finalise Plans for Data Documentation Procedures:** Revise DMP if necessary. Communicate data responsibilities to project members. Establish, document and communicate protocols and methods.
3. Project data lifecycle (note: all 'stages' may coincide)
   ◦ Organise files; use consistent, thoughtful file-naming conventions; carry out regular back-ups; consider access control and security.
   ◦ Assign clear roles for questions and answers; check instrument precision, bias, and scale; replicates were promising; the usage of controlled vocabulary on log/data sheets; check for out-of-range values, empty cells, etc.
   ◦ Check the methodology; study area, sampling and sampling techniques, data collection procedures, data analysis validation, reporting etc.
   ◦ Document and manage file versions; write software codes with future sharing in mind; document file manipulations etc.
4. **Project Wrap Up:** Determine appropriate file formats; finalise data documentation; share data within the project team for analysis and interpretation.

5. **Write a Paper(s):** Deposit data in archive or repository.
6. **Provide the Link:** To enhance availability and access of data.
7. **Perform Data Management Audit and Submit the Final Report:** To inform or as a requirement for funder or organisation such as university, library, research institute etc.
8. **Ensure Data is Available:** Through open data sharing mechanism for non-sensitive data or through request to the author for sensitive data such as medical history, diseases, budget etc.

Since implementation requires a strategy and a guideline to maintain the standard of given service, thus RDM policies and guidelines become vital.

RDM POLICIES AND GUIDELINES

Establishment for RDM policy and guidelines is imperative for knowledge creation and institutional development. Hence, policy development cannot be done without a well-designed, structured agreed framework. HEIs guides capturing research data from its inception, use, storage, archiving and retrieval as noted by (Monash University, 2013). Monash University (2013) affirms that the rationale of RDM policy is "to ensure that research data is stored, retained, made available for use and reuse, and disposed following legal, statutory, ethical and funding bodies requirements" Nevertheless, as research data output is shared, Various concerns have been raised who owns the data? How unethical issues such as allegation handled or treated? Who is responsible for providing resolutions? Is paramount, and requires special attention to safeguard researchers. Institutional policy Development is inappropriate to address these issues, as described by the National University of Singapore (2016) design and adoption of policies for research data management help to safeguard valuable data and assists to answer allegations of research misconduct. Considering RDM in HEIs through library service which works as a hub of knowledge creation and transfer, act as custodian to design policy gearing for RDM and play the role of harmonising RDM practice from its early stage of planning to storage. Considering the case of Zimbabwe the RDM being in infancy stage, this experience is covered in most developing countries as compared to developed countries.

In the UK 57 research institutions had commonly agreed in addressing 13 essential items to harmonise the RDM practices even though they are indifferences in the approach and implementation shown in (Digital Curation Centre, 2016) which stipulates these items as:-

- Offers definitions of key RDM terms, i.e. "data", "documentation."
- Defines roles' institution plays in supporting RDM implementation.
- Provides the requirement to complete a DMP (either institutional or funder).
- Specifies who covers the cost for RDM.
- Provides a clear statement to the ownership of the research data.
- Provides a statement on the primacy of external funding requirements.
- Provides a criterion on data and documentation required to be retained.
- Provides the minimum length of time data should be kept.
- Provides a statement on the ethical use/reuse of data.
- Provides a statement on how data will be accessed.
- Provides a statement on data availability.

- Provides a statement on the costs of RDM.
- Provides a statement on subject to periodic review.

Digital Curation Centre (2016) states that out of 13 variables, the statement made by the institution about ownership of research data is 10 out of 57, followed by the statement of RDM cost. This setup implies that ownership to most of the institutions for RDM policy and guidelines require clarity.

OPEN ACCESS TO DATA AND DATA SHARING

Researchers should know that of the fact that research data belongs to their institution or funder; however, this must be agreed before commencing to the research project. Generally, HEIs need these data to comply with project agreements, securing intellectual property rights where applicable, protecting the rights of the researchers concerning the access to data, and facilitating any investigation of charges of misconduct or conflict of interest (Crewe 2007, p. 2). Keeping these data open to be accessed is among the initiative worldwide; however each institution has its procedures. The group on earth observations (GEO) and the Committee on data for science and technology (CODATA) meeting held on 2015 about the value of open data sharing in which the following benefits of data sharing areas identified by (Hodson, Uhlir & Chu 2015, p. 4-5)

- **Economic:** Data sharing has economic benefits and growth, both public and private.
- **Societal:** Open data meet society's expectations of appreciating the management of appropriate management of public digital resources, provide various reputational benefits, and incorporate ethical principles for accessing and using data.
- **Research and Innovation:** Research and innovation expand with a policy of openness for upstream data resources. Such data can reduce unproductive barriers to interdisciplinary, inter-institutional, and international research. They enable data mining for automated knowledge discovery in a growing sea of big data. Open data are essential for verification of research results and in generating full trust in them. They avoid much inefficiency, such as the unnecessary duplication of research and identification of erroneous conclusions.
- **Education:** Closely related to public research opportunities are that the education of new generations is significantly facilitated.
- **Governance:** Finally, there are critical advantages for improved governance.

Even though there is a significant demand from publishers and funders to ensure that data are kept open, this is not the situation in different countries. In Tanzania for example, the majority of research institutions are not allowed to make their data open for sharing. Only the data in some governmental data centres, e.g. Tanzania Open Data Centre (http://opendata.go.tz/) is openly shared online. The National Bureau of Statistics (NBS) in addition to providing national data and reports to the public through the 2002 Statistics Act of Tanzania also has the mandate to approve which data the centres can openly share with the public. Data from Nation Bureau of Statistics (NBS) are used by other government agencies and are available on their website (www.nbs.go.tz) for the global public, including researchers.

Despite the advantages and principles of open data sharing mentioned, researchers need to understand that the value of any data lies in their use and re-use; however, this will depend on the type and sensitivity

of data before deciding on making them open. The advantages of data sharing must be established and shared among researchers to make them participate fully on data sharing motives within their institutions. On the other hand, HEIs need to ensure a reliable mechanism to motivate researchers to share their data.

CHALLENGES AND RECOMMENDATIONS

Challenges are facing HEIs to ensure the proper implementation of RDM. Lack of ICT infrastructure about migration research data is reduced. HEIs, especially those in developing countries, are using simple computers with office software where data are just kept in excel file. HEIs planning to implement RDM should ensure enough fund is provided for the activity. Various means of applying funds such as seeking donors, funding, project writings and government support should be prepared.

Bryant, Lavoie and Malpas (2018, p.13) report two other approaches that have been used to offer RDM infrastructure. One method is to use an eco-system of technologies, i.e. technologies such as repositories and data analytics tools that are deployed together by a service provider at the consortia or national level. Another approach is too different external service providers. This approach can include national or subject-specific repositories as well as services like Amazon's web services. The improvement of the first approach is that the technologies will likely work together seamlessly, and as various other groups use them, enough technical support will be available. The second approach is more advantageous if only some infrastructure, e.g. a high performance computer (HPC) is needed or if the institution wants only to offer the infrastructure once there is a demand for it.

Technology obsolescence and technology fragility, as noted by Harvey (2000) as cited in (Kennan & Markauskaite 2015, p.71) are among the challenges to be highlighted in implementing RDM. Thus, HEIs should ensure proper storage and preservation mechanism of the data. Backup and long term preservation should be provided as most of these data are in digital format. The University of Pretoria (UP) in South Africa applies two types of preservation of data to ensure long term preservation. Therefore bit preservation ensures that a file remains the same over the time, and not a single bit is changed while physical media evolve around it. Functional preservation ensures that the file does not change over time so that the material continues to be instantly usable in the same way as it was initially while the digital formats (and the physical media) evolve (Zierau, 2012, p. 473). Therefore some file formats can be functionally preserved using straightforward format migration (for example TIFF images or XML documents). However other formats are proprietary, or for other reasons are much harder to preserve functionally. Proper data curation should be in place to avoid technology obsolescence and technology fragility. DCC lifecycle model should be implemented the storage of data in repositories and enable such data to be re-used.

There is a lack of libraries' responsibilities ensuring implementation of RDM in HEIs. Academic libraries should provide advisory and consultation services on RDM in HEIs. These include data-related training and assistance on writing DMPs, whereas librarians should offer one-on-one consultations with researchers who are faced with writing DMPs. Researchers should rely on libraries for their DMPs and other activities related to RDM in general. Chigwada, Chiparausha and Kasiroori (2017, p.5) researched research institutions in Zimbabwe which indicated the roles of libraries to ensure the RDM services are conducted well and researchers are well informed and participated. Matlatse, Pienaar, and van Deventer (2017, p. 300) provide that HEIs have shifted the responsibility of RDM to library and information science (LIS) professionals.

CONCLUSION

RDM for researchers in Sub-Saharan Africa, specifically in HEIs, is still at an early stage and requires creating more awareness of research data management. As a prerequisite towards using RDM the consideration of data plan is essential. Additionally, various techniques and format using ICT are in place to capture qualitative and quantitative data to assist researchers storing and re-using data through the research life cycle for researchers. Open access to data and data sharing should be considered, and researchers need to be motivated to share their data. Implementation of RDM requires to be integrated well with research policy.

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Chapter 25
Research Productivity, Visibility, and Impact at the University of Namibia:
Building a Framework for Open Access and Research Data Management

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ABSTRACT

The global competitiveness drive, pursuit for relevance, and search for true identity continues to challenge many African universities in their quest to achieve the delicate balance of preserving national indigenous repute and worldwide visibility. For decades, universities have occupied a centre stage in this balancing act through research productivity, evaluation, and impact. The benefits of university research and innovation are varied, persuasive, well-documented, and acknowledged as benchmarks for the visibility, sustenance, and relevance of any modern university. This chapter examines the research profile of the University of Namibia (UNAM) by looking at its current research productivity, visibility, and impact in the SADC region and beyond. Using bibliometric and altimetric analysis from Web of Science, Scopus, and SciVal databases, and the institutional repository, the chapter underscores the fragility but evolving UNAM's research performance output and highlights open access and research data management as keys to enhancing institutional research productivity and visibility.

INTRODUCTION

There is a recurring academic narrative that has foundation in the notion that the emerging global competitiveness and knowledge economy underscores a universal shift that necessitates the increased use of performance measurement metrics as basis for the appraisal of universities' research output, productivity and visibility. Clearly, there is a contemporary drive towards university research output comparisons and ranking that now appears to be a compulsion to reassert the key role that modern universities can increasingly play in a knowledge-driven global economy. Clermont, Dirksen, Scheidt and Tunger (2017, p. 250), all agree to a larger extent that "various socio-economic developments, especially in the political sphere," have actually prompted the "increasing internationalization and harmonization of university performance. The comparison of research outputs among universities has been raising an increasing amount of interest in the last few years, in that, it adds value to the decisions in the allocation of limited funds as fairly as possible (Clermont, Dirksen, Scheidt &Tunger, 2017). Increasingly therefore, there has been attention on academic research productivity for the purposes of funding and promotion in universities as well as for comparison of the personal academic, institutional, specialties, and publications standings.

In this chapter, we examine the research profile of the University of Namibia (UNAM) by looking at its current research output, productivity, visibility and impact in the SADC region and beyond. The chapter first presents the background on the quest for the reclaim of the research agenda in African Universities. The chapter then discusses bibliometric as tool for measuring research output and the rationale for the evaluation of research output and visibility at UNAM. The research infrastructural profile of UNAM is highlighted and the findings and analysis regarding UNAM's research performance and visibility are presented. The chapter underscores the slack and fragility but positively evolving UNAM's standing; underlining issues of Open Access (OA) and Research Data Management (RDM) as fundamental to enhancing institutional research productivity, competitiveness and visibility at the institution. Discussions and recommendations are then drawn in context.

BACKGROUND

Research impact "is the degree to which research findings are seen, noticed, read, used, built upon, cited and applied by other scholars" (Bashorun, 2015, p.53). Most authors of scholarly content desire their papers to be widely disseminated, read, cited and built upon to increase scientific knowledge and research impact (Chan, 2004). In that regard, research performance and output remain a key ingredient in most African universities as they strive to achieve the delicate balancing act of preserving national indigenous repute and world-wide visibility. For decades, African universities are said not to feature well in the global university rankings due to among other reason, low research output (Andoh, 2017). In most African Universities, given the pressures of government policies of massification of higher education, research and innovation has fallen short and remained minimal, with teaching more pronounced (Andoh, 2017). Retracting the "lost mission of research" in Africa, Andoh (2017, p.20). validly observes that "the first universities in Africa were established with the mission of teaching, research and community engagement, but between the early 1970s and 2000, teaching became the only *de facto* mission of many of these African universities". He argues that most of the post-independence period witnessed a lot government and nationalistic interference in the running of universities. Andoh (2017, p.21) draws evidence to depict the low research output during that time. He says:

Data from Thomson Reuters Web of Science-Science Citation Index shows that Africa, excluding South Africa, produced 1646 publications between 1985 and 2000, and 5534 publications between 2000 and 2015 within the sciences. These numbers fall well below the total global scientific output for the same period, of nearly 44,963,737 (mostly from Europe and the United States of America)…[and] during the period of the "lost research mission", the ratio of gross domestic expenditure on research and development to gross domestic product of all African countries, excluding South Africa, was less than 0.2 percent and non-existent in most African countries… Postgraduate research was virtually non-existent and universities only carried out their mandate of developing human resources for their respective countries. African universities were associated with, among others, terms such as "teaching", "vocational", and "developmental".

Clearly, this indicates that in most African countries, research was never a priority with very low output. An earlier study commissioned by the Scholarly Communication in Africa Programme (SCAP) in 2014 that sought to understand the impact and visibility of African scholarly research argues that there are three primary reasons that account for the invisibility;

- Research production on the continent is growing in absolute terms, but falling in comparative terms (countries such as China ramp up research production), reducing its relative visibility.
- Traditional metrics of visibility (especially the ISI/WoS Impact Factor) which measure only formal scholar-to-scholar outputs (journal articles and books) fail to make legible a vast amount of African scholarly production, thus underestimating the amount of research activity on the continent.
- Many African universities do not take a strategic approach to scholarly communication, nor utilize appropriate information and communications technologies (ICTs) and Web 2.0 technologies to broaden the reach of their scholars' work or curate it for future generations, thus inadvertently minimising the impact and visibility of African research (Trotter, et al, 2014).

The SCAP study highlighted the importance of visibility in terms of digital open access. This means that scholarly outputs should be profiled in a way that makes it easily findable by search engines or databases through a relevant search string. Open Science principles through OA and Open Data are key to enhancing Africa's research visibility. OA advocates the profiling and curation of research outputs and its data, thereby making it freely available to the public. African research can benefit from OA principles and that may shape the academic discourse as it would be make more scholarly content more visible to scholars, governments, industry and civil society personnel who can leverage it for socio-economic development. Many studies have demonstrated that articles made available through OA are cited more than those of toll-accessed versions (Antelman, 2004; Hajjem, Harnad & Gingras, 2005; Sanchez-Tarrago & Fernandez-Molina, 2009). For example, Antelman (2004) found out that the relative increase in citation for OA articles ranged from 45% in philosophy, 51% in electrical engineering, 85% in political science and 91% in mathematics disciplines. In a similar trend, other findings show that OA articles received between 25-250% more citations than articles that are not freely accessible via the Internet (Hajjem, Harnad & Gingras, 2005).

In another related study, Ani, Ngulube and Onyancha (2017) used bibliometrics to examine patterns of trend in the annual publication in science (LIS) research from 2000 to 2014 in Nigeria. The study revealed the three most visible (productive) universities in LIS research were University of Ibadan,

University of Nigeria and the Delta State University. The study also affirmed that trends in research output were fluctuating and unpredictable. It recommended that there should be increased investment in universities towards a steady increase in sustained sources.

Nonetheless, there have attempts since the year 2000 for most universities in Africa "regain their "lost research mission" by prioritizing research as a new mission and vision" (Andoh, 2017, p.21). In recent times, there has been shift in policies "to embrace global changes in their missions and visions and that has been necessitated by global university rankings, internationalisation, and the massification of higher education" (Andoh, 2017, p.21). Therefore, after 2014, most have now invested more research, publishing, post graduate programmes and "the recruitment of more professors to supervise at master and doctoral levels and by establishing laboratories where research can be conducted" (Andoh, 2017, p.21). It is anticipated that if there is to be further improvement in research outputs, then they would need to double their efforts

METHODOLOGY AND SCOPE

The analytic tools such as InCites, which is built on Web of Science by Clarivate Analytics (Formerly Thomson Reuters) and SciVal Suite built on Scopus by Elsevier were used respectively to analyse the research profile of the UNAM. The Web of Science and Scopus are the major indexes that are globally used to provide bibliometric data, not only because of their scope and ability to provide bibliographic data but it is because they also provide a number of key features that allows for the production of citation counts and other bibliometric indicators (Boshoff & Akanmu, 2017). These includes features such as multidisciplinary, the capture of the names and addresses of all the authors of an article, and the establishment of links between the cited references of an article and all other articles in the indexed journals (Martín-Martín, Orduna-Malea, Thelwall & López-Cózar, 2018; Archambault, Campbell & Gingras, 2009). Web of Science and Scopus are therefore the largest abstract and citation database of peer-reviewed literature, featuring smart and present and delivers the most comprehensive coverage of science, technology, medicine, social of the worlds research output in the fields science and arts and humanities. Data was extracted of the time period is between 1996 and 2019. The data was extracted in February 2019 and analysis done between February and June 2019. This study is limited to exploring the research productivity and impact using bibliometric citation as well as altmetric downloads, view and analysis of the university research output from the local UNAM institutional repository. The social networks altmetrics were not covered in this study. Therefore, the university research impact from blogs, social networks such as Twitter, Facebooks, research gate, academia as well as sharing and savings of UNAM scholarly and non-scholarly communication in reference management software was not investigated.

