



The digitization of theses and dissertations at the University of KwaZulu-Natal

Bongiwe Cleopatra Nyide
(B.A., H.D.L.S., B.Bibl. Honours)

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DECLARATION

I, **Bongiwe Cleopatra Nyide**, declare that

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Signature: Date:

Supervisor:

Dr Zawedde Nsibirwa

Signature: Date:

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ABSTRACT

This study investigated the digitization of theses and dissertations at the University of KwaZulu-Natal. The main aim of the study was to try to address the issues and challenges encountered in the UKZN project, to help ensure that new digitization projects fulfil the expectations of libraries, students, and other stakeholders such as academics and other institutions. The population of the study was the entire library staff involved in the digitization of theses and dissertation projects at the University of KwaZulu-Natal. The sample consisted of library staff who were selected using purposive sampling. The actual number of respondents was 30 respondents, out of a population of 36 staff-members. Out of the 30 respondents nine participated in structured interviews, while the remaining 21 answered the questionnaire. The central theme of the study was to investigate challenges that the University of KwaZulu-Natal encountered, and still encounters, in its digitization of theses and dissertation projects. The researcher used both qualitative and quantitative research methods (mixed method). Structured interviews and questionnaires were used as research instruments. The quantitative data that was collected was analyzed using the Statistical Package for Social Sciences (SPSS) and the qualitative data, after having been coded, was manually analyzed. Data collected was presented in the form of frequency tables and pie charts. Through this study the researcher hoped to make recommendations on identified issues. The researcher hoped that such recommendations would help provide ways in which future digitization projects could be implemented. The researcher also hoped that this project would increase the librarians' understanding of the importance of the digitization of theses and dissertations which, in turn, would encourage them to participate in the formulation of digitization strategies and policies. The data collected was divided into seven categories, namely demographic information, background information, strategies and policies, staff training, staff support, technical support and library challenges.

Results showed that the University of KwaZulu-Natal library theses and dissertations digitization project did not have guiding digitization strategy and policies. In addition to this there were no clear communication lines. As a result there were unexpected delays to the project which was supposed to last for two years.

TABLE OF CONTENTS

DECLARATION	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
TABLE OF CONTENTS	vi
LIST OF FIGURES	xv
LIST OF TABLES	xvi
LIST OF ACRONYMS AND ABBREVIATIONS	xix

CHAPTER 1

OVERVIEW OF STUDY

1.1 INTRODUCTION	1
1.2 BACKGROUND OF THE STUDY	1
1.3 BRIEF BACKGROUND OF UKZN	2
1.3.1 Brief background of the UKZN library	4
1.4 DIGITIZATION OF THESES AND DISSERTATIONS	6
1.4.1 Developed countries	7
1.4.2 Developing countries	8
1.4.3 South Africa	9
1.5 DIGITIZATION OF THESES AND DISSERTATIONS AT UKZN	10
1.5.1 Retrospective theses and dissertation digitization project	10
1.6 DEFINITION OF CONCEPTS	12
1.6.1 Digitization	12
1.6.2 Digital Librarian	12
1.6.3 Digital Libraries	12
1.6.4 Institutional Repositories	13
1.7 PROBLEM STATEMENT	14
1.8 SIGNIFICANCE OF THE STUDY	15

1.9	AIM AND OBJECTIVE OF THE STUDY	16
1.10	KEY RESEARCH QUESTIONS	16
1.11	THEORETICAL FRAMEWORK	17
1.12	RESEARCH DESIGN AND METHODOLOGY	17
1.13	DELIMITATIONS OF THE STUDY	18
1.14	STRUCTURE OF THE DISSERTATION	18
1.15	SUMMARY	19

CHAPTER 2

LITERATURE REVIEW

2.1	INTRODUCTION	20
2.2	THEORIES GUIDING THE STUDY	20
2.2.1	Communication Theory	22
2.2.1.1	Communication Theory in relation to this study	22
2.2.2	Conversation Theory	22
2.2.2.1	Conversation Theory in relation to this study	23
2.2.2.1.1	Identify	23
2.2.2.1.2	Compare and contrast	23
2.2.2.1.3	Explain	24
2.2.2.1.4	Debate/Argue	24
2.2.2.1.5	Decide	24
2.2.2.1.6	Design	24
2.2.3	Data Curation Lifecycle Model	25
2.2.3.1	DCC Curation Lifecycle Model in relation to the study	25
2.2.3.1.1	Describe and represent information	27
2.2.3.1.2	Build preservation strategy	27
2.2.3.1.3	Collaborate, supervise and participate	27
2.2.3.1.4	Curate and preserve	27
2.2.3.1.5	Plan your data creation	28

2.2.3.1.6	Create or receive	28
2.2.3.1.7	Appraise and select	28
2.2.3.1.8	Take in and transfer	28
2.2.3.1.9	Store for access, reuse and retrieval	28
2.2.3.1.10	Transform	29
2.3	ELECTRONIC THESES AND DISSERTATIONS IN THE SEVEN CONTINENTS OF THE WORLD	29
2.3.1	North America	29
2.3.2	South America	30
2.3.3	Europe	30
2.3.4	Australia	31
2.3.5	Asia	31
2.3.6	Antarctica	32
2.3.7	Africa	33
2.3.7.1	South Africa	33
2.3.7.1.1	University of KwaZulu-Natal	34
2.4	DIGITIZATION OF LIBRARY MATERIALS	35
2.5	BENEFITS OF DIGITIZATION	35
2.6	PRINCIPLES OF DIGITIZATION	37
2.7	FACTORS TO CONSIDER IN THE DIGITIZATION PROJECT	38
2.7.1	The intellectual and physical nature of the source materials	38
2.7.2	The number and location of current and potential users	39
2.7.3	The current and potential nature of user	39
2.7.4	The format and nature of the proposed digital product ...	40
2.7.5	Projections of costs in relation to benefits	40
2.8	GUIDELINES FOR STARTING AN INSTITUTIONAL REPOSITORY (IR)	41
2.9	PHASES OF DIGITIZATION	42

2.10	BEST PRACTICES AND PLANNING FOR DIGITIZATION PROJECTS	42
2.10.1	Planning processes for a digitization project	43
2.10.2	Implementation	45
2.10.3	Organizational support	45
2.10.4	Digitization strategy and policies	46
2.10.4.1	Know what you have	48
2.10.4.2	Know your users	49
2.10.4.3	Determine your selection principles and rules	49
2.10.4.4	Describe the digital items and collections	49
2.10.5	Availability of specialized staff	49
2.10.5.1	Staff requirements for digitization	50
2.10.5.2	Staff training for digitization projects	52
2.10.6	Qualities for a digital librarian	53
2.10.6.1	Compound knowledge structure	53
2.10.6.2	High-level information literacy	54
2.10.6.3	Excellent personality	55
2.10.7	Staff retention	55
2.10.8	ICT Infrastructure	55
2.10.9	Management of collection and selection of digital materials	57
2.10.9.1	Copyright/intellectual property rights	62
2.10.10	Information management	65
2.10.11	Content capture	66
2.10.11.1	Logistics	66
2.10.11.2	Pipeline	66
2.10.11.3	Text capturing	67
2.10.12	Creating metadata	67
2.10.13	Quality assurance	69
2.10.14	Communication and co-ordination	70

2.10.15	Service delivery	73
2.11	PROJECT MANAGEMENT	73
2.11.1	Project management in a library context	73
2.11.1.1	Definition	74
2.11.1.2	Formalization	74
2.11.1.3	Implementation	74
2.11.1.4	Completion	75
2.11.2	Project planning	75
2.12	DIGITIZATION CHALLENGES FACED BY LIBRARIES	77
2.12.1	Digitization policies	77
2.12.2	Digitization costs	78
2.12.3	Staff training	80
2.12.4	Lack of human resources	81
2.12.5	Staff support	81
2.12.6	Technology	81
2.12.7	Time	83
2.12.8	Copyright	84
2.13	SUMMARY	85

CHAPTER 3

RESEARCH METHODOLOGY

3.1	INTRODUCTION	86
3.2	RESEARCH QUESTIONS FOR THE STUDY	86
3.3	RESEARCH DESIGN	87
3.3.4	Research paradigm	87
3.3.4.1	Pragmatic paradigm	89
3.3.5	Categories of the research design	89
3.3.5.1	Exploratory research	89
3.3.5.2	Causal research	90

3.3.5.3	Descriptive research	90
3.3.5.4	Exploratory, causal and descriptive research interlinked	91
3.3.5.5	Category selected for this study	91
3.3.6	Research methods	92
3.3.6.1	Qualitative research method	92
3.3.6.2	Quantitative research method	92
3.3.6.3	Mixed research method	92
3.3.6.4	Type of mixed research methodology employed	94
3.3.6.5	Concurrent triangulation and theoretical framework	95
3.3.7	Population of the study	97
3.3.8	Sample of the study	97
3.3.9	Data collection method	98
3.3.10	Construction of the research instrument	99
3.3.10.1	Construction of the questionnaire	100
3.3.10.2	Construction of the interview schedule	100
3.3.11	Pre-testing of the research instrument	101
3.3.12	Changes made to the questionnaire and interview schedule	102
3.3.12.1	Questionnaire	102
3.3.12.2	Interview schedule	103
3.3.12.3	Administration of the questionnaire	104
3.3.12.4	Administration of the interview schedule	104
3.3.13	Validity and reliability of the study	105
3.3.13.1	Research hallmark to enhance validity and reliability	105
3.3.14	Data analysis	107
3.3.15	Ethical issues observed	108
3.4	SUMMARY	109

CHAPTER 4

DATA ANALYSIS

4.1	INTRODUCTION	110
4.2	THE RESPONSE RATE	110
4.3	PRESENTATION OF RESULTS	110
4.3.1	Demographics	111
4.3.2	Background	113
4.3.2.2	Cross-tabulation	121
4.3.3	Strategies and policies	125
4.3.4	Equipment/facilities	131
4.3.5	Staff training	133
4.3.6	Staff support	136
4.3.7	Technical support	139
4.3.8	Library challenges	146
4.4	FACE-TO-FACE INTERVIEW RESULTS	155
4.4.1	Demographics	155
4.4.2	General questions	155
4.4.3	Strategies and policies	156
4.4.4	Equipment/facilities	156
4.4.5	Staff training	157
4.4.6	Staff support	157
4.4.7	Technical support	158
4.4.8	Library challenges	159
4.4.9	Time and budget	159
4.5	SUMMARY	160

CHAPTER 5

DISCUSSION OF THE RESEARCH FINDINGS

5.1	INTRODUCTION	161
5.2	DEMOGRAPHICS	162
5.3	BACKGROUND	165
5.4	STRATEGIES AND POLICIES	168
5.5	EQUIPMENT/FACILITIES	172
5.6	STAFF TRAINING	172
5.7	STAFF SUPPORT	174
5.8	TECHNICAL SUPPORT	176
5.9	LIBRARY CHALLENGES AND OTHER PROBLEMS	177
5.10	TIME AND BUDGET	179
5.11	SUMMARY	180

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1	INTRODUCTION	181
6.2	CONCLUSIONS	181
6.2.1	Background to the study	182
6.2.2	Digitization strategies and policies at UKZN	183
6.2.3	Basic facilities for the digitization project	184
6.2.4	Training skills for the UKZN library staff	185
6.2.5	Staff support for the digitization project	186
6.2.6	Technical support for the digitization project	187
6.3	RECOMMENDATIONS	187
6.3.1	Background to the study	187
6.3.2	Digitization strategies and policies at UKZN	189
6.3.3	Basic facilities for the digitization project	189

6.3.4	Training skills for the UKZN library staff	189
6.3.5	Staff support for the digitization project	191
6.3.6	Technical support for the digitization project	191
6.4	FURTHER RESEARCH	192
6.5	SUMMARY	193
REFERENCES		194
APPENDICES		219
APPENDIX 1	REQUEST FOR GATEKEEPER'S PERMISSION ...	219
APPENDIX 2	COVERING LETTER FOR COLLECTING DATA	221
APPENDIX 3	INFORMED CONSENT	223
APPENDIX 4	QUESTIONNAIRE	224
APPENDIX 5	INTERVIEW SCHEDULE.....	240

LIST OF FIGURES

Figure 1:	The DCC Curation Lifecycle Model	26
Figure 2:	Proposed selection model of decision-making for digitization project	59
Figure 3:	The relationships among research designs	91
Figure 4:	Period it takes to sort out digitization related technical issues	143
Figure 5:	Showing downtime period experienced per month	144
Figure 6:	Showing period it usually takes to resolve downtime issues	145
Figure 7:	Rating for the theses and dissertations digitization project	146
Figure 8:	Understaffing	147
Figure 9:	Budget	148
Figure 10:	Library staff support	149
Figure11:	University community support	150
Figure 12:	Technical support	151
Figure 13:	Planning	152
Figure 14:	Workflow	153

LIST OF TABLES

Table 1:	How the theories address the research questions	21
Table 2:	Gender of respondents	111
Table 3:	Age of respondents	112
Table 4:	Period respondents worked on the digitization project	112
Table 5:	Section in which each participant worked	113
Table 6:	Participants knowledge of the digitization project	114
Table 7:	Method of informing respondents of the digitization project	114
Table 8:	Library dedicated digitization department	115
Table 9:	Effect of a dedicated digitization department	115
Table 10:	Showing whether or not having a dedicated digitization department would help to improve on digitization processes	116
Table 11:	Concerns relating to digitization processes with other departments in the library	117
Table 12:	Concerns affecting the digitization progress	118
Table 13:	Concerns relating to digitization processes with other campus libraries	118
Table 14:	Respondents' concerns' effect on the digitization processes	119
Table 15:	Function(s) performed by respondents in the digitization project	120
Table 16:	Time spent on the digitization project per day	121
Table 17:	A cross-tabulation between age and time per day spent on the digitization project	122

Table 18:	A cross-tabulation between section of the library in which respondents work and time they each spent on the digitization project per day	123
Table 19:	A cross-tabulation between section of the library in which respondents work sections and age group	124
Table 20:	Availability of work-plans to follow in performing digitization functions	124
Table 21:	Whether work-plans help to better plan digitization function(s)	124
Table 22:	Need for work-plan	125
Table 23:	Digitization policy	126
Table 24:	Respondents involvement in the digitization policy development	126
Table 25:	Awareness of the digitization policy	127
Table 26:	Digitization policy awareness process	127
Table 27:	Respondents knowledge of what the digitization policy entails	128
Table 28:	Strategic plan for UKZN library	129
Table 29:	Digitization strategy and policies contribution to the digitization progress	130
Table 30:	Basic equipment required for digitization tasks	131
Table 31:	Respondents satisfaction of the digitization equipment	132
Table 32:	Digitization training acquired.....	133
Table 33:	Digitization training method.....	134
Table 34:	Digitization training	134
Table 35:	The number of digitization training sessions undergone by respondents	135
Table 36:	Support received from the university management and university community	136

Table 37:	Support received from the library management and library staff	137
Table 38:	Marketing method	138
Table 39:	Availability of a technical person	139
Table 40:	Benefits of technical person	140
Table 41:	Benefits of technical person	140
Table 42:	Digitization problems	142
Table 43:	Other problems	142
Table 44:	Effect of downtime issues on digitization processes	145
Table 45:	Other issues as major challenges faced by the library ...	153
Table 46:	Possible solutions to major challenges	154

LIST OF ACRONYMS AND ABBREVIATIONS

AAU	Association of African Universities
AAU-ETD	Addis Ababa University- Electronic Theses and Dissertations
BSU	Benguet State University
CSIR	Council for Scientific and Industrial Research
DALRO	Dramatic, Artistic and Literary Rights Organisation
DATAD	Database of African Theses and Dissertations
DCC	Digital Curation Centre
DISA	Digital Innovation South Africa
DL	Digital Library
DoE	Department of Education
DVD	Digital Video Disc
EAD	Encoded Archival Description
EThOS	Electronic Theses Online Service
ETDs	Electronic Theses and Dissertations
HDSS	Health and Demographic Surveillance Systems
HR	Human Resources
HTML	Hyper Text Markup Language
IA	Information Architecture
IAM	Identity and Access Management
ICA	International Council on Archives
ICADLA	International Conference on African Digital Libraries and Archives
ICT	Information and Communications Technology
ICTLIG	Information and Communication Technology in Libraries Interest Group
IFLA	International Federation of Library Associations
IMLS	Institute of Museum and Library Services
INASP	International Network for the Availability of Scientific Publications
IR	Institutional Repository
IT	Information Technology

JISC	Joint Information Systems Committee
JRUL	John Rylands University Library
LBSNAA	Lal Bahadur Shastri National Academy of Administration
LIASA	Library and Information Association of South Africa
N.d.	No date
NISO	National Information Standards Organization
NKC	National Knowledge Commission
NRF	National Research Foundation
OA	Open Access
OAU	Obafemi Awolowo University
OCR	Optical Character Recognition
PCs	Personal Computers
QA	Quality Assurance
QC	Quality Control
RDF	Resource Description Framework
SADI	South African Digitization Initiative
SAN	Storage Area Network
SGML	Standard Generalized Markup Language
SPSS	Statistical Package for Social Sciences
SRB	Storage Resource Broker
TDs	Theses and Dissertations
TRLN	Triangle Research Libraries Network
UBC	University of British Columbia
UDW	University of Durban-Westville
UGC	University Grants Commission
UK	United Kingdom
UKZN	University of KwaZulu-Natal
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISA	University of South Africa
UNLV	University of Nevada, Las Vegas

UPeTD	University of Pretoria Electronic Theses and Dissertations
URL	Uniform Resource Locator
US	United States
USA	United States of America
XML	Extensible Markup Language

CHAPTER 1

OVERVIEW OF STUDY

1.1 INTRODUCTION

Digitization projects are becoming popular within libraries, whether academic, public or special libraries. Libraries are either engaging in retrospective digitization by digitizing previously acquired hard copies, or are building up digital libraries or institutional repositories by submitting electronic copies to the repositories. Digitization of library materials thus plays an essential role in promoting the visibility and accessibility of materials. Evans (2006:9) revealed that a number of academic institutions such as the University of Pretoria, University of the Free State, Rhodes University, and many others, have embarked on the digitization of theses and dissertations submitted by their students. The present study looks at how the University of KwaZulu-Natal (UKZN) is digitizing its library material, with particular reference to theses and dissertations.

This chapter starts with a brief background of the digitization projects. This is followed by a statement that reveals what motivated the researcher to embark on such a study. The researcher states what the study hopes to achieve. All research projects have specific aim(s) and objective(s) and these are achieved by interpreting the data, based on the statement of the problem of the study as well as answering specific research questions. The problem statement, aim and objective, research questions, theoretical framework and research design and methods of this study are thus provided in this chapter.

1.2 BACKGROUND OF THE STUDY

Digitization became popular not only with academic institutions, but also with all types of libraries around the world. According to Fabunmi, Paris and Fabunmi (2006:24), before 1997 digital projects were associated with large academic libraries

but, of late, most academic institutions and an increasing number of public libraries are now joining in the digitization of their materials.

According to Kipaan (2012:Introduction), digitization has received attention with the aim of allowing wider access, but this is sometimes handicapped or limited by a number of factors, such as 'existing policies, structures, skills, and financial capability'. That view is supported by Okorie (2013: Introduction), where the author argued that some of the constraints faced by libraries when digitizing their material are in the form of finances, staff shortages, proper planning, lack of dedicated staff and other factors, that, if left unaddressed, may limit the potential of digitization to enhance research and teaching. Eke (2011: Finance) and Kippan (2012: BSU [Benguet State University] Experience ...) argued that finances play a role in library digitization projects and that most developed countries such as the USA, the UK and Germany allocate significant amounts of money to digital library (DL) projects. Developing countries, especially some African universities, find it challenging to set aside funds for purposes like digitization while they are facing economic crises.

1.3 BRIEF BACKGROUND OF UKZN

According to UKZN (N.d.(a):History), the University of Durban-Westville and the University of Natal merged on 1 January 2004, and the new university became the University of KwaZulu-Natal, bringing together "the rich histories of both the former Universities."

The Natal University College in Pietermaritzburg was founded in 1910. It was granted independent university status in 1949, "owing to its rapid growth in numbers, its wide range of courses and its achievements in and opportunities for research" (UKZN, N.d.(a):History). Natal University College was renamed the University of Natal. The University of Natal opened two other campuses in Durban after World War 1, namely, Howard College in 1931, and the Medical School, for African, Indian and Coloured students, in Durban in 1946 (UKZN, N.d.(a):History).

“The University of Durban-Westville was established in the 1960s as the University College for Indians, on Salisbury Island in Durban Bay” (UKZN N.d.(a):History). The college was granted university status in 1971 and moved to the new premises in Westville. It was then named the University of Durban-Westville (UDW). UDW opened its doors to students of all races in 1984 (UKZN, N.d.(a):History).

According to Khan (2010:11), the University of Durban-Westville (UDW) and the University of Natal (UN) were merged in January 2004 and the newly formed university was called the University of KwaZulu-Natal (UKZN). These two universities were among the first group of South African academic institutions to merge in response to the “government’s higher educational restructuring plans” (UKZN, N.d(b).: History).

After the merger, the University of KwaZulu-Natal formulated the new vision and mission statement, which reflected the merger. UKZN (N.d.(b):Vision and Mission) tabled its vision and mission as follows:

VISION

To be the Premier University of African Scholarship.

MISSION

A truly South African university that is academically excellent, innovative in research, critically engaged with society and demographically representative, redressing the disadvantages, inequities and imbalances of the past.

Makgoba (2005:14), the first Vice-Chancellor of the merged UKZN, in his inauguration speech, indicated that, as the Premier University of African Scholarship “we need to fully engage the idea of an African University”, as well as what the “institution can offer, not only to the people of Africa, but to the world and the global corpus of knowledge.”

In line with the above vision and mission statement, as well as in relation to Makgoba's comments, the University of KwaZulu-Natal (UKZN) Library embarked on the theses and dissertation digitization project to offer the institutions research output not only to the UKZN's community, but also to the people of Africa and the world at large. According to Lawrence (2001:Abstract), the World Wide Web has allowed people to have increased access to literature that previously required trips to the library, inter-library loan delays, or substantial effort in locating the source. The UKZN engaged itself in the digitization project to make theses and dissertations easily available and accessible everywhere. This not only improves accessibility, but also enhances UKZN's visibility worldwide and, according to Crow (2002:6), such visibility "reflects a high quality of scholarship."

Evans (2006:8) indicated that the traditional way of disseminating theses and dissertations (TDs) meant that the information was only accessible to mainly local and limited audiences, whereas, with the digitization of TDs, "accessibility is increased through the internet, leading to the greater electronic dissemination of postgraduate academic TDs."

1.3.1 Brief background of the UKZN library

The University of KwaZulu-Natal has five campus libraries and a number of branch libraries. The five campuses are Edgewood, Howard College, the Medical School, Pietermaritzburg and Westville. There are also four special collections libraries "of regional and national interest", namely, Killie Campbell Africana Library in Durban, Alan Paton Centre and Struggle Archives in Pietermaritzburg, Gandhi-Luthuli Documentation Centre in Westville and University Archives in Pietermaritzburg (UKZN library, N.d(a):About us).