USE OF BIBLIOMETRICS IN THE MEASUREMENT ACADEMIC RESEARCH OUTPUT

Currently, there are several quantitative indicators that are used to investigate and compare academic research output and productivity. Performance indicators and comparison analysis largely centres on the manipulation techniques of the bibliometric and altmetrics fields. In literature and practice, these include various calculations to analyse the number and citations of publications in order to capture both

the quality and quantity of publications, such as the: Journal Impact Factor, and Eigenfactor score and h-index, (in bibliometric) or alternative metric (altmetrics). In Africa, like most global universities, despite the limitations aforesaid of these indicators, their relevance in measuring the performance of research productivity, visibility and impact is still acknowledged (Onyacha, 2018).

For the past decade "Bibliometric has become a standard tool of science policy and research management" (Dimitra, Nikolaos & Maro, 2017, p. 1). Most of the studies that "measure national research performance in the international contexts or to describe the development of a science field with the help of bibliometrics" (Dimitra, Nikolaos & Maro, 2017, p. 1). In the literature reviewed, there appears to be an evolving relationship regarding the terms *bibliometric, scientometrics, informetrics, webometrics and altmetrics.* Thus, according to Dimitra, Nikolaos, Maro (2017, p. 1), "after the 1990s, bibliometrics transformed from a simple statistical bibliography study to a separate and unique field of study according to the Institute for Scientific Information – ISI - Science Citation Index – SCI". Scientometrics is usually described as the study of science and technology; including the interaction between scientometric theories and scientific communication (Mingers & Leydesdorff, 2015, Hood & Wilson, 2001). It is said that the term informetrics first appeared in 1979 and was adopted as an umbrella definition of *bibliometrics* and *scientometrics* in 1984 (Dimitra, Nikolaos & Maro, 2017). The definition covered both metrics and characteristics of retrieval performance measures (Hood and Wilson, 2001, Tague-Sutcliffe, 1992). *Webometrics* arose out penetration of Web 2.0 and use of Internet in science as a huge scientific database including link analysis, web citation analysis and search engine evaluation (Bar-Ilan, 2008, Thelwall, 2008). Thelwall, 2008). *Altmetrics* are in general from academic social media, and difficult to generalize due to the diversity between sources and measurable actions (Sugimoto et al., 2016). Altmetrics tend to focus on the "interaction with scientific blogs, grey literature, books and conferences compared with bibliometric that are unable to cover such sources. (Dimitra, Nikolaos & Maro, 2017, p. 10). Moreover, altmetrics are unstable and influenced by information providing services, such as Research Gate and Google Scholar; while bibliometrics, even though they can be effected by the scientific database (e.g. h-index), tend to be more stable (Ortega, 2015, Torres-Salinas et al., 2013). There should always a caution that "scientists should consider altmetrics as a complementary factor to bibliometrics and combine them for a more informed peer-review judgment, decreasing the dependence on less reliable indicators" (Dimitra, Nikolaos & Maro, 2017, p. 10). This particular study focused on bibliometrics. By general definition bibliometric represents the statistical analysis regarding books, journals, scientific articles and authors.

Bibliometric refers to "quantitative analyses of publication data using document-, author-, or source-(e.g., journal-) level data elements to uncover characteristics, patterns, and relationships to demonstrate individual investigator or research team productivity, quality, or impact" (Carpenter, Cone, & Sarli, 2014, p. 162). Bibliometric measures research productivity of an individual, groups can be done by applying different metrics such as number of publications, author status, and publication sources in which researchers publish, impact factor score, citation, h-indices using popular international bibliographic databases such as Scopus (SciVal) and Web of Science (Carpenter et al., 2014). Bibliometrics have been used to measure scientific progress in many disciplines and they are a common research instrument for systematic analysis (Van Raan, 2005). The structure and elements of bibliometric analysis include the data sources; publication counts (full and fractional counting); citations and co-citations; and factors that affect citation impact (Van Raan, 2005).

According to Freeman (2012), the bibliometric methods used as a measure of or at least as a surrogate for the measure of—the impact of research can be divided into two general classes: journal-level metrics, and article-level metrics. Journal-level metrics rank the journals in a field of research. It is generally assumed that any article published in a journal with a high impact-factor is of high quality, and therefore researchers with publications in high impact-factor journals are doing high quality research. Article-level metrics are more direct and aggregate the data about all of an individual's published articles into a single measure, in order to give an indication of the quality of that researcher's work. An obvious way to overcome the logical and practical problems of using journal-level metrics to evaluate the quality of the articles, is to base evaluations on the articles themselves. Various article-level metrics are available to do this. The H-index has also been introduced as an "evaluative bibliometric" method. The H-index has been used to characterize both the quantity and significance of a scientist's research publications. Hirsch (2005) defines the H-index by the h of Np papers having at least h citations each and the other (Np-h) papers have ≤ h citations each. The h-indexing has become an accepted indicator for the evaluation of the research productivity of scientists (Clive et al., 2009**).** If your h-index is 15, you have 15 papers cited 15 times or more. If your h-index is 20, you have 20 papers cited 20 times or more. The h-index is a measure of the number of publications published (productivity) as well as how often they are cited (impact). In addition, the Journal Citation Reports (JCR) keeps track of citations at the journal level (same data as in Web of Science, just a different presentation of the data). According to Tijssen (2003, p. 15), citation impact indicators "disclose the actual scientific influence of papers on the outside world - a key indicator of research excellence from a user-oriented point of view". Some of the indicators used include: number of citations; number of citations per document; number of highly cited papers; number of uncited publications; number of citations received by a publication from other publications; number of publications; citations per publication rate, normalised by the average citation scores of corresponding journals during a specified time interval; average number of citations per indexed publication(s) produced by an entity within a specified time interval; number of h-index which is a single measure of quantity (publications) and the impact of the research output; and relative citation rate (RCR), that is, citations of documents as compared with their publication journal. The SCI database has been used to carry out research evaluation in relation to all fields in science and technology. Using the SCI database, Guoa et al., (2014) published an article on "Global research on soil contamination from 1999 to 2012: A bibliometric analysis". The Web of Science Citation Index (SCI), relative to several other bibliographic databases, has the advantage of a wide coverage of recognized, citation-based, and widely read scientific journals. SCI contains high-quality published research output and citation and is indexed based on certain strict citation criteria which assists in reliable analyses.

Bibliometrics have been criticised as an impact measures for several reasons. Firstly, bibliometrics assessment is based on citation indexes as key to research evaluation (Haustein & Lariveire, 2017) because of global coverage of these databases and their ability to provide feasible large-scale analysis. However, these indexes, do not provide a full picture of African research output and impact. Bakuwa (2014) attributed that the low contributions of Sub-Saharan African research output for global knowledge to the poor representation of regional publications in Web of Science and Scopus indexes. In addition, the international research performance assessment framework such as Research Excellence Framework (REF) https://www.ref.ac.uk/about/ have refocused their impact assessment to social and public engagement in the assessment of quality and impact of research. Which could be measured though the use of altmetric measurements. In this regard, altmetric is considered as one of the viable options for evaluating research social impact (Gunn, 2013). According to Piwowar (2013) altmetric has potential to measuring

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research societal impact because it provides new methods to measure public engagement with research output. This depends on distributions, disseminations and discussions of research outputs in open platforms such as research gate, reference management software (e.g. Mendeley).

In addition to that, Weller (2015) in his study to explore alternative evaluation methods of scholarly communication, did a deep analysis on the limitation of the classical bibliometric valuations and articulated the following limitations: Notable shortcomings include the following: (1) Citations do not measure readership and do not account for the impact of scholarly papers on teaching, professional practice, technology development, and non-academic audiences; (2) publication processes are slow and it can take a long time until a publication is cited; (3) publication practices and publication channels vary across disciplines and the coverage of citation databases, such as the Web of Science and Scopus, may favour specific fields; and (4) citation behavior may not always be exact and scholars may forget to acknowledge certain publications through citations or may tend to quote those papers that are already more visible due to a high number of citations (p. 263).

Considering the limitations of bibliometric as depicted above, there are other metric measures like altmetrics or alternative metrics that provide document-level metrics used to determine how a document is read online, downloaded, viewed, commented, recommended and shared in social networks and references manager (Linn & Fenner, 2013). Altmetrics is used as a value-added service to showcase their content impact and it supplement the classical research performance assessment in research institutions (Dhiman, 2015). Because it can provide a measure of impact for all scholarly and non-scholarly works available in open access, like usage statistics (views and download), and provide deeper analysis by contextualising the readership of an author's research output (Rehemtula, Rosa, Leotao, & Aviles, 2014). In addition, altmetrics is being used as a tool for measuring research sociaetal and social engagement impacts (Wouters, 2018). Altmetrics data provide evidence of early influence of a work and serve as complementary measures of impact to citations (Carpenter et al., 2014 and Galligan & Dyas-Carreia, 2013). Several authors that have explored the benefits of altmetrics in relation citation have found correlation between altmetrics and citation measurements (Bornman, 2014; Erdt, Nagarajan, Sin & Theng, 2016).

In evaluating research, it is critical to work with the most comprehensive global data and most insightful analytics. Web of Science is the leading source of content and tools for ranking organisations around the world. Almost all the major global university rankings with strong credibility us Web of Science data to support their activities. The Web of Science Core Collection is indisputably the largest citation database available, with over 1 billion cited reference connections indexed from high quality peer reviewed journals, books and proceedings. Each cited reference is meticulously indexed to ensure that it is searchable and attributes credit to the appropriate publication. Web of Science captures and indexes cited references for all records from 1900 to the present. The Web of Science Core Collection serves as the backbone for citation metrics products, providing a standard resource that allows for the production of reliable and trustworthy metrics that can be used for evaluating research productivity and citation impact. Complete citation coverage is from 1900 to the present (Web of Science online brochure, 2019). Scopus was launched in November 2004. It is the largest abstract and citation database of peer-reviewed literature, featuring smart tools to track, analyse and visualise research. With 22,800 titles from more than 5,000 international publishers, Scopus delivers the most comprehensive view of the world's research output in the fields of science, technology, medicine, social sciences, arts and humanities. The source types covered on Scopus are either serial publications that have an ISSN (International Standard Serial Number) such as journals, book series and some conference series, or non-serial publications that have an ISBN (International Standard Book Number) such as one-off book publications or one-off

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conferences. To ensure that coverage, discoverability, profiles and impact measurement for research in all subject fields is accounted for, Scopus covers different source types. As part of this effort, Scopus takes a highly targeted approach of identifying content types that are significant to each discipline and expand coverage accordingly (Scopus online brochure, 2019). Open Science is a movement that advocates for making scientific research and data accessible to all. It promotes practices such as publishing open scientific research, campaigning for open access and generally making it easier to publish and communicate scientific knowledge. Additionally, it includes other ways to make science more transparent and accessible during the research process (UNESCO, 2017). The advantages of the open access movement include greater availability and access to publicly funded research, rigorous peer review, transparency of scientific works and greater impact of scientific research. Open Science fosters the use of internet and associated digital tools to enable greater local and global research collaboration. Numerous organisations have adopted open access principles. There are continuous developments around the Open Science movement, and recently Plan S has been unveiled and it promises to bring an end to the reign of paywalls to research outputs. Funders across Europe through coalitions have launched a plan to take an aggressive approach to end the reign of subscription-based journals. Plan S mandates that starting in 2020, academics receiving grants from participating agencies, which include funders in the UK, France, and the Netherlands, must make all scientific articles open access immediately upon publication. The coalition also outlines 10 key principles, such as commitments from funders to help cover publication fees, provide incentives to establish quality open-access journals and publishing platforms, and a promise to sanction those who do not comply with the new rules (https://www.coalition-s.org/). Based on the notion of open science, UNAM institutional repository http://repository.unam.edu.na/ that collect, store, preserve and provide accessibility to the university scholarly and non-scholarly communication will be used to further analyse the productivity, visibility and impact of UNAM research.

As indicated earlier, this study is limited to exploring the research productivity and impact using bibliometric citation and view, download altmetrics of the university research output, social networks altmetrics was not covered in this study. Therefore, the university research impact from blogs, social networks such as Twitter, Facebooks, research gate, academia as well as sharing and savings in of UNAM scholarly and non-scholarly communication in reference management software was not investigated.

WHY EVALUATE RESEARCH PERFORMANCE AND VISIBILITY AT UNAM

As earlier indicated, this chapter focuses on evaluating the research performance and visibility of the University of Namibia (UNAM) in the nation, SADC region and beyond. Currently, there appears to be a dearth of evidence-based studies that have focused on research performance and visibility at UNAM. Most efforts that have been highlighted in that past have those by the UMAM library in advancing and supporting research output and visibility about the academia. This study is therefore critical on many standpoints. However, the major motivation relates to national policy on the contribution of research and development in the realisation of Namibia as an industrialised and knowledge-based economy in its national programme frameworks and plans such as vision 2030 and National Development Plan (NDP5) (National Research Commission on Research Science & Technology, 2014). For a long while, there have calls for evidence-based research that should be able to show the current research capacity and visibility of UNAM as espoused in Vision 2030. Clearly, Vision 2030, enjoins that education, scientific research and technology innovation are the main drivers of economic growth, social development and

industrialisation. In addition, NDP5 places emphasis on the significance of investing in research and development, and skills development for the transformation and realisation of Namibia as a knowledge-based country. Furthermore, Namibia has formulated and adopted several comprehensive policies and programmes that support the contribution of research and development to the overall social and economic development of the country. Some of these policies include the Industrial Policy of 2012, Research, Science and Technology Act no. 23 of 2004, and its regulations formulated in 2011, National Policy on Research, Science and Technology of 1999, and the National Programme on Research, Science, Technology and Innovation for 2014/15 to 2016/2017 and its implementation plan. The government has also established the National Commission on Research Science and Innovation, which emanated from the Research, Science and Technology Act of 2004, to coordinate the development of the national programme for research. Previous research shows that Namibia as a country has about 1132 research and development headcounts, of which 570 headcounts are devoted to full time equivalent researchers. Over 60% of the research headcount belongs to Higher Education Institutions (National Commission on Research, Science & Technology (NRST), 2016, p. 25). This study was therefore motivated by fact providing evidence through a bibliometric analysis of research output for a period of ten years (1996-2019) to evaluate how UMAM has been able to fair in terms of research output would be a useful policy feedback on the ground. This study could possibly be useful in understanding, not only UNAM's scholarly standing with other selected Universities in the SADC region, but also the extent to which the University is able to collaborate and enhance their research agenda. It is also envisaged that within the current resources constraints of UNAM, evidence from this analysis could assist in directing specific efforts and resources in dealing with the under resourced research pockets within UNAM. Below we present the profile: national research policy context, funding, infrastructure and policies, research support and library and information services support as derived from the literature reviewed.

RESEARCH INFRASTRUCTURAL PROFILE OF THE UNIVERSITY OF NAMIBIA

The University of Namibia's (UNAM) responsibility to conduct research stems from its legal establishment by Act 18 of 1992. UNAM has an obligation to undertake research in order to advance and disseminate knowledge, provide extension services, encourage the growth and nurturing of cultural expressions and therefore contribute to the social and economic development of Namibia (Republic of Namibia, 1992). In order to fulfil this mandate, UNAM has established two centres of excellence, the Multidisciplinary Research Centre (MRC) and Sam Nujoma Marine and Coastal Resources Research Centre (SANU-MARC) with full time employed researchers. The two centres were established to conduct research and to strengthen research collaborations with national and international partners from both the public and private sector. The University of Namibia has about 1450 academics who are obliged to commit about 30 percent of their work to research activities (UNAM, 2019).

The overall funding of research in Namibia comes from the government. According to the national survey of research and experimental development report of 2013/2014, over 60% of research and development funding in Namibia is from the government, with a contribution of over 10% funding received from business entities and international funding agencies (National Commission on Research, Science and Technology, 2016). As the University of Namibia is the main contributor to research output in the country, there is no doubt that it will continue to be the main receiver of government funding. According to the University of Namibia's research report of 2015, the university received about N$9.7 million to

cater for 57 research projects from international funding agencies. In addition, N$8 million was received from the National Commission on Research, Science and Technology to account for about 15 research programmes (UNAM, 2016). The situation of research funding might have improved by now, with more engagements with international collaborations and projects like the Phoenix project. The funding statistics provided however, do not reflect how much UNAM has received from the industry. There are challenges in extracting actual funding data nationally at UNAM because there is no research management system in place. Currently, research funds and expenditures on research and development are being recorded, allocated, monitored and managed and disbursed in accordance with programmes of activities of researchers manually; as a consequence, the reporting of research funding is difficult (UNAM, 2019).

The low international funding for research at UNAM is attributed to the lack of skills in writing winning funding research proposals, and this was expressed during the training for academics on how to search for funding opportunities using the Research Professional Africa Platform that was conducted in March 2019 by an expert from Cardiff University through Phoenix project. (Haufiku, 2019).

UNAM has developed policies that govern and promote the quality of research output at the university. These include the research and research ethics policy, research strategy and the scholarly communication policy. The UNAM Scholarly communication policy of 2013 is through which the establishment of the institutional repository emanated. According to the UNAM scholarly communication policy, the library has the responsibility to manage and maintain the repository (UNAM, 2013). To date, the institutional repository has about 1975 documents published as open access (see: http://repository.unam.edu.na/).