In line with the university, the UKZN library had to formulate their vision and mission which reflected the merged libraries from the two universities. The library's mission and vision are reflected in the UKZN Library Strategic Plan (2007-2011:1) as follows:

MISSION

The mission of the University of KwaZulu-Natal Library is to support teaching, learning, research and community engagement by providing a high-quality, relevant, expanding and innovative library and information service.

VISION

To be a strategic partner in positioning the University of KwaZulu-Natal as the premier university of African scholarship.

Buchanan and Stilwell (2012:5) commented on the impact information and communications technology (ICT) has on university libraries. The digitization of library materials is part of developments as a result of the impact of ICT to improve service to library users. The UKZN also responded positively to the call for digitizing materials by first engaging in the digitization of theses and dissertations, then research articles, special collections, conference papers, technical reports and other materials.

According to the UKZN Library Annual Review (2009:1), the University of Pretoria and the Council for Scientific and Industrial Research (CSIR) jointly hosted a conference in May 2009 on African Digital Scholarship and Curation, which was attended by librarians from various institutions, including the UKZN. According to the UKZN Library Annual Review (2009:1), the three subject librarians who represented UKZN attended a full-day training workshop on how to set up an institutional repository, using the DSpace open source software. On returning to UKZN they immediately began work on the UKZN Institutional Repository.

The UKZN Library Annual Review (2009:1) states that the plan to set up the UKZN Institutional Repository was supported by Professor Nelson Ijumba, the Vice Chancellor (Research), and was implemented based on the framework that had been set up in 2008 during the joint Library/Faculty of Education pilot project. The Report states that the plan was implemented after the working group that would run the project was convened and the project plan was designed. It was named ResearchSpace.

ResearchSpace was launched in September 2009 at the University of KwaZulu-Natal Teaching & Learning Conference, which was held at Edgewood Campus from 21-23 September (UKZN Library Annual Review, 2009:1). According to the UKZN Library Annual Review (2009:1), at the time of the launch, ResearchSpace included only doctoral and masters theses and dissertations produced at the University.

1.4 DIGITIZATION OF THESES AND DISSERTATIONS

According to National Information Standards Organization (NISO) (2004:2), theses and dissertations have for a long time not been easily accessible, due to the limited lending restrictions. As a result, digitization of theses and dissertations is very important in that it offers an opportunity to build up collection(s) with unrestricted access. NISO (2004:2) indicated that the conversion of theses and dissertations to digital format is growing rapidly, internationally. Limb (2005:10) pointed out that the digitization of theses has been of considerable interest to universities since the early 1990s.

Some academic institutions implemented, or are implementing, electronic theses and dissertations (ETD) repositories at their institutions, for example, ResearchSpace at the UKZN in South Africa and Addis Ababa University-Electronic Theses and Dissertations (AAU-ETD)- in Ethiopia. Yiotis (2008:101) stressed that electronic theses and dissertations (ETD) “benefit students and universities by enhancing graduate education, expanding graduate research, increasing a university’s visibility,

and instructing students, faculty, administration and librarians about digital technology.”

In the next three sections, the researcher will look into some digitization initiations that took place in the developed and developing countries, and South Africa in particular as UKZN is one of South African universities, which is the focus of this study.

1.4.1 Developed countries

El-Bayoumi and Charlong (2003:244) recorded that the University of Montreal was one of the first Canadian universities to explore electronic theses and dissertations. It ran an ETD pilot programme for two years, 1998 – 2000, which is now solid and has ETD processes and support in place. El-Bayoumi and Charlong (2003:244) revealed that the University of Montreal partnered with the University of Lyon and created an ETD portal site called Cybertheses.

According to Copeland, Penman and Milne (2005:185), the Joint Information Systems Committee (JISC), led by the Robert Gordon University, committed to fund three digitization projects in 2002. Caldwell (2007:6) pointed out that the JISC thesis digitization project is the “most innovative research output in the United Kingdom (UK)” to help shaking “its cloak of invisibility in its two years’ time with the roll-out of a service that will take UK doctoral theses out of rarely visited library- stacks and into the online mainstream.”

Caldwell (2007:6) stated that the Electronic Theses Online Service (EThOS) started in January 2007 with more than 70 academic institutions intending to join the project to digitize past doctoral theses. The project aimed to commence in 2009, with the aim of being completed in 10 to 15 years, regardless of issues of concern like copyright and intellectual property rights. EThOS currently holds 320 000 records,

with more than 100 000 full text theses (EThOS, 2013: EThOS news). These theses are available for access to users worldwide.

The University of Waterloo in Canada started on a pilot project for electronic theses in 1990. Within three years their students were offered “an option to submit their theses online” (Jewell, Oldfield and Reeves, 2006:184). The University of British Columbia (UBC) embarked on a retrospective digitization of theses and dissertations project in 2007 for all theses and dissertations produced from 1919 to 2007. According to Pope (2011:A UBC retrospective ...), by July 2011 they were at the final phase of the project, with about 6500 titles to add. The repository already had 25 000 titles, including the first UBC thesis in Arts and Science by Ruth Vivian Fulton, dating back to 1919 (Pope, 2011:Did you know?).

1.4.2 Developing countries

Materu-Behitsa (N.d.:1) reported that the Database of African Theses and Dissertations (DATAD) was initiated in 1998, with the aim of enhancing the research output of academic institutions in Africa. According to Jagboro, Omotayo and Aboyade (2012:8) DATAD is a project of the Association of African Universities (AAU). It is co-sponsored by the Carnegie Corporation of New York, the Ford Foundation, the Rockefeller Foundation and other sponsors.

Materu-Behista (N.d.:1) pointed out that for a long time African theses and dissertations were not indexed in major databases and did not feature in the international literature. Chisenga (2006:2) stated that unpublished research output, such as research reports, theses and dissertations, are often “produced in limited numbers, and have limited circulation even within institutions where they are produced”. In other words, theses and dissertations are some of the research outputs that lack good distribution and visibility in African countries. According to Alhaji (2007:229), digitization of such materials is advantageous over print materials

in the sense that digitized materials allow users to more easily and conveniently find, retrieve, study and put into use the findings of this research work.

The launch of DATAD in 2003 saw the beginning of a pilot project to digitize theses and dissertations for wider access and visibility. According to Limb (N.d.:10), “DATAD has shared new skills among a range of African universities and invited overseas experts to participate.”

According to Jagboro, Omotayo and Aboyade (2012:8), the Obafemi Awolowo University joined the DATAD project in 2004 at the request of the Carnegie Corporation of New York. The equipment and software for the project were supplied by the AAU in July/August 2004 and training was conducted for staff members between 15 and 18 August 2004. The project work started immediately after the training.

1.4.3 South Africa

The National Research Foundation (NRF) (2010:2) explained that “developing countries like South Africa are following the digitisation trend set by developed countries.” Drijfhout and Ledwaba (2011:1) stated the Digital Innovation South Africa (DISA) was established in 1997 for the implementation of digital technologies in libraries. The aim was to enhance access to South African content. Drijfhout and Ledwaba (2011:1) indicated that DISA was the centre of digitization expertise in South Africa and was also involved with providing training and support in South and southern Africa.

Limb (2005:10) pointed out that most South African universities are placing their theses online. While universities in the United States have been successfully selling their dissertations, the universities of the Witwatersrand, Pretoria, and University of South Africa (UNISA) engaged to open-access digital dissertations, a new trend

towards shift in attitude, giving theses and dissertations open access. (Limb, 2005:10).

According to the University of Pretoria (UP) library website, the UP Electronic Theses and Dissertations (ETDs) project started in 2000 and was rated number 95 out of 400 best institutional repositories worldwide in the January 2010 Ranking of the World Repositories (University of Pretoria Library, 2010:UPeTD celebrates ...). The University of Pretoria Electronic Theses and Dissertations (UPeTD) celebrated 10 years of success in 2010.

1.5 DIGITIZATION OF THESES AND DISSERTATIONS AT UKZN

According to the UKZN Library Strategic Plan (2007-2011:2), one of its strategic goals is to provide information sources that support teaching, learning and research. Library digitization is referenced under this plan as one of the strategies and outcomes for 2007-2011 (UKZN Library Strategic Plan, 2007-2011:2). The strategic plan, for example, indicated that the library had plans for digitizing its materials. The library had already compiled a list of collections for possible digitization and was by then awaiting costing and copyright clearance for certain collections.

In the UKZN Library Annual Review (2009:6) it is stated that the University of KwaZulu-Natal Library's 2010 projections included plans "to digitize all print copies of all UKZN theses and dissertations (that is, all theses of the former Universities of Durban-Westville and Natal) held in the campus libraries and to place them in ResearchSpace."

1.5.1 Retrospective theses and dissertation digitization project

ResearchSpace has been operational since 2009. This was initially for current theses which were loaded onto the database. The project for scanning and uploading older print copies of masters and doctoral theses of the University only started in 2010. According to the UKZN Library Annual Review (2010:2), the cost for the retrospective

project was estimated at R1 million and about half of that was already available from “various Library endowment funds.”

According to the UKZN Library Annual Review (2010:2), the library was able to purchase a high-resolution scanner which was important to possess to be able to start the project. They engaged the services of Digital Imaging South Africa (DISA), which had an office in the E G Malherbe Library, “to carry out scanning” (UKZN Library Annual review 2010:2). At the beginning of November 2010 the DISA office unfortunately closed down without notice. This forced the project team “to consider other options including the possibility of outsourcing the scanning to a commercial company” (UKZN Library Annual Review 2010:2).

As indicated in the UKZN Library Annual Review (2010:2), the estimated number of theses to be scanned was 13 000 theses, which was later increased by 11 000. By the end of December 2010, ResearchSpace had about 2772. This comprised 1795 scanned and 977 current theses. The projected date for the completion of the project was 31 December 2011.

A project manager for the library digitization project was seconded in October 2011. By the end of December 2011, ResearchSpace had 4901 theses. Based on the estimated number of theses to be scanned and the number of theses that were already uploaded on ResearchSpace, the assumption was that by the end of December 2011, the library still had to scan and upload 6099 theses in order to complete the project. It is, however, mentioned in the annual review that “the manner in which theses were catalogued in different libraries” made it difficult to obtain accurate figures and to measure the exact size of the project (UKZN Library Annual Review 2011:6). Due to the fact that there were many print copies to be digitized and no dedicated staff to digitize them, it was later decided to scan and digitize all doctoral theses and only scan older masters theses, as “required by users or

requested by other libraries on interlibrary loan”, in order to speed up the project (UKZN Library Annual Review 2011:7).

1.6 DEFINITION OF CONCEPTS

There are a number of concepts that are frequently used in the subsequent chapters and they need to be defined for clarity purposes.

1.6.1 Digitization

There are various definitions of what constitutes digitization. Different authors have defined digitization in a variety of ways. Eke (2011: Digitization Overview) defined digitization as “the art of converting the contents of a document from hard copy into machine-readable format.” According to Fabunmi, Paris and Fabunmi (2006:28), digitization is “a process in which materials are converted from the hard copies to electronic copies.” Even though these definitions mean more or less the same thing, for the purpose of this study, the researcher adopted Amollo’s definition of digitization. According to Amollo (2011:5) digitization means “converting print-on-paper resources to digital form, usually by scanning.”

1.6.2 Digital Librarian

There is no specific definition of a digital librarian. Marion (2001:143) felt that the definition of a digital librarian is not clear, as it “nests within the field of digital libraries that is rapidly evolving and inventing itself.” For the purpose of this study, digital librarian refers to librarians, whether subject librarians, metadata librarians, specialized staff and anyone involved with the digitizing processes in the digitization project of theses and dissertations at UKZN.

1.6.3 Digital Libraries

According to Amollo (2011:5), digital libraries are also known as electronic or virtual libraries and are perceived to be libraries without walls since they contain online information that is not found in print. According to Amollo (2011:5) digital libraries

contain information that is accessed via a computer network. Isfandyari-Moghaddam and Bayat (2008:850) argued that there is no universal definition for digital libraries. Isfandyari-Moghaddam and Bayat (2008:850), provided a definition one published by the Digital Library Federation that is frequently cited. The same definition is used by the researcher for the context of this study:

Digital libraries are organizations that provide the resources, including the specialized staff [librarians], to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community [audience] or set of communities (Isfandyari-Moghaddam and Bayat, 2008:850).

Chavan (2012:2) defined a digital library as “not only digitization of physical resources, but also thoughtful organization of electronic collection for better access.”

1.6.4 Institutional Repositories

Lynch (2003:328) defined an institutional repository as follows:

A university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members.

According to Lynch and Lippincott (2005:Survey of US ...), institutional repositories house “the documentation of the intellectual work – both research and teaching – of the institution, records of its intellectual and cultural life, and supporting evidence for present and future scholarship.”

1.7 PROBLEM STATEMENT

The importance of investigating and sharing the experiences and challenges encountered by the UKZN in the digitization of its theses and dissertations will serve as a learning curve to other institutions which are yet to embark on projects of this nature.

According to Alhaji (2007:229):

Digitization of past question papers, theses and dissertations offers great advantages over printed medium by allowing users to find, retrieve, study and put into use the findings of these research work.

Evans and Mersham (2006:2) pointed out that the wealth of knowledge and experiences of academics contained within theses and dissertations is generally available “in paper bound formats or as microfilm or microfiche,” making them difficult and expensive to obtain and access. The digitization of theses and dissertations increases accessibility to these invaluable resources.

The present study seeks to determine how far the UKZN library is with the digitization of these invaluable sources of research and how advanced it is with “the global technology transformation” Alhaji (2007:229), in an attempt to try and give answer(s) to the way forward for a successful digitization process. The study hopes to better understand what factors have contributed to the project’s successes and challenges experienced.

The UKZN library project of the digitization of theses and dissertations started in 2010. After realising that the project was still ongoing in 2013, the researcher wanted to discover why that was the case, given the fact that UKZN library had embarked on the digitization project in 2010, a project that was scheduled to take two years.

The UKZN like many other academic libraries such as the University of South Africa, University of the Witwatersrand, University of Cape Town, University of Johannesburg, University of Pretoria, Rhodes University and others has had its own share of challenges to growing and sustaining the digitization project.

In a study of the digitization of past papers, theses and dissertations in Nigeria, Alhaji (2007:233) revealed that the reason why Nigerian university libraries are lagging behind with digitization is that they have not yet embraced the idea of the electronic library. Alhaji (2007:233) indicated that most university libraries and university administrators have not come to terms with the latest trends in relation to “the vision, management, operations, funding and staffing of the university libraries in order to enable them to function as electronic information dissemination hubs.”

Rafiq and Ameen (2013:41) and Alhaji (2007:233) identified the lack of a digitization policy as one of the main factors affecting the digitization process. They indicated that lack of a formal digitization policy reflects “the unplanned approach of the libraries towards digitization activities.”

1.8 SIGNIFICANCE OF THE STUDY

The researcher was involved in the digitization project and, as a result, is interested in the functionality and benefits of the end-product of the project. As an alumnus of the UKZN and an ex-UKZN librarian, the researcher has continued associating with the UKZN through the use of its library materials, especially its journal articles, theses and dissertations. The study was also motivated by research papers produced by authors such as Alhaji (2007:228-246), Rafiq and Ameen (2013:37-46), in which they provide different challenges that institutions face when digitizing library material, lack of policies being one of the major ones.

Through this study the researcher hopes to contribute towards:

- Improving the digitizing process, help progress and address the challenges and prospects of digitization, by making recommendations on identified issues to form the basis of providing the way forward to a successful digitization process of theses and dissertations.
- Improving the library staff's understanding of the importance of the library digitization of theses and the digitization project and changing the focus of the library as a whole.
- Improving library digitization strategies and policy issues.
- Extending the literature on library digitization in South Africa.

1.9 AIM AND OBJECTIVE OF THE STUDY

The main objective of the study is to present the experiences and challenges of the digitization of theses and dissertations project at the UKZN and using the lessons learned for future projects of this nature. The main aim is to try to address the issues and challenges encountered in the UKZN project to help ensure that new digitizing projects fulfil the expectations of libraries, students and scholars.

1.10 KEY RESEARCH QUESTIONS

The following research questions stem from the problem statement, significance of the study and the aim and objective of the study as discussed in sections 1.7 to 1.9 above:

- What digitization strategies and policies are in place at UKZN?
- What facilities are in place or needed for the UKZN library theses and dissertations digitization project?
- What training skills does the UKZN library staff have to handle the theses and dissertation project?
- How much support does the digitization of theses and dissertations project have from the staff involved in the project?

- What is the level of the technical support for digitization of theses and dissertations?

1.11 THEORETICAL FRAMEWORK

To enhance this study, the researcher used the Data Curation Lifecycle Model, Communications Theory and Park's Conversation Theory. The Data Curation Lifecycle Model, developed by the Digital Curation Centre (DCC), is according to Higgins (2008:135), a lifecycle approach to the management of digital materials, to enable successful curation and preservation from initial conceptualisation to either disposal, or selection for reuse and long-term preservation. The Communications Theory is referred to as the exchange of information between at least two people (Fabunmi, Paris and Fabunmi 2006: 29). It may be by means of speaking, writing, or a common system of signs or behaviour. According to Kwanza (2011:14), Conversation Theory assumes that "individuals, organisations, and even societies build knowledge through conversation; specifically, by interacting and building commonly held agreements.' The above theories will be discussed in, detail, in Chapter 2.

1.12 RESEARCH DESIGN AND METHODOLOGY

According to Babbie (2011:92) "a research design is a plan or blueprint of how you intend conducting the research". This section briefly introduces the research design and methods used in this study. The details of the research design are presented in Chapter 3.

The researcher employed the mixed method approach, which uses both qualitative and quantitative research methods. It followed the pragmatic paradigm which draws on both numeric and narrative approaches. The study was conducted in the five libraries of the University of KwaZulu-Natal. It had a population of 36 staff members who were directly involved with the UKZN's digitization project and were in a position to provide relevant information on the issues to be investigated.

Data was collected using a self-administered questionnaire and interviews that were personally conducted by the researcher. The SPSS (Statistical Package for Social Sciences) and Stata software was used to analyze the data collected from the questionnaire. Data collected from interviews was coded and analyzed using manual content analysis. Content analysis is a systematic approach to qualitative data analysis that identifies and summarizes message content (Maree 2010:101).

1.13 DELIMITATIONS OF THE STUDY

The scope of the study was viewed by the researcher as a limitation of the study of digitization. If it was not for time constraints the researcher would have conducted a study that involved more than one institution, as to identify challenges that are common to all institutions. For example the research could have been done within the libraries of the UKZN and the Durban University of Technology (DUT). If the scope was wider it would perhaps have been relatively easy to generalize the findings to other institutions.

1.14 STRUCTURE OF THE DISSERTATION

The thesis has six, chapters covering the following areas:

Chapter 1 provides the overview of the whole research. It outlines the background, problem statement, significance of the study, research questions, delimitations of the study and it briefly discusses the theoretical framework and the research design.

Chapter 2 covers the detailed literature review and theoretical framework on which this study is based.

Chapter 3 is the research methodology chapter. This chapter indicates the location and the population and sample of the study. The chapter gives detailed explanations on the selected research method, collection of data, sampling method, research instrument, data analysis and the ethical issues that were observed.

In Chapter 4, the data that was collected is presented and analyzed. The presentation takes the form of frequency tables and pie charts. Cross tabulations between two variables are presented in this chapter. The chapter contains the statistical analysis of the data, correlations between variables and the Cronbach's coefficient, which indicates the internal reliability of the study.

Chapter 5 discusses the findings and interpretations to the research questions.

Chapter 6 gives recommendations and the conclusion of the research project. Chapter 6 is followed by the list of references and appendices.

1.15 SUMMARY

This chapter has provided the basic parts of the research project, without which the study would have no direction. The aim and objective of the study, as well as the research questions, were clearly stated. The problem statement was crafted and stated. This chapter was able to explain who the population of the study were and where the study was located. The chapter provided a clear and concise research design and exposed the major delimitations of the study. Other aspects of the study are discussed in detail in the following chapters.

Chapter 2 presents the literature review on different aspects of library digitization.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

According to Creswell (2014:28), a literature review provides the framework for establishing the importance of the study, as well as the benchmark for comparing the results with other findings. It “involves a search and study of current writings on the problem under investigation” (Bless, Higson-Smith and Sithole, 2013:49). This chapter aims to examine the literature concerning library digitization.

The chapter first discusses the theoretical framework and how these theories link to the main objective of this study as stated under section 1.9, aim and objective of the study, which is to present the experiences and challenges in the digitization of theses and dissertations at the UKZN, using lessons learned for future projects of this nature. It will look at the electronic theses and dissertations (ETDs) projects that took place in some countries around the world. The chapter will touch on the challenges and opportunities faced by libraries on digitization. The chapter then sets the background for digitization of library materials, covering the general information on digitization, benefits of digitization and factors to consider in the digitization project. Best practices and planning processes for digitization projects, as discussed in the literature reviewed, are covered in this chapter. It is important to stress that the digitization of library materials is a process and is implemented in the form of a project. It is on this basis that elements of project management are discussed in this chapter.

2.2 THEORIES GUIDING THE STUDY

According to Labaree (2013:Definition), “theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge, within the limits of the critical bounding assumptions.” The theoretical framework is the structure that can hold or support a theory of a research study. The

researcher in this study is guided by the three theories, Communications Theory, Park's Conversation Theory and the Data Curation Lifecycle Model, to address the following five research questions (see Table 1).

Table 1: How the theories address the research questions

Research questions	Theoretical framework	Attributes	Theme addressed
What digitization strategies and policies are in place at UKZN?	Communications/Conversation Theory Data Curation Lifecycle Model	Strategies and policies Building strategies	Agreement on strategies and policies guiding the project
What facilities are in place or needed for the UKZN library theses and dissertations digitization project?	Communications/Conversation Theory Data Curation Lifecycle Model	Facilities necessary for the project Store for access, reuse and retrieval	Discussion on the basic facilities the library needs for the project.
What training skills do the UKZN library staff have to handle the theses and dissertation project?	Communications/Conversation Theory and Data Curation Lifecycle Model	Skills assessment and training.	Identifying and addressing skills and training requirements for library
How much support does the digitization of theses and dissertations project have from staff?	Communications/Conversation Theory (Theories of Persuasion)	Attitudes Staff support	Staff support
What is the level of the technical support for digitization of theses and dissertations?	Communications/Conversation Theories Data Curation Lifecycle Model	Technical support Resistance Collaborate, supervise and participate	Communications on and level of technical support Acquiring needed skills.

2.2.1 Communication Theory

The Communications Theory is referred to as the exchange of information between at least two people (Fabunmi, Paris and Fabunmi, 2006: 29). It may be by means of speaking, writing, or a common system of signs or behaviour.

2.2.1.1 Communication Theory in relation to this study

First and foremost, the most crucial element in the library digitization project is to encourage “the dialog engagement among computer scientists, librarians, university community and other interested parties” (Levy and Marshall, 1995:77). The authors added that the dialogs within and among different stakeholders will ensure better understanding of the project processes and promote co-operation within departments.