UNAM has subscriptions to data analysis tools and referencing management software that is required to fasten the research process. These include subscription to Atlas.ti, SPSS and Mendeley. In addition, the university has a subscription to Research Professional Africa, a database which indexes research funding where African countries are beneficiaries. Researchers can use this tool to locate funding that is relevant to their areas of research and apply for funding (Haufiku, 2019).

In supporting research, the University of Namibia established a Centre for Research and Publications under the leadership of the office of the Pro-Vice-Chancellor: Research Innovation and Development. The Centre for Research and Publications aims to oversee the policies related to research and to support research with the procurement of relevant infrastructures and software required by researchers to effectively conduct research (UNAM, 2019). The Centre for Research and Publications supports researchers with obtaining ethical clearance, payment for article processing charges, research funding proposal writing and grant management, and providing workshops to improve researchers' capacity and skills in conducting quality research UNAM, 2019). The Research and Publications Office in collaboration with the library also oversees the indexing process of the university journals in international indexing systems like SCOPUS and Web of Science and ensuring the compliance of UNAM publications to the international ethical standards and strategies for research (UNAM, 2016).

Considering the modest contribution of international funding agencies to research development in Namibia, the Centre for Research and Publications subscribes to the Research Professionals Africa, a platform that indexes research funding opportunities from diverse international bodies in different subject areas. It is assumed that having access to international funding opportunities information will increase the submission of funding proposals, therefore contributing to the improvement of international funding agencies to the local research and development expenditure. In March 2019, over 120 researchers were trained on how to utilise the platform to retrieve relevant funding opportunities. Moreover, in January 2019, The Centre for Research and Publications through the Phoenix project, conducted a workshop on Grant Writing and Grant Application Review Workshop that was run for a week, and about 60 academics

were trained. This workshop was followed by the swift action of research grant coordinators appointment for each faculty. These grant coordinators are entitled to support fellow researchers with writing winning grant applications, updating them on grant opportunities and providing advice in the allocation and management of research grants. In addition, the Research and Publications Office encourages open access scholarship by supporting researchers with funding for article processing fees. (UNAM, 2019).

The UNAM library's mandate is to support the teaching, learning and research activities by providing international scientific peer-reviewed information resources (books, journals, databases) and cutting edge services that are relevant to the researchers' and students' needs. The UNAM library invested about N$12 million annually on the subscription to international scientific electronic resources and databases such as Science direct, Springer link, Tylor and Francis, Wiley, SA E-publication, Juta, Emerald, Scopus, SciVal (UNAM, 2015).

In line with the university's endeavour to pursue research excellence and relevance, the university library provides services to support researchers at each stage of the research lifecycle. Ensuring access to the most possible academic information sources, facilitating scholarly communication and promoting research output are particular focus areas. The library is mandated to manage and maintain the university's institutional repository, this is executed by assisting researchers with depositing their publications into the repository, ensuring the compliance to copyright conditions and law of materials deposited in the repository by handling applications such as SHERPA/ RoMEO publishing and requesting copyright permission from publishers on behalf of researchers.

Considering the current trends in research support services in academic and research libraries, the UNAM library has realigned its structures by allocating the existing manpower and staff members to research support services. As a result, one librarian for research support services and one librarian for postgraduate studies were appointed. The librarian for research support services of the University of Namibia is responsible for training researchers on effective searching, partnering with researchers in conducting systematic reviews, guiding researchers in identifying international indexed journals for publications, organising authorship workshops, reference management software training, doing metrics analysis for researchers when applying for promotion, doing literature searches, supporting researchers with data management plan, and advising on copyright and open access scholarship. (UNAM, 2019)

The library supports researchers by organising authorship workshops for emerging researchers, assisting and advising researchers on identifying journals for publishing, sensitising researchers on current issues on scholarly communication (such as open access open science, copyright), and alerting researchers about predatory publishing. The UNAM library has also taken on the role of applying bibliometric analysis to evaluate research productivity and impact at an institutional and departmental level, and for individual researchers, for informed decision making. The university library has also established a Research Common, an adequately equipped space with computers, printers, internet connection, etc. for researchers and postgraduate students (UNAM, 2019).

THE STATUS OF UNAM'S RESEARCH PERFORMANCE AND VISIBILITY

In section, the findings and analysis regarding UNAM's research performance and visibility are presented. Research performance evaluations have evolved over the years. Scholarly publishing has remained one of the key outputs of research. Such scholarly publishing has been in the form of journal articles, working papers, conference proceedings and book chapters. In many instances, these outputs have been

an indicator used to evaluate researchers in the universities and research institutions. In recent times, the indicator-based methods of research evaluation have emerged, and these been used globally. In this particular study on UNAM research performance and visibility, analytic tools such as InCites, which is built on Web of Science by Clarivate Analytics (formerly Thomson Reuters) and SciVal Suite built on Scopus by Elsevier were used respectively to analyse the research profile of the University of Namibia. The time period is between 1996 and 2019. The data was extracted in February 2019.

Rankings

UNAM is the largest and leading national institution of higher education in Namibia. It is a diverse institution with a student population from 43 countries and from all the five continents. Although a relatively young university, it has grown to support a student population of 26,763 as per the 2019 enrolment figures (UNAM, 2019).

In Namibia, UNAM is ranked as the top in terms of outputs (1263) compared with its counterpart, the Namibia University of Science and Technology (361), a new University that was upgraded from a Polytechnic in 2015.

UNAM is among the small emerging universities in Southern Africa that has a relatively comparative research and development headcount. In terms of research outputs, UNAM as a relatively young university that was established in 1992 but features very well in the Southern African Development Community (SADC) member states. According to Web of Science, UNAM is sitting at number 42 out of 65 ranked institutions in the region. When compared with its South African counterparts consisting of 26 public universities, the University of Namibia is ranked at number 22 (Binda, Buchana, Clayford, Hlakula, Khan, Kondlo at al., 2017).

In addition, the high number of publications from most universities in South Africa as indicated from both WoS and Scopus (SciVAl) in Figure 1 and 2 could be attributed to the research head count at those universities and nationally. South Africa has a high rate of researcher headcount of 19, 217, with 24.5% of the headcount devoted to the full time equivalent researchers (Binda, Buchana, Clayford, Hlakula, Khan, Kondlo at al., 2017). Over 60% of the headcount is from high education institution, compared to Namibia with only 1132 headcounts and 570 full time equivalent researchers (NCRST, 2016). UNAM has a relatively small population of 532 researchers that are indexed in Scopus, unlike universities in

Table 1. Total enrolment by nationality and gender at UNAM

Nationality	Female	Males	Grand Total
Namibian	16858	8880	25738
SADC	491	438	929
Africa non- SADC	35	26	61
Asia	11	8	19
North America	8	3	11
Europe	4	0	4
Caribbean	1	0	1
Grand Total	**17408**	**9355**	**26763**

Source: http://www.unam.edu.na/about-unam

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South Africa such as the University of Cape Town, University of Pretoria and Stellenbosch University that have more than more than 8000 researcher headcount (Binda, Buchana, Clayford, Hlakula, Khan, Kondlo at al., 2017). In addition, gaps in research productivity in terms of output between the two countries' universities could be attributed to the differing research environment, rewarding systems in place, and financial expenditures on research and development. In Namibia, researchers are not being remunerated when they publish in international indexed journals; their research contribution is only considered when they apply for promotion. This is unlike their counterparts in South Africa where researchers are remunerated through an approved subsidy from the Department of Higher Education and Training for their publication outputs. In addition, researchers only have about 30% of their workload to do research.

Citations of UNAM Publications

As shown in Figure 3, UNAM's overall publications of 1235 in the WoS during 1995 -2019 have been cited 19,464 times, with 11,619 times being cited without self-citations. Articles which have received citations are 12,087, with 11,619 citing articles without self-citations. The average number of citations per item is 15, 76. The results are evidence that UNAM's authored publications have a fair amount of impact in the global system. In addition, UNAM's authored publications in high impact and indexed journals are making fair progress. However, the number of publications is quite infinite compared to publications from the South Africa counterparts.

Figure 1. Rankings: Institutional comparisons of South Africa and Namibia (InCites)
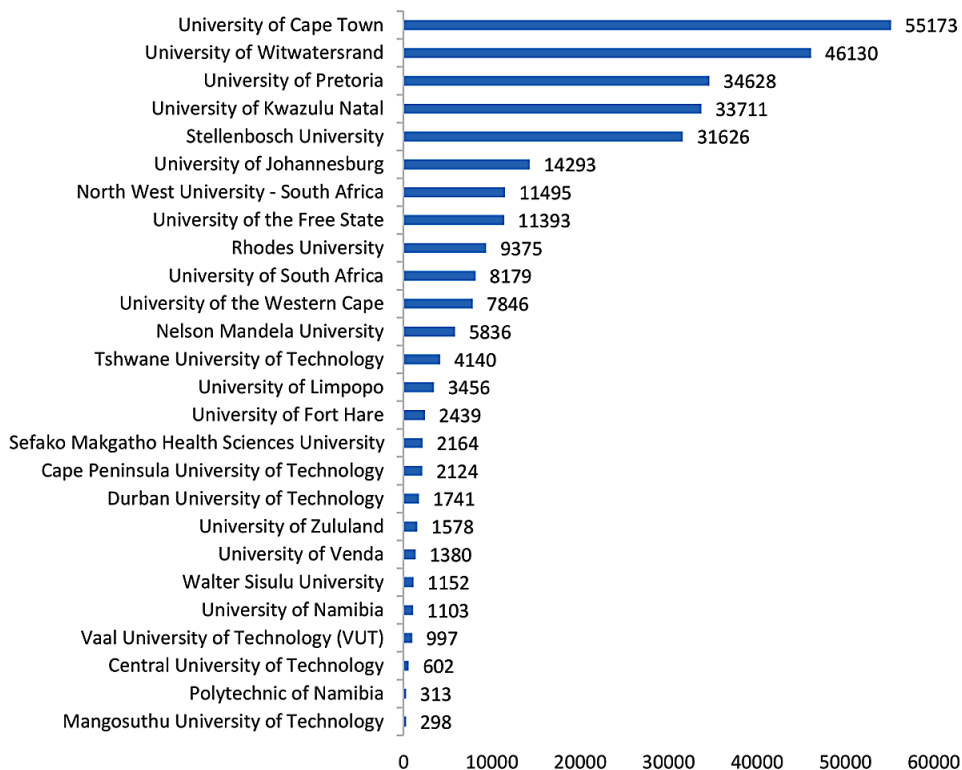
Figure 2. Rankings: Institutional comparisons of South Africa and Namibia (SviVal) 2013-19
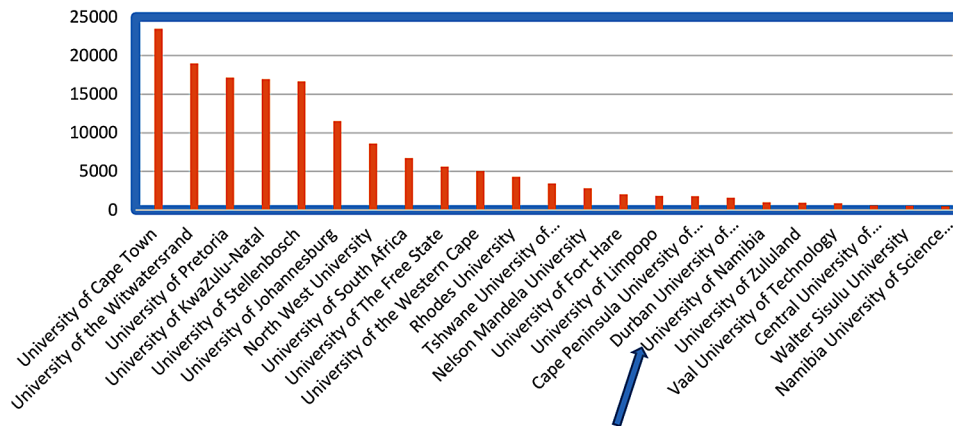
Moreover, on Scopus there are 1617 documents published during the period of 1995-2019 with the overall citation of 23677 excluding self-citations and an h-index of 71. Despite the difference in the number of publications in Scopus compared to Web of Science, the publications in Scopus also show high global visibility as is reflected by its academic impacts through citation performance analysis.

Figure 3. UNAM citations record web of science
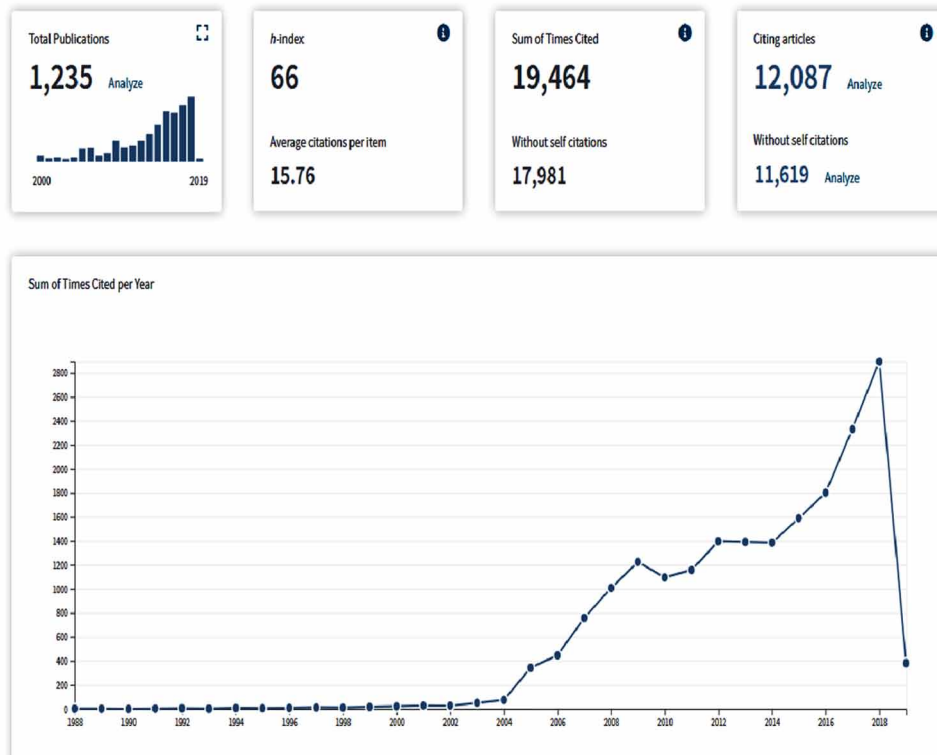
UNAM Disciplines Profiling

Publications in Astronomy and Astrophysics contributed more than 13% percent of the publications in the Web of Science categories (as shown in Table 2). Multidisciplinary sciences as well as public environmental occupational health follow respectively.

In addition, data from Scopus and SciVal (see Table 2) shows that research productivity and publications in Medicine stand at 219 (15.0%), Social Sciences has 198 (13.6%), Agricultural and biological sciences has 160 (11.0%) and miscellaneous field has 204 (14.0%), Earth and planetary sciences with 115 (7.9%), thus outperforming other fields of research in terms of the number of research outputs. Table 3 provides more details on research performance by subject area and their impact thereof, while economics, energy, health professions, dentistry, nursing, decision sciences and neurosciences are the least productive area in research. The low contribution from other disciplines' publications in the WoS and Scopus can be attributed to the researchers' interests in publishing in more open access journals and publishing more technical notes and policy briefs.

In addition to research productivity performance as indicated in Table 3 above, it also shows that the research output of UNAM have high impact. UNAM publications from different fields of research are impactful, performing beyond the global average field weighted citation impact. Except in disciplines such as *nursing, energy, economics and finance, business management, veterinary sciences, chemistry and mathematics* whose field weighted citation is below the global field citation impact.

Table 2. Disciplines in the web of science categories

Web of Science Categories	No. of Publications	% out of 1241
Astronomy astrophysics	164	13.215
Multidisciplinary sciences	75	6.044
Public environmental occupational health	63	5.077
Education educational research	56	4.512
Respiratory system	54	4.351
Infectious diseases	49	3.948
Environmental sciences	47	3.787
Ecology	43	3.465
Plant sciences	42	3.384
Geosciences - multidisciplinary	38	3.062
Pharmacology - pharmacy	38	3.062
Information science and library science	30	2.417
Tropical medicine	29	2.337
Medicine - general, internal	27	2.176
Language and linguistics	25	2.015

Table 3. Publications by subject distribution: SciVal (Scopus)

Subject	Scholarly output	Field Weighted Citation Impact
Medicine	236	3.63
Social Sciences	198	0.87
Agricultural and Biological Sciences	163	0.94
Earth and Planetary Sciences	113	2.16
Environmental Sciences	104	1.09
Physics and Astronomy	92	2.56
Biochemistry, Genetics and Molecular Biology	85	0.68
Computer Sciences	79	0.51
Pharmacology, Toxicology and Pharmaceutics	55	0.97
Immunology and Microbiology	53	0.7
Arts and Humanities	46	0.87
Engineering	46	1.29
Chemistry	37	0.45
Mathematics	24	0.36
Business, Management and Accounting	23	0.39
Material Science	24	4.27
Psychology	19	1.91
Energy	23	0.42
Veterinary	18	1.02
Multidisciplinary	22	2.44
Chemical Engineering	16	0.63
Economics, Econometrics and Finance	15	0.4
Health professionals	14	0.43
Nursing	6	1.3
Decisions Science	6	0.31
Neuroscience	4	2.62
Dentistry	1	1.97

Publishing Trends and Impact of Institutional Repository

In addition to international publishing practices as explained above, the UNAM recognizes gaps in local research visibility, accessibility to local policy makers, industrial development and social development thereof, hence it established an open access repository and the scholarly communication policy that encourages the researchers to make available the institutional research output openly accessible online in 2013. The repository is structured by community and sub-community. The community represent faculties and independent centres at the university. Journals published by UNAM are also made available through the institutional repository presented as communities. These includes Namibia CPD Journal for Educators (NCPDJE), Journal of the University of Namibia Language Centre (JULACE), Journal

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for Studies in Humanities and Social Sciences (JSHSS), International Science and Technology Journal of Namibia (ISTJN). These Journals disseminate publications not are covered through Web of Science and Web of Science. Below we will discuss the institutional repository publishing trends and impact thereof by presenting output by communities that represent faculties, centres and journals publications that are subject focused (see Figure 4).

A total 1757 documents have been published through the institutional repository from 2013-2019. Major publications contributions in economics and management sciences constitute a 17%, followed by humanities and social sciences 16%, 12% contribution from education and Health Sciences with 11% respectively. If this is compared with the data from international indexing systems economics and management science has the least contribution compared to other discipline. This could be because the repository publish postgraduate thesis and dissertations that are not covered in the international indexing systems. Hence the high output in the institutional repository. Also there is a gap in the overall publication trends between the repository and the two indexing systems. Data shows that Web of Science recorded 1263 publications, while SCOPUS recorded 1472 publications between 1995 to 2019; compared to 1757 publications uploaded in the repository during the short period of 2013 to 2019. Table 4 below provides an overview of the type of documents published through the institutional repository.

Looking at the type of publications indexed in the repository since its establishment, Thesis and dissertations has major contributions of the scholarly communication of the university through institutional repository with 58% followed by articles publications contributing with 34% respectively.

Figure 4. Total documents uploaded per community

Legend:
- Agriculture and Natural Resources
- Economics and Management Sciences
- Education
- Engineering
- Health sciences
- Humanities and Scial Sciences
- Law
- Science
- Library
- UNAm press
- Multi-disciplinary
- ISTJN
- JHSS
- JULACE
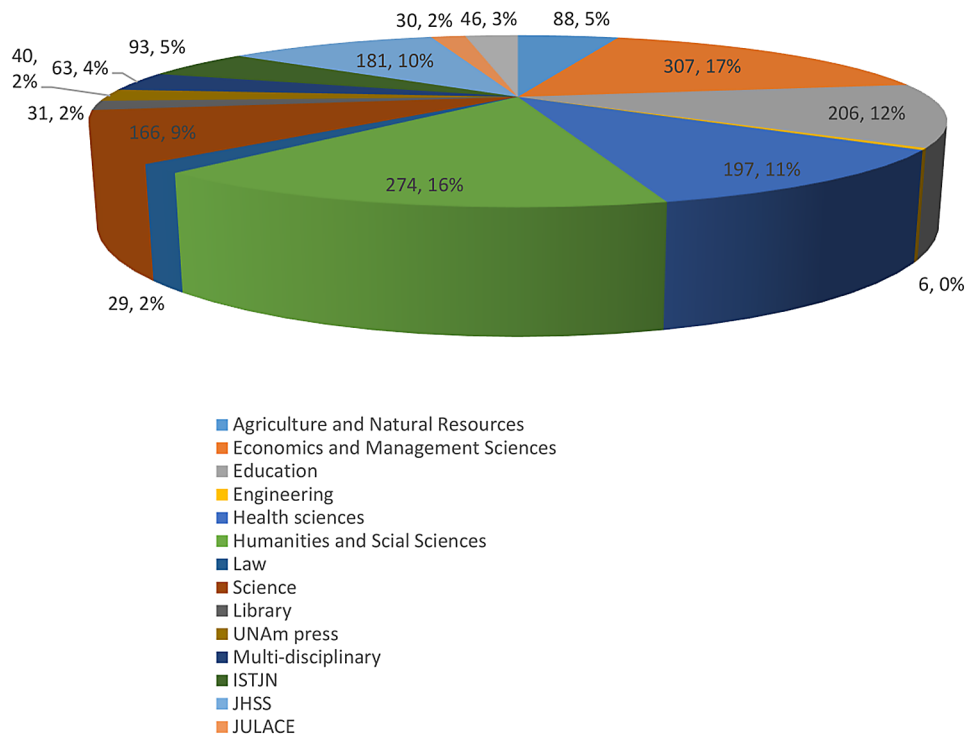
Table 4. Distribution of documents uploaded through the repository

Type of documents	Number of items uploaded	Percentage
articles	601	34%
Thesis	1033	58%
Books	17	1%
Book chapters	71	4%
conference presentations	11	1%
Technical reports	10	1%
Others	11	1%
Total	1754	100%

The impact of publications in the repository is measured by metrics analysis, which accounts for views and downloads of items published in the repository. It is evident that the institutional repository has an impact both at local, regional and international level. This has been demonstrated by the Figure 5, which presents the repository views. Scholarly output from the Education Faculty have the highest views impact of 17532 followed by Economics and Management Sciences 16773 and Humanities and Social Sciences output impact came third with an impact of 16488 views.

Education, Economics and Management Sciences, Health Sciences, Agriculture and Natural resources received high impact rating between the ranges of 14000 to 17532. With regards to journal publication, the ISTJN and JHSS has high impact of 14348 and 14318 views respectively.

It is important to note that the overall impacts of publications in the repository by communities is not influenced by the number of publications in the community. Some communities with less publications distribution have considerable high impact, for example the Economics and Management Sciences community which has the highest published documents comes at the second place on the impact assessment.

Figure 5. Repository publications impact

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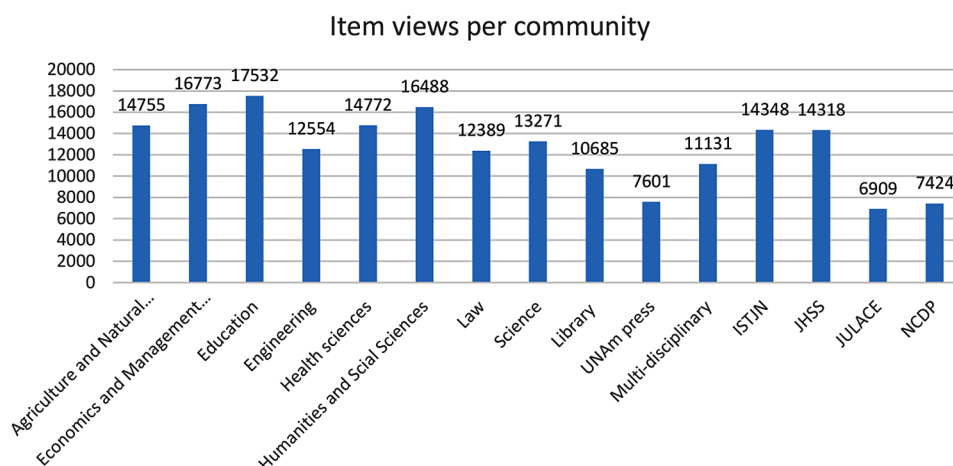
Research Collaborations with Other Institutions

The University of Namibia has good collaboration networks regionally in Africa and abroad. From the Table 5 below, the North-West University is a major collaborating institution with a total of 213 records produced between the two universities. This is followed by known international institutions like Max Planck Society and others. The high collaboration rate could be accounted to the bilateral agreements the university has with South African and European countries. It could also be attributed to the international projects in Physics and Astronomy, Earth and planetary Sciences and Environmental science.

Table 6 below that was extracted from the SciVal database shows the top 10 international collaborations with the University of Namibia. It is evident that the university has high international collaboration with the universities in South Africa, the University of the Witwatersrand and Northwest University) leading with 101 and 96 publications respectively followed the universities in France and German respectively.

Table 5. UNAM Collaborations with other institutions

Collaborating Institutions	Records	% of 1241
North West University South Africa	213	17.164
Centre National De La Recherche Scientifique	188	15.149
Max Planck Society	186	14.988
Ruprecht Karls University Heidelberg	184	14.827
Humboldt University of Berlin	182	14.666
Sorbonne Universite	182	14.666
University of Hamburg	182	14.666
Universite Paris Saclay Comue	177	14.263
Universite Sorbonne Paris Cite Uspc Comue	177	14.263
University of Paris Diderot	177	14.263
PSL Research University Paris Comue	176	14.182
CEA	175	14.102
CNRS National Institute of Nuclear And Particle Physics IN2P3	175	14.102
Ecole Polytechnique	175	14.102
Observatoire De Paris	175	14.102
Communaute Universite Grenoble Alpes	174	14.021
Universite Grenoble Alpes Uga	174	14.021
Ruhr University Bochum	173	13.94
Universite De Montpellier	173	13.94
Dublin Institute for Advanced Studies	172	13.86
Universite Paris Saclay	172	13.86
Yerevan Physics Institute	169	13.618
Eberhard Karls University of Tubingen	149	12.006
Charles University Prague	148	11.926

Table 6. Institutional collaboration (SciVal)

Institution	Co-authored publications	Co-authors at University of Namibia	Co-authors at the other institution	Field-Weighted Citation Impact	Citations
University of the Witwatersrand	101	27	28	3.42	2369
North West University	96	34	65	2.64	2184
CNRS	81	17	294	3.17	2159
Universite Paris 7	75	11	120	3.06	2105
CEA	74	11	79	3.03	2102
ComUE Paris-Saclay	74	11	115	3.1	2105
Heidenberg University	74	9	38	3.12	2107
Max Planck fur Kernphysik	74	7	100	3.1	2105
PSL Research University	74	11	117	3.05	2109
Sorbonne Universite	74	13	56	3.72	2301

Looking at the analysis of distribution of publications at the University of Namibia by international, national and institutional collaboration and single authorship as presented in Table 7; it appears that 74.4% of the overall UNAM research productivity in Scopus is published through international collaboration, with only 1.4% national collaboration. The National collaboration come second with 115 publications of 12.3% to the overall university publication productivity in Scopus. In addition, high citation count (5990), and citation average per publication of 8.6 has been recorded for international collaboration publication with the field weighted citation impact above the global average. However, the national institution and single authorship has relatively low citation impact and their performance in global field weight performance is below the global average. The findings of this study supports the findings of other studies elsewhere that affirm that most international research collaborations tend to publish in high impact factors and receive high citations compared to national and institutional collaborations (Wang, Xu, Wang, Peng, &Wang. 2013; Levitt and Thelwall 2009). Other studies have indicated that such collaborations tend to actually improve the competitive advantage of research units (Sonnenwald, 2007).

Table 7. Collaboration publications

Metric	Publications	Citations	Citations per Publication	Field-Weighted Citation Impact
International collaboration (74.4%)	695	5990	8.6	1.78
Only national collaboration (14%)	13	4	0.3	0.13
Only institutional collaboration (12.3%)	115	121	1.1	0.4
Single authorship (no collaboration) (11.9%)	111	241	2.2	0.78

DISCUSSIONS OF THE UNAM RESEARCH PERFORMANCE AND VISIBILITY

The following are the key points that could be discerned from the analysis on UNAM research performance and visibility.

Open Access and Effective Institutional Repository

Although the University of Namibia does publish in open access or hybrid journals, there appears to be limited access to these journals since the access is based on subscription. The university therefore needs to embark on a very stringent open access drive that will not only focus on theses and dissertations that are produced as a result of research conducted by students. Currently the scholarly communication policy of the university encourage researchers to publish open access, the university needs to have a policy that will make it compulsory for the researchers to submit pre-print and post-print of their publication into their scholarly institutional repository. The University also need to respond to the international funding requirement and trends in open science by establishing an exclusive open access policy that will require researchers not only to publish their research output in open access platform but also to make their associated research data and research process openly accessible for further exploration, reproducibility and therefore promote transparency. Although there are existing data repository, the university can establish an institutional data repository in order to be able to monitor and manage the overall performance and impact thereof of their datasets.

Integration of Research Data Management (RDM) in UNAM Research Processes

RDM services involves a number of key stakeholders and it is crucial to identify all the role players and stakeholders to ensure that RDM implementation at UNAM is fairly distributed. All internal stakeholders have to be equally aware of their roles and responsibilities. At UNAM, the Centre for Research and Publications and the UNAM library are key stakeholders in the realisation of RDM implementation. Data and research records form an indispensable part of all research projects. With unprecedented advances in information technology and digital science over the last decade, the broader research perspective has changed rapidly, and the amount of data being generated has increased radically. That has necessitated a need to ensure that research data is managed appropriately to guarantee accessibility and security, and the UNAM as a public entity should be at the forefront of initiatives that ensures that publicly funded research output and its research data are open.

Research Mentorship Programme and Policy

The university research mentorship is supposed to enhance the quality research output and therefore improve the citation counts of publication published at national, institutional and single authorship collaborations. This currently remains weak. It has been observed that having a formally designated mentor was identified as a significant predictor of high research productivity can invariably improve retention in academic context (Bland, Seaquist, Pacala, Center, & Finstad, 2002; Ries, Wingard, Morgan, Farrell, Letter, & Reznik, 2009).

Library Research Support Services and Faculty Partnership

Library and librarians are resourceful component of the research processes, its productivity and impact. Research support services is one of the prominent services within the university research frameworks. However, without a strategic framework on what support, how the support will be provided at what stage of research lifecycle support services is to be provided, it is difficult to meritoriously execute, monitor and evaluate the research support services at the university. Libraries can also offer other services such as searching, source selection, and teaching, research data management, citation and references management support, scholarly publishing, systematic reviews, research impact measurements and research profiling, research guides and consultation services (Si, Zeng, Guo & Zhaung, 2019; Brown, Alvey, Danilova, Morgan & Amberyn, 2018).

RECOMMENDATIONS

Arising out of the analysis, below are some of the key recommendations that could strengthen research visibility and output at UNAM.

Open Access and Effective Institutional Repository

- The university therefore needs to embark on a very stringent open access drive that will not only focus on theses and dissertations that are produced as a result of research conducted by students.
- Currently the scholarly communication policy of the university encourage researchers to publish open access, the university needs to have a policy that will make it compulsory for the researchers to submit pre-print and post-print of their publication into their scholarly institutional repository.
- The University also need to respond to the international funding requirement and trends in open science by establishing an exclusive open access policy that will require researchers not only to publish their research output in open access platform.

Integration of Research Data Management in UNAM Research Processes

- The UNAM library need to become more engaged in research support services to respond to the growing open data initiatives. Librarians need to acquire an understanding of research matters in order to respond to RDM needs at UNAM. The UNAM library need to emphasise technical hands on training to ensure the development of RDM training programs to be developed to support researchers in their management of data. Moreover, the Centre for Research and Publications must work closely with faculties, library and establish the culture of research data management and the creation of data management plans that will inform the type of data to be produced by the research. It will also inform how and where that data will be stored to necessitate access and re-use. In addition, the university should also respond to international trends on open access scholarly communication by investing in open access publishing and include data set publishing into university remuneration system for academics

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- It is also recommended that a stable publishing process need to be established at UNAM that would enable researchers obtain DOI numbers for specification reference of data. The UNAM librarian for research support services need to provide data reference for scientific research work in the form of FAQs, emails and online consultations on the basis of academic services.
- It is also recommended that the research data management be integrated into the university research processes.

Development of Open Access and Open Data Policy Frameworks

Open Access and open data frameworks need to be established and entrenched within the university systems. UNAM needs to work on a research data management framework that will include designing a research data management policy, guidelines and procedures of the RDM process as well as the Data Management Plan (DMP) tool that will be used by all those doing research. Liaison with IT services is also an important element as they will be the providers of the infrastructure where data will be deposited. The university can use the already available DSpace open source software as it has the capability of a data repository. This framework will ensure adherence and compliance from all key stakeholders involved in research. Adding to that would be guidelines and procedures that will give in detail how the data will be managed. The guidelines will be supporting the policy. An emphasis should be made that the DMP is compulsory at the inception of research (Proposal stage). Collaboration between the Library, Research Office and IT should be fostered for the successful implementation of this framework.

Strengthening Research Mentorship Program and Policy

The university needs enforce the mentorship policy by refocusing on research capacity development of academic staff. It is recommended that the university develop mentorship programs by identifying researchers with high impact profiles in order to provide research leadership and guidance to the emerging researcher.

Strengthening Research Support Services and Library/Faculty Partnership

The University Library: Research support services unit should be an integral support for academics in relations to advice on writing research data management plan, research data formats, assigning Digital Object Identifier (DOI) to dataset, metadata, data licensing and guidance on data citation.

It is recommended that UNAM library support researchers not only with literature searching, but also by helping researchers with analysing, synthesising literatures and collaborate in conducting systematic reviews publication. This will not only encourage the faculty to use the library services and value librarians contributions in research process, but it will also contribute to the institutional research productivity and research impact

It is also recommended that the UNAM library develop and implement a research support strategy. One of the key trends in academic libraries is the faculty/library partnership and collaboration in research to enhance the library faculty partnership.

SUGGESTION FOR FURTHER RESEARCH

Through the analysis and review of the web of Science and Scopus data in comparison with the research populations and open access publications published through UNAM's institutional repository, it was observed that some of the academics at UNAM publish in open access platforms. Publications that were published in open access platforms do not appear in the international indexing system like WoS and Scopus, hence, there is a need to conduct a study to investigate the open access publishing performance from UNAM and its global impact. Such a a study should be able to influence the policy direction open access and research data management.

CONCLUSION

This chapter examines the research profile of the University of Namibia (UNAM) by looking at its current research productivity, visibility and impact in the SADC region and beyond. Using bibliometric analysis from Web of Science, Scopus and SciVal databases, and altimetric analysis on the institutional repository, this chapter underscores the fragility but evolving UNAM's research performance output; and highlights issues of Open Access and Research Data Management as key to enhancing institutional research productivity, competitiveness and visibility in the regional university performance metric ranking system.