According to Copeland, Penman and Milne (2005:Abstract), the three electronic theses projects funded by the Joint Information Systems Committee (JISC) in the United Kingdom were completed on schedule. Copeland, Penman and Milne (2005:2) pointed out that communications and close co-ordination with each other played a major role in their successful completion of the projects. From the beginning of the project right through to the end, the members of the Electronic Theses team kept in close contact with their counterparts from the other two funded projects, Theses Alive from the University of Edinburgh and the Daedalus project from the University of Glasgow.

2.2.2 Conversation Theory

According to Kwanya (2011:14), Conversation Theory assumes that “individuals, organisations, and even societies build knowledge through conversation; specifically, by interacting and building commonly held agreements.”

2.2.2.1 Conversation Theory in relation to this study

There definitely has to be close engagement through dialogues between different stakeholders and other institutions to address different issues of the digitization processes. In the case of the library digitization of theses and dissertations, Klemm (2002:4-5) discussed the six actions of the Conversation Theory closely which relate to the digitization process. These actions are: identify, compare and contrast, explain, debate/argue, decide and design.

2.2.2.1.1 Identify

According to Klemm (2002:4), identify refers to the pooling of skills to identify and solve problems. Klemm (2002:4) suggested that workers can pool their skills on-line to solve problems. The library digitization project is a very involved process, which requires a number of specialized skills, ranging from scanning of the documents right through to archiving the completed material for easy access. There are many other stages involved in between, such as setting up the infrastructure, project management, creating the metadata, quality control, legal, IT and human resource issues. It is therefore important to identify those skills and engage them in forums from the beginning.

2.2.2.1.2 Compare and contrast

When it comes to 'compare and contrast', Klemm (2002:4) pointed out that the approach requires people to recognize similarities and dissimilarities. "Workers can compare and contrast alternative ways of doing things" (Klemm, 2002:4). Digitization projects are time-consuming and expensive and, by understanding resemblances and differences within and outside the institution, it will make it easier to adopt best practices and make relevant decisions. You can even adjust and adapt the strategies and policies in other institutions that have engaged in similar projects, to suit your own needs, than to spend time re-inventing the wheel.

2.2.2.1.3 Explain

Klemm (2004:5) reasoned that explaining things promotes better understanding. It plays an important role in getting co-operation from staff from the word go. Staff members need to know and understand why certain decisions are made, what initiations or changes are taking place and the reasons for the changes, because ultimately they will be affected by these changes and their full support is very important. The digitization project must have support from staff to avoid unnecessary resistance, which will cause delays.

2.2.2.1.4 Debate/Argue

According to Klemm (2002:5), the central reasoning tool required to analyze complex issues is to construct and evaluate arguments, meaning that arguments are necessary to strengthen the debates that may arise from discussions. The digitization projects involve many forums for planning. For the project to succeed there must be good debate/argument to understand the importance of digitization in relation to finance, marketing, planning and other aspects, such as why it needs to be budgeted for and why it needs external funding.

2.2.2.1.5 Decide

Decision-making is important when it comes to digitization processes. According to Klemm (2002:5), the ability to make wise decisions is one of the important steps in the digitization project. Making a decision is based on the results from the four steps discussed above. Digitization of library materials requires many decisions to be made, starting from deciding which materials to digitize, which software to use, right through to deciding on whether to keep the digitized hard copies or not.

2.2.2.1.6 Design

Klemm (2002:5) pointed out that “both creativity and critical thinking are stimulated when people are asked to design something” and people are always asked to design plans, samples, proposals, better procedures. In the case of library digitization,

people need to work on the digitization procedures for improvement on the project. “People work in teams to help each other produce the deliverable” (Klemm 2002:9).

2.2.3 Data Curation Lifecycle Model

The Data Curation Lifecycle Model (sometimes referred to as DCC Curation Lifecycle Model) was developed by the Digital Curation Centre (DCC). According to Higgins (2008:135), the Data Curation Model is a lifecycle approach to the management of digital materials. It enables “successful curation and preservation from initial conceptualization to either disposal, or selection for reuse and long-term preservation” (Higgins, 2008:135).

2.2.3.1 DCC Curation Lifecycle Model in relation to this study

The model links up with the present study, as it deals with digitization processes. According to Halbert, Skinner and McMillan (2008:90), the Data Curation Lifecycle Model provides an overview of the stages for curating and preserving a digital collection. Halbert, Skinner and McMillan (2008:90) stressed that the model encourages institutions to think about the lifecycle processes in a holistic manner “in terms of layers and of action and policies” (Halbert, Skinner and McMillan, 2008:90). In relation to what is indicated by Higgins (2008) and Halbert, Skinner and McMillan (2008), the model promotes that digitization of library materials must be looked at, planned and decided on holistically not in terms of one process at a time.

Heidorn (2011:667-668) pointed out that some of the Data Curation Lifecycle Model’s important steps include building preservation strategy, collaborating, supervising and participating in data creation activities, to assist in the creation of standards to use, tools to create data and appropriate software to create it. Heidorn (2011) added that the Data Curation Lifecycle Model includes stores for access, reuse and retrieval, which ensures that data is stored using appropriate standards to ensure they remain usable and can be easily retrieved. According to Higgins (2008:134), “the DCC

Curation Lifecycle Model (Figure 1) offers a graphical high-level overview of the lifecycle stages required for successful curation.”

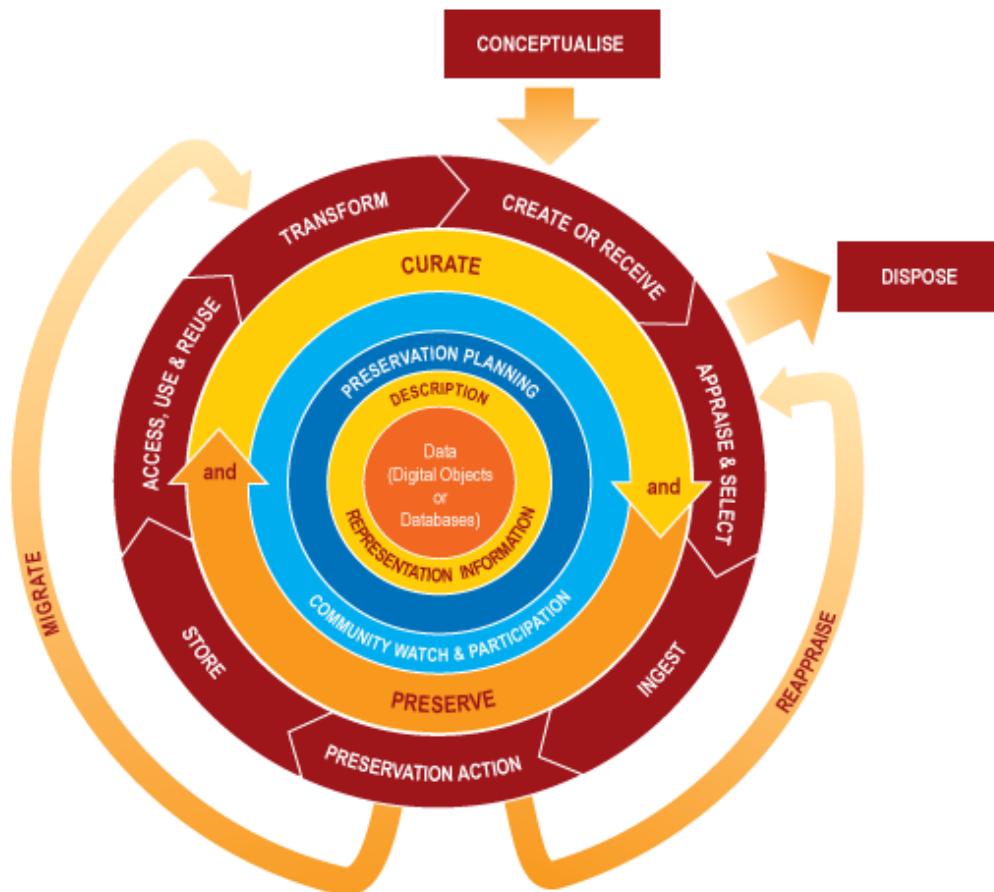


Figure 1: The DCC Curation Lifecycle Model (Source: Higgins 2008:136).

In explaining the DCC Curation Lifecycle Model, Heidorn (2011:667) stated that the inner ring is maintained in all steps of the cycle, to provide representational information and description. According to Heidorn (2011:667), “no one individual will have all of the required skills.” There has to be collaboration among staff to complement each other.

Read (2012: Action of the Data Curation Lifecycle) summarized the Data Curation Lifecycle Model in relation to digitization by highlighting some of its important points.

2.2.3.1.1 Describe and represent information

According to Read (2012:Describe...) this refers to the importance to use appropriate standards in order to describe metadata, so that it can be controlled over the long term, as it ensures that all metadata and associated digital material can be represented and understood in appropriate formats.

2.2.3.1.2 Build preservation strategy

As summarized in Read (2012:Build preservation strategy), it is important to plan for preservation throughout the data lifecycle. The planning stages must include discussions concerning the preservation strategy. Read (2012:Where do librarians fit in?) pointed out that librarians can “fit data preservation into their existing management and administration,” which would require them to work closely with researchers.

2.2.3.1.3 Collaborate, supervise and participate

According to Read (2012:Collaborate ...), librarians must “supervise data creation activities and assist in the creation of the standards to be used, the tools to create data and appropriate software to create it”. Read (2012:Collaborate ...) indicated that this action is good place for librarians or archivists, as they can assist in the collaborative and managerial duties of ensuring that data is created appropriately and preserved.

2.2.3.1.4 Curate and preserve

Higgins (2008:137) and Read (2012:Curate and preserve) indicated that taking managerial and administrative actions that will promote curation and preservation throughout the lifecycle will assist in keeping a close eye on the creation of data and encourage best practices through policies and standards to improve the organization of data throughout its lifecycle.

2.2.3.1.5 Plan your data creation

Read (2012:Plan ...) further highlighted the steps to build a strategy and policy that will address how data will be captured and stored. They include describing and representing information, building preservation strategy, collaborating, supervising and participating strategy and lastly, curating and preserving strategy.

2.2.3.1.6 Create or receive

Read (2012:Create or receive) summarized this action as a process to create data using descriptive and technical metadata; and to receive from data creators, other archives and data centres, based on the documented collecting policies. Higgins (2008:138) stressed the importance of abiding by the documented policies or legal requirements as guides.

2.2.3.1.7 Appraise and select

According to Higgins (2008:138) and Read (2012:Appraise and select), another action is to create an appraisal and selection policy with data creators and curators. Once this policy has been established, the data should be evaluated and selected for long-term curation and preservation.

2.2.3.1.8 Take in and transfer

Read (2012:Take in and transfer) indicated that, after appraisal and selection have been completed, the data should be transferred to an archive or repository and the guidelines that were created to ensure the activity is completed properly, should be adhered to.

2.2.3.1.9 Store for access, reuse and retrieval

Data should be stored, using appropriate standards, to make sure they remain usable and can be retrieved easily (Read, 2012:Store for access; Higgins 2008:138).

2.2.3.1.10 Transform

Read (2012:Transform) indicated that “transform” is a very important component, which requires creating new data from the original material. According to Higgins (2008:138), data is transformed by migrating it to a different format and/or by creating a subset “to create newly driven results.”

2.3 ELECTRONIC THESES AND DISSERTATIONS IN THE SEVEN CONTINENTS OF THE WORLD

Hirwade (2011:Need for developing ...) stated that doctoral theses and dissertations are primary sources of documents which contain many new ideas, innovations and new results, in highly specific topics. Hirwade (2011) pointed out that theses and dissertations must therefore be made accessible to everyone regardless of where they are. Brief information on the theses and dissertation digitization projects that took place in some institutions around the world will be discussed.

2.3.1 North America

Swain (2010:2) recorded that North America is the originator of ETDs and is considered as one of the leaders in the ETDs. According to Fox, McMillan and Eaton (1999:3), theses and dissertations digitization projects originated in 1987 in the USA at an ETD workshop in Ann Arbor, Michigan, on Standard Generalized Markup Language (SGML). In 1997, Canada started “Theses Canada Portal”. The aim of the portal was “to acquire and preserve a comprehensive collection of Canadian theses at Libraries and Archives of Canada,” as well as “to provide free access within the country and around the world” (Vijayakumar and Vijayakumar, 2007:72). The University of Maryland (UM) in the USA is also one of the universities that engaged in the digitization project. According to Pinkas and others (2012:266), the UM embarked on the digitization project for dissertations in 2011. The UM digital archive was launched in May 2011 and its purpose was to collect, preserve and distribute, in digital format, the academic works of the University of Maryland. The project was

completed in 2012 and 3035 theses from 1813 to 1889 were then accessible from the UM digital and Internet archives (Pinkas and others, 2012:270).

2.3.2 South America

According to Vijayakumar and Vijayakumar (2007:71), the SITE-Theses System was the first attempt in Brazil to integrate Brazilian theses and dissertations in a unified database. The database started in 1996 and was co-ordinated by the Institute of Brazil for Information Communication Technologies (IBICT). The IBICT played an important role in the development of the Biblioteca Digital de Teses e Dissertações (BDTD) project. The BDTD project was approved in 2002 with the aim of “building a national digital library of theses and dissertations by integrating various national initiatives as well as promoting the integration of the national ETD digital library with international initiatives” (Southwick, 2006:105).

Southwick (2006:108) described some of the outcomes since the BDTD project in 2002. These include almost 21000 theses and dissertations from 28 Brazilian local ETD digital libraries. The project was extended to several universities in South American countries outside Brazil, countries like Argentina, Colombia, Uruguay and Venezuela, with support from the United Nations Educational, Scientific and Cultural Organization (UNESCO). These countries started pilot-projects using technology supplied by IBICT.

2.3.3 Europe

Several countries in Europe had theses and dissertations digitization projects. According to Swain (2010:2), the Cranfield LIS, a member of the European Initiative in Library and Information in Aerospace (EURILIA) project, participated in a thesis-scanning project in 1990. Cranfield Library and Information Services later collaborated to test the uploading of thesis metadata and full text. French Universities initiated several ETD programmes and a Multi-Disciplinary Theses project.

The Digital Scientific Archive or Digitala Vetenskapliga Arkivet (DiVA) project (Academic Archive On-line) was initiated at Uppsala University in Sweden and has evolved from being a project at one university to a joint project, with partners from seven universities in three different countries (Denmark, Norway and Sweden). According to Muller and others (2003:The DiVA project), the DiVA project started in September 2000. The project focused first on developing a workflow and finding technical solutions for publishing doctoral theses in electronic format. It was later extended to keep other publications such as research reports and undergraduate theses.

2.3.4 Australia

The Australian Digital Theses (ADT) Project resulted from the collaboration of seven Australian institutions in 1998/99 “to accept electronic theses from postgraduate students” (Fox and others, N.d.:6). According to Fox and others (N.d.:6), the oldest work in the collection dated back to 1968. Vijayakumar and Vijayakumar (2007:70) indicated that the ADT project was designed to improve access to, and enhance transfer of, the research information contained in theses, by providing a full text version available from the desktop via the web. In 2007 there were already 26 Australian Universities in the ADT project, but ADT “ceased operation on 28 March, 2011. The database server has been decommissioned and the content of that database is accessible from the National Library of Australia’s Trove service” (Council of Australian University Librarians, 2013:ADT).

2.3.5 Asia

According to Sheeja (2012:422), the National Knowledge Commission (NKC) and University Grants Commission (UGC) played a major role in the establishment of electronic theses repositories and Open Access (OA) movement in India. Swain (2010:3) indicated that In India the digital libraries began in the mid-1990s, with the support of government. The ETD Repository Shodhganga was originated, and became operational on 20 May 2010. The aim of the repository was to “facilitate

open access to Indian theses”, world-wide (Sheeja, 2012:422). The project aimed at digitizing older theses from all universities in India. Sheeja (2012:423-424) stated that the project was well received by the Indian academic community, resulting in 62 universities signing a memorandum. By 19 June 2012 Shodhganga already had 3350 theses in the repository, from 52 universities.

According to Jin (2004:367), the China Academic Library and Information System (CALIS), which is a federation of academic libraries in China, initiated the China Networked Digital Library of Theses and Dissertations (CNDLTD) project to improve the accessibility of local ETD collections. Jin (2004:369) indicated that improved access to ETDs can contribute greatly to the dissemination and preservation of knowledge.

CALIS is a federation of academic libraries in China and has more than 152 members and seven local centres. “CALIS members let students and their advisors determine the online accessibility of their ETDs. The majority of students allow their ETDs to be viewable online soon after submission, while the others elect to protect their ETDs for a certain period of time” (Jin, 2004:369). In 2003 there were already 2340 ETDs submitted by students of Shanghai’s Jiao Tong University. Out of the 2340 theses submitted, 69 percent of students wanted theirs immediately accessible online, the remaining 31 percent included those who gave access permission to their theses from either one year onwards or to no access at all.

2.3.6 Antarctica

Antarctica is the coldest, driest and windiest continent on earth. Human life does not exist on this continent because of its harsh climate. The world's lowest temperature of minus 81°C was recorded in Antarctica in 1983. Only a few human beings reside there for research purposes (7 Continents, N.d.:Antarctica). The researcher could not find a source that indicates the existence of ETDs in this continent.

2.3.7 Africa

The Hezekiah Oluwasanmi Library, Obafemi Awolowo University (OAU), Ile-Ife, in Nigeria started on the project to digitize abstracts of theses and dissertations in 2004, (Omotayo and Aboyade, 2012:8). According to Eke (2011:1), digitization of theses and dissertations at the university libraries of Jos and the Obafemi Awolowo Universities (both in Nigeria) provided a model for Ahmadu Bello University (ABU), also in Nigeria, under the Association of African Universities - Database of African Theses and Dissertation (AAU-DATAD) programme, to start digitizing its post-graduate theses and dissertations. The main aim of the digitization was to provide global access through the Internet for all the theses and dissertations accepted for higher degrees at the university. According to Vijayakumar and Vijayakumar (2007:72), the theses and dissertations in Egypt are available on the Ain Shams University Network (ASUNET), “including theses and dissertations of Egyptians who graduate from other international universities”.

2.3.7.1 South Africa

According to Ubogu (2001:249), in 1998, Rhodes University uploaded its digital theses on the World Wide Web and “became the first institution in Africa to do so.” The university made it compulsory for students to submit digital files of their theses and dissertations. The Rhodes University Masters and doctoral theses and dissertations are digitized and made accessible on the Rhodes Digital Commons. The RU theses and dissertations collection includes some theses predating the inauguration of Rhodes University in 1951. The oldest thesis currently held within the repository is dated 1928. The repository holds in excess of 5000 Rhodes theses and all new theses and dissertations submitted for degree purposes are continually added to the collection (Rhodes University Library, 2014:RU theses collection). To date, the Rhodes theses collection has more than 5501 theses in its database.

UPeTD is the University of Pretoria's electronic theses and dissertations service. The submission of masters and doctoral theses and dissertations is compulsory. According to the University of Pretoria library (2003>About UPeTD),

the UPeTD initiative was launched in July 2000 with the objective to create the necessary infrastructure and resources to allow post-graduate students to publish their theses or dissertations on the Internet in a well-managed environment which will make it accessible to the international research community.

The UnisaETD is an open access digital repository of electronic versions of the University of South Africa theses and dissertations since 2003. The repository includes theses completed by UNISA staff at other academic institutions (University of South Africa library, 2011:2.). The University of the Western Cape electronic theses and dissertations repository holds full-text theses submitted for degree purposes since 2004, with selected titles prior to 2004 (University of the Western Cape, 2002-2011: UWC Electronic Thesis).

The majority of universities in South Africa have most of their theses and dissertation available online, for example, the University of Cape Town (UCTScholar) has, to date, 15 October 2014, 7602 theses online, and the University of Johannesburg (UJDigispace) has 9439 theses.

2.3.7.1.1 University of KwaZulu-Natal

The University of KwaZulu-Natal launched its digital repository, ResearchSpace in September 2009. The plan for the repository was to start by uploading masters and doctoral theses and dissertations before embarking on other digitization projects (University of KwaZulu-Natal, 2009). The repository, to date, has 6632 theses.

2.4 DIGITIZATION OF LIBRARY MATERIALS

Chan and Costa (2005:143) pointed out that “one of the key roles of a library is to provide structured access to information” and with the increasing reliance on technology, libraries are engaged in digitizing their materials as one of the methods for providing access to information.

According to the International Federation of Library Associations (IFLA) (2002:8), digitization is a costly exercise which requires detailed planning and established infrastructure and yet organizations are going ahead with starting digitization projects, regardless of “financial constraints and diminishing institutional budgets” (National Research Foundation [NRF], 2010:2). Hazen, Horrel and Merrill-Oldham (1998:v) explained that digitization of library materials involves conversion of textual, visual and numeric information to electronic form. This includes preparation and conversion to presentation and archiving. The digitization process involves a number of different procedures and technologies which are costly and have complications. According to Bulow and Ahmon (2011: Introduction), digitization not only involves “image capture, transcription, indexing and delivery but also technical issues around online presentation, digital file management and digital preservation.”

Jagboro, Omotayo and Aboyade (2012:2) pointed out that libraries worldwide, especially university libraries, are increasingly becoming digitally conscious. Like Jagboro, Omotayo and Aboyade (2012:2), Rafiq and Ameen (2013:39) pointed out that academic libraries all over the world are digitizing their materials, ranging from “books, journals, archives of newspapers, artifacts, music, theses and dissertations, and other historical documents and images of international and cultural interest.”

2.5 BENEFITS OF DIGITIZATION

According to IFLA (2002:6), there are a number of reasons for implementing digitization projects, which benefit users in one way or another. Jagboro, Omotayo and Aboyade (2012:2) stated that libraries digitize their materials for various reasons,

such as providing wider access to collections, as a way to preserve aging materials and also to allow users to “search collections rapidly and comprehensively from anywhere at any time”. Jagboro, Omotayo and Aboyade (2012:2) added that, in developing countries, digitization helps to prevent theft of library materials where libraries do not have electronic security systems as preventive measures.

According to Bulow and Ahmon (2011:1), while the digitization of library materials has a number of benefits, it has also “put new pressures on libraries, archives and museums.” Bulow and Ahmon (2011:1) added that library users, especially the new generation born in the internet age, “expect to find and retrieve information online”, as they are not used to retrieving information using catalogues. Alhaji (2007:3) identified four benefits that digitization of library materials bring:

- **Improved access.** Alhaji (2007:3) pointed out that digitization of library materials contribute to improving accessibility, since the digitized material can be accessed at any time, regardless of where the physical library is and whether it is open or closed. Jagboro, Omotayo and Aboyade (2012:2) agreed that “users can access the library’s digitized resources from their offices and halls of residence even when the library is physically closed.” Access to digitized content is not tied to its physical location nor operating hours.
- **Wider access.** Alhaji (2007:3) said that a physical copy of a document is only available where it is located, which means if there is one copy then one person at a time can access it. Jagboro, Omotayo and Aboyade (2012:2) pointed out that digitization of library materials provides wider access to materials by making them available electronically. According to Alhaji (2007:3), as well as Jagboro, Omotayo and Aboyade (2012:2), digitized content can be simultaneously accessed by as many people as possible, something which is not possible with text resources.