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Chapter 26

Taking a Photograph With Your Student:
Framework, Challenges, and Opportunities of Publishing From Theses and Dissertations

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ABSTRACT

In this chapter, the author highlights why scholars publish, explores the nature and size of LIS theses and dissertations originating from South Africa, discusses their publication output, explores how to publish from dissertations/theses, and discusses the challenges and opportunities of engaging in such publications by using largely personal experience and desk research. The author concludes that successful publication from theses and dissertations calls for significant support for and mentorship of novice researchers by research supervisors, experienced peers, and established researchers, and this requires a great deal of collaboration and patience. He also argues that publishing research results, such as dissertations/ theses in a credible scholarly journal or book, symbolizes quality research output.

INTRODUCTION

A large part of scholarly research output emanates from postgraduate theses and dissertations at the master's and doctoral levels. Unfortunately, such scholarly output, particularly in Africa, rarely gets disseminated beyond the walls of the higher education institutions (HEIs) of origin as institutional repositories (IR), where they can be deposited and accessed through open access (OA) are still quite limited as will be discussed later. From the experience of this author, most postgraduate students find it difficult to publish their dissertations because they lack knowledge on how to prepare their research output for publication in scholarly journals or outlets, and also because they fear possible criticism from peer reviewers. In this paper, I highlight why scholars publish, explore the nature and size of LIS

theses and dissertations originating from South Africa, discuss their publication output, explore how to publish from dissertations/theses and discuss the challenges and opportunities of engaging in such publications by using largely personal experience and desk research. In the next section, I discuss what motivates scholars to publish.

WHY SCHOLARS PUBLISH

Several widely cited reasons explain why scholars publish their research output (Ocholla, 2007; Stilwell, 2006; Ocholla, 2011; Clowes & Shefer, 2013; Maher et al., 2014). Calvert and Gorman (2002, p. 3) observe that authors write

to disseminate new research findings or ideas. The publication of a paper establishes precedents in the formation of new knowledge, and puts new information in the professional domain where it can be scrutinized, criticized, and either accepted or rejected. It may then contribute to further discourse. The author also makes personal gains by adding to a list of publications that can be used for tenure and promotion, for gaining professional acceptance that may lead to speaking engagement, consultancy work, perhaps even awards.

Murray in Stilwell (2006, p. 7) summarizes the reasons as follows: career progression or moving up to the next rung on the ladder, gaining recognition for work done, preventing others from taking credit for one's work or using one's materials, helping one's students gain recognition for their work, learning higher standards of writing, contributing to knowledge, building the institution's status, and developing a profile. Other noteworthy reasons, in my view, include: to justify funding for an individual; department or institution; for tenure or permanent appointment; "publish or perish", or as a job requirement; career progression/promotion and other forms of reward, gratification, or boosting one's ego through recognition/visibility, knowledge sharing, announcement of propriety or ownership, community practice and incentive, and education and training. The next section focuses on research collaborative theories, which make up the co-authorship framework.

FRAMEWORKS AND THEORETICAL PERSPECTIVES

By frameworks, we refer to theories, models, policies and guidelines for partnership and collaboration. The concept, collaboration, has several meanings. Among other useful definitions, it may be viewed as a "partnership, alliance or network, aimed at a mutually beneficial clearly defined outcome" (Commonwealth of Australia, 2004, p. 1).

In a paper on research collaboration, Fari and Ocholla (2016) recognised Sullivan and Skelcher's (2002) three theoretical viewpoints on collaboration, namely: optimist, pessimist and realist. In the optimist viewpoint, the authors explain that the parties involved are regarded to be altruistic individuals with a long-term focus on benefits rather than immediate reward. Closely linked to the exchange theory, they add that the optimist viewpoint advocates the partnership of different parties involved in carrying out a project; aimed at solving a common problem through the implementation of shared responsibility, and a mutually oriented initiative for continuous long-term benefits. Thus, a collaborative initiative can

be embarked upon following the invitation of one individual by another with similar interests, known as collaborative advancement; and the setting of mutually agreed specifications and engagements for the conduct of a project, referred to as collaborative consent (Himmelman, 1996). This type of collaboration focuses more on benefits than risks. The pessimist perspective or paradigm views the motive behind collaboration to be the influence and dominance of the parties involved, which echoes the resource dependency theory (RDT) that was proposed by Pfeffer and Salancik in 1978 (known then as the 'resource dependence perspective'). The collaborative norms are competitive in nature, and the parties involved use their resources and influence to control one another and to manipulate or control their participation. This theory emphasizes dominance and control (Boshoff, 2009; Emerson in Charles, Hayman & Mdee, 2012). Thus, the theory views collaboration as an opportunistic venture, where the perceived benefits of dominance and resource control are certain (Sullivan & Skelcher 2002, 41); Such collaboration has risks exceeding benefits (Pouris & Shan-Ho 2014, 2170) as the actors pursue collaboration through 'self-interested strategies' (see Adams et al., 2014) that may raise concern or misunderstanding for the parties involved (Clowes & Shefer, 2013)

The realist perspective focuses on the prevailing situation at the time of a collaborative project; as the basis for making informed decisions about participation and level of involvement in the project, as also echoed by Alter and Hage's evolutionary theory. The argument is that a number of factors influence the viability of a collaborative initiative, such as politics, economy, technological advancements and partners. The realist perspective is similar to the pessimist perspective in some respects.

Co–authorship is a major component of research collaboration where the interplay of the three theoretical viewpoints does occur. Essentially, collaboration is about sharing and exchanging knowledge and skills. Thus, it involves knowledge, skills and techniques sharing and transfer, enables visibility, and solves problems rapidly. There are several benefits derived from research collaboration (Katz & Martin, 1997, Maher et al, 2014; Fari & Ocholla, 2016), which drives its growth. We can point out that a few are as follows: collaboration promotes peer review; enables and supports sharing of knowledge, skills and techniques (Fari, 2015a, 2015b; Fari & Ocholla, 2016); promotes knowledge transfer; enables the cross fertilisation of ideas; develops professional ties; increases visibility and recognition; and enables the benchmarking of research culture, such as increasing the understanding of the value of knowledge and applied collaborative research; enables growth of advocacy for shared responsibilities among experts towards achieving better results; supports an increase in funding for collaborative research processes and projects; and the desire to expand the provision of, and access to higher education globally (Katz & Martin, 1997; Sullivan & Skelcher, 2002). Thus, research collaboration has become a global norm (Rao & Raghavan, 2003:230) and co-publications/authorship play a key role in the collaboration.

There are many types of collaboration. They can be defined by its nature and level, for example: individuals- inter-individual, groups-intra/inter-group, departments–intra or inter-departmental, institutions- intra/inter-institutional, sector- intra/inter-sectorial, countries– national/ international, regional– inter-regional. It can also be informal and formal. Barriers to collaboration arise from lack of time; costs (funding, locations, communication, dissemination of results, travel, and administrative costs, such as research management- bureaucracy, cultures, financial systems, ethics, clash of values); geographical barriers, cultural and political, for example, policy, inclusivity and exclusivity; psychological factors-willingness and attitude; and the type of collaboration paradigm/model used (Ocholla, 2009).

All the stages of collaboration between supervisor and student for the development of thesis and dissertation are quite important. Normally, such collaboration starts from the initiation stage; that is the proposal development stage, which is quite crucial. A student may be enrolled into an existing or

funded research programme where the supervisor is the principal investigator or lead researcher. In this case, the initiation comes from the supervisor, who recruits a student into his/her research project. Initiation often comes from the student as well. In such cases, before or upon admission into a postgraduate study or qualification programme, student submits research intent or a short proposal to the supervisor through relevant institutional structures (e.g. Department/School, Faculty). The proposal is discussed, scrutinized for relevance, academic ethical integrity and viability and may be accepted for postgraduate research. The second stage in the research collaborative process is implementation or execution. This is the most complex stage, where close collaboration between supervisor and the student may lead to co-publication during or after graduation. Normally, support by the supervisor in terms of mentorship, advice, encouragement and co-publication that enables the student to learn how to publish is crucial. The last stage is evaluation, which simply focuses on accounting for goal achievement. For example, did the mentee/student develop scholarly writing and publication knowledge and skills? Were there quality publications between the supervisor and the student during or after the postgraduate research? What gains did both the supervisor and the student achieve in their collaborative activity?

NATURE AND SIZE OF LIS THESES AND DISSERTATIONS FROM SOUTH AFRICA

Theses and dissertations are concepts that may be used interchangeably when referring to research output produced for postgraduate academic qualifications or degrees at master's or doctoral levels. Most universities in South Africa refer to thesis as a doctoral research output for a qualification at that level. Thesis, for that matter, is supposed to be: quality research; rigorous in theoretical discourse; robust in methodology, project sound and credible research results and discussions; and demonstrate a high level of originality and contribution to knowledge. Many countries consider high level qualifications essential for the development of the knowledge and skills requirements for the knowledge economy, particularly in education, research and innovation. For example, South Africa is planning to increase the number of doctorate degree holders in the country from its HEIs by at least 50% by the year 2030, largely to support university education capacity building and research in the country.

The size of theses and dissertations in South Africa can be best determined by analysing its Union of Thesis and Dissertations (T&D) database hosted by SABINET and produced by National Research Foundation (NRF) South Africa but also by using OpenDOAR repository as reflected in Figure 1, where Thesis and Dissertations (T&D) lead among other content types deposited in the repository. Globally at the moment, however, articles lead in IR followed by thesis and dissertations.

While there are many ways of publishing research from T&D, institutional repositories in OA platform have become popular despite the slow growth of IR in Africa (3 in 2005 – 165 in 2019) that has not exceeded 4.5%(165) of global publications (3799) in this category[1]. The reasons behind this slow growth has been widely discussed (e.g. Dlamini and Snyman, 2017) to include lack of institutional support, awareness, funding and internet access. There has also been unfounded fear among some academics/faculty that publication of T&D or any other form of scholarly publication electronically on an open access platform, such as institutional repositories, increases the risk of plagiarism. A study by Ocholla and Ocholla (2016) entitled "Does Open Access Prevent Plagiarism in Higher Education?" concluded that OA indeed reduces plagiarism. This is even most succinctly summed by Purdy in Ocholla (2016, p.168) that: *"If plagiarism is easier to commit because of the Internet, it is also easier to catch because of the*

Figure 1. Content type in OpenDOAR Repositories 2016

Percentage of Repositories

Theses and dissertations	25 = 80 %
Journal articles	18 = 58%
Conference and workshop papers	9 = 29%
Unpublished reports and working papers	8 = 25%
Multimedia and audio-visual materials	6 = 19%
Other special item types	6 = 19%
Books, chapters and sections	4 = 12%
Datasets	3 = 9%
Bibliographic references	2 = 6%

OpenDOAR 12-Jan-2016   Total = 31 repositories
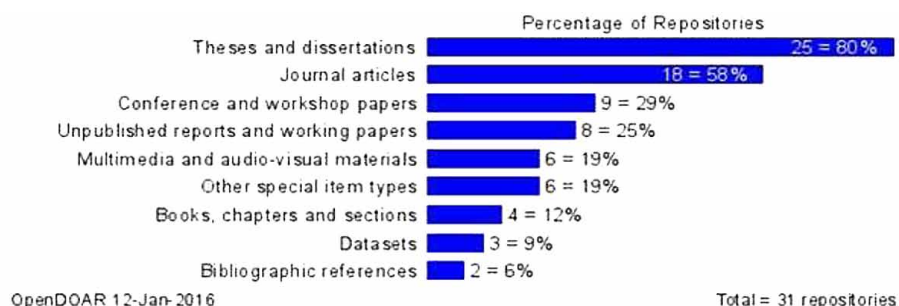
Internet." While publication in English is led by the USA, the use of Dbase software, multidisciplinary subjects are common globally, with theses and dissertations – listed in DOAR- still dominating the bulk of IR in general and particularly in Africa (see figure 1). Schöpfel (2013) writes that *"Part of the grey literature, electronic theses and dissertations (ETDs) represent a growing segment of open, available content in institutional repositories (IR) where they contribute to the impact and ranking of their institution."* This could be happening because of policies in place in some universities- mandatory in South Africa– demanding the deposit of T&D in the IR by postgraduate students before master's and doctoral graduation occurs. For example, in South Africa (with 44 of the 165 IR in Africa) as depicted in figure 1, T&D still dominates in the IRs and this ratio is beginning to change at the University of Pretoria IR, in South Africa, where articles lead.

University of Pretoria (UPDspace) has been ranked by Webometrics to be top in Africa, and among 100 in the world, in terms of IR development. For example, by 2018 there were *"11 453 theses and dissertations, and 14 679 research articles available on UPDspace. Since 2011, 34 million searches and 46 million downloads have been conducted on the platform."*

Publications from thesis and dissertation still raise controversies and challenges (Cotteral, 2011; Clowes & Shefer, 2013; Maher et al, 2014). Yet it is an important pedagogy for doctoral education (Cotterall, 2011). Among the questions students often ask are: should we publish from T&D when it has been published in IR? Should we publish parts of a dissertation/thesis before final examination or defence/presentation of thesis? Is it mandatory to co-publish with supervisors? What should be the sequence of author names in the publications? (Clowes & Shefer, 2013). How can one publish from a thesis/dissertation? Fortunately, many academic institutions, including my university- the University of Zululand, have policies and support in place to address these questions. For example, academics/faculty and students are encouraged to publish most or parts of T&D in quality peer refereed publications/ journals –among other things- to promote quality research work, enable research publication capacity building among novice or emerging researchers, share knowledge and skills, disseminate knowledge in multiple platforms (IR is one of them), enable research visibility, and receive government research output subsidy (see DHET, 2015) in instances where that occurs, such as in South Africa. While it is not mandatory that students publish parts of T&D with their supervisors as they can also publish alone as single authors, good practice held by most university research policies (e.g. in South Africa) require that students be the first author for publication originating from their theses and dissertations while the supervisor can be the co-author(Clowes & Shefer, 2013); unless there are circumstances beyond any

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reasonable doubt where this may not occur; for example, funders requirements. In the next section, we discuss how to publish from T&D based on my experience as I have co-authored more than fifty research publications with masters and doctoral students for over 20 years.

HOW TO PUBLISH FROM A DISSERTATION

A large part of scholarly research output emanates from postgraduate theses and dissertations at masters and PhD levels, with more emphasis on the latter for obvious reasons. Unfortunately, such scholarly output rarely gets disseminated beyond the walls of the HEIs of origin, particularly in Africa, where IR is still minimal. For example, a study by Ocholla (2000) focusing on research output based on the analysis of 218 masters and doctoral papers from 1993 to 2000 indexed in the Union of Theses and Dissertations (UTD) database (hosted by the South African Bibliographic Network, SABINET), revealed that approximately 52% of this kind of research output gets published. This trend was confirmed once again in a study by Sitienei and Ocholla (2010) that investigated the publication pattern of academic librarians in Eastern and Southern Africa. Here, it was found that scholarly/research publications are often motivated by a reason, particularly where such publications are linked to career growth, individual and institutional visibility, tenure, promotion and financial gain. Unfortunately, as we have witnessed (Ocholla, 2010; Cotterall, 2011; Clowes & Shefer, 2013; Maher et al., 2014), most postgraduate students find it difficult to publish their dissertations because of many reasons such as lack of knowledge on how to prepare their research output for publication in scholarly journals or outlets, tackling power relationship in co-publication with supervisors, lack of pedagogical support, and also because they fear possible criticism from peer reviewers. For example, Clowes and Shefer (2013, p. 3) cites Gail Smith admission that her *"greatest barrier to writing publically was fear – fear of being criticised, fear of being ridiculed, fear of expressing an opinion, and the ubconscious belief that I did not have the right to an opinion."* Cotterall (2011, p. 414) writing on the pedagogy of doctoral student writing suggest that *"the writing opportunities students experience are powerfully shaped by the relationship between student and supervisor"* and further citing community of practice model (COP) that *"The newcomers' writing expertise will develop as they observe experts writing and produce their own texts, supported by advice and feedback."* Her (Cotterall, 2011, pp. 423-424) case study concludes *"that supervisors need to embrace their pedagogical role in inducting students into their discipline's writing practices"*. Clowes and Shefer (2013) research on challenges of co-authorship between supervisors and students report that *"participants agreed that students' work should be more widely disseminated, that a conscious awareness of the complexities embedded in collaborations between differently positioned subjects is important, and that publication be foregrounded more clearly as a 'natural' outcome of research"*.

Generally, the nature, size, level, structure, quality and orientation of a thesis or dissertation largely varies from one research paradigm to the next, and in some cases from discipline to discipline. For example, variations between positivists or quantitative and interpretive/critical/analytical/constructivist or qualitative research ontology and paradigm, as well as a blend of the two (pragmatism/mixed method, or quantitative and qualitative) paradigms, would influence the structure or appearance of a thesis or dissertation, and ultimately on how a publication would be organised and presented. The research articles emanating from these variations could be analytical, empirical, descriptive, evaluative, case studies, literature review, etc. I do, however, identify common structures in theses and dissertations that can

Figure 2. Publication model for thesis and dissertation

Common divisions	Possible Combinations
1. Preliminaries (title, address, abstract and keywords)	A=1+2+4+5+7+8.+9
2. Introduction	B=1+2+3+5+6+8+9
3. Problem Statement, purpose/objectives/RQ	C=1+3+5+6+8+9
4. Literature Review	D=1+2+3+4+9
5. Methodology	E= 1+3+5+7+8+9
6. Results	F= 1+3+4+7+9
7. Discusions	G = 1+3+4+9
8. Summary, conclusions and recommendations	H = 1+ 2+3+5+8+9
9. References	O= 1+2+3+4+5+6+7+8+9

be used to develop an easy publication formula, as illustrated below. From my experience of extensive publication with postgraduates, one can produce research publications from a thesis or dissertation by using one or more of the following combinations (Figure 2):

Figure 2 is significantly revised from the original version published earlier (Ocholla, 2011). Generally, most theses and dissertations share a common organisation with preliminaries, starting with an introduction (termed differently e.g. orientation, background, introduction and background etc.), where the concept and context of the thesis would be briefly discussed in chapter one. The following would be a problem statement, which focuses on the gap or void in knowledge to be addressed by the thesis. This could be a long narrative or a short articulation of the gap, particularly if the background of the problem and the significance of solving it have been addressed elsewhere. The purpose of the study, which includes research aim and objectives/questions, normally articulates the problem and is represented either on its own (under purpose or aim of the study) or within the problem statement. Literature review, methodology, results/findings, discussions, conclusions (which include recommendations) and list of citations/references follow. I have numbered the divisions on the left hand side and used alphabetical symbols to list possible combinations on the right hand side. Essentially, with the right combination, a research paper/publication can be put together. Fundamentally, the combinations would produce the right size and shape for the paper, but would not produce the final paper for publication, as the article will still require refining, sizing, editing, formatting, and referencing according to the requirement of a journal. It also does not mean cutting several papers/articles from a thesis, if the content and quality does not allow. Experience has shown that co-publication with a supervisor (who would be more experienced) makes the production and publication much easier when the formula in Figure 2 is reasonably applied.

Generally, Ocholla (2007) highly recommends that authors for scholarly journals, and indeed scholarly LIS publications, take note of the following eight points of advice as outlined by Fischer (2004) that are also supported by his study (2007), based on referees' and editors' comments. Fischer advises that: i) One must pick one's level and build up (begin with less competitive publication sources or outlets and build on them); ii) Diversify one's portfolio of submissions (decide whether you want to go a mile wide and an inch deep or an inch deep and a mile wide); iii) Follow your comparative advantage (explore and engage co-authorship for sharing expertise and to reduce your workload); iv) Partake in apprenticeships

(work with experienced authors); v) Network to enable partnership and knowledge sharing; vi) Learn from the best- access and read the 'best papers' in journals or as declared at conferences; vii) Get critical feedback- benefit from the expertise of colleagues who offer critical feedback, some of which can be offered at conferences or other paper presentation forums; and viii) Learn critical evaluation skills-look at your own work critically and market your submission to the editor (a good cover letter clarifying items in the paper is worthwhile). Organizing and participating in authors' workshops, seminars and conferences are essential. Above all, actively participating in scholarly communication at various levels regularly, learning from one's mistakes, and not being afraid of the peer review process produces the best results. There are also useful advises regarding publishing with doctoral students in related studies (Maher et al, 2014; Clowes & Shefer, 2013; Cotterall, 2011) that are worth considering. Error studies suggest that no author, not even the most experienced, produces an error-free manuscript and this makes a good peer review fundamental.

Successful publication from theses and dissertations calls for significant support for and mentorship of emerging researchers by research supervisors, experienced peers and established researchers, and this requires a great deal of collaboration, as alluded to earlier.

CHALLENGES AND OPPORTUNITIES

I would divide the challenges into knowledge, skills, attitude, experience and exposure that affect both the experienced/supervisor and student/novice researcher. Some of this is built in the three research collaboration paradigms mentioned earlier.

The challenge of having sufficient knowledge, skills and attitude for scholarly publishing does not only affect the student, but supervisors as well (see Fischer, 2004 & Ocholla, 2008). The knowledge of publishing research results in quality research outlets does not normally occur naturally but has to be nurtured/developed through sustained publication over time, reading work by other people, writing for publications, paying attention to peer reviewers' remarks/reports/criticism and self-criticism. I believe that is why postgraduate master's, and especially doctoral research supervision in most established or research intensive universities, is allocated to senior academics and researchers in a discipline, who are knowledgeable in both research supervision, research and scholarly writing for publication; as this knowledge and skills would be shared with the student for research capacity building. Experience has shown that where the supervisor lacks research publication knowledge, skills, attitude, experience and exposure, among other reasons, co-publication between the supervisor and postgraduate student is rare or may not occur at all, as no support and mentorship comes from the research collaboration.

Content is a major challenge to any scholarly publication, including thesis and dissertation. Thus, the publication formula suggested in Figure 2 would not work with a poor content or weak dissertation/thesis that requires additional development into a publishable paper, despite its having favourably passed through examiners (who are also content reviewers). Authors of theses/dissertations have to understand that producing research reports is not the end. Some T&D require additional content improvement, such as: additional data collection, updating the citations, extending the methodology, re-writing, additional collaborators, in order to get published into peer refereed and /or good or high impact factor journals.

I note also the publication guidelines by Fischer earlier that discuss challenges and opportunities to be addressed by the author. Essentially, content, mentorship, and a strong support system (policy + resources + recognition) all play significant roles. There are several opportunities for scholarly publishing

that promote publication of supervisors and students' collaborative publishing. First, are the reasons why scholars publish, which were addressed at the beginning of this chapter? The second is that research is a mandate of a university for knowledge generation and dissemination. Third is that research visibility is increasingly important for fulfilling the mandate. Visibility enables an institution, in this case, research activities to be known by others, and it is a tool for transparency, accountability and accessibility. Thus, it supports and serves opportunistic reasons, such as self-promotion for recognition and reputation, and competition for staff and students. Fourth is the bench marking of universities, that is increasingly fulfilled through, for example, university ranking. There are several world university rankings. In an article on ResearchGate by Thelwall and Kousha (2014), they highlight the following five major ranking organizations: "QS World University Rankings[2], The World University Rankings[3], The Academic Ranking of World Universities (ARWU)[4], The CWTS Leiden Ranking[5], and The Webometrics Ranking of World Universities[6]. Research plays a significant role in the rankings. The fifth opportunity for scholarly publishing is attracting funding from government, business, civil society, philanthropists, etc. requires research pillar for such support. The sixth is research policy of countries and institutions/universities. Thus, countries and institutions increasingly devise research policies that favour quality research. For example, the National Research Foundation (NRF) rating of researchers[7] and the DHET (2015) subsidy in South Africa provide opportunities for moral and material reward for quality research output, which are highly exploited by researchers in the country.

CONCLUSION

It can be concluded that successful publication from theses and dissertations calls for significant support for, and mentorship of novice researchers by research supervisors, experienced peers and established researchers, and this requires a great deal of collaboration and patience. A suitable collaborative framework/ paradigm built on mutual benefit between supervisor and student should be encouraged. Also, publishing research results such as dissertation/thesis in a credible scholarly journal or book symbolizes quality research output.

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Chapter 27
Guide for Postgraduate Student Research and Publications:
A Step-by-Step Approach

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ABSTRACT

Academic research writing (manuscript writing) involves many shortcomings and challenges, but the process is systematically structured. Overcoming these challenges should involve proper adherence to steps and processes when carrying out academic studies. These challenges are a continuous worry for beginners and emerging researchers. Also, the components that constitute academic writing and its structure are continuously debated by scholars globally, especially for beginners and emerging researchers. The purpose of this chapter is to provide guidelines and steps that can assist researchers (beginners) to write manuscripts that meet the requirements of journal editorial boards, their audiences, as well as theses/dissertations for academic institution requirements and expectations of examiners. To achieve the purpose of this chapter, various vital variables and constructs were explained in clear and understandable terms in line with literature review of precious studies. The constructed ideas make the chapter useful for beginners who are writing manuscripts, theses, and dissertations.

INTRODUCTION

Writing to deliver high quality manuscript for publication and thesis/dissertation for postgraduate degree can be demanding. It necessitates strict adherence to standard, steps and approaches with clarity in terms of structuring and presentation of information to foster easy understanding of the readers. The process in developing and delivering these quality scientific papers can be challenging and time con-

suming, nevertheless rewarding. Meanwhile, owing to ambiguous perceptions clamoring the mindset of beginners regarding research and manuscript writing, detailed and coherent explanations of the various steps involved are imperative. Importantly, applying lay down processes and procedures as contained in this chapter can minimize as well as eliminate common mistakes and errors involved in writing. This guide will increase the possibility of producing quality manuscripts for publication and (a) successful research document/s (passing of thesis/dissertations examination) for beginners as well as established researchers and authors.

Despite the challenges in writing for publication and thesis/dissertation, Tribe and Tunariu (2016) believes that producing acceptable and publishable manuscripts is a huge achievement as well as contributing to the general scientific community, but this demands great patience and guideline. This chapter aim to present a comprehensive guideline for beginners and established researchers in writing academic proposal and manuscript that will contribute towards a quality academic writing and outputs. This chapter regards thesis/dissertations as postgraduate research documents for examination and degree purposes, while manuscripts are considered journal, conference, book chapter and other contributions. Oftentimes, in this chapter, academic writing or paper will be used to refer to both the thesis/dissertation and manuscript writing process. The structure and components of this chapter will benefit beginners to understand the most common problems encountered by researchers in writing manuscripts and thesis or dissertation proposals, field reports, grant applications and consultancy documents, which makes it more needful for readers.

The study is structured into five parts; steps to consider in academic writing, additional components to consider, summary or conclusion, future research direction and references. Importantly, any reader should refer to Table 1 for the necessary components to include while developing manuscripts, such as article writing or thesis/dissertations.

Steps To Consider In Academic Writing

Considering the rigorous nature of academic writing and the manuscript publication process, knowledge of the appropriate steps connotes a positive direction. For instance, when an individual understands the intricacies involved in any project, actualising the project becomes easier and clearer. Clarity is a distinct feature in any scientific writing, which a researcher should always bear in mind (Day & Gastel, 2016). The clarity of any scientific paper demands proper organisation, communication skills and presentation of information throughout the paper. Day and Gastel (2016) further stated that in any manuscript writing, understanding of the paper depends on the clarity of the information being passed and the reader's interpretations. Therefore, there is a need to consider the audience. Audiences (readers) are primarily people to consider while writing (Cargill & O'Connor, 2013). Manuscript publication is undoubtedly an avenue of joining the scientific community. Therefore, to join the community it is important to understand the rules of engagement. The rules will vary with disciplines, but the researchers follows general steps while attempting to write or publish academic manuscript as well as writing thesis/dissertations. The steps are the following:

Step 1: Develop Idea

The ability to write any manuscript or thesis/dissertation begins with a conception, imagination or ideas. This idea builds the intention that engineers the purpose for the study. An idea defines the overall view

of the study. Research ideas can aim to explore, investigate, discover, understand - more the underlying situation within a certain research discipline. The development of research ideas propels a researcher to discover and note the main research topic, objectives, problem statement, literature study, population sample and few others.

The researchers believes that the development of research ideas necessitates the motive to initiate academic writing. Similarly, for a researcher to carry out any academic writing, the first and foremost step will be to develop a clear research idea that leads to topic formulation, area of focus and the rest follows.

Step 2: Deeper Reading and Writing

Reading involves cognitive process and active involvement in the search of knowledge, while writing documents involves interpretation of the researcher's views and understanding. Both ensures the construction of researcher's idea/s. The researcher logically constructs the ideas - in line with the initiated topic. The reading and writing processes are important steps to consider in academic writing. Researchers should be involved in wide active reading within the scope of a chosen research area. The reading enables a researcher to understand empirical viewpoint of other scholars within the research idea/s initiated in step one (1) above. The reading also assists a researcher to determine the research gap/s. Writing also produces new insights, knowledge and interest from the read scholarly works. The reading and writing process must flow logically.

Step 3: Logical Flow

This harmonises the reading and writing processes logically. The presentation of academic writing determines its acceptance or rejection by any publication house and audience. It also determines whether a postgraduate study will pass the internal and external examiners' review processes. According to Shaikh (2016) manuscript writing should be logically written. The process involves rereading of the work by the authors and any independent researcher. The author further alludes that continuous rereading of any academic work eliminates omissions, grammatical errors and mistakes, unidentified and overlooked issues and many more. In other words, logical academic paper flow is affected by poor writing, lack of structural writing patterns and lack of experience in manuscript writing requirements (Hoogenboom & Manske, 2012). All the processes involved in reading and rereading a manuscript will help to improve the quality. The logical flow aimed to communicate thoughts and results in writing in a manner that will allow the readers to be able to understand the message that is being passed through (Couper & Mash, 2014). Importantly, researchers should avoid the use of jargon, unnecessary use of abbreviations without properly giving the full meaning and be able to make correct simple sentences. Any logical work in the form of academic papers and others will be reviewed; therefore, coherent reading and writing are important.

Step 4: Understanding Review Process

Every quality and well-written scientific paper must be published for public (academia, practitioner and student) usage. Review is a scientific reviewing process done by experts in the research area to evaluate the contents of an academic paper (Hoogenboom & Manske, 2012). For example, a thesis/dissertation is internally and externally reviewed by examiners who are experts in the particular research area, while manuscripts are peer-reviewed by appointed reviewers by the journal editor/s. The research evaluation

processes are done to review the scientific contents and the methodological process adopted. This process is done to bring the best out of the academic paper for soundness in readability and understandable in providing a document that is of a high quality. Academic paper review is a rigorous practice done to ensure that the scientific document provides fundamental, informative and innovative ideas to assist in decision-making processes (Hoogenboom & Manske, 2012). To this chapter, academic paper review processes are done by experts to assess document quality in the contribution to the body of knowledge. For example, the rigorous thesis/dissertation examination process is a key for academic institutions to confirm the degree on a candidate or not. However, a manuscript can be rejected by the editors of some journals if it fails to meet their standard even without sending the manuscripts out to be peer-reviewed (Bjork & Solomon, 2013). However, thesis/dissertations can be failed by the external examiner(s) if the candidate does not meet the required standard; failure to meet the standard means the academic institution will not confirm the degree. Importantly, every academic paper sent for review is accompanied by an evaluation rubric. The first four steps in this chapter present in-depth understanding and introduction to the field of academic writing. Step five highlights an impressive layout consisting of different headings necessary in most academic writing processes.

Step 5: Present Impressive Layout

Any given academic paper receives attention and impression by a journal house, examiner or audience through three steps: title page, abstract or introduction. However, abstract is the fundamental part of academic research writing after the title. On another level, these are the first points that impress or depress journal editor/s (Shaikh, 2016), as well as examiners of a thesis/dissertation. Apart from the three mentioned steps, the section presents other important components that contribute towards impressive academic paper layout.

Title Page

A title provides overview content of the study. Equivocally, the title of any academic paper contains vital information regarding the paper, and therefore the title should be concise, with the fewest words, specific, unambiguous, and without abbreviations. An example of a title is "***An empirical investigation into the impact of smartphone on students' academic performance***". A title provides the summary of the academic paper objectively as well as the main aim. It captures the attention of the editor, examiner and the audience. An academic research title should be carefully chosen to capture the attention of the audience. Lengthy titles, at times, lose the main ingredient of a title, and therefore are often discouraged. Furthermore, adding to the importance of a title, academic papers are easily identified by a reader as a good title describes the content of a paper. Tribe and Tunariu (2016) said that the title of any paper goes a long way in determining the audience and should reflect the body of the paper.

Meanwhile, prospective writers or researchers should also know that conceptualizing a good title of a study is not as difficult as it appears. Wood et al. (2010) are of the opinion that once an individual decides on embarking on a study, title ideas will start coming to mind. Titles can be generated from a constructive reasoning based on life experience, phenomenon of interest, existing research flaws, observations, broader research and contradicting opinion to generally held opinions, day-to-day activities or existing problems around the individual. Stuwe and Drescher (2012) added that the title of the academic paper should be placed on its own in a page following a particular format; in some rare cases, where the

abstract of the manuscript is short, it can be on the same page above the abstract. Furthermore, Davidson and Galbridge (2011) believed that a title should be concise, easy to understand, and able to direct the reader on the actual content of the study. The title should be eye catching, grammatically sound and error free to guide and portray the entire image of the document. According to this chapter, a title should be limited to 15 words or less in length as indicated in the example earlier. It can be seen as a point of departure into the reading of academic paper.

Abstract

This section determines whether an academic or research paper will be read and always written last (Johnson, 2008) and it catches the eyes of the audience (Davidson & Galbridge, 2011). It is an executive summary of the study that provides the succinct study overview, aim/objective, the problem investigated, theory(ies) applied, research methodology deployed, data analysis, discussions, main findings and conclusions (Shaikh, 2016; Vitse & Poland, 2016; Ecarnot, Seronde, Chopard, Schiele & Meneveau, 2015).

An abstract, undoubtedly, provides a reader with clues regarding the study, which will propel the reader to go on to read the work. It is structured in such a way that it contains relevant information as briefly as possible as contained in the entire study. When an abstract is not properly written, a reader may not be able to pick interest in the study. Therefore, it is imperative for any researcher or a beginner in writing to get familiar with the vital information that makes a grounded and well-articulated work. According to Stuwe and Drescher (2012), an abstract should be the summary of an academic paper. Research abstracts vary in length (number of words) depending on individual journals or academic institutions. Vitse and Poland (2016) suggest that research abstracts should be mainly between 150 and 300 words, but the words depend on the journal or academic institution.

To this study, abstract is an "executive summary" that covers everything that was done by the researcher/s. Abstract is always short (Hornstein, n.d). According to Michael and Hennerici (2007), abstract means reducing and summing up ("AB – absolutely, STR – straightforward, ACT – actual data" analysis and interpretation). To present an attractive abstract, the following questions (abstract questions) can assist researcher/s to start an abstract and finish it well (Meo, 2018):

- Why the study started?
- What did the researcher/s do?
- How did we do it?
- What the study found?
- What does the findings mean?