- **Improved information sharing.** According to IFLA (2002:7), digitization gives institutions an opportunity to partner with other institutions and share resources. In support of IFLA (2007), Alhaji (2007:3) added that, by digitizing library information, digitized libraries are able to share information among themselves, provided they have appropriate metadata and information exchange protocols.
- **Improved preservation.** Alhaji (2007:4) warned that physical library materials are prone to wear and tear and can easily be lost to the library communities, yet that is not always the case with digitized material. IFLA (2002:8) indicated that digital technologies offer opportunity to preserve the original by giving access to a digital surrogate. However, according to Alhaji (2007:4) that did not mean the digitized material cannot be damaged, but it is less likely to be damaged and should it be damaged it is easy to make an exact copy from the original. Digital copies are sometimes exposed to computer viruses and can be corrupted. Asogwa and Ezema (2012:9) agreed that viruses and disasters can damage digitized material.

Nsibirwa (2012:74-78) provided other factors that can cause deterioration of library material, such as environmental factors, including the building in which the materials are kept. These causes of deterioration were emphasized by Nsibirwa in the discussion of the deterioration of physical copies, but it could be argued that this is equally applicable to digitized copies as well. Even though some libraries digitize materials to preserve them, IFLA (2002:8) argued that digitization is not a solution to preservation and is also not a cheaper, safer or more reliable way to preserve materials than microfilming.

2.6 PRINCIPLES OF DIGITIZATION

Although the principles of digitization that are discussed in this section have been formulated by the Committee of the Canadian Council of Archives of 2001, they are relevant to all digitizing institutions. According Asogwa (2011:Principles):

- The process of digitization must not place original records at risk of damage from handling or use.
- The original analogue document or a digital version must always be kept.
- Records to be digitized should be chosen only after a careful selection process.
- The technological approach to digitization must satisfy project objectives and must accommodate the characteristics of the records, such as the principle of provenance or the sanctity of the original order.
- Search tools are an essential part of a digitization project and must meet the needs of users.

2.7 FACTORS TO CONSIDER IN THE DIGITIZATION PROJECT

According to Hazen, Horrell and Merrill-Oldham (1998:v), the factors to consider in a digitization project include:

The intellectual and physical nature of the source materials; the number and location of current and potential users; the current and potential nature of use; the format and nature of the proposed digital product and how it will be described, delivered, and archived; and projections of costs in relation to benefits.

2.7.1 The intellectual and physical nature of the source materials

Hazen and others (1998:3) stressed that when making a decision to engage in a digitization project, it is very important to carefully look into the type of materials being digitized. The authors emphasized that digitization is very expensive and the intellectual value and physical nature of the materials need to be considered to determine whether or not digitizing those materials is worth the money and time that would be spent on them. These authors are of the view that by digitizing materials the institution is making them easily accessible for further research and, as a

consequence, materials with scholarly value and intellectual output are more worth digitizing than less valuable materials. Hazen and others (1998:3) and Jagboro, Omotayo and Aboyade (2012:2) agreed, that the library may decide to digitize materials that are “of immediate and curricular importance.”

2.7.2 The number and location of current and potential users

According to Hazen and others (1998:5), not all scholarly materials are heavily used. Some are always used and others are hardly used. Jagboro, Omotayo and Aboyade (2012:2) stated that the choice of materials to be digitized may include materials that are on high demand by patrons and only available in limited numbers, or restricted in access. Hazen and others (1998:9) reasoned that digitization resources may be selected according to the frequency of the usage of the materials, notwithstanding the fact that the hardly used materials become more frequently used. Hazen and others (1998:5) felt that material that was previously in hard copy can entice new users who otherwise would not have known about it had it, not been digitized.

Hazen and others (1998:5) pointed out that academic institutions usually have more than one campus located very far from each other and, in such cases, materials are sometimes available on one of the campuses and not available on another, and yet are equally relevant for both or all campuses. The authors stated that, by digitizing the materials, all potential users have equal opportunity to access the materials, including external users in the case where the material is open to access by outsiders.

2.7.3 The current and potential nature of use

Hazen and others (1998:5) cautioned that materials can be digitized because of their nature and some materials are too sensitive and fragile for handling. As a result, their usage is limited to avoid damage to the material, regardless of the value of the information contained in them. Hazen and others (1998:5), however felt that digitizing

such materials would add value to research and scholarly needs, as they would be equally accessible to everyone, anywhere and anytime.

2.7.4 The format and nature of the proposed digital product

According to Hazen and others (1998:10), the nature and format of the materials for digitization also counts, and it would be important to check if the library has the means to deal and cater for the type of materials to be digitized. According to Hazen and others (1998), the original material must be converted to electronic version satisfactorily. It is thus important to know what features are critical for the material to be effectively digitized, because digitizing certain materials without such considerations would be a waste of time and money, as they would not be as effective and meaningful as the original copies. Hazen and others (1998) warned that, if the digitized copy does not meet users' needs, it is as good as not being there and users would resort to the hard copy.

2.7.5 Projections of costs in relation to benefits

Hazen and others (1998:16) revealed out that digitization costs differ greatly from one project to another, from one document type to another, and that it is very important to determine that the benefits of digitized materials are worth the cost and time involved. Hazen and others (1998:16) also suggested that costs are to be determined in relation to the file sizes and processing of the end-product, labour requirements, accessibility and search ability of the end-product. This means that 15 years ago, as pointed out by Hazen and others (1998:16), all digitization projects were regarded as costly. In recent years, as stated by de Vries (2009:7-9), digitization projects are classified as low cost or high cost based on the duration of the project. According to de Vries (2009:7-9), projects that run for a relatively short period of time, for example two to three years, are regarded as low cost digitization projects. Hazen and others (1998:16) argued that there is no need to digitize information that would not be used, for example due to its size and poor quality, simply because the cost involved would outweigh the benefits.

2.8 GUIDELINES FOR STARTING AN INSTITUTIONAL REPOSITORY (IR)

According to Chowdhury and others (2011:Defining Institutional Repository), “an institutional repository is a new method for identifying, collecting, managing, disseminating, and preserving scholarly works created in digital form by the constituent members of an institution.” The University of Stellenbosch library (N.d.:Guidelines) provided seven steps to consider when starting an institutional repository. These include:

- Policy: The very first thing to do is to formulate digital reservation policy, using “open access, open standards, open source software and open systems.”
- Persistent Uniform Resource Locator (URL): The next step involves deciding on an IR URL which has an easy name to remember and that will not change overnight, as this is important for visibility on the net, as well as for branding and marketing. UKZN’s IR name is ResearchSpace and the URL is <http://researchspace.ukzn.ac.za/xmlui>.
- Personnel: Personnel will have to be appointed that will work on the digitization project(s). According to the University of Stellenbosch library (N.d.:Personnel), in addition to the library staff that would be involved in the digitizing of materials, there must be at least a library repository manager, a system administrator and a Web developer.
- IT infrastructure: This step involves budgeting for the necessary equipment, such as server hardware resources, for the IR.
- Repository software: Step five involves the installation of the software, e.g. DSpace, which is used in a number of South African institutions like the University of Pretoria, Durban University of Technology, Stellenbosch University, Rhodes University and others, including UKZN.
- System backup and monitoring: There must be plans in place for disaster recovery.
- Launch: The final stage involves the official launch of the repository to ensure that users are aware of its existence and purpose.

2.9 PHASES OF DIGITIZATION

Bulow and Ahmon (2011:10-12) summarized four phases of digitization as important phases to consider from the beginning to the end of the project, in order to meet the objectives of preserving and increasing access to a collection.

According to Bulow and Ahmon (2011:11):

- Phase 1 involves the selection of materials to digitize. Copyright issues need to be considered, as they may be the deciding factor whether it is worth digitizing those materials or not. This phase also includes deciding on the scanning preparations of the document.
- Phase 2 concerns recording the scanned image, the creation of metadata, quality control and Optical Character Recognition.
- Phase 3 concerns information for online presentation. This includes website development, marketing and promoting the end-product.
- Phase 4 covers sustainability and involves the maintenance and long-term financing of the project.

2.10 BEST PRACTICES AND PLANNING FOR DIGITIZATION PROJECTS

According to Bulow and Ahmon (2011:172), “the key to successful digitization is collaboration, planning, preparation and presentation.” Different authors and academics, such as Hirwade (2011), Kanyengo (2009), Hammond and Davies (2009), Isfandyari-Mghaddam and Bayat (2008), have suggested a number of requirements that need to be met for the successful implementation of a library digitization project. For example, Hirwade (2011:Need for developing ...) proposed the three requirements for implementing the library digitization project, namely, the provision of policy guidelines, required infrastructure and training of people involved. In addition to the three requirements, Kanyengo (2009:38-39) stipulated technical knowledge, financial and legal issues. Hammond and Davies (2009:1) and Isfandyari-Moghaddam and Bayat (2008:850-851) focused on a number of issues identified from different digitization projects.

In line with the DCC Curation Lifecycle Model, Bell and Natale (2012:Planning, planning, planning) recommended selection, standards and access as the key components for a digitization project. According to the Bell and Natalie (2012), digitization projects are complex, time-consuming and costly and their success is generally in proportion to the time spent in planning the project.

For the purposes of this chapter, the researcher adopted and adjusted the combination of elements provided as discussed by Hammond and Davies (2009); and Isfandyani-Moghaddam and Bayat (2008) as they cover most of the common issues identified in different digitization projects in most of the literature reviewed.

2.10.1 Planning processes for a digitization project

Bell and Natale (2012:Planning, planning, planning) highlighted planning as the most important key to a successful digitization project. Bell and Natalie (2012) reasoned that the success of a project is generally in proportion to the time spent on planning the project. Bulow and Ahmon (2011:172) stressed that digitization projects must be carefully planned, “to ensure that all requirements and opinions have been considered.” Bulow and Ahmon (2011) felt that planning ahead and anticipating possible problems before the start of the project is far better than rectifying problems during the project, a process which is costly and time-consuming.

According to Beagrie (N.d.:Getting it right first time), the initial planning stages are crucial to the success of digitization projects. Beagrie (N.d.:Getting it right first time) emphasized that decisions made at this stage play a critical role in determining the sustainability and usefulness of resources created. The planning processes for the digitization project need to be done from the beginning of the project right to the end.

Alhaji (2007:3) stated that “planning involves identifying various tasks related to creating a digital library collection, developing strategies for handling these tasks,

identifying required resources and formulating a timeline for accomplishing these tasks.”

Hammond and Davies (2009:8) added out that the planning processes and costing for the digitization project is usually guided by the funding body requirements. According to Beagrie (N.d.:Introduction), even though most organizations are guided by external funding bodies, the most successful digitization projects “have had a well-established wider context, thought through the issues, and have therefore achieved the greatest impact.”

Hammond and Davies (2009:8) recommended that the more knowledge you have about the materials to be digitized the better, as you will be able to plan the project better. In a case where you have a poor knowledge of the materials to be digitized, it may end up costing you more and may take longer to complete the project than anticipated, “or you may not be able to digitize all of the content you had hoped to” (Hammond and Davies 2009:8).

According to Hammond and Davies (2009:8), planning must be properly done to the extent that it incorporates costing and time-frame for the digitization process. For instance, it is important that “the people managing the bid” are aware of the materials to be digitized, as to what state they are in and how many items are to be digitized. They further indicated that in a case where they do not know, they must find out from people who have that kind of information, and if none of the people know, they must plan the project in such a way that it takes that into account, by either allocating a contingency budget or by planning a project review halfway through (Hammond and Davies 2009:8).

Beagrie (N.d.:Introduction) cautioned that “the initial planning and implementation phases of a digitization project are widely recognized as being crucial to its eventual success”. Most of the decisions made at this time will determine the future

sustainability and usefulness of the resources created. Beagrie (N.d.:Getting it right first time) added that, because of this, most projects recommend a holistic lifecycle approach, “in which all stages from data creation to future use and interdependencies between them are considered.” According to Ubogu (2010:47), the planning must be reviewed now and then, “to reflect new ideas and changing conditions within the library and its environment.”

2.10.2 Implementation

Alhaji (2007:4) states that planning is followed by implementation. The implementation process refers to the actual steps required to set up the collection. Alhaji emphasized that, before the implementation of the project, it is crucial “to obtain management approval for the plan and the required resources before proceeding with the implementation” (Alhaji, 2007:4).

As one of the important initial steps, it is important to identify and designate a project manager to lead the implementation of the digital project from the beginning, and, according to Alhaji (2007:4), for large digital library projects, it is essential to have a full- time project manager for the duration of the project.

2.10.3 Organizational support

Hammond and Davies (2009:10) pointed out that organizational support is one of the crucial aspects for the success of the digitization project. Hammond and Davies (2009:10) warned that the digitization process does not only involve library as a unit, but involves other departments such as Information Technology (IT) for IT-related issues, Human Resources (HR) for staff recruitment and other staff-related matters and a Legal Department for copyright and other legal issues.

According to Hammond and Davies (2009:11), internal organizational bureaucracy is usually considered as one of the most problematic issues, since it deals with a number of departments and it usually takes longer than anticipated to get things

done. It is therefore important to engage in negotiations as early as possible, as this process is very time-consuming.

2.10.4 Digitization strategy and policies

Liu (2004:338) recorded that more and more libraries are digitizing their collections. As a result, policy concerns and technology problems surrounding digitization are becoming very important. Liu (2004:338) felt that many of the libraries digitizing their collections seem not to have strategies and policies in place. According to Liu (2004:338), the Institute of Museum and Library Service survey report in 2001 suggested that “libraries need to implement policies regarding the standards, preservation, and selection of digitized material”.

Pickover and Mohale (2013:2) reported that development of digitization policies, strategy frameworks and standards are some of the challenges commonly faced by libraries and archives engaged in digitization projects. The University of KwaZulu-Natal was one of the 20 South African and three German institutions and organizations which attended the South African Digitization Initiative (SADI) workshop, in which ways to overcome policy issues were discussed as one of the aims of the workshop (Pickover and Mohale, 2013:2).

The literature review conducted by the present researcher supports Liu's (2004:338) comment that most libraries digitizing their collections lack digitization strategies and policies. The literature shows that UKZN library is no exception in this regard, in that there is either no digitization policy or the policy is not readily available for access. The UKZN Vice-Chancellor, Professor M.W. Makgoba, however, signed the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities in 2012, which supports open access to research materials (Bass, 2012:Berlin Declaration signed). According to Bass (2012:Berlin Declaration signed), by signing the Berlin Declaration, the institution agrees to the principles of the Open Access movement, as set out in the Berlin Declaration. These are:

- To encourage researchers to make their materials available in open access (through self-archiving in open access repositories or publishing in open access journals);
- To encourage the holders of cultural heritage to support open access by providing their resources on the Internet;
- To develop means and ways to evaluate open access contributions to maintain the standards of quality assurance and good scientific practice;
- To advocate that open access publications be recognized in promotion and tenure evaluation;
- To advocate the intrinsic merit of contributions to an open access infrastructure by software tool development, content provision, metadata creation, or the publication of individual articles.

(Bass, 2012:What is the Berlin Declaration ...)

According to Layton (2011:Summary):

A digitization strategy is a statement for how an institution positions itself into the world of digitization and what it is planning to do about this. It provides a library's approach in relation to the digitization activities.

Layton (2011:Summary) added that the library digitization strategy is an essential document aimed at providing focus and direction to meeting a goal, as well as the means for measuring progress towards meeting that goal. According to the John Rylands University Library (JRUL) (2009:2) digitization strategy, the JRUL strategy is a result of extensive "dialogue between library staff and schools to clarify their priorities for digitization and external funding", thus emphasizing the importance of communication throughout the process of the project.

Chaparro (2004:Slide 12) pointed out that the availability of adequate information access and digitization policies helps in addressing and reducing challenges faced by academic libraries of not having direction and information on why digitize. According to Layton (2011:Summary) it is crucial that a library has digitization strategy and policies, as the institution's guide towards "getting digitization done," and as a marketing strategy for the digitization project. Institutions must create their own digitization strategy that is in line with their goals and objectives. Layton (2011:Summary) pointed out that the library management must identify and make decisions on whether digitization must be done for the entire collection, or select certain materials, whether to do the project in-house or to outsource the digitization process, and so on. Layton (2011:Summary) added that the digitization strategy and policy must be reviewed on regular basis, either annual, bi-annually, to reflect changes that may have come up in the digitization process. Layton (2011) provided guidelines to the drafting of the digitization strategy as a set of minimum information elements, to include:

- Know what you have
- Know your users
- Determine your selection principles and rules
- Describe the digital items and collections

2.10.4.1 Know what you have

Layton (2011:Know what you have) stressed that it is important to know the type of collection you have, to understand what the threats are to the collection and what needs to be prioritized. This includes the usage of the collection, how often it is used and what the risks are to damage and loss of items in the collection. The frequently used items can be identified as of priority. Layton (2011:Know what you have) recommended that the strategy must highlight and include the issue concerning rights; "what rights are held by who and how these rights are to be managed?"

2.10.4.2 Know your users

According to Layton (2011:Know your users), knowing your users makes it easy to understand their needs and decide how digitization of specific materials will benefit them, as well as how to present it to them. Beagrie (N.d.:User needs) stated that understanding user needs can be essential in developing a digitization strategy.

2.10.4.3 Determine your selection principles and rules

Layton (2011:Determine your selection ...) argued that the fact that digitization of materials is expensive, in-as-far as time and financial and human resources are concerned, the digitization strategy must set up rules to determine what and how to go about digitization within the selected collection. Layton (2011:Determine your selection ...) cautioned that it may not be possible to digitize everything within the collection and different rules may be set for different collections and institutions, as the strategies and policies are not a “one size fits all” kind of thing.

2.10.4.4 Describe the digital items and collections

According to Layton (2011:Describing the digital ...), it is important to clearly specify the format, media and metadata to use for the collection. The strategy must specify in which repository the digital collection will be housed.

2.10.5 Availability of specialized staff

According to Moodley (2009:4), “librarians and archivists need to possess unique skills to work in the digital information world.” Recently, libraries are witnessing a high demand of positions that require advanced skills in information technology. Tammara (2007:229) recorded that the labour market in Europe is now beginning to demand specialized skills, but there is a serious shortage of such skills, mainly due to the lack of formal (and informal) opportunities for education in IT profiles that are suited to libraries. Hammond and Davies (2009:15) stated that projects usually require staff with specialized backgrounds who will be competent and engaged in the project.

2.10.5.1 Staff requirements for digitization

According to Zhou (2005:235), human resources are the most important resource; “without human resource, no resource may be useful.” Posgate (2008:9) stressed that since staff is likely to take the biggest part of the budget, it is important to plan beforehand the staff requirements in terms of staff size and required skills. Posgate (2008:9) indicated that there must be plans concerning how many staff are required, what budget will be used to cover staff cost(s) and where the money is coming from. Posgate (2008:9) felt that there must be indications as to the required skills needed for the team, as well as plans and budgets for the training needs of staff and “what kind of work can be done by unskilled staff or volunteers”.

Zhou (2005:235) reasoned that the most critical task to convert a traditional library to a digital one lies in successfully changing the human resources of the library into “digital librarians”. Digitization processes of the library materials require a number of specialized skills in contrast to the traditional library of print and hard copies. According to Chavan (2012:3), “the basic goal of library and information profession has always been to provide access to information to those who need it.” The role of library professionals is dramatically changing with the changing face of libraries.

Anderson and Gesin (1997:Impact of digital ...) stated that information-seekers no longer have to leave their homes or offices to locate and access information, but can access it electronically via digital gateways from their desktops. According to Murphy (2010:3), technological advancements have enabled people, especially young people to access information through cellphones and other devices such as i-pads. Anderson and Gesin (1997:Impact of digital ...) added that the digital age is bringing changes in the way information is stored and accessed, bringing about changes in library and information professionals. Library staff are learning new skills, skills related to digital information (Anderson and Gesin 1997:Cost of ownership).

Ferguson and Bunge (1996:252) felt that librarians need to radically change their perspectives on user needs, and even transform the ways in which they organize themselves, to serve these needs. Ferguson and Bunge (1996:252) stated that academic librarians are aware of the need to work aggressively towards bringing “the library to the users’ rooms, residence halls, offices, and anywhere else the network goes.”

According to Hammond and Davies (2009:16), “digitization projects have staffing requirements that are distinct from most roles in a university: specific skills are required, but contracts are typically limited to 18-24 months.” Isfandyari-Moghaddam (2009:33) stressed that, for the success of digital libraries, it is important that all staff, whether familiar or unfamiliar with theory and practice of Digital Libraries (DLs), had better learn the needed skills of working in these libraries through continuing informal education.

For the successful implementation of digital library and digitization processes, the library personnel need to be well-trained in order to acquire the required knowledge and skills for this venture. Mohsenzadeh and Isfandyari-Modhaddam (2011:347) stated that library staff needs to be aware of the implications brought about the changes in library environment, and develop technological and managerial skills to make them effective in using information and making it accessible.

According to Isfandyari-Moghaddam and Bayat (2008:852), specialized human resources are very important elements in the success of digitization. Isfandyari-Moghaddam and Bayat (2008:852) added that specialized staff is not necessarily limited to librarians as cataloguers, indexers and archivists, but also includes other fields such as information technology and project management.

Some of the literature reviewed indicated that librarians should be capable and competent in several fields so that they can play an influential role in developing and

managing digital libraries (Zhou 2005:437; Isfandyari-Moghaddam and Bayat 2008:852). Isfandyari-Moghaddam and Bayat (2008:852) identified 21 skills which the digital library staff should have. These include:

- Ability to formulate search strategies
- Know how to evaluate the websites
- Be able to guide and educate users
- Understand how to integrate network resources
- Ability to catalogue and organize digital information
- Understand visualization and digitization technologies
- Be able to design user interfaces and portals
- Have knowledge of analysis and interpretation of information
- Project management
- OCR (optical character recognition)
- Be aware of mark-up languages such as SGML, HTML and especially XML
- Indexing & Abstracting
- Technologies of databases
- Programming
- Web technology
- Familiarity with web search tools
- Management of e-publications
- Information architecture (IA)
- Information literacy (plus literacy of computer and network)
- Metadata
- E-metrics and evaluation methods of DLs

2.10.5.2 Staff training for digitization projects

Hammond and Davies (2009:16) stated out that digitization projects have staffing requirements that are distinct from most roles in a university. Hammond and Davies

added that specific skills are required for digitization projects and sometimes it is not easy to get the right people with such skills. As a result, more time might have to be invested in training staff at the beginning of the project.

According to Beagrie (N.d.:Training) good, early staff training would make a significant difference, more especially because digitization is a complex process. Beagrie (N.d.:Training) stated that “training in digitization can make a valuable contribution to skilling up staff to either undertake or manage digitization projects.” Hammond and Davies (2009:16) agree with Beagrie, in that it is important to determine what training staff will require from the word go and how such training will be done.

Training librarians and/or other library personnel to work effectively, properly and with understanding of their roles in the new environment can contribute to the success of digitization. Constant training of staff for digitization projects is a necessity.

2.10.6 Qualities for a digital librarian

Zhou (2005:437) summarized the qualities and capabilities of the ‘digital librarian’ for meeting the requirements of successful digitization into three main categories, namely compound knowledge structure, high-level information literacy and excellent personality.