In line with the above questions (abstract questions), anatomy of an abstract is also very important in constructing attractive and impressive abstract. Figure 1 shows the combination of the anatomy and abstract questions. The anatomy of an abstract presents the components which constitute a comprehensive manuscript abstract writing while the questions enables a researcher to understand how things begins through to the end. It ensures an abstract is well structured with the right contents.

Figure 1. The anatomy and abstract questions
Source: *Adapted from Meo (2018)*
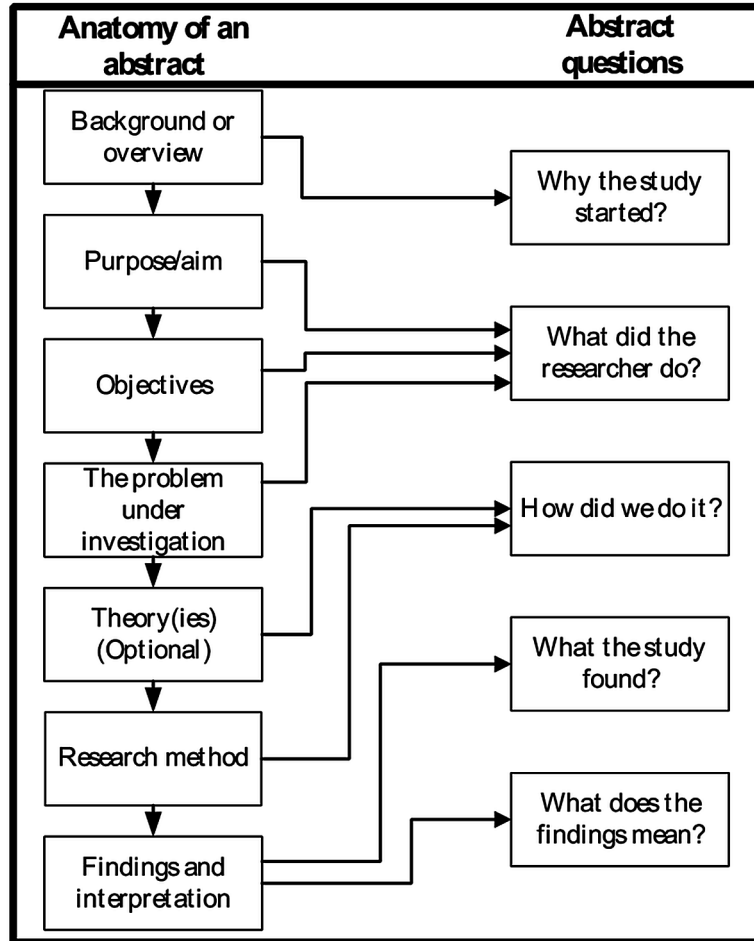
Keywords

This provide and list the important words that describe and underpin the study. Keywords are deduced from the study for indexing and searching purposes. An example of keywords from the title section above will be "student, smartphone, academic performance and others". Keywords are phrase or words that directly linked to the main concept of the study (Sousa, 2006).

Introduction

The introduction to any scientific paper should be concise and direct to the point because a well-constructed introductory part of a study arouses the interest of the reader to read the study. In other words, the introduction should be direct and short (Johnson, 2008). It provides the purpose of the study, the background, study origin, the research questions and how to answer them, the problem statement and brief literature (Davidson & Galbridge, 2011). Writers or researchers should understand that the introduc-

tory part of any paper guides a reader from the simple to a more general aspect of a study. Furthermore, they should prioritise captivating the attention of their reader with the introduction covering some vital information missing in the abstract. Stuwe and Drescher (2012) add that a writer loses it once the intention of the paper is not made known within the third line of an introduction, and therefore that should be avoided. Couper and Mash (2014) also posit that a study introduction should put at the forefront, the reasons for the paper or study. An introduction should be brief and properly structured containing vital information regarding the study that will arouse the interest of the reader in a clear language for a proper understanding of the paper headway (Locke et al. 2007). Interestingly, the introductory part of a paper paves the way for the subsequent heading and subheadings of the study. Locke et al. (2007) further add that the easiest way of writing the introductory part of any paper is by identifying and defining the central construct in the study, bearing in mind that constructs are concepts that provide the authentic underpinning information in a study. In general, the introduction of the study looks into the overall aspect of the study (background), covering the aim/objectives, the problem investigated and the subsequent expectations in the study.

Background of the Study

Writers should understand the importance of a good background of the study. Postgraduate students are expected to understand the necessary ingredients for writing the study background. According to Gruba and Zobel (2017), the background of any academic paper should be extensively explained, detailing the need for the study, what other authors have written regarding the topic under study, the very knowledge the writer or researcher is building and the context of the study. This is a bit tricky, but can be done by acquiring skills that can be built through the review of literatures to see how others are structuring theirs. The researcher should be able to prove how past studies relate to the current study. It is expected of any researcher or writer to be able to link paragraphs appropriately in order to have a coherent paper. Tribe and Tunariu (2016) maintained that the background of the study should have well-structured information that portrays the relevance of the study and captivates the interest of the audience. Furthermore, the background of the study should be well augmented for better understanding. It is helpful to begin from a broader sphere and contextualise your background to your immediate study area and continuously reminding your reader of the title or reason for the study. By constantly reminding your reader of the title or reason for conducting the study, it keeps the reader up to date of where the study is driving to.

Problem Statement

According to Locke et al. (2007), a problem statement of any study should have its root in the background of the study, which must be concise and straight to the point and within an achievable limit. Wood et al. (2010) believed that a research problem statement is the main issue behind the study, which the study intends to investigate. For example, for "an investigation into the impact of smartphones on students' academic performance", the problem statement will be based on exploring 'the impact of smartphone usage on students' academic performance'. In writing a problem statement, it is imperative to properly structure the statement within a logical progression of precepts and good argumentation in the background of your research knowledge and competence. Furthermore, a problem statement should be clear, understandable and doable. A well-structured problem statement should flow in line with your topic or title, introduction and the background of the study and be able to address the need to investigate

it. Furthermore, a problem statement of any study should be able to provide proper answers regarding any impending questions on who, what, where and when the prospective audience or reader might ask (Wood et al., 2010). Rout and Aldous (2016) add that the problem statement should contain what is intended to be studied and the reasons why it is a problem in clear terms. A well-drafted problem statement clearly shows the direction of the study and the necessary boundaries. There are different ways a problem statement could be written: it could be written with a specific problem at hand, written to explore or investigate an issue or a case, or written to understand certain phenomena. Whichever way, a researcher should structure the problem statement to align the issue under investigation with existing literature. Furthermore, the problem statement should be built from the general (highlighting what other researchers are saying in relation to the topic) to the specific (stating the objective of the study).

Research Motivation

It is very important for a study to have a motive. Motivation can be seen as "reasons underlying behaviour" (Lai, 2011:4). All academic writing must be motive driven and justified as to why the study is being carried out. The researcher should clearly state the motive behind a study and underlining benefits to the discipline and audiences. The motive could be to understand or explore a given situation, to answer and address a certain question or issue, to provide (a) solution/s to a certain problem, and many more. No matter the intention of a study, it must be clearly motivated and stated. Research motivation can be triggered intrinsically or extrinsically. For this chapter, a research motivation is the brain behind the study that guides a researcher to undertake a study. An example of a research motivation, this chapter was motivated due to a lack of postgraduate students' understanding of the processes and procedures in writing academic research or projects (proposal, thesis/dissertation, journal and other research writings).

Purpose of the Study

It is imperative to explicitly state your purpose of embarking on the study. If the purpose of conducting a study or writing a paper is not well defined, accomplishing the task is jeopardised. Locke et al. (2007) are of the opinion that the purpose underpinning every scientific paper should be clearly stated. The statement of the purpose does not necessarily need to be exhaustive or presented as a research question; rather, it should be concise and within an achievable limit. Researchers should convince readers of the purpose of the study.

Research Objectives and Questions

When the objective of embarking on a journey is not well defined, getting to the destination will be jeopardised and this also applies to academic writing. Therefore, in order to achieve the objective of a study or manuscript, the objective should be well defined and within achievable limits and time. An example from the title page above: the main research objective will be to 'understand the impact of smartphone usage on students' academic performance'. To begin the sentence, words such as "understand, investigate, explore and inquire" can be used. Therefore, it is imperative for researchers embarking on any research to bear in mind what to achieve at the end of the study and how to achieve it, which necessitates adequate background knowledge and well-structured answerable questions. Furthermore, research questions should be concise and plain for easy understanding. Most times, sub-questions are deduced from

the main research question, which enhances its answerability. Wood et al. (2010) suggest that research questions are simply queries about a problem that can be scrutinised, reviewed and analysed in order to produce useful information regarding a study. A well-answered research questions brings new knowledge and also broadens the scope of a study and at the same time contains facts. Research objectives should be an inverse of the research questions and vice versa. For example, the research question can be "what are the impact of smartphone usage on students' performance?" While the research objective can be "to investigate the impact of smartphone on students' academic performance". In many occasions, research objectives and questions are presented separately.

Definition of Terms

Definition of terms composes of words or phrases that better describe the study. In other ways round, there are words used to describe key concepts in academic writing or manuscript. Usually it comes before the literature review or study highlighting main unique concepts and terms describing the study. These terms are exploited and explained in belief in regards to the study under investigation.

Literature Review (LR) or Study

A literature review (LR) constitutes important aspect of every paper, which goes a long way in proving the soundness of the researcher or writer in understanding and interpreting other people's work. Interestingly, reviewing of literature exposes a researcher or a writer to a wider scope of studies, thereby broadening the perception of the individual. According to Galvan and Galvan (2017), understanding the reason for carrying out a literature review is the first consideration toward planning to write a literature review of a study, and a writer should bear in mind the readers of the work. These considerations cut across literature reviews for different types of papers such as dissertations, thesis and articles for publications and go a long way in ascertaining the broadness or in-depth nature of the paper.

Maree (2016) maintained that a literature review provides a researcher with vital knowledge regarding current and relevant studies in a discipline and also aids in ascertaining the existing research gaps, thereby helping in proper decision-making in a study. The wider an individual read, the more information is acquired, and consequently the need for a proper literature review.

Prospective writers and junior researchers should bear in mind the need to identify the already existing knowledge in their field of interest as well as the flaws, and make proper judgements in addressing such situations. Ary et al. (2014) suggested that a baseline literature review should be done before the commencement of the paper for preliminary knowledge. The researchers further noted that good background knowledge of a literature review sets a researcher on the right course into the study, helps in drafting the necessary research questions, defines their boundaries, obtains knowledge of the study methodology, avoids repetition of a study, and sets a definite goal that also portrays the importance of the study. Meanwhile, Machi and McEvoy (2016) posit that researchers or writers across the globe carry out literature reviews for different inherent reasons, but generally, the need for literature review should be centred on enhancing learning, broadening knowledge, demonstration of writing skills and competency, and to obtain satisfaction as a result of self-accomplishment of a particular task or academic project. With the topic example above (see title page section), the writer gathers existing literature information about the topic.

For a writer or researcher to achieve a good literature review, patience, foresight and focus are necessary in order to uncover the hidden knowledge in other people's work and to properly align it with the current study. Most times, researchers lack the patience and are in a hurry to produce a paper, and consequently end up producing little to meaningless reviews that discredit the individual. This brings into the picture that the mere understanding of the procedures in carrying out literature review is not enough to produce a good literature but good understanding of the procedures, proper critical evaluation, focus, patient and constructive judgement of other people's work and in all writing to present the current state of knowledge will go a long way in a guaranteeing quality literature review. According to Onwuegbuzie and Frels (2016), they believed that a literature review exposes a researcher to a field of study, necessary research methodology used and also helps the individual in getting familiarised with the appropriate writing terms and strategies needed in producing a quality study. For this chapter, a high quality literature review should be structured in accordance with the study objectives or questions. This means that each of the study objectives or questions should form a heading or subheading in the literature review and discussed extensively.

Theoretical Perspective (Important but Optional)

Theoretical perspective is regarded as the theoretical framework which can precede literature review. For researchers conducting research for academic qualifications within the field of social sciences, education and others, theoretical perspective might be needed depending on the type of study the individual is conducting. Using an example from the topic above (see title page section), there are different kinds of frameworks to be applied, such as self-determination theory (SDT), technology acceptance model (TAM), theory of reasonable action (TRA), theory of planned behaviour (TPB), decomposed theory of planned behaviour (DTPB), unified theory of acceptance and use of technology (UTAUT), culture-oriented e-learning system framework (COe-LSF) and many more. When conducting dissertation or thesis study, the proposal (chapter 1) and chapter 2 usually discuss the issues related to the development of conceptual framework and application of theoretical frameworks resepectively. Theories portray soundness of knowledge in a selected field of study and help the audience in understanding the aspect the study is grounded in. Some studies might be to generate theory, while some to test theory(ies), so having theoretical framework in your study should be based on the direction of your study. According to Adom, Kamil and Agyem (2018), a theoretical framework or perspective helps the researcher to understand his or her methodological, epistemological, philosophical and analytical stance for the study. Based on this, a theoretical framework is a copied theory that lays a foundation that guides the research objectives and questions construction. A researcher should be careful in choosing a framework because the components of the chosen theoretical framework should guide the construction of the objectives, questions of the study and hypothetical viewpoint. Furthermore, a theoretical framework lays the foundation for the construction of the conceptual framework. A conceptual framework is the researcher's own work built from the components of an existing framework/s or theory(ies) (theoretical framework). These components are most times used to construct the research objectives and questions, which are tested in the study.

Research Methodology (RM)

Research Methodology (RM) constitutes a vital portion of every scientific research paper. RM can be used when carrying out empirical (using primary data) and non-empirical research (using secondary data) study. Ary et al. (2014) stated that research methodology constitutes the approaches adopted by the researcher that guide in answering pertinent questions and aid in actualising the study objectives. For instance, quantitative, qualitative or mixed research methods are commonly used research methods in carrying empirical study (collecting primary data). However, quantitative, qualitative or mixed research can also be regarded as research approaches (Galt, 2009). These research methods can be applied in the field of social science, humanities, education and others. To Couper and Mash (2014), the methodology section is a vital aspect of any scientific writing, and therefore should be clearly stated for a better understanding of the audience. It is ideal to present the step-by-step explanation of procedures taken toward collecting data, such as the adopted approaches and design (quantitative, qualitative or mixed research methods), site selection, population of the study, sampling techniques, instrument of data collection and data analysis.

Tribe and Tunariu (2016) further add that researchers should always endeavour to give detailed explanations of the methodologies adopted in a study for in-depth understanding by the audience. Gemayel (2016) is of the opinion that the research methodology section should be structured using subheadings in order to enable the audience to understand the study and also give a coherent description of each of them. Importantly, if these processes are not properly outlined and explained, confusion may arise. Although a research methodology is written in the past tense (Johnson, 2008), a researcher may follow the research methodical approach as presented in the "Research Onion" (RO) in achieving academic writing. Data analysis and discussion of the findings are part of the research methodology.

While, other methods can be used without collecting primary data, such as the secondary data method (non-empirical research). Non-empirical research can be done without data. Non-empirical research method can be called desktop survey, stand-alone literature review (SALR), systematic review (SR) research or systematic literature review (SLR) (Adom, Umachandran, Asante, Ziarati & Sawicka, 2019; Okoli & Schabram, 2010). According to Okoli and Schabram (2010), SLR is a known methodology in the field of health sciences. It aims to analyse, identify, collect and discover new ideas from existing peer-reviewed journals, textbooks, conference paper and other scientific works and materials (Adom et al., 2019; Creswell, 2009). This methodology is applied to the study to discover structured steps to assist postgraduate students or beginners in writing an academic paper, manuscript, dissertation or thesis.

Data Analysis

As an element within a research methodology, analysis aims to extract the full meaning from collected data. Analysing the data collected is usually a tricky process that demands some expertise, but is not necessarily something to fear. When data have been collected, transforming it to actualise the objective of the study becomes vital. Data analysis can be done manually or computerised. For example, the Statistical Package for the Social Sciences (SPSS) and Statistical Analysis System (SAS) can be used for quantitative data, while Atlas.ti can be used for qualitative data and many more. According to Ary et al. (2014), data analysis is simply the processes of reducing or disintegrating raw data, making meaning out of it in order to answer the research questions. Through the proper analysis of the data, attention is paid in order to reduce biases to the barest minimum. Gemayel (2016) also adds that data should be clearly

analysed following a distinct chosen method. Collis and Hussey (2013) further expanded that data analysis is among the major aspects of conducting any scientific study that will depend on the philosophical standpoint of the researcher or the chosen type of study being conducted. The data analysis involves a statistical process in displaying the results graphically or using tables. According to Vitse and Poland (2016), statistical analysis is presented by showing the relationships among data variables, significance tests, correlations, confidence intervals, regression, chi-square and many more. The researchers further alluded that statistical analysis aimed to draw out the detailed findings or evidence from the study.

Discussion of the Findings

A discussion of the findings is important after data analysis, as a researcher is expected to communicate the results of the study in an understandable language for the consumption of the audience. Discussion of the findings can be grouped into two parts; (1) reporting findings (the deduce from data analysis in figures like graphs, charts and diagrams) and (2) reporting discussions (building concept from the results found in data analysis and linking it to the existing literatures and theory(ies)). Gemayel (2016) recommends that discussing the findings portrays the relevance of the study and also reaches the audience. From the topic example above (see title page section), the study discusses the findings from the study. Vitse and Poland (2016) believed that discussion is a vital aspect of an academic paper in relating the current findings with the existing findings.