2.10.6.1 Compound knowledge structure

According to Zhou (2005:437), digital librarians must be multi-skilled and not confined only to a single field. For example, Zhou (2005:437) suggested that that a typical digital librarian needs to possess what Zhou called compound knowledge structure. Zhou (2005:437) described compound knowledge structure as the ability of the digital librarian to cover a variety of fields, not just one. Zhou (2005:437) suggested that that the digital librarian needs to possess a keen information

consciousness. By a keen information consciousness Zhou (2005:437) meant the following:

- Be quick to respond to outside sources;
- Be good at finding useful information;
- Have the consciousness to offer information service actively; and
- Have the consciousness to add value to the information;

Other qualities suggested by Zhou (2005:437) include high information ability, excellent personality, which includes a high team spirit, high flexibility, good imagination and foresight.

2.10.6.2 High-level information literacy

Zhou (2005:437) spoke of keen information consciousness and high information ability, in that, while digital librarians must be quick to respond and be good at finding useful information, they must also offer information services actively and add value to information. In relation to the digitization project at UKZN, digitizing theses and dissertations and making them available for access adds value to information. Chisenga (2006:7) stressed the importance of providing access to theses and dissertations, considering the fact that they contain the most current and valuable information which, if not digitized, is “underused as research resources.”

In addition to this, Zhou (2005:437) discussed the high ability to filter information and evaluate its usefulness, to acquire information in the best manner, to process, organize and manage information, and to disseminate information to the right users at the right time and place. Digitization of library materials speaks to the above points discussed by Zhou (2005).

2.10.6.3 Excellent personality

The digital librarian must possess an excellent personality in relation to innovation, team spirit, flexibility and good imagination and foresight. According to Sreenivasulu (2000:13), digital information system management refers to different competencies such as knowledge, know-how, skills and attitudes, which are all necessary for digital librarians to create, store, analyze, organize, retrieve and disseminate digital information.

According to Fabunmi, Paris and Fabunmi (2006:27) the lack of technical know-how is a major problem in digitization, which is the reason why most digitization projects often run into problems. Jones (2001:Hiring and training staff) felt that digital projects for libraries, museums and archives require new skills, and the lack of ICT skills are what librarians mostly lack. There is a great need to improve staff ICT skills and expertise.

2.10.7 Staff retention

According to Hammond and Davies (2009:16), the success rate of digitization projects do not come cheap, in that they require that the institution invests in either the recruitment of skilled personnel or extensive training of existing library personnel. It is therefore important to have plans in place to minimize staff movement as much as possible. According to Hammond and Davies (2009:16), planning towards retaining staff throughout the duration of the project is important, because it minimizes time and effort spent in recruiting and training new, incoming staff.

2.10.8 ICT Infrastructure

According to Amollo (2011:23), “the right infrastructure includes the right equipment, skilled staff, management support, content developers or contributors and guidelines or standards.” Amollo (2011:23) added that if the infrastructure is correct from the word go it will help to streamline the digitization process, “indexing, and archiving collections, managing archived data and ensuring efficient solutions that are

compliant with current and emerging standards.” The correct infrastructure will ensure an organized digitization process workflow, in which digitization is able to progress from one point to the next within the established system, with little or no obstruction (Amollo, 2011:24).

A number of authors, such as Mishra and others (2007), Klapwijk (2010) and Rosenberg (2008), discussed infrastructure requirements for a digitization project. According to Mishra and others (2007:251), setting up the ICT infrastructure for digitization is one of the main components in the planning of the digitization project. Klapwijk (2010:35-37) discussed minimum criteria for the digital infrastructure, to which digitization projects should adhere:

- Network infrastructure of connectivity: refers to network connectivity which ensures access to the repository.
- Hardware: equipment that supports rendered services to users and ensures the smooth running of procedures to digitize.
- Backup and disaster recovery: adequate hardware and software to support backup and a well-written disaster and recovery plan.
- Identity and access management services (IAM): refers to the use of an authentication service, where users will be able to authenticate and identify themselves on the system.
- Security considerations: refers to a firewall/server-based firewall to strengthen security measures against malicious interventions.
- Storage: refers to appropriate space for storage either on the “physical hard drive of the server hosting the repository, a Storage Resource Broker (SRB) device, or it could be centrally located on an enterprise Storage Area Network (SAN) (Klapwijk, 2010:37).

Rosenberg (2005:7) emphasized that an adequate ICT infrastructure, with a sufficient number of networked and Internet-connected workstations, is a necessity

for a library's offering and access to electronic resources and to develop e-services. According to Mishra and others (2007:251), for digitization purposes, institutions should at least provide the necessary infrastructure, which includes servers, PCs, scanners, internet bandwidth, hardware and software, required for setting up an institutional repository and also have the required funds and manpower.

Banach and others (2011:7) added that the success of the digitization projects also depends on the hardware and software used to capture and manage digital images. They stated that it is important to "communicate the project's needs to the Library Systems Department to receive guidance on appropriate equipment and to ensure that the project's needs are met" (Banach and others, 2011:7).

Mohsennzadeh and Isfandyari-Moghaddam (2011:347) pointed out that "the future of knowledge and science depends on the sources and equipment which help them to be accessible for users." Therefore academic centres should adopt ICT developments and equip themselves properly. Shaw (2000:395) cautioned that investing in hardware, software and technical expertise do constrain the choice of material that can be effectively digitized and made accessible. It is sometimes better to capitalize on existing resources in order to minimize costs than to spend money on equipment that will not be effectively used.

2.10.9 Management of collection and selection of digital materials

According to Brancolini (2000:784), "all academic institutions that are planning and implementing digitization projects confront issues related to selecting collections for digitization." The decision on the selection of a collection to digitize is crucial in any digitization project, as it has an impact on the future and use of the digitized collection. De Stefano (2000:11) stated that the success and efficiency of a project will suffer if the wrong selection choice is made.

Though it may seem good to have all collections in a digital format, time and resource limitations play a big role and must be taken into consideration. According to Levy and Marshall (1995:80), “the highest priority of a library, digital or otherwise, is to serve the research needs of its constituents.” Libraries cannot merely engage in digitization for the sake of digitizing, but must think carefully and decide on which materials to digitize, be it theses dissertations, or special collections. This view is supported by Phillip (2012:Imperative of maintaining...). The statements made by Levy and Marshall (1995:80) and Phillip (2012:Imperative of maintaining) suggest that the highest priority of the library has not changed, even though the means to an end might have changed slightly.

Brancolini (2000:784) pointed out that “libraries can only undertake a limited number of digitization projects, based on wise and expeditious choices.” Brancolini (2000:783) stressed the importance of getting planners to develop a selection criteria and procedures to ensure that “limited time and resources are committed to projects to digitize the most significant collections with the highest probability of successful completion.”

De Stefano (2000:22) and Brancolini (2000:784) indicated that a number of institutions, like Columbia University libraries (1998) and the University of California (1997), developed criteria and models for selecting materials for digitization. Hazen and others (1998:19) proposed a model, known as the Harvard Model, which includes a graphical matrix for decision-making (see Figure 2). According to Brancolini (2000:787), the Harvard Model was developed “to help Harvard’s librarians and curators plan digital projects.”

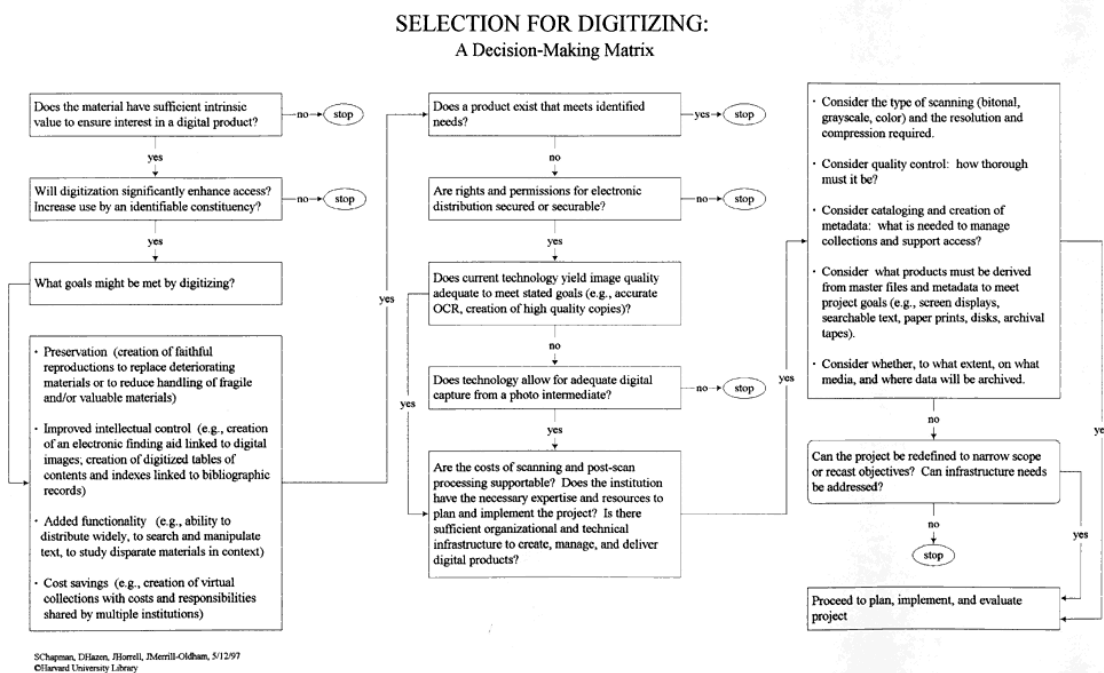


Figure 2: Proposed selection model of decision-making for digitization project
(Source: Hazen, Horell and Merrill-Oldham 1998)

In Figure 2, Hazen and others (1998:iv) pose a number of questions to consider when selecting materials to digitize as a guide to help avoid using resources on materials that will not be worthwhile in the long run. According to Brancolini (2000:788), the questions that Hazen and others (1998) are referring to lay the groundwork for a plan of work, should the collection under consideration be selected for digitization. Brancolini (2000:788) explains that the matrix is made up of nine broad questions, the answers to which are either 'yes' or 'no'. Brancolini (2000:788) explains that if there is a 'no' to any of the questions, then the evaluation process for a given collection must be stopped. In this way, according to Brancolini (2000), unsuitable collections would be eliminated early in the process, thus saving the effort of answering all the other questions.

The selection of a research collection for digitization is one of the challenges facing digitization project planning. The library management or project team needs to think

about a number of things, including the costs involved, and whether or not the collection is worth the time and cost.

In summarizing the above Harvard Model, Smith (2001:6) points out that the authors of the model, Hazen and others, begin with the issue of copyright—“whether or not the library has the right to reformat items and distribute them in limited or unlimited forms.” Smith (2001:6) further indicated, that, after looking at the copyright issue, Hazen and others ask a series of questions derived from essentially two points of departure:

- Source material: Does it have sufficient intellectual value to warrant the costs? Can it withstand the scanning process? Would digitization be likely to increase its use? Would the potential to link to other digitized sources create a deeper intellectual resource? Would the materials be easier to use?
- Audience: Who is the potential audience? How are they likely to use the surrogates? What metadata should be created to enhance use?

Smith (2001:6) pointed out that the answers to these and similar questions should guide nearly all the technical questions related to scanning technique, navigational tools, networking potential, preservation strategy and user support.

According to Hammond and Davies (2009:12), selection of content should be given careful consideration, as there are a variety of factors that will affect the cost of the project and which need to be considered beforehand. Hammond and Davies (2009:12) added that the physical characteristics of the content have an impact on “estimations of the content for digitization, the methods used to capture the content, the preparation time required and ultimately the cost of the project.”

Lopatin (2006:276) stated that selecting materials for a digital project entails different factors from selecting print materials. These include factors such as legal issues and

the high costs of digitization projects. The project team needs to determine if the materials to be digitized warrant the time and expense of transferring the digital files to new formats every few years as technologies change. Hazen and others (1998:v) also pointed out that “decisions must be based on the current state of technology, but they must also anticipate how changes in technology could enhance or make obsolete an investment in digitization”.

Posgate (2008:12) stated that collection management for digitization requires that the project leader must be aware and know where the materials that make up the collection to be digitized are and, if the materials are not local, how they will be gathered to be sent for digitization, or if the team will go from one area to another. Posgate (2008:12) stressed that the condition of the materials must be considered, as this will determine their handling during digitization, as well as the quality of the scanned end-product. According to Hazen and others (1998:vi), “decisions to digitize must take into account the physical size, nature, and condition of source materials as they affect the characteristics of the desired product.”

De Stefano (2000:13), in Lopatin (2006:276), lists issues to consider for the selection of materials for a digital project, with copyright being the first issue. Lopatin (2006:276) indicated that selection applies to different goals of a digitization project: “selection to increase access to materials; selection based on content; and selection for preservation.” This is why it is important to make such decisions from the initial stages of project planning.

In line with what other authors (De Stefano,2000; Lopatin, 2006; Posgate, 2008) have indicated, Hazen and others (1998:2) have identified the importance of looking into issues like copyright, as this will have an effect on the selected materials for digitization, whether they are affected by copyright issues or not.

2.10.9.1 Copyright/intellectual property rights

According to Nicholson (2010:8), copyright is a category of intellectual property which represents the property of the mind or intellect. Nicholson (2010:8) added that copyright “is a statutory monopoly or a bundle of exclusive rights conferred by the law on authors and creators to protect their original work.”

Nicholson (2010:8) stipulated that the legal considerations that have to be made regarding the creation and maintenance of digitized collections is encompassed in the copyright. In South Africa the copyright is governed by the Copyright Act No.98 of 1978. The purpose of this Act is to “regulate Copyright and to provide for matters incidental thereto” (South African Copyright Act No.98 of 1978). Nicholson (2010:8) explained that the Act provides various categories of ownerships, for example copyright ownership in music, literary materials, sound recordings, broadcasting rights and copyrights in Government publications.

According to the South African Copyright Act No.98 of 1998, the Act has been amended a number of times to effect certain changes. This has been done by introducing a number of copyright amendment acts, such as the Copyright Amendment Act No.61 of 1989, which was passed to make provision for the importing, selling and distribution of films and sound recordings, Copyright Amendment Act No. 125 of 1992 was introduced to amend, delete or insert certain definitions and to ensure that computer programs be eligible for copyright. This issue plays an important role in digitization projects and must be addressed as early as possible.

Beagrie (N.d.:Copyright) emphasized that copyright is very important in all digitization projects. Liu (2004:342) pointed out that copyright law is one of the main issues in digitizing library materials. Smith (2001:4) agreed that copyright is one of the main factors influencing selection decisions. Nicholson (2010:8) cautioned that with copyright there are legal issues that must be considered “regarding the creation and

maintenance of digitised collections”. Liu (2004:342) warned that, “before beginning the digitization process, librarians have to consider whether or not the digitized material will violate copyright and intellectual property laws.” Lopatin (2006:278) also felt that it is important for libraries to be aware of the status of the materials they plan to digitize in relation to whether there are protected by copyright law or not, before they even engage in the digitization project(s).

The South African Copyright Law, as stated in the Copyright Act No.98 of 1978 and its amendments, provides guidelines on issues such as categories of works protected, copyright ownership, transfer of copyright, exclusive rights of authors and creators and term of copyright protection. According to Nicholson (2010:12) it is important for libraries to make a decision concerning which works require copyright clearance. Nicholson (2010:12) provides a number of procedures that need to be followed if copyright clearance is needed:

- Establish whether or not the works are in the public domain. If not, they need to establish who owns the copyright, e.g. individuals, institutions, organisations, shared or joint owners (known and anonymous), research organisations or funding agencies, and so on.
- Approach the relevant copyright holders. The Dramatic, Artistic and Literary Rights Organisation (DALRO) have a mandate to clear only reprographic reproductions and transient electronic copies. Permission for works to be digitised or to convert, adapt, translate or migrate born-digital (soft copy) works need to be obtained directly from the rights holders.
- Establish whether the work has more than one copyright holder, e.g. a film, video or DVD can incorporate a number of different copyright works. Permission would be needed from all relevant copyright holders.
- Establish whether all parts of multimedia can be made accessible or whether there are embargoes on some.

- Establish whether there are any digital rights management systems with technological protection measures embedded in the works to be digitised, or in the born-digital works. The library would need to obtain the 'keys' or decryption codes from the rights holders to 'unlock' the content in order to enable access to these works and/or to engage in preservation or digital curation activities.

The above procedures are also mentioned by other authors, such as Hazen and others (1998), Hughes (2004), Hammond and Davies (2009), Beagrie (N.d.) and Lopatin (2006). Lopatin (2006:278) pointed out that libraries must take into consideration whether or not the material to be digitized is protected by copyright law, or whether or not it is in the public domain, when they undertake a digitization project. According to Hazen and others (1998:2), digitizing works that are not in the public domain requires the library to first secure permission and pay appropriate fees before embarking on such a project. Ignoring these issues will create many legal battles that may end up causing institutions problems. On the other hand Hughes (2004:56) pointed out that works in the public domain can be used freely without paying royalties or fees or asking permission as these are not protected by copyright. The digitization project may continue without problems. Also, if the source materials to be digitized are protected by copyright, but rights are held by the institution, or if permission can be secured, the work can continue.

Hammond and Davies (2009:13) pointed out that sometimes institutions and other organizations keep content that is copyright and other rights protected. Hammond and Davies (2009:13) indicated that, in a case where the library wants to digitize a collection that is rights protected, it is necessary to seek permission for providing such content online for public access. Clearing rights is time-consuming and expensive, as it sometimes requires paying rights owners to clear the rights. According to Hammond and Davies (2009:13), "many institutions and organizations are deterred from digitizing copyright-protected content despite much of this material

having high academic, cultural and historic worth”. Beagrie (N.d:Copyright) stated that the amount of time needed to clear rights in order for a digitization project to continue is sometimes underestimated.

Lopatin (2006:278) cautioned that, in a case where you may have to deal with rights-protected content, it is important to decide beforehand how to handle it, whether you leave out copyrighted content or you digitize it. If you digitize, detailed plans on how to approach this must be in place. With regards to copyright issues, De Stefano (2000:13) warned that “obtaining copyright permission is not always possible and can derail a project that appears otherwise straightforward.”

In the case of theses and dissertations, institutions usually do not have copyright issues, since they are written by students and research staff and are submitted as a requirement for a qualification. As a result, theses and dissertations are owned by the institution and can easily be digitized without complications.

2.10.10 Information management

According to Hammond and Davies (2009:21), managing information is one of the most challenging aspects of the digitization project. Hammond and Davies (2009:21) pointed out that keeping track of the content, the progress of the project and the information generated during the project is not easy.

For example:

- The physical location of the content (e.g. in archives, in transit, or with a sub-contractor);
- The progress of each item of content (e.g. digitized, metadata generated);
- The digital files created (e.g. master file, low resolution files, playback copies);
- Associated information (e.g. rights clearance status and supporting evidence);
- Metadata;
- The Quality Assurance (QA) status e.g. has it been signed-off.

(Hammond and Davies, 2009:21)

At the start of the project there has to be a decision on how tracking and information management is done and who is responsible for it.

2.10.11 Content capture

There are a number of issues that must be identified and decisions made in relation to the process of digitizing content. Hammond and Davies (2009:23) identified four main issues, which are logistics, pipeline, capturing text and creating metadata.

2.10.11.1 Logistics

By logistics, Hammond and Davies (2009:23) stated that it is important to look into the workflow of digitized materials, how feasible it is to move them from one area to the other and whether they are within the same building as the digitization process or not. Hammond and Davies (2009:23) added that if not within the same building, it is important to look into the planning stages for moving materials from one area to the other and also the financial implications. When materials for digitization are to be moved, the library must have tracking plans in place, to be able to track them throughout the digitization process.

2.10.11.2 Pipeline

According to Hammond and Davies (2009:23), pipeline is more concerned with the outsourcing of materials. It is important to carefully manage pipeline of work, such that you do not incur extra charges for content capture. Hammond and Davies (2009:23) felt that having “a carefully organized, methodological approach to sending out content, and dealing with returns” will assist greatly in keeping track of outsourced content.

2.10.11.3 Text capturing

Hammond and Davies said that sometimes it is more appropriate to capture text in such a way that it allows full-text searching for digitized materials. Hammond and Davies (2009:24) discussed the two approaches that can be used to enable this. These are Optical Character Recognition (OCR) and rekeying:

- OCR is a “process by which specialized software is used to convert scanned images of text to electronic text, so that that digitized texts can be searched, indexed and retrieved” (Bennett, 2010:Introduction). Hammond and Davies (2009:24) defined OCR as “the automated processing of images to identify and digitize text, using specialist software and computer facilities.”
- According to Davies and Hammond (2009:24), rekeying refers to the manual entering of textual content.

2.10.12 Creating metadata

Amollo (2011:7) defined metadata as “data about data” and, according to the National Information Standards Organization (NISO) “metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use or manage an information resource”. Metadata or 'the documentation of data' serves the purpose of making data discoverable, usable and understandable. According to Banach and others (2011:12), there are different types of metadata and all of them support “the discovery, evaluation, selection, access, navigation, management, and preservation of digital objects.”

Banach and others (2011:12) defined the following types of metadata:

- Descriptive metadata, which provides information about the intellectual content and physical format of the object.

- Structural metadata, which is the data about the different parts that make up a complex digital object.
- Administrative metadata, which supports the short- and long-term management of a digital object in an online environment.

According to Lopatin (2006:280), good metadata is not only useful for accessing information from a digital repository, “but also for representing information about an object such as structure, creators, format, and technical information.” Metadata is vital for accessing digitized materials (Lopatin, 2010:717).

Amollo (2011:7) pointed out that there are a number of common metadata standards and formats that have been developed, over time, to support data discovery and data documentation. Some of them, like Dublin Core, Encoded Archival Description (EAD) and Resource Description Framework (RDF), are used by libraries for their digitization projects.

Metadata plays an important role in the digitization projects. The creation of metadata is, according to Lopatin (2006:279), a major component of a digital project. It is not just important for material access, but also for representing the object. Without good metadata, users will find it difficult to trace items and staff will have difficulty keeping track of the progress of the project (Lopatin, 2010:717).

Much planning must be done and decisions made, regarding the creation of metadata. According to Lopatin (2006:281), “the project team must determine what metadata and vocabulary sets are appropriate for a particular digital project.” It is important to link it to the actual objectives of the project, rather than creating it for the sake of having it there, even if it will not ultimately be of use. Manual creation of metadata is time-consuming and requires the services of skilled staff such as cataloguers.

Hammond and Davies (2009:27) stated that the important function of metadata is “to store administrative and technical information about the artefact (filename to which the metadata file relates, physical details about the original artefact or details of the capture process).”

According to Hammond and Davies (2009:28), it is important to consider the mechanism by which metadata will be created, as this will have a great impact on the project. Hammond and Davies (2009:28) stated that “this includes the tools that will be used, and the workflow that will be applied” and getting these right during project planning will decrease the risk to the project.

2.10.13 Quality assurance

Quality Assurance (QA) or quality control (QC) is an important aspect for the digitization project, especially “when using external suppliers for content capture and website development” (Hammond and Davies, 2009:21). According to Mishra and others (2007:250), “quality assurance is one of the essential processes in the digitization to ensure quality output and to get the most reliable and consistent data.” Banach and others (2012:5) indicated that QC encompasses procedures and techniques to verify the quality, accuracy and consistency of digital images.