Couper and Mash (2014) maintained that discussing the study findings is among the challenging parts of any scientific writing due to the large volume of data at the writer's disposal, but aligning data with the study objective will make it less difficult. However, much attention should be paid in order not to be reciting the result in the name of writing a discussion. Therefore, understanding and digesting the data, exploring the findings, as well as explaining their importance and implications will give a proper discussion of findings. Tribe and Tunariu (2016) add that optimum attention should be paid when discussing the findings of the study, avoiding over-generalising of claims, and endeavouring to heed to the guideline of the journal publishing company regarding their pattern of placing tables, figures and abbreviations. To Vitse and Poland (2016) and Johnson (2008), discussion should provide current study findings in the first paragraph (the known), the second will relate the current to the existing ones. According to this chapter, the discussion of the findings should be organised in accordance with the structure of the research objectives or questions in making sense of the study discovery.

Recommendation and Future Study

Often times, recommendations in scientific research are necessary as they promote future studies. From the topic example above (see title page section), the recommendation can be directed to the students, academic institutions and smartphone makers. Students and academic institutions can be guided on how to apply smartphones effectively to impact teaching and learning and academic performance positively; while smartphone makers can be recommended on how to produce smartphone with features to impact students' academic performance effectively. Therefore, recommendations are based on the current research findings. Meanwhile, one of the advantages of recommendations is to give some pictures of more areas to be expanded in a field of study, the things to be done and the implications.

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Implication of the Study

Scientific research findings mean different things to different stakeholders and it can be applied differently from each other. Scientific research should be concluded and give a practical guide for the findings' application by interested group/s and stakeholder/s. A process may be provided for the readers to follow in order to apply the research finding into practice. Then, a conclusion drawn on the importance of the findings can be regarded as an implication. In other words, an implication can be seen as the significant or important points that must be considered before or while applying the findings of academic research findings in practice. Furthermore, it can be seen as the significant contribution of a research finding. A researcher/s should guide the reader on what they need to know or do before applying the findings or recommendations of any given research results into action or practice.

CONCLUSION

Yearly, the number of manuscripts submitted for publication and examination keeps increasing. To Shaikh (2016), 10% of manuscripts submitted to high-impact journals are accepted and it is difficult to screen out the best. Academic research conclusions should provide the reader with the new discovery, and the direction for future research. According to Stuwe and Drescher (2012), researchers should understand that the conclusion is never the same as the abstract; therefore, it should be a point-to-point summary of the study results. Couper and Mash (2014) also add that the conclusion should contain what was addressed by the objective of the study. Table 1 presents a summary of items to consider while writing thesis/dissertations or research papers (manuscripts). The items may differ from journal to journal and academic institution to institution, but these items are more generic and common to many publications and academic writings. Table 1 is divided into two parts: 18 basic research proposal layouts and 10 steps to consider in manuscripts writing. The first part highlights fundamental components that constitute thesis/dissertation proposal structure, and the second part shows the general attributes and in manuscript writing.

Step 6: Do Professional Language Editing

This section highlights the importance of presenting step five in a sound and professional language, in this case, English. The readability and easy understanding of an academic paper lie in its sound writing, as well as absence of grammatical and typographical errors. Content clarity is the main attribute of a good quality scientific document, which can be achieved through proper, professional language editing (Shaikh, 2016). Clarity ensures the readability of academic paper. Unfortunately, many manuscripts are rejected at the point of arrival on the desk of journal editor/s. Elsevier statistics prove that 30 to 50% of the rejected manuscripts are attributed to poor grammar or language (Shaikh, 2016). All scientific writing must be free of typographic and grammatical errors, and achieving such is done through editing and proofreading. While submitting for publication or examination, a researcher (student) should ensure the document is grammatically edited, corrected and error free.

Table 1. Thesis/dissertation proposal layout vs manuscript writing layout (Authors)

	18 basic research proposal layout		10 steps to consider in manuscripts writing
1.	Title	**1.**	Develop an idea
2.	Introduction	**2.**	Deeper reading and writing
3.	Background of the study	**3.**	Logical flow
4.	Problem statement	**4.**	Understanding review process
5.	Research motivation	**5.**	Present impressive layout: ✓ Title ✓ Abstract ✓ Introduction ✓ Background of the study ✓ Problem statement ✓ Research motivation ✓ Research objectives ✓ Research questions ✓ Literature review Theoretical perspective (important but optional) ✓ Research methodology ✓ Data analysis ✓ Discussion of the findings ✓ Recommendation and future study ✓ Implication of the study ✓ Conclusions ✓ References
6.	Purpose of the study	**6.**	Do professional language editing
7.	Research objectives	**7.**	Selecting a suitable journal
8.	Research questions	**8.**	Understanding journal aims and scope
9.	Definition of terms	**9.**	Journal author guideline
10.	Literature review	**10.**	Manuscript cover letter
11.	Theoretical perspective		
12.	Research methodology		
13.	Important/Significance		
14.	Limitation of the study ● What the study is not ● Validate and reliability		
15.	Layout of the study		
16.	Conclusion		
17.	References		
18.	Do professional language editing		

Step 7: Selecting a Suitable Journal

Submitting to a suitable journal increases the chance of acceptance or rejection, but finding the right journal can be challenging and stressful (Shaikh, 2016). Submitting to an appropriate journal attracts the right audience. Cargill and O'Connor (2013) are of the opinion that the choice of good journal for your work should be among the first considerations before commencing writing a manuscript. For this chapter, an appropriate journal for publication or manuscript should be the one that is easy to publish

in, has high prestige and with the right audience. The following are the most important ways to identify a suitable journal for publication:

- Search the internet to discover journals addressing and covering the research area of your paper.
- They must be accredited by any of these indexing organisations, such as Scopus, International Bibliography of the Social Sciences (IBSS), Norwegian, Information Scientific Indexing (ISI), Sciel O SA and few others.
- The journal's publication must have an International Standard Serial Number (ISSN) and International Standard Book Number (ISBN) for a textbook.
- Understand the scope and objective of the journal. The researcher should consider a suitable journal if the research topic fits into the journal objectives and scope of research interest. The discovery of the objective is paramount; if not, the manuscript can be rejected.
- Consider a high impact factor (IF) journal.

According to Vitse and Poland (2016), researchers should consider high quality journals with a high impact factor (IF); however, IF is not a yardstick of quality. Therefore, researchers should make appropriate choices before publication in order to achieve high success rate in their publications. Tribe and Tunariu (2016) further add that one should endeavour to choose the right journal that will aid in reaching the right audience and also consider their prestige and 'academic impact rating' (otherwise called 'impact factor' or IF). Ascertaining the IF is necessary because the annual impact rating that is based on an 'evaluation system rating' is awarded to journals on the average number of times papers "published within journal are cited (Journal Citation Report)". A researcher should choose a journal that fits the manuscripts and right audiences (Davidson & Delbridge, 2011).

Step 7.1: Understanding Journal Aims and Scope

After identifying the suitable journal, the author/s should carefully read and understand the aims and scope of the journal before submission. To Shaikh (2016), careful reading and rereading chosen journal aims and scope increase the possibility of its acceptance. To this point, understanding the aims and scope of a journal enables a researcher in structuring the research document in line with those aims and scope that also make the study appealing to editors and later the audience. Couper and Mash (2014) posit that researchers should make proper decisions regarding the journal and the type of audience for their paper and endeavour to shape the study toward capturing their interest.

Step 7.2: Journal Author Guidelines

Formatting a manuscript or a research paper increases its chances of being accepted. According to Shaikh (2016), one fifth of submitted manuscripts do not conform to the publication formats. The more conformed a manuscript could be, the higher the acceptance for publication. Tribe and Tunariu (2016) suggest that understanding the epistemological, methodological or theoretical approach of the intended journal is very important before making your choice. Meanwhile, a few journals display the statistics of articles submitted to them for publication and the number of ones they finally published, and therefore proper enquiry is imperative.

Step 7.3: Understanding Acceptance and Rejection Possibilities

Every research document undergoes the process of acceptance (passing) and rejection (failure). These two categories should guide researchers and postgraduate students while on the journey of academic writing. Furthermore, researchers need to understand that editors receive thousands of manuscripts each year and only a few are accepted for publication (Davidson & Galbridge, 2011). Meanwhile, thesis/dissertation success demands that the researcher should conduct high-quality research. However, failure or rejection is heart-breaking, and Shaikh (2016) believes that manuscripts are accepted or rejected based on a number of reasons, which include manuscript objectives, failure to meet journal aims and scope, using the wrong format, not meeting journal expectations, and many others.

Sometimes, a manuscript sent for publication to a journal company can be withdrawn by the author due to unacceptable revision protocols, but in a situation where the manuscript is accepted, publishers format and typeset the manuscript while contacting the corresponding author to cross check the final version for publication (Bjork & Solomon, 2013). Furthermore, after the process of copy editing, formatting, typesetting and sending back to the author to cross check, the publishing companies usually add the final manuscript to the queue in the print publishing for the final publishing, but most times, articles submitted get more special treatment (Bjork & Solomon, 2013). Meanwhile, the quality of any manuscript cuts across journals, disciplines and the extent of the peer-review. Therefore, Hoogenboom and Manske (2012) state that scientifically written document/s should be published for accessibility. Meanwhile, rejections may arise from publishing companies, but that should not discourage the individual, because it is still part of the publication journey, but when such occurs, let it be an avenue for learning and improvement. Many successful authors have at one point or the other been rejected.

Step 7.4: Manuscript Cover Letter

The cover letter is an important aspect of a manuscript, according to Shaikh (2016), who states that editors and editors-in-chief are delighted when a manuscript is submitted with a cover letter because it sends a good signal to the editorial board that the work should be reviewed. Manuscript cover letters should cover the followings: the theme of the paper, the main objective of the paper, the unique attribute of the paper, the relevance of the paper, the contribution to the chosen journal and the contribution to the body of knowledge (Shaikh, 2016). The researcher noted that it is important for the researchers to acknowledge colleagues who read or proofread and guided the research process.

Step 7.5: Carefully Address Reviewer Comments

The final acceptance of a manuscript is usually based on adherence to reviewer/s' comments and recommendations. Then, it is wise for author/s to revise a manuscript according to those minor or major comments and suggestions of the reviewer/s (Shaikh, 2016). Sometimes, author/s overlook(s) some of the comments and recommendations of the reviewer/s. However, it is very important for a revised manuscript to address all the comments, to be submitted within stated deadline, identifying all modifications, and providing a correction table to show all the comments have been addressed (Shaikh, 2016). Sometimes, author/s may agree or disagree on reviewer/s comments and recommendations (Shaikh, 2016); in a case like this, enough evidence should be provided to justify the disagreement politely.

Scientific studies will not at any time cover every aspect of scientific field, and therefore it is necessary to draw the attention of your audience on what your study is not. Although it is not necessarily compulsory to have a subheading in your manuscripts regarding what the study is not, adhering to the guideline of the chosen journal is imperative.

ADDITIONAL COMPONENTS TO CONSIDER

This section provides additional components which can be included in writing manuscript. However, the entire section can be used on journal or conference publications but they can be well suitable on thesis/dissertations. While citation and references are used across any form of manuscript writing.

Important/Significance

Every scientific study or manuscript is expected to have some specific contribution to the scientific community (body of knowledge). According to Rout and Aldous (2016), significance of the study should be brief and contain how the study or manuscript will improve the already existing scientific body of knowledge.

Limitations/Scope of the Study

Researchers should be able to know the areas that their studies intend to cover as a scope or limitation. Couper and Mash (2014) stated that researchers should take note of the necessary boundaries and what they have found. Avoid making sweeping statements without proper explanation to avoid leaving your readers in the dark; for instance, when you say that the sample used for the study is too small, try as much as possible to explain what it means because it is expected of you to have explained the study sample size in your methodology. Using the example from the topic above (see title page section), the scope of the study will be focused on students at a particular college or institution only. Furthermore, barriers or challenges that limit the study should be properly made known in the study, though usually at the directive of the publisher, but should be stated in dissertations and thesis. At the level of scope, what the study did not cover should be stated.

What the Study is not

Rigour, Validity and Reliability

Every academic (scientific) research should have rigor, validity and reliability depending on the adopted research method and approach of the study. According to Cypress (2017), reliability and validity are the main two sides of any academic research. However, different schools of thought use terms best fit for their research discipline, such as rigour or trustworthiness in qualitative studies in place of validity and reliability in quantitative studies, but all speak to the authenticity of the study (validity and reliability). **Rigour** is regarded the state of being true, valid, thorough, exact, careful and the quality of accuracy. To

Cypress (2017), rigour in research means quality research design and proper application of methods in answering the research questions. The researcher further alluded that minus rigour, academic research is senseless, worthless, unimaginative and misguided.

Furthermore, rigour is referred to as trustworthiness for the qualitative research approach, and validity or reliability for quantitative approaches of a scientific study and are generally adopted to curtail biases and to enhance the authenticity of the research findings. The **validity** of a research means 'appropriateness' of processes, instruments, tools and data, while **reliability** stands for the replicability of research tools, processes and findings or results (Leung, 2015). Meanwhile, this paper intends to explicitly explain the core steps in writing manuscripts, dissertations and thesis, but does not necessarily explain the concepts on the basis of qualitative and quantitative studies. Ary et al. (2014) maintained that rigor denotes reliability and validity in qualitative research, which entails how reliable the study findings are.

Layout of the Study

An impressive academic dissertation and thesis is always organised into chapters. It is imperative for any researcher to arrange his or her research document into chapters. The number of chapters solely depends on the institution or the supervisor/s (promoter/s). A thesis/dissertation may consist of up to four/five chapters and more. This section is necessary to be outlined in any academic writing (thesis, dissertation or research proposal) for examination.

Citation and References

It is always imperative for a researcher to remember to acknowledge the source of their information included in the academic paper. Every social science, education and other discipline research work is based on already existing knowledge; however, acknowledging the original source of your information is necessary. Bornmann et al. (2012) noted that research has proven that research citation denotes a vital aspect of every research work and is an indicator of the subjective assessment of a high profile scientific community. Citation should be correctly done to enhance the study focus area. Stuwe and Drescher (2012) stated that citation should be uniformly done with strict adherence to the guideline provided by the publication company for manuscripts or the institution for dissertations and thesis. Every cited paper must be referenced and added in the reference list at the end of the paper. According to Vitse and Poland (2016), proper referencing should be done; many journals can reject a submitted manuscript due to failure to follow recommended referencing style. The most used referencing style are Chicago, APA, Harvard, MLA and Oxford. Furthermore, most dissertation and thesis examiners can fail a candidate because of improper referencing format and citation.

SUMMARY

The writing of a manuscript and thesis/dissertation can be an exciting, hard and rewarding journey. A successful academic or publication journey demands careful adherence to all that is stated in this paper and continuous improvement by the authors. Producing a high-quality and acceptable manuscript can be a daunting task for starters and average authors, and dealing with a rejected paper and reworking can be discouraging if there are no grounded ideas. Any manuscript writing comes to a point of summary

or conclusion which deals with synopsis of what was covered in the study. According to Bavdekar and Gogtay (2015), conclusion provide the summary of the entire study or manuscript while restating answers to the study objective/s, question/s. the key findings and the results found from the discussions. It restates the know-how discovered towards advancing the body of knowledge and make recommendation for future study. It is always a separate with a heading in any manuscript.

FUTURE RESEARCH DIRECTIONS

In the quest to advance academic structured and quality manuscript and research proposal writing, there is a need for academia's to look into the following research areas: (1) to research and identify the common challenges confronting postgraduate students and emerging researchers in constructing research proposal and academic paper/s (manuscript), (2) established researchers should share their experiences in the academic manuscript writing and publication journey, (3) investigation should focus on understanding ways to strengthen academic manuscript and proposal writing for advancing quality than quantity, (4) research should be done to understand the impacts of "publish or perish" slogan on emerging researchers and postgraduate students when writing manuscript, and (5) academic institutions should define a standard structure to guide emerging researchers and postgraduate students in writing manuscript and research proposal respectively.

CONCLUSION

The quest to present structured and quality academic or scientific manuscript is a continuous effort for all emerging and established academia's. Also, postgraduate students are required to be grounded in their research proposal and manuscript writing in advancing quality academic writing and paper publication. This chapter was able to identify different steps that will guide emerging researchers and postgraduate students and even established researchers to understand what to include when writing research proposal and manuscript aimed for publication. The application of this chapter in academic research writing will surely eliminate the challenges confronting researchers currently. This chapter has provided current and innovative ideas for any author to produce a desired manuscript or a scientific paper (thesis or dissertation). There are several suggestions out there that can guide authors towards their scientific writing journey. But the finding from this study ensures that researchers are well acquainted with processes and procedures that makes a quality academic manuscript. All the suggestions provided here should be carefully considered and implemented in carrying out scientific research projects, for now and in the future.

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KEY TERMS AND DEFINITIONS

Academic Research: There are different views on academic research, to chapter it is referred as a systematic scientific investigation which involves steps to establish some facts.

Academic Writing (Paper): Refer to both the thesis/dissertation and manuscript paper or writing process.

Beginners: Beginners are emerging researchers or postgraduate students.

Manuscripts: It is a systematic written academic document that advance scientific "body of knowledge".

Postgraduate Students: To this chapter, postgraduate students are individuals doing postgraduate studies like Master's and Doctor of Philosophy (PhD) degree.

Publication: To this chapter, it is an academic book, journal, or conference proceedings to advance academic knowledge for the general public to read.

Research Methodology: It is structured process adopted by researchers to understand and carry out research project to answer relevant questions in realising the research objectives.

Research Proposal: It is a systematic academic document proposing plan to carry out research project with a clear objectives and expectations.

Thesis/Dissertations: It is a postgraduate document or academic manuscript prepared by a postgraduate student for examination.

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