Hammond and Davies (2009:21) pointed out that it is important to have quality procedures in place and implement them at the start of the project with the output of early batches. “The decision as to how you will do it, how much QA you will do, when it will be done, who will do it and who will sign it off must be made” (Hammond and Davies, 2009:21). That way it will be easy to see if the process is right, if it is enough, or too much, as early as possible. By not checking the quality from the beginning there may be severe implications at a later stage and result in delays to completing the project. According to IFLA (2002:21), a quality control programme must be in place, whether the project is outsourced or in-house, to ensure accuracy and quality of image files.

Banach and others (2011:5) state that the goal of any scanning project should be to “capture once, use many times.” Mishra and others (2007:250) pointed out that some of the pages have “pale typed paper”, dating years back to the typewriter era. As a result, the state of some theses are poor, resulting in discrepancies during the scanning process. Without a quality check in place, a lot of these errors will go through unnoticed, resulting in poor quality output and unreliable data.

2.10.14 Communication and co-ordination

According to Kipaana (2012:Conclusion), “collaboration and good public relations are essential in implementing digitization initiatives”. Posgate (2008:10) pointed out that communication is essential for any project, since it is the way your project team shares their ideas, makes plans and makes those plans a reality.” Establishing a firm footing in open, productive communication is essential for any team.” Jewell, Oldfield and Reeves (2006:184) indicated that early involvement of representatives from all concerned groups is crucial to the success of the digitization project. Collaboration and staff involvement from the beginning resulted in the success of the project at the University of Waterloo in Canada (Jewell, Oldfield and Reeves, 2006:184). Bulow and Ahmon (2011:172) also stated that, for a digitization project to be successful, it must include all stakeholders, from the beginning.

According to Jewell, Oldfield and Reeves (2006:185), teamwork and co-operation across campus played a big role in the University of Waterloo project. The project team members from the University of Waterloo included a representative from the graduate studies office, library systems and information services and campus computing department. Faculties and graduate students were also involved, in the early stages. Jewell, Oldfield and Reeves (2006:185) indicated that each of these representatives played a crucial role in the project.

Jewell, Oldfield and Reeves (2006:185) pointed out that the graduate studies office of the university focussed specifically on the electronic submission and checking

procedures. The library systems and information services representatives focussed on access and dissemination issues and representatives from the campus computing department contributed infrastructure support and technical recommendations. Faculties participated as consultants and visionaries. The graduate student players were the true energy source and the project relied heavily on their labour and analytical skills.

The UKZN also had early stakeholder involvement for the theses and dissertations digitization project. This was evident in the pre-planning stages, where it showed that efforts were made to involve other team-players in the digitization project plans. The UKZN Library Institutional Repository Committee (2008; 2010), for instance, held various meetings on 2 October 2008; 23 March; 18 May; 1 June and 6 July 2010, with its university stakeholders from the Higher Degrees Committee, Copyright Office and other academic departments. The UKZN Library Institutional Repository Committee comprised of the Library Director, two campus librarians, two subject librarians, library systems assistant and a representative from Digital Innovations South Africa (DISA).

According to Shaw (2000:397-398), one of the strengths for the success of the digitization project at the University of Pittsburgh in the United States of America was the close communication between the staff of the University of Pittsburgh Digital Research Library and the university as a whole. Shaw (2000:398) pointed out that the staff communicated about everything affecting the project, such as data capture methods, and problems they encountered. Communication and co-ordination between internal and external departments is vital and can minimize many errors.

The importance of communication and collaboration is discussed by other authors as crucial for the success of, not just digitization projects, but any other types of project (Lopatin, 2006:275; Marcum, 2003:644; Posgate, 2008:10). Roberts (2007:Slide 7) indicated that the University of Witwatersrand had some problems with their workflow

relating to the cataloguing of bound copies before the digital copy was uploaded, a problem which could be solved through communication. Roberts (2007:Slide 7) pointed out that their workflow was not a problem, but they experienced problems “mostly due to communication around workflow rather than the workflow itself.”

Posgate (2008:10) identified four points that are important for a team leader to consider. These are:

- Are your teams all working onsite? Or offsite? If offsite, how often will they interact face to face?
- What will be the best (most accessible) form for communication between team members? Telephone? Electronic? Print? Face to face?
- Which medium works best for what kind of communication?
- How often will there be meetings? Reports? Decide who will be responsible for the reports, for attending meetings, etc.

Lack of communication between, and within, members may result in complications and misunderstanding which might take longer to resolve, thus delaying the progress of the project. Gurira and Muganhiri (2007:51) strongly emphasized the importance of healthy dialogues among stakeholders. In their discussion, Gurira and Muganhiri (2007:51-52) stressed the fact that there is a need for librarians, faculty and IT specialists to communicate, a need to strengthen this communication and a need for collaboration between teaching staff, researchers, students and administrative staff, business, government and the entire educational community.

In relation to the electronic theses project at the University of Waterloo, Jewell, Oldfield and Reeves (2006:184) stressed that the involvement of everyone concerned with the project at an early stage contributed to the success of the project. They indicated that the project benefitted through communication and collaboration

among groups from different sections, from the library, graduate office, computer department, faculties and graduate students.

2.10.15 Service delivery

The main objective for most digitization projects is delivery of service to the end-user. According to Hammond and Davies (2006:37), the digitization project is not just about digitizing content, “it is about designing and developing an attractive, usable service for the target audience”, in the sense that the target audience will find required information in a structured more user-friendly format without any restrictions of place and time.

2.11 PROJECT MANAGEMENT

Bulow and Ahmon (2011: Introduction) indicated that digitization projects are “high-risk ventures where successful implementation is critical.” According to Hammond and Davies (2009:19), “good project management is key to a successful project, but it is also an area that is commonly underestimated and undervalued.” Lopatin (2006:274) indicated that digital projects are extremely complex and their success is highly dependent on effective project management. Effective project management for library digitization projects includes “managing budgets, staffing, workflow, determining technical specifications, and metadata creation” (Lopatin, 2006:274).

2.11.1 Project management in a library context

Middleton (1999:Library project management) indicated that since some of the library’s processes are implemented in the form of projects, formalized project management is gaining recognition. According to Middleton (1999:Library project management), project management, in the context of libraries, can be organized into four phases, namely definition, formalization, implementation and completion. The four stages are briefly discussed, following Middleton’s explanation:

2.11.1.1 Definition

According to Middleton (1999:Library project management), the definition stage of the project is where the project is identified and where individuals and participating teams are identified. It is also the stage where all participants and stakeholders are briefed about why the project was identified. It is at this stage that the preliminary costing of the project is done and a business case is established. This is also the stage where the relationship between the project itself and the objectives of the institution is established.

2.11.1.2 Formalization

The definition stage is the infancy stage, where objectives of the projects are set. These projects are subject to review. According to Middleton (1999:Formalization), it is in the formalization stage that these objectives are reviewed. Middleton (1999:Formalization) added that it is in the formalization phase that the outcomes of the project are specified, and sub-tasks, if they exist, are identified. It follows, therefore, that when objectives are reviewed, chances are the costing also changes.

According to Middleton (1999:Formalization), the formalization stage is also a stage where the reviewing of costing is done and, since projects are subjected to various risks, risk assessment is the essential part of the formalization phase. At the formalization stage, the people that will be part of the project are merged with the tasks they will perform and the reporting processes are established.

2.11.1.3 Implementation

Middleton (1999:Implementation) indicated that once phase two has been accomplished, then time-frames are assigned to tasks and sub-tasks. Implementation, is where co-ordination of the tasks and processes is done, and the whole project is monitored and evaluated, since this is like a work-in-progress.

2.11.1.4 Completion

According to Middleton (1999:Completion), completion is the stage where the project is being completed. This is where you evaluate the actual outcome against the exact outcome. The report is written and given to the relevant authorities.

2.11.2 Project planning

Posgate (2008:5) indicated that “when planning a project of any scope, issues to seriously consider are: staff, equipment and infrastructure, desirable products, measured progress, risks and contingency plans, and collaboration.” Posgate (2008:5) indicated that, in terms of staffing, it is important to know your staffing resources. What skills you have; will internal staff be moved to the project; if you will recruit staff or not, as all these issues are to be taken into consideration with regards to budget and time.

With regards to equipment, Posgate (2008:6) pointed out that you must know what equipment is available and what needs to be purchased, and whether scanning equipment and computers are available. Posgate (2008:6) further stressed the importance of knowing how the existing infrastructure supports the “requirements of processing, hosting and storing the project materials”; make sure you have considered projected consumables in the budget; and, in terms of space, where you will accommodate the project and its staff. Posgate (2008:6-8) raised four points to consider on planning a project, namely, collaboration, measured progress, risk and contingency plans, and desirable products. These points are briefly discussed below:

- Desirable products, where he discussed the standards and guidelines to follow, which are important to implement in a case of an in-house project and to communicate them in the case of outsourcing.
- Measured progress, where he stresses the importance of measuring production with a work plan, writing regular reports and checking on project milestones. According to Hazen and others (1998:18), the best way to have a

strong base for the future is to have a detailed plan of work, with regular progress assessment of the project and closely documented adjustments and corrections.

- Risk and contingency plans relate to “mishaps, obstacles and unforeseeable problems”, which is what should be expected and catered for in a project. Projects must have an element of flexibility.
- Collaboration, which refers to working together with partners and/or funders. Posgate discussed the importance of having communication plans incorporated from the word go. Posgate (2008:8) stressed the point that the project leader(s) must be available and open-minded when it comes to arguing and discussing new ideas during the digitization process.

Eden (2001:397-400) presented guidelines based on his experience of managing a digitization project at the University of Nevada, Las Vegas, for managing successful digitization projects. These include identifying best practices, designing the website and choosing a metadata scheme, as well as the importance of communication, collaboration and quality control. In support of Eden’s guidelines (2001:397-400), Copeland, Penman and Milne (2005:186) pointed out that for the Joint Information Systems Committee (JISC)-funded electronic theses project, the team avoided re-inventing the wheel and developed new solutions, “where good practice was in operation in other countries”. They had a common agreement with regards to the preferred software and identification of “a core set of metadata.”

According to Hazen and others (1998:18), before engaging in any digitization project, it is essential that libraries look into the changes that will happen and adjust accordingly. Hazen and others (1998:18), stated that “projects based on careful review, analysis, and planning can yield electronic resources that are functional and faithful to the original sources, and that support new kinds of scholarship.”

2.12 DIGITIZATION CHALLENGES FACED BY LIBRARIES

Amollo (2011:16) points out that “every good thing includes its challenges and digital libraries are no exception”. According to Lampert and Vaughan (2009:116), “establishing a successful digitization program is a dialog and process already undertaken or currently underway at many academic libraries.” It is usually best to consider best practices from other organizations, rather than to re-invent the wheel.

According to Kipaani (2012:BSU Experience ...), different libraries experienced different challenges, some of which are common and others are unique to those libraries. Amollo (2011:16) identified lack of sufficient funds, appropriate facilities, skilled manpower and staff turnover and the right incentives, as some of the common challenges faced by libraries in Kenya. This seems to be the case with libraries in India as well. Hirwade (2011:Issues and barriers), for example, cited difficulty of content recruitment, lack of institutional policy, funding problems, lack of skilled human resources, lack of necessary infrastructure, lack of interest shown by authorities, lack of co-ordination of a national body for IR, software problems and integration of the repository into the workflow and existing structures as some of the challenges for libraries in India. Galvin (2005:12) pointed out that even though much has been achieved towards free dissemination of information, there are still many hurdles that exist which need to be attended to.

Below are some of the common digitization challenges faced by different libraries, as identified by different authors such as Chepesiuk (2001), Liu (2004), Chisenga (2006), Alhaji (2007), Iwhiwhu and Eyekpegaha (2009), Amollo (2011) and Kipaani (2012).

2.12.1 Digitization policies

Liu (2004:338) cited lack of policies as a digitization challenge for most libraries in the United States of America (USA). According to Liu (2004:338), in-as-much as most libraries in the USA are involved with digitization processes, most of them still

lack guiding policies regarding processes and procedures. It is not only the USA that lacks guiding digitization policies. This is also the problem in Nigeria and other countries. Alhaji (2007:234), for example, cited lack of institutional policy as one of the challenges of the digitization projects in Nigerian universities.

2.12.2 Digitization costs

Lack of funding has been identified as one of the common obstacles for library digitization projects (Amollo 2011:16-17). According to Kipaan (2012: Introduction), one of the challenges for the digitization projects is managerial and financial constraints. These constraints sometimes result in the digitization projects not being fully implemented (Kippan 2012: Introduction). Chepesiuk (2001:55) stressed that digitization is not cheap and many libraries depend on grants for support in their digitization projects.

Iwhiwhu and Eyekpeggha (2009:533) research revealed that academic libraries in some African countries like Kenya lack digitization funding because “university management does not support libraries adequately. They do not pay much attention to them as they are not profit-making units.” According to Chisenga (2006:12), digitization projects are generally expensive, in that they are time-consuming and labour-intensive. The digitization projects require “hardware, software, and trained staff to perform such responsibilities as scanning, performing quality control, and creating metadata” (Lopatin, 2006:275). Both Lopatin (2006:275) and Amollo (2011:16) agree with Chisenga (2006:12).

In a study conducted in the 26 libraries in Kenya, Amollo (2011:17) found that most of the libraries could not afford to digitize their materials, due to cost and inadequate funding. Alhaji (2007:233) indicated that 95 percent of the respondents in the digitization of past papers, dissertations and theses conducted in the 30 Nigerian university libraries cited inadequate funding as a major constraint for digitization projects.

In contrast to the experiences of most libraries on the African continent, Liu (2004:339) and Mathias (2003:30) found that most of the libraries in the USA that implemented digitization projects are financially capable. According to Lopatin (2006:275), the Institute of Museum and Library Services (IMLS), a US Federal Agency, was established in 1996 as a source of grant support in the USA for the preservation or digitization of library materials. Currently IMLS is still supporting libraries and museums. IMLS's three goals include "supporting libraries" in providing opportunities for lifelong learning, anchors for community engagement and access to "content" (Institute of Museum and Library Services, 2014:IMLS focus). Fabunmi, Paris and Fabunmi (2006:29) agree with Liu (2004) and Lopatin (2006:275) pointing out that most USA libraries involved in digitization projects had good funding agencies, which made them financially capable.

IFLA (2002:6) cautioned that "institutions in countries of the developing world especially should consider whether the costs and time involved will be commensurate with the benefits." IFLA (2002:6) reasoned that these institutions should not be easily influenced to engage in digitization projects by outside donor agencies, especially if they are aware of the fact that "the use of microfilm would be adequate, even preferable" (2002:6).

In contrast to the developing countries, when it comes to developed countries, Swanepoel (N.d.:Introduction) felt that digitization is most popular in the Western world, because the technology required to digitize is very affordable. All that is needed is to make content available "through a free hosting service on the Internet and using only a simple digital camera and/or scanner, bought for a couple of hundred dollars" (Swanepoel, N.d.:Introduction). As a result, digitization programmes are enthusiastically run successfully, even by under-funded libraries.

According to Asogwa and Ezema (2012:7), "a well-funded digitization project assures new and improved services and sustainability of the project." Rosenberg (2005:15)

recorded that all of the libraries in a survey commissioned by the International Network for the Availability of Scientific Publications (INASP) in 2004, stressed the need for continued external support, both financial and in the provision of expertise, including libraries that were comparatively advanced in their use of e-resources.

2.12.3 Staff training

According to Jagboro, Omotayo and Aboyade (2012:9), staff training/capacity building remains a key challenge in digitization, as it requires a combination of skills. They stated that many librarians lack the basic computer training and specialized training required for digitization. There is a great need for continuous training to build library staff capacity in equipment maintenance and software management. According to Yiotis (2008:111), the United Nations Educational, Scientific and Cultural Organization (UNESCO) guide stipulates that training involves “training team members, organizing training, and developing training manuals, tutorials, and documentation.”

Eke (2011:Constant training) pointed out that, with all the new technologies emerging in the libraries, training for librarians on a regular basis and other staff involved in digitization project is necessary. Ezeani (2009:14) agreed that technical skills can only be achieved through continuing education. Ezeani (2009:14) added that digitization is highly dependent on technology and library staff members need to be trained in the latest developments and use of technology.

Regardless of the fact that regular training for digitization is a necessity, Ezeani (2009:14) raised the point that training requires funding and “most African universities hardly have extra money for overseas training”, which is a challenge, since staff loses out on training opportunities. Jagboro, Omotayo and Aboyade (2012:9) felt that even though there are a number of training workshops conducted on digitization, “only few librarians get sponsored to attend while most could not

afford to sponsor themselves”, yet it is cheaper to train staff than to outsource the project.

2.12.4 Lack of human resources

Insufficient staff has been identified as one of the obstacles to digitization projects. According to Lampert and Vaughan (2009:123), out of the 36 respondents in a University of Nevada, Las Vegas (UNLV), Library Digitization Survey, 18 respondents raised the lack of staff as one of the major issues for digitization.

2.12.5 Staff support

Staff support, both within and outside the library, is one of the major problems libraries face. Without staff buy-in, it becomes difficult to have smooth progress during the digitization project. Alhaji (2007:233), for example, indicated that “Nigerian universities are lagging behind in the pace of digitization”, mainly because most of them “have not yet embraced the idea of the electronic library in the digital age.”

Galvin (2005:9) advised that libraries need to “take an assertive role in the changes that are to take place in scholarly communication.” Digitization of library materials is one of the changes that are currently taking place in libraries.

In addition to staff support as indicated above, Veldsman (2007: Slide 6) stressed how important it is to have top management on your side. According to Veldsman (2007:Slide 6), a “lone voice may not help in the longer run”. Hirwade (2011:Issues and barriers) also cited “lack of interest shown by authorities” as one of the challenges faced by libraries when it comes to the digitization of library materials.

2.12.6 Technology

Ezeani (2009:15) pointed out that most institutions, especially in developing countries, can hardly keep up with the rapid pace of technological changes in digitization. Technological issues have been identified as another challenge for

digitization projects. According to Kanyengo (2009:39), “technical knowledge on the digital elements of electronic documents is largely lacking among staff that are in preservation departments.” Kanyengo (2009:39) added that the changes brought in by the digitization of resources makes the need for technical skills very urgent.

Asogwa and Ezema (2012:7) were of the opinion that most traditional librarians and archivists are conservative and have technophobia. Asogwa and Ezema (2012:7) drew attention to the generation gap between the old and the new professionals. Traditional librarians perceive computers as a threat to their status as experts, making them reluctant to accept and resistant to, technological innovations.

Coates (2000:Details of its human resources ...) indicated that the unfortunate part, when considering the 2000 survey on conservation facilities by the IFLA/International Council on Archives (ICA) Committee, is that Africa does not offer any formal training in conservation, except for the short courses or introductory modules which are “offered as part of archival or library training.” According to Asogwa and Ezema (2012:8), there is a shortage of librarians with computer science qualifications and this results in the “frequent break down of ICT facilities and disruption of services in digitized libraries and archives.”

Bist (N.d.:Slide 16), among other technical-related issues pointed out by other libraries, identified storage issues as one of the technical hurdles for the digitization project at Gandhi Smriti Library of Lal Bahadur Shastri National Academy of Administration (LBSNAA) in Mussoorie, India, because of their lack of technological know-how. This was due to the fact that they were not able to estimate the storage requirements earlier. Bist (N.d.:Slide 19) stressed the need to understand the technical requirements before starting the project. Liu (2004:342), in his paper on digitization practices in the USA also identified the storage issue as a problem, but not because of the technical requirements, but because of the large sizes of image files which the internal server could not store. Liu (2004:342) indicated that libraries

have tendencies to digitize materials using digital cameras rather than flatbed scanners. This results in larger images taking longer time to download, as there is no consistency and decisions on the size of digital images for the library's website.

While developing countries are more concerned with the training of librarians and lack of technical knowledge, Liu (2004:342) identified the reliability of equipment and software. Concerns are more based on the ability of the equipment to be easy to use and not involving a lot of steps for processing the digitization of materials, for example, scanning to be done without removing the binding of the materials.

In summarizing the ICT issues experienced by different libraries, Rosenberg (2005:14) pointed out that the low level of ICT literacy among university administrative and academic staff not only affects performance in the digitization processes, but it also "impinges on other areas such as library funding." Rosenberg (2005:14) added that unless there is a major change in the mindset of library staff, "the university authorities would not be convinced to provide money for ICT maintenance and replacement in the library's recurrent budget."

2.12.7 Time

According to Amollo (2011:19), digitization is time-consuming, from the setting up right through to the actual digitization processes. Firstly, much time is spent on character accuracy, since staff has to either rekey or use optical character recognition (OCR) text, which is crucial for quality assurance, to make sure that meaning is not distorted. According to Anderson and Maxwell (2004:73) "OCR is software used to convert a scanned document to text" and rekeying is the process of taking a document and physically typing information into the document as text (Anderson and Maxwell 2004:76). A long time is spent in the scanning of materials, which is "time that the library may not easily have, since other normal operations have to continue as usual" (Amollo 2011:19).

2.12.8 Copyright

The “who owns it?” question is an issue for most libraries (Asogwa and Ezema, 2012:7). Copyright has been cited as one of the major issues affecting the digitization of library materials. Hirwade (2011: Issues and barriers) for example indicated that, in a study conducted in India, the 17 academic institutions studied all cited copyright issue as the biggest problem in developing ETDs.

According to Kanyengo (2009:39), copyright is a “complex process that libraries should study and teach to their particular constituencies” so that it can be used to their own benefit. Kanyengo (2009:39) stated that, unlike the hard copy of the library materials, where it is clear how the photocopying of the hard copy material is used, with the electronic copy it is a different case, since the copyright law is interpreted according to the “agreed terms with the publisher or vendor, and this depends on the licensing agreement.”

Asogwa and Ezema (2012:121) indicated that it is important to have a clear understanding of the copyright law and rights of ownership before deciding on materials to digitize. Liu (2004:342) stated that “before beginning the digitization process, librarians have to consider whether or not the digitized material will violate copyright and intellectual property laws.” Liu (2004:342) pointed out that libraries face copyright issues in different ways, varying from one institution to the other, mainly because international rules and regulations are not standardized. Because of this, libraries must consult with a copyright attorney before starting on a digitization project.

According to Yiotis (2008:110), most of the libraries in the USA raised ownership of property rights as one of the issues of concern. The University of Kentucky, for instance, raised the issue on “how ETDs relate to intellectual property rights lost to publishers, plagiarism issues, costs of software and hardware infrastructure, and long-term preservation issues” (Smith 2002:21).

.2.13 SUMMARY

This chapter commenced by discussing the theoretical framework of the present study. The three theories were defined and discussed in relation to the study. A summary on ETD projects that took place in other countries was presented. This was followed by a literature review on different aspects of library digitization. The researcher first looked at reasons why libraries all over the world are embarking on the digitization of their materials. The benefits of digitization were discussed. The chapter provided principles that need to be followed when digitizing library materials. There are a number of factors that need to be considered when an institution embarks on a digitization project. These factors were discussed in this chapter.

The digitization of library materials is done in different phases and it was therefore important to discuss these phases in this chapter. In different projects there are known best practices that can be emulated by others involved in similar projects. In this chapter such practices in the context of digitization of library materials were discussed. Chapter 2 further provided the strategy and policies that need to be followed in the digitization of library materials. It was shown how formalized project management plays a role in the digitization of library material. In common with other projects, digitization projects face challenges. These were discussed in this chapter. Lastly, the chapter provided the different aspects of the digitization projects.

Chapter 3 will discuss the research design for this study, in detail.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter is referred to as the research methodology chapter, because it spells out how the research was conducted. The chapter provides the research design of the study. In this chapter the researcher provides all the important components of the research process, without which the researcher assumes the study would not have been a success. These include identifying the research paradigm, the categories of research and the research methods. In the research design section the researcher shows which research instruments were used and how they were constructed. The researcher discusses validity and reliability of the study and provides the research hallmarks that the researcher adhered to, to ensure that the whole research project was objective, reliable and valid. Finally, this chapter provides the ethical issues that were observed in conducting the study.

3.2 RESEARCH QUESTIONS FOR THE STUDY

The following were the five research questions in this study:

- What digitization strategies and policies are in place at UKZN?
- What facilities are in place or needed for the UKZN library theses and dissertations digitization project?
- What training skills does the UKZN library staff have to handle the theses and dissertation project?
- How much support does the digitization of theses and dissertations project have from staff?
- What is the level of technical support for digitization of theses and dissertations?

3.3 RESEARCH DESIGN

There are a number of definitions of research design that different authors such as Babbie and Mouton (2001), Kerlinger (1986) and Dawson (2002), have advanced. According to Babbie and Mouton (2001:74), research design is a plan or blueprint of how you intend conducting the research. This is a view shared by Kellinger (1986:279), where research design is defined as “a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problems”. Kellinger (1986:279) defined research design as a complete outline or programme of research which the researcher uses from the beginning of research to the end. Dawson (2002:28) defined research design as “a way to systematically solve the research problem.”

Based on the definitions above, this section will discuss the plan, structure and the strategy used in this study to examine the digitization of theses and dissertations at the UKZN.

3.3.4 Research paradigm

According to Maree (2010:47), a paradigm is “a set of assumptions or beliefs about fundamental aspects of reality which gives rise to a particular world view”. Paradigms serve as organizing principles by which reality is interpreted. Mackenzie and Knipe (2006: Research paradigms) discussed the four most common paradigms which are postpositivist (and positivist), interpretivist/constructivist, transformative and pragmatic.

Mackenzie and Knipe (2006:Postpositivist and positivist paradigm) argued that the postpositivist paradigm aims to test a theory or describe an experience using observation and measurement methods, in order to “predict and control forces that surround us.” Positivist and postpositivist research is usually associated with the quantitative method of collecting data. For the purposes of this study, the researcher was not going to use observation as a method of data collection. Secondly, this study

aimed at looking into the issues and challenges encountered in the UKZN theses and dissertation digitization project and making recommendations for improvement, if and where necessary. To be able to do that, the researcher depended on the information provided by the library staff involved in the digitization project. The aim of the researcher was not to predict or control forces surrounding the digitization project this paradigm was thus irrelevant to the study.

The interpretivist/constructive paradigm is described by Creswell (2003:8) as the paradigm in which the researcher relies on participants' views of the situation being studied. The constructivist researcher relies more on the qualitative data collection methods and analysis, or mixed method, whereby a researcher uses both qualitative and quantitative methods, but quantitative data is more likely to be used to support or expand on qualitative data. This research paradigm was almost suitable to this study but was discarded by the researcher due to what the researcher viewed as its limitation. This limitation is based on the fact that this paradigm, as argued by Mackenzie and Knipe (2006:Interpretivist/constructivist paradigm) is supporting or expanding on the qualitative data. In the present study the researcher did not aim to use the quantitative data as a subordinate to the qualitative data. The researcher viewed both qualitative and quantitative data as equally important. For this reason this research paradigm was also discarded.

According to Mackenzie and Knipe (2006:Transformative paradigm), in the case of a transformative paradigm the researcher feels that the interpretive approach to research does not adequately address issues of social justice and marginalized people. In this paradigm the researcher feels that the interpretive paradigm should have gone further, to include politics and the political agenda which provides changes that may benefit the lives of participants, the institutions in which individuals work and the researcher's life. In other words, the transformative paradigm is an extension of an interpretivist paradigm. It is suggested by Mackenzie and Knipe (2006) that in such a research paradigm it is advisable for the researchers to use

both qualitative and quantitative methods, in other words, to use a mixed methodology. This study was not about issues around social justice and marginalized people, so this research paradigm was deemed to be unsuitable.

3.3.4.1 Pragmatic paradigm

According to Mackenzie and Knipe (2006:Pragmatic), the pragmatic paradigm is not tied to any one system. Researchers using this paradigm are more concerned with the 'what' and the 'how' of the research problem. Although the mixed method could be used with any paradigm, Creswell (2003:11) indicated that the pragmatic paradigm places the research problem as central and applies all approaches to understand the problem at hand, just as the researcher in this study used both the questionnaire and interviews to understand the digitization processes. The pragmatic paradigm is more associated with the mixed method research, even though some mixed method researchers use the transformative paradigm.

Based on the fact that the researcher employed both quantitative and qualitative research methods and that the researcher's focus was on the research problem at hand as well as the aim and objective of the study, the pragmatic research paradigm was deemed the most suitable of the four paradigms.

3.3.5 Categories of the research design

There are a number of categories of research defined by different authors such as Kumar (2012) and Nouri (N.d.). These two authors identified exploratory, descriptive and causal as the three major categories of research design. Below is the description of the three categories of research designs and the category selected for this study.

3.3.5.1 Exploratory research

Kumar (2012:385) described exploratory research as a study "undertaken with the objective to explore an area where little is known or to investigate the possibilities of undertaking a particular research study." According to Nouri (N.d.:12), exploratory

research is undertaken when not much is known about the situation being studied, or when information has similar problems or issues which were resolved in the past, is not available. It is used to understand the nature of the problem in a case where very few studies were previously conducted on the subject.

According to Kowalczyk (N.d.:Exploratory research), exploratory research refers to “the initial research into a hypothetical or theoretical idea. This is where a researcher has an idea or has observed something and seeks to understand more about it.” It is more of a starting point or as a foundation for further studies.

Based on the explanations above, the researcher realized that this study did not fall into this category, since a number of similar studies on digitization were conducted in the past, and information is available on issues experienced by other libraries.

3.3.5.2 Causal research

According to Nouri (N.d.:14), a causal study is when the researcher wants to explain or define the cause of one or more problems. Bless and Higson-Smith (1995:46) referred to this category as correlational research. According to Bless and Higson-Smith (1995:46), “it is often useful to detect the existence of a relationship between variables (co-variance) which suggests a possible base for causality.” The researcher obviously wanted to define the cause for problems in digitization of library materials, including theses and dissertations, but that was not what the study was all about.

3.3.5.3 Descriptive research

McNeill and Chapman (2005:7) explained that “a descriptive study aims to answer questions like ‘how many?’ and ‘what is happening?’” According to Kumar (2012:283), descriptive research is a study in which “the main focus is on description rather than examining relationships or associations”. Nouri (N.d.:14) and Kumar (2012:10) added that the goal of the descriptive study is to offer a profile or to

describe relevant aspects of the phenomena of interest to the researcher, from an individual, organizational, industry-oriented, or other perspective. “It tries to describe a situation, problem, phenomenon, service or programme, or provides information about the living conditions of a community, or describes attitudes towards an issue” (Nouri, N.d.:14).

3.3.5.4 Exploratory, causal and descriptive research interlinked

Although each category may be viewed as distinct from one another, all three categories can be linked together as stages that follow one another, as depicted in Figure 3.

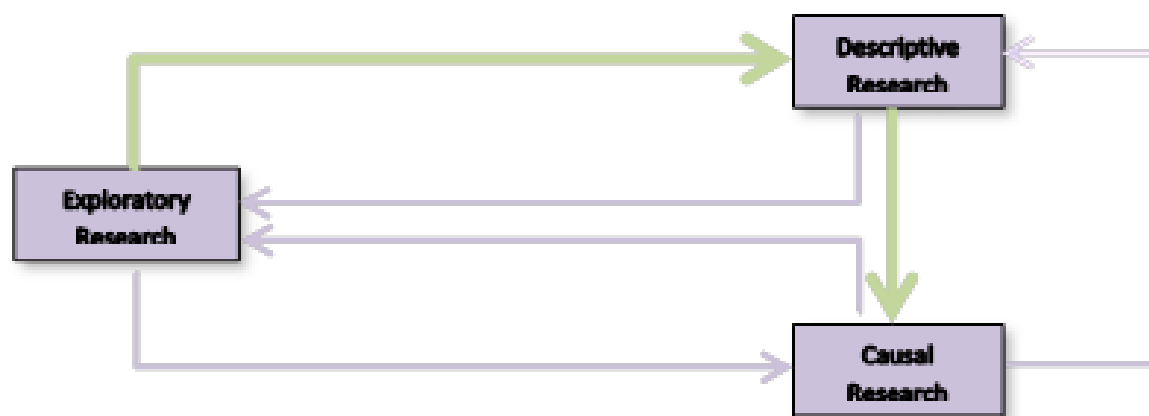


Figure 3: The relationships among research designs
(Source: Monroe College 2011:28)

3.3.5.5 Category selected for this study

From the descriptions above it became clear that this study is of a descriptive nature. The researcher wanted to address the issue and challenges experienced in the UKZN digitization project and use lessons learnt to resolve or reduce similar problems in future. In a way, based on the research questions below, it also became obvious that the researcher tried to describe the situation/problem and describe attitudes towards the UKZN's theses and dissertations digitization project, as is explained in descriptive research.

3.3.6 Research methods

Authors like Bless, Higson-Smith and Sithole, (2013), Harwell (2011) and Gomm (2008) distinguish between the three research methods, which are quantitative, qualitative and mixed. According to Bless, Higson-Smith and Sithole (2013:16), social science research can use either quantitative or qualitative research, or use a combination of both approaches. The researcher had to decide which method to use for the study. Before making that decision, the researcher had to look at all three methods and select the most suitable method to use, based on the objectives of the study.

3.3.6.1 Qualitative research method

According to Harwell (2011:148), qualitative research methods focus on discovering and understanding. Bryman and Bell (2007:402) described qualitative research as a research strategy that usually emphasizes words rather than numbers in the data collection and analysis. It is the research method that uses words or descriptions to record aspects of the world.

3.3.6.2 Quantitative research method

The quantitative method depends mainly on measurement to compare and analyze different variables (Bless, Higson-Smith and Sithole, 2013:56). With the quantitative approach, the researcher collects data according to a set of steps and tries to remain as objective and neutral as possible. Kumar (2012:103) stated that quantitative study designs are specific, well structured, have been tested for their validity and reliability and can be explicitly defined and recognized.

3.3.6.3 Mixed research method

The mixed method design is sometimes referred to as multi-method approach. It is an approach of inquiry that combines both qualitative and quantitative methods. It employs both qualitative and quantitative approaches in the same study. The main purpose for mixed research, according to Gomm (2008:362-363), is to get more than

one purchase on the phenomenon and to triangulate data from one approach with data from another. In other words the researcher is able to view the research problem from both quantitative and qualitative views.

Johnson and Onwuegbuzie (2004:14) defined the mixed research method as “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study.” In addition, Creswell (2009:18) states that:

A mixed method design is useful when either quantitative or qualitative approach by itself is inadequate to best understand a research problem or the strengths of both quantitative and qualitative research can provide the best understanding.

Bless, Higson-Smith and Sithole (2013:56) described the mixed method as a method that “uses both measurements and descriptions in a complementary fashion to deepen the researcher’s understanding of the topic.”

The main advantage of the mixed method is that it improves the credibility of the research if the merging of results is obvious. In a case where findings do not correspond, it allows the researcher to question and improve the research from all aspects. By adopting mixed research the researcher is able to bring the strength and advantages of both “the rigour of quantitative research and the exploratory power of qualitative research to the project at hand” (Bless, Higson-Smith and Sithole, 2013:242).

The mixed research methodology was selected as most appropriate for this study. This methodology relates very well to the pragmatic paradigm selected for the study. It was earlier indicated that the pragmatic paradigm places the research problem at the centre and applies all approaches to understand it. The mixed research method

gives the researcher an opportunity to use both quantitative and qualitative methods to understand the issue being investigated. There were a number of reasons why the mixed research methodology was chosen.

Firstly, it was to enhance the validity and reliability of the study. Babbie and Mouton (2001:275) stated that studies conducted using a mixed research methodology tend to possess more reliability and validity. In support of this view, Johnson and Onwuegbuzie (2004:21) stated that collecting data using different strategies, approaches and methods strengthens the study, as it “can add insights and understanding that might be missed when only a single method is used.”

Secondly, past experiences as argued by Gil-Garcia and Pardo (2006:1) recorded that the multi-method approach provides valuable alternatives for digital government research, since it is a complex process which involves technical, organizational and policy elements. The UKZN digitization of theses and dissertations involves the same complexity as the digital government processes discussed in the paper by Gil-Garcia and Pardo (2006:1). Library digitization requires active interaction between information technology and existing structures. It also requires commitment, training and policies, as stipulated by Gil-Garcia and Pardo (2006:2) for digital government.

Lastly, it was to allow the researcher to triangulate qualitative and quantitative data. According to Bless, Higson-Smith and Sithole (2013:238), triangulation requires that different methods of data collection be used, for example, for comparing data collected from one-on-one interviews with data collected from a questionnaire survey. By using the mixed method the researcher was going to be able to obtain different perspectives.

3.3.6.4 Type of mixed research methodology employed

According to Bless, Higson-Smith and Sithole (2013:22), a mixed research method can either be sequential or concurrent. Teddie and Tashakkori (2009:26-27) pointed

out that the sequential method uses one method first followed by the second method, to clarify the findings of the first method. The concurrent method makes use of several methods simultaneously, to understand a single phenomenon.

In the concurrent method, one approach is given priority over the other, either quantitative over qualitative, and *vice versa*. Creswell and others (2008:67) indicated that there are two major designs that can be conducted concurrently. These are the triangulation and embedded mixed method.

The embedded mixed method is used when researchers want to enhance a study based on one method by including secondary data from the other method. Triangulation is “the combinations and comparisons of multiple data sources, data collection and analysis procedures, research methods, and inferences that occur at the end of a study” (Teddie and Tashakkori, 2009:32).

The present study used the concurrent triangulation method, as the two methods of interviews and questionnaire were employed at the same time. The quantitative method was given priority, since it involved a larger number of respondents and therefore required more time. While some participants were responding to the survey questionnaire, the researcher was conducting one-on-one interviews with other participants in the study.

3.3.6.5 Concurrent triangulation and theoretical framework

The present study is guided by the Communications Theory, Park’s Conversation Theory and Data Curation Lifecycle Model. The selected theoretical framework ties in perfectly with the focus of the study, which tries to understand the issues, experiences and challenges of the theses and dissertation digitization project at UKZN.

According to Navarro (2001:777), the conversation theory is essential for anyone “trying to understand how agreements, consensus, new concepts, norms and common assumptions emerge.” Navarro (2001) added that the conversation theory is a valuable tool to comprehend how human beings are able to reach agreements to build a common reality through conscious communication. Klemm (2002:1) felt that conversation is crucial for exchanging information in order to make situations known, as well as to persuade and motivate others.

In line with what Klemm (2002) and Navarro (2001) stated on the conversation theory, Fabunmi, Paris and Fabunmi (2006:29) defined communication as “the exchange of information between at least two people”. Fountain (2001:25) pointed out that “the flow of communications determines the direction and the pace of dynamic social development”.

These two theories helped the researcher to understand the extent and nature of communications taking place within the library. Using concurrent triangulation, the researcher distributed questionnaires and conducted face-to-face interviews to determine the effectiveness of conversations (communications) within the library in relation to the digitization project.

The researcher used the Data Curation Lifecycle Model, which links up with the two theories, as it emphasizes the importance of staying in constant communication with everyone in data curation. According to Higgins (2008:134):

The DCC Curation Lifecycle Model has been developed as a generic, curation-specific, tool which can be used in conjunction with relevant standards, to plan curation and preservation activities to different levels of granularity.

This model sets the guidelines to the management of digital materials, systematically working through the steps of data curation. The model “ensures that all the required stages are identified and planned” and that the necessary actions are implemented in the correct order (Higgins, 2008:135)

3.3.7 Population of the study

The population of a research project is defined by Babbie and Mouton (2011:100) as “that group (usually of people) about whom we want to draw conclusions” .The population is defined by Gerring (2012:74) as “the universe of the phenomena that a hypothesis seeks to describe or explain”.

The population of this study consisted of those library staff members who are involved in the digitization project within the UKZN. These library staff members account for 36 of the entire total complement of 133 staff members. This population of 36 staff members included subject librarians, metadata librarians, digitization staff and library management. The 36 library staff members were selected because they were either directly involved in the digitization project, as they were doing the actual digitization, or they were indirectly involved because they were in the library management team and therefore had influence on the decision-making of issues involving the digitization project.

3.3.8 Sample of the study

According to Gerring (2012:74), the sample of the study is defined as “the evidence that will be subjected to direct examination”. The sample of the study is useful only when the population is large. In this study, the population of the study was 36 staff members. It is a fairly small population and therefore there was no need to sample the population. However, purposive sampling was used to select the population to be interviewed from the selected 36 staff members.

According to Kumar (2012:207), purposive sampling is when a researcher chooses only those people who, in the researcher's opinion, are likely to have the required information, as well as being willing to share it. Bless, Higson-Smith and Sithole (2013:1770) reasoned that purposive sampling "rests on the assumption that the researcher knows what type of participant is needed." In this case, the researcher wanted to interview participants that were involved in decision-making concerning the digitization processes, including the budget and staff allocation to the project, and who would be in a position to provide the researcher with the relevant information. Out of the 36 staff members, 11 staff were selected to be interviewed, either because they were on the digitization committee and/or were library management.

3.3.9 Data collection method

A variety of research methods for data collection are advanced by different authors, such as Bryman and Bell (2007), Wilkinson and Birmingham (2003) and Bless, Higson-Smith and Sithole (2013). According to Bryman and Bell (2007:40), a research method is simply a technique for collecting data which involves a specific instrument to collect the data. Research instruments are simply devices for obtaining information relevant to the research project and there are many alternatives from which to choose" (Wilkinson and Birmingham, 2003:3).

A good example of these methods is given by Bryman and Bell (2007) and Bless, Higson-Smith and Sithole (2013). These include:

- Observation, where events are observed and recorded by an outsider (Bless, Higson-Smith and Sithole, 2013:190).
- Experimental method, where data collection does not rely on what the participant is saying, but on how he or she behaves (Bryman and Bell, 2007:44).
- Case study design, in which a single case is analyzed, be it an organization, a location, or a person (Bryman and Bell, 2007:62),

- Self-reported methods, where the participants report on their own experiences by means of questionnaires and/or interviews (Bless, Higson-Smith and Sithole, 2013:192).
- Focus groups, where the population being studied is divided into small groups (Bless, Higson-Smith and Sithole, 2013:200).
- Diaries, where the respondents keep diaries in which they report their experiences (Bryman and Bell, 2007:251).

The method that was used in this study is the self-reported method, since the respondents had to report on their own experiences. Both the questionnaire and interviews were used as the research instruments. According to Bless, Higson-Smith and Sithole (2013:194), a questionnaire is based on an “established set of questions with fixed wording and sequence of presentation”. It usually comes with an indication of how to answer each question, by giving the participants options to choose from. An interview, on the other hand, involves “direct personal contact with the participant who is asked to answer questions relating to the research problem” (Bless, Higson-Smith and Sithole, 2013:193). Bless, Higson-Smith and Sithole (2013:193) added that interviews can be structured or unstructured. In the former, the interview schedule is drawn prior to the interview. In the latter, the interview is usually based on general guidelines.

3.3.10 Construction of the research instrument

According to Wilkinson and Birmingham (2003:3), “research instruments are simply devices for obtaining information relevant to your research project.” Kumar (2012:24), stated that the construction of the research instrument is the first step towards carrying out the study. To be able to collect data for a study, it is important to either construct a research instrument or select one that has already been created. In the present study the researcher decided to construct the questionnaire. The researcher in this study used a self-administered questionnaire and an interview schedule as research instruments.

3.3.10.1 Construction of the questionnaire

In constructing the questionnaire, the researcher looked at the aim of the study, as well as the five research questions, to make sure that the questionnaire was in-line with both the aim and the research questions. According to Babbie and Mouton (2011:239), “the format of the questionnaire is just as important as the nature and wording of the questions asked.”

The questionnaire was written in English and consisted of 48 closed questions and 23 open-ended questions. It was divided into nine sections. The first section included four demographic questions. The demographic questions were included because the researcher wanted to cross-tabulate and be able to find out if issues like age, sex, section and position have any effect on the digitization processes. The second section included questions, which aimed at giving a background to the study. This was followed by the five sections which aimed at obtaining information that would help in answering the five research question of the study. These sections covered questions on strategies and policies, equipment and facilities, staff training, staff support and technical support. Section eight covered library challenges, and the last section was the conclusion, in which respondents could add anything they wanted to relating to the digitization of theses and dissertations.

3.3.10.2 Construction of the interview schedule

The construction of the interview schedule was based on the questions in the questionnaire, except for section 9 of the interview schedule, which covered questions on time and budget that were not included in the questionnaire. The similarity in the questions for the questionnaire and interview schedule enabled the researcher to compare responses received from interviews and the questionnaire, as questions were based on the same issues for both interview schedule and questionnaire. The researcher wanted to be able to obtain different perspectives.

The interview for this study consisted of 68 questions. These included 26 semi-structured and 42 open-ended interview questions. The semi-structured questions included demographics questions on gender and age. The dichotomous questions that offered two fixed alternatives of 'yes' or 'no' responses were meant to determine whether the respondent would be asked the follow-up open-ended questions. According to Maree (2010:5), a semi-structured interview is commonly used to collaborate data emerging from other data.

The interview schedule consisted of nine sections. These were made up of the demographic section and eight broad sections, five of which covered the five research questions. The eight broad sections focused on the background information around digitization issues, digitization strategies and policies, infrastructure, staff training, staff support, technical support, library challenges and, lastly, time and budget. These are questions that the researcher thought would be more appropriate to ask the 11 selected participants, rather than the whole population of 36 participants.

3.3.11 Pre-testing of the research instrument

The research instrument was pretested prior to administering it to the study population. "Pretesting questionnaires or interview schedules is one of the tools that may be used for content validation" (Ngulube 2005:136). According to Bryman and Bell (2007:274), pretesting gives the researcher an opportunity to assess how well the questions flow, because at times there is a need to move questions around to ensure that there is a proper sequence and flow.

Pretesting would help indicate whether or not the questions can be completed within a reasonable period of time. It would also indicate whether or not the language used in the questions is simple enough to be understood by the respondents, that way saving the researcher time and money. According to Babbie and Mouton (2011:244), no matter how careful you are in designing a data collection instrument, there is the

possibility of errors, like ambiguous questions that people cannot answer, or questions in violation of some rules. In the case of questionnaires, it would be costly to print questionnaires that would not be understood by the respondents, because they would not provide the necessary expected data, which might necessitate designing and printing another questionnaire.

The researcher pretested the questionnaire with the assumption that changes effected on the questionnaire would be the same as on the interview schedule, since the questionnaire and the interview schedule were focused on the same questions, except for section nine. The questionnaire was distributed to seven University of South Africa (UNISA) library staff members who are part of management and/or in one way or another involved in their university library's digitization project. This was done in line with the pre-test requirement given by Kumar (2012:24), which indicates that "as a rule, the pre-test of a research instrument should not be carried out on the sample of your study but on a similar population which you are not proposing to study." The respondents for pretesting made suggestions and highlighted the ambiguous questions. The questions were adjusted and revised according to their suggestions.

3.3.12 Changes made to the questionnaire and interview schedule

The researcher made changes to the questionnaire and interview schedule based on the suggestions from pre-testing.

3.3.12.1 Questionnaire

The following changes were made to the questionnaire:

- **Question numbering was changed:** The questions under demographics were initially numbered from one to four, and numbering started again under background from one to 73. The numbering of the questions in the questionnaire now flows from one to 71.

- **Re-wording question:** Question 5 (which was previously question 1 under background), was re-worded from “are you involved in the project” to “do you have anything to do with the digitization project (e.g. scanning, loading, archiving)”. Question 6 (previously question 2) was re-worded from “have you been formally orientated about the digitization project at the UKZN” to “were you formally informed of the digitization project at the UKZN”, and this question was followed by question 7, in which respondents were supposed to indicate how they were informed of the digitization project.
- **Questions combined:** Questions 50, 51, 52. 53 were combined into one question, question 54. The four questions were asking the same thing in relation to four scenarios. The researcher therefore combined them to one, in which the respondent would be able to select the four options and rate them. The same applied to questions 54 and 55. These were combined to one question, question 55, and questions 56 and 57 were combined to question 56. The last questions to be combined were questions 68, 70 and 71. These were combined to form question 69.

3.3.12.2 Interview schedule

The following are the changes made on the interview schedule. Initially the interview schedule had 13 pages of 78 questions and the main concern was that the length and number of questions would discourage the participants from responding since they would not have enough time to sit and respond effectively. Instead they would end up losing focus.

Instead of having individual questions, the interview questions were combined under nine sections, namely, demographics, background, strategies and policies, infrastructure, staff training, staff support, technical support, library challenges and time and budget. The yes or no questions were combined with the follow-up questions to reduce the number of questions from 78 to 68. The researcher first asked the yes or no question to determine the relevancy of the question(s) to follow,

questions which gave respondents a chance to expand on the different digitization issues. The researcher asked follow-up questions depending on the responses of each respondent. Because the responses from people interviewed would sometimes cover the questions to follow, the researcher did not see the need to ask them again, unless there was a need to probe further.

3.3.12.3 Administration of the questionnaire

The questionnaire was a self-administered questionnaire. The questionnaires were distributed to the subject librarian, cataloguers and digitization staff, excluding those who were members of the digitization committee, by email, on 19 September 2013. They were returned by email, except for two respondents, who returned hard copies. The respondents were asked to complete the questionnaire during their spare time. For that reason it would have been difficult for the researcher to assist each respondent. In the researcher's view all the respondents were able to understand every question in the questionnaire, since it involved questions around their field of specialization, and all questions were in the English language, which all respondents understood.

3.3.12.4 Administration of the interview schedule

The interviews were conducted by the researcher in person. The researcher felt it was important to be personally involved, since most of the respondents were the researcher's former colleagues and would feel comfortable disclosing even sensitive information that they would not have disclosed to an unknown field worker. To prevent bias, the researcher did not debate the answers provided by the respondents, but accepted all answers as presented. The researcher was objective throughout the interview sessions. The interviews were conducted with the library management and librarians who were members of the digitization committee during the September and October months. The first interview was held on 20 September and the last one on 8 October 2013.

3.3.13 Validity and reliability of the study

According to Cooper and Schindler (2006:348), validity is defined as “the extent to which a test measures what we actually wish to measure.” In this study all the questions that the respondents had to answer related to the digitization process and therefore the study possesses validity. Kumar (2012:179) referred to this type of validity as face validity, whereby what is asked is based upon the link between “the questions and the aim of the study”, which is what was done in this study.

Reliability, as explained by McNeill and Chapman (2005:9), refers to whether or not the study will come up with the same results if the same methods were to be used by another person, or the same person at another time? Bryman and Bell (2007:40) pointed out that “reliability is concerned with the question of whether the results of a study are repeatable.”

The researcher in this study ensured reliability and validity by using the mixed method in the form of concurrent triangulation. Wright (1995:61) argued that by combining qualitative and quantitative methods, the end results of the research become more meaningful and have a greater probability of being valid. The researcher also pre-tested the data collection tool using staff at the University of South Africa, based on a similar situation as at UKZN, staff that were either in management or involved in the digitization.

3.3.13.1 Research hallmark to enhance validity and reliability

Sekaran (2003:22) identified eight requirements a researcher must meet in order for a study to be valid and reliable. These requirements are briefly discussed:

- **Purposiveness:** Researchers do not embark on a research project for no reason. There must be a purpose for conducting a project. In this study, the researcher indicated the purpose of the study by clearly stating the aim and objective. According to Iqbal (2012:Purposiveness) and Waris

(2012:Purposiveness), the purpose of research must be clear and understandable.

- **Rigour:** According to Iqbal (2012:Rigor), “rigor means carefulness, scrupulousness and the degree of exactness in research investigation.” Iqbal (2012:Rigor) explained that for a researcher to be able to make a meaningful and worthwhile contribution to the field of knowledge, the research must be carried out carefully, with rigour. Iqbal (2012:Rigor) mentioned that “conducting a research with rigor requires a good theoretical knowledge and a clearly laid-out methodology”. This will help to eliminate the bias and assist in proper data collection and analysis, which will lead to “sound and reliable research findings” (Iqbal, 2012:Rigor). The present study was based on a sound theoretical framework, as discussed in the literature review section. Secondly, the researcher ensured that there was objectivity, to eliminate bias. The researcher facilitated the collection of data by personally conducting the interviews and distributing the research instrument.
- **Testability:** According to Yin (1994:93), a study must have a clear testable aim. For testability, in this study the researcher used both interviews and questionnaire. Information obtained from the interviewees and questionnaire was compared to ensure validity.
- **Replicability:** According to Sekaran (2003:23), research is supposed to be replicable, in that if the same study were to be repeated it would produce the same results. Bryman and Bell (2007:Replicability) supported this view by stating that the study is believed reliable if the results of the study are the same if repeated. Questions asked were about the situation that had already occurred and therefore could not change, which means that if a similar study were to be conducted the results would be repeatable.
- **Precision and confidence:** Waris (2012:Precision and confidence) defined precision as “the closeness of the finding to ‘reality’ based on sample”. Confidence refers to “the probability that the estimation made in the research findings are correct.” To ensure precision and confidence, the researcher

asked questions that were specifically related to theses and dissertation digitization. The researcher also ensured confidence by using respondents that were directly involved with the project, so that their contribution to the study was based on practical experience in the digitization project.

- **Objectivity:** According to Nouri (N.d.:6) the conclusions should be based on the facts of the findings derived from actual data, and not on the researcher's own subjective or emotional values. The researcher in this study collected data from respondents through interviews and survey questionnaire. The results were based on these findings.
- **Generalizability:** This refers to the scope of applying the research findings of one organizational setting to other settings of almost identical nature (Sekaran, 2003:25). The research will be more useful if its solutions are applicable to other studies of similar nature. The participants that were selected for this study were selected because of their familiarity and involvement in the digitization processes, which is what others in similar situations are most likely to experience. As a result the research findings could be generalized to similar settings.
- **Parsimony:** According to Nouri (N.d.:6), parsimony means "simplicity in explaining the phenomena or problems that occur, and in generating solutions for the problem, is always preferred to complex research framework that considers an unmanaged number of factors." Sekaran (2003:26) stated that basing the study on similar research work with a thorough literature review is one of the ways to ensure parsimony. The researcher has presented a thorough literature review in the previous chapter.

3.3.14 Data analysis

The SPSS (Statistical Package for Social Sciences) software was used to analyze the data. Pie charts and bar graphs were used to depict the data. The co-relation was used to statistically analyze the data. Data collected from interviews was cleaned, coded and analyzed using manual content analysis. Content analysis,

according to Maree (2010:101), is “a systematic approach to qualitative data analysis that identifies and summarizes message content”.

3.3.15 Ethical issues observed

When conducting research, the researchers are expected to adhere to a number of strict research ethics. In this study the researcher had to do this. Like most Institutions of higher learning the UKZN has its own Research Ethics Policy, which applies to all staff members and students involved in research. The researcher had to get familiar with these ethical issues, and sign an undertaking to adhere to them. These are discussed in the University's Research Ethics and they include the following:

- **Autonomy:** Participants need to be aware of their autonomy and that participation was voluntary. This was done through the use of the informed consent form, which was written in simple English, that all the respondents would understand. Participants were given the consent form to make sure they were aware that participation in the study was voluntary.
- **Communication of aim and objective of the study:** Participants were informed of the nature and purpose of the study. The consent form given to participants clearly specified the nature and purpose of the study.
- **Researcher and supervisor identity:** Participants were informed of who the researcher and the supervisor of the study were and their contact details were made available on the consent form given to participants.
- **Confidentiality:** The researcher must ensure and maintain confidentiality. This means that the responses to the questions must be confidential and the respondents themselves must remain anonymous. Participants were informed of the confidentiality.
- **Freedom to withdraw:** Participants must be aware that they are free to withdraw from the study at any time without any negative or undesirable consequences to themselves.

3.4 SUMMARY

In Chapter 3 the researcher painted a picture of how the research was designed. This was done by stating the research questions of the study. The research design was then discussed, to make sure that the plan followed in the study was clearly understood. The researcher gave a description of why a particular design method was selected over the others. As part of the research design, the chapter discussed where the location of the study was and how and why the participants were selected. It covered the category selected for this study, the time dimension and the research paradigm.

The chapter discussed the research methods and gave details of the method selected for this study and the reason(s) why. The data collection method was discussed next, where the researcher looked at a number of methods and finally discussed the method used for this study. The final topics covered in the chapter included the construction of the research instrument, the pretesting of the questionnaire, the administration of the research instrument, the validity and reliability of the study, data analysis and ethical issues observed. All these discussions formed the elements of the research methodology employed in this study.

In the Chapter 4, the research will present data collected quantitatively and qualitatively, using the methods discussed above.

CHAPTER 4

DATA ANALYSIS

4.1 INTRODUCTION

This chapter presents the data collected from respondents in the form of self-administered questionnaires and semi-structured interviews. The collected data is presented in the form of frequency tables, bar-charts and pie charts. The total population of the study was 36 library staff. The researcher had hoped that all 36 staff members would participate, but only 30 (83.3%) participated. Twenty-one of the 36 respondents answered the questionnaire and nine respondents participated in face-to-face interviews. Out of the six potential respondents who did not participate in the study, two were to be interviewed by the researcher unfortunately they declined to participate. With regards to the questionnaire four respondents simply did not return the questionnaire.

4.2 THE RESPONSE RATE

The questionnaires were distributed on 19 September 2013 by email to 25 library staff; however three of them requested hard copies and these were sent through the university internal mail. Out of the 25 distributed questionnaires, the researcher received 21 responses, resulting in a response rate of 84%. The 25 library staff members were selected because of their involvement in the digitization project. The questionnaire had 71 questions (48 closed questions and 23 open questions for clarification purposes).

4.3 PRESENTATION OF RESULTS

The questionnaire and interview results are presented according to the sections covered in the questions. These include demographics, background or general questions, followed by the five sections on strategies, equipment, staff training, staff support and technical support. These five sections were based on the five objectives of the study. This is followed by the results on library challenges, which is also

covered in both questionnaire and interview results. The section on time and budget was applicable only to the interviews. The results for the questionnaire are presented by means of frequency tables and pie-charts. Cross-tabulation of some variables was also done to check if age and sections in which respondents work have any effect on the time spent on the digitization process. The results of the interviews are discussed and summarized, based on the responses of the interviewees.

4.3.1 Demographics

The questionnaire had four demographic questions. These questions included gender, age, period worked in digitization and section in which respondents are working. This was important for the researcher to discover the age, gender and experience of participants in the digitization project and whether or not this has an effect on the digitization project process. It was also to determine whether or not the UKZN library digitization has an independent section or not, or it involves staff from other sections, and what effect this has on the project.

Below are frequency tables showing the demographics information of staff involved in the digitization project.

Table 2: Gender of respondents

N=21

Gender	Frequency	Percent
Male	3	14.3
Female	18	85.7
Total	21	100.0

Table 2 shows that all 21 respondents indicated their gender. Out of 21 respondents, 18 (85.7%) were female and three (14.3%) were male.

Table 3: Age of respondents

N=21

Age of respondents	Frequency	Percent
30 years and below	2	9.5
31 to 40 years	4	19.0
41 to 50 years	10	47.6
Above 50 years	4	19.0
Non-response	1	4.8
Total	21	100.0*

**The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.*

Table 3 shows that 20 (95.2%) responded to the question and one (4.8%) did not respond. Out of the 20 (95.2%) respondents, 14 (66.6%) were above the age of 40 and six (28.5%) of the respondents were 40 years and younger.

Table 4: Period respondents worked on the digitization project

N=21

Period worked	Frequency	Percent
Less than 1 year	1	4.8
1 to 5 years	16	76.2
More than 10 years	1	4.8
Non- response	3	14.3
Total	21	100.0*

**The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.*

Table 4 shows that 18 (85.7%) responded to the question relating to the period they worked on the digitization project and three (14.3%) did not respond. Out of the 18 (85.7%) participants, one (4.8%) worked less than a year, 16 (76.2%) worked for a period between one and five years, one (4.8%) worked for more than 10 years.

Table 5: Section in which each participant worked

N=21

Sections in which participants work	Frequency	Percent
Information Services	16	76.2
Technical Services	3	14.3
Digitization Section	2	9.5
Total	21	100.0

Table 5 shows that all 21 respondents indicated the sections in which they worked. The majority of the respondents, which is 16 (76.2%), worked in the information services section of the library, three (14.3%) worked in the technical services and two (9.5%) worked in the digitization section.

4.3.2 Background

There were 24 questions under background. These questions were included in order to get an idea of the status of the digitization project, to understand and know how the respondents are involved, how were they informed of the project, and all other communication aspects relating to the preparations of the project.

The respondents were asked in question 5 to indicate whether they were part of the digitization projects or not. All 21 respondents responded to the question. Out of the 21 respondents, 18 (85.7%) indicated that they were involved with the digitization project and three (14.3%) indicated that they had nothing to do with the digitization project. The following 23 questions, from question 6 to 28, respondents were asked questions based on gaining insight and understanding of the project and how they were informed of the project, their involvement and other operations of the project. Respondents were further asked in questions 6 and 7 whether or not they were formally informed about the digitization project and, in cases where they indicated that they were informed, they were asked to select from the three options concerning how they were informed.

Table 6: Participants knowledge of the digitization project

N=21

Knowledge of the digitization project	Frequency	Percent
Yes	18	85.7
No	2	9.5
Not sure	1	4.8
Total	21	100.0

Table 6 shows that 18 (85.7%) respondents indicated that they were formally informed of the digitization project, two (9.5%) indicated that they were not informed and one (4.8%) was not sure whether or not they were formally informed.

Table 7: Method of informing respondents of the digitization project

N=21

Method of informing respondents	Frequency	Percent
At a meeting	14	66.7
By email	1	4.8
By both email and meeting	2	9.5
Other	1	4.8
Non-response	3	14.3
Total	21	100.0*

The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%

Table 7 shows that out of 21 respondents, a total of 18 (85.7%) responded to the question and three (14.3%) did not respond. Out of the 18 (85.7%) who responded, 14 (66.7%) indicated that they were informed of the digitization project at a meeting, two (9.5%) were informed at a meeting and by email, one (4.8%) was informed by email and another (4.8%) by other means which they did not specify.

Questions 8 and 9 asked respondents about the library digitization department and whether having a digitization department would improve the digitization processes or

not. Depending on their responses they were asked to provide details how it would or would not improve the digitization processes.

Table 8: Library dedicated digitization department

N=21

Dedicated digitization department	Frequency	Percent
Yes	15	71.4
No	6	28.6
Total	21	100.0

Table 8 shows that 15 (71.4%) respondents indicated that the library has a dedicated digitization department and six (28.6%) indicated that the library does not have a dedicated digitization department. Table 9 below shows that all 15 respondents who in Table 8 indicated that the library has a dedicated digitization section responded. Out of the 15, 10 (66.7%) were positive of the fact that a dedicated digitization department helps to improve the digitization processes, three (20%) indicated that having a dedicated digitization section does not help to improve the digitization processes and two (13.3%) were not sure if it helps or not.

Table 9: Effect of a dedicated digitization department

N=15

Effect of a dedicated digitization department	Frequency	Percent
Yes	10	66.7
No	3	20.0
Not sure	2	13.3
Total	15	100.0

Respondents were asked in question 11 to indicate whether or not having a dedicated department would help improve the digitization processes. This question was meant to be answered by the six respondents who indicated that the library does not have a dedicated department.

Table 10: Showing whether or not having a dedicated digitization department would help to improve on digitization processes

N=6

Dedicated digitization department	Frequency	Percent
Yes	4	66.6
No	1	16.7
Not sure	1	16.7
Total	6	100

The results in Table 10 show that the six respondents who earlier indicated that the library does not have a dedicated digitization department responded to this question. Out of the six that responded, four (66.6%) were positive about the fact that having a dedicated digitization department would help improve the digitization processes, one (16.7%) indicated that a dedicated digitization section would not help improve the digitization processes and one (16.7%) was not sure whether the dedicated digitization department would help or not.

Follow-up questions were asked in questions 10 and 12. The 14 respondents who indicated that a dedicated digitization department will help to improve the digitization processes were asked to indicate how. Out of the 14, four (28.6%) did not respond, three (21.4%) indicated that they were not sure how it will improve the digitization processes and the remaining seven (50%) gave responses indicating that the dedicated digitization department will help improve the digitization processes, as there will be better communication, better planning and better control of the processes.

In question 13, respondents were asked if they have any concerns relating to the digitization processes with other departments within the library.

Table 11: Concerns relating to digitization processes with other departments in the library

N=21

Digitization concerns with other departments in the library	Frequency	Percent
Yes	7	33.3
No	14	66.7
Total	21	100.0

Table 11 shows that all 21 respondents responded. Seven (33.3%) indicated that they have concerns relating to digitization processes with other departments in the library and 14 (66.7%) indicated that they do not have concerns relating to digitization processes with other departments in the library.

A follow-up question was asked in question 14, for respondents to indicate what concerns they have, if they have any. In response to this question, out of the seven that indicated they have concerns, only four (57.1%) responded. The four that responded had this to say:

- “They were concerned with the staffing and budgetary constraints that do not meet the digitization requirements”,
- “The involvement of different staff from other sections affects accuracy and consistency in the processes as there is a lack of direction”,
- “Scanning of maps bigger than A4 size is a challenge and time-consuming as we do not have a scanner big enough to cater for that. We usually depend on scanner from Architecture department which is not always available.” and
- “There is no communication within the library which results in the fact that not everyone in the library is aware of the digitization project and its relevance to the library and university community as a whole”. “There is no unity, no one voice”.

Respondents were asked in question 15 if their concerns affected the digitization progress.

Table 12: Concerns affecting the digitization progress

N=7

Concerns affecting the digitization progress	Frequency	Percent
Yes	6	85.7
Not Sure	1	14.3
Total	7	100

Table 12 shows that out of the seven respondents who indicated that they had concerns relating to the digitization processes with other departments in the library, six (85.7%) indicated that their concerns affect the digitization progress and only one (14.3%) was not sure whether or not these concerns affect the digitization progress.

In question 17, respondents were asked if they have any digitization concerns with other campuses. This question was asked because the scanning of theses and dissertation takes place at Howard College. Other campuses have to send their theses and dissertations for scanning, which is the process that happens before the other digitization processes take place.

Table 13: Concerns relating to digitization processes with other campus libraries

N=21

Digitization concerns with other campus libraries	Frequency	Percent
Yes	3	14.3
No	17	81.0
Not Sure	1	4.8
Total	21	100.0*

**The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.*

Table 13 shows that three (14.3%) indicated that they have concerns relating to the digitization processes, 17 (81.0%) do not have concerns relating to the digitization processes with other campus libraries and one (4.8%) was not sure.

Respondents were asked in questions 18 and 19 to specify what their concerns are, if they have concerns, and how do these concerns affect digitization processes. In response to question 18, where they were asked to specify what concerns they have, one (4.8%) out of the three (Table 13 above) who indicated that they have concerns, responded that the main concern was the issue of batches not arriving on time from other campus libraries which affected the scheduled tasks and a process as a whole.

Table 14: Respondents' concerns' effect on the digitization processes

N=3

Concerns effect on the digitization processes	Frequency	Percent
Yes	2	66.7
Non-response	1	33.3
Total	3	100

Table 14 shows that out of 3 respondents who indicated that they have concerns with digitization processes at other campus libraries, two (66.7%) indicated that their concerns affect the digitization processes, one (33.3%) did not respond.

In response to question 19, only one (33.3%) out of the three responded and indicated that the late arrival of batches results in slow progress on digitization processes.

Respondents were asked in question 21 to indicate the functions they perform in the digitization project.

Table 15: Function(s) performed by respondents in the digitization project**N=21**

Functions respondents perform in the digitization project	Frequency	Percent
Submit, Create metadata, Do quality control	2	9.5
Select, Prepare, Submit, Create metadata, Archive, Other	1	4.8
Select, Prepare, Scan, Submit	2	9.5
Submit, Create metadata	1	4.8
Submit theses	9	42.9
Create metadata	1	4.8
Archive theses	3	14.3
Select, Submit, Create metadata, Archive, Do quality control	1	4.8
Non- response	1	4.8
Total	21	100*

**The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.*

Table 15 shows the tasks performed by respondents on the digitization project. Out of 21 respondents, a large number of respondents, nine (42.9%) only submit the thesis or dissertation to the database, seven (33.4%) performed more than one task, ranging from scanning, submitting, archiving, creating metadata and doing quality control, one (4.8%) created metadata only, three (14.3%) archived theses only and one (4.8%) did not respond. In question 22, respondents were asked to indicate how much time they spend on the digitization project.

Table 16: Time spent on the digitization project per day**N=21**

Time spent	Frequency	Percent
Less than 2 hours	13	61.9
Between 2 to 4 hours	4	19.0
Between 4 to 6 hours	1	4.8
More than 6 hours	1	4.8
Other	2	9.5
Total	21	100.0

Table 16 shows that all 21 respondents responded to this question. Thirteen (61.9%) indicated that they spend less than two hours per day on the digitization project, four (19.0%) spend between two and four hours, one (4.8%) spent between four and six hours, one (4.8%) spent more than six hours and two (9.5%) indicated other hours, other than the ones specified.

Respondents were asked in question 23 to indicate what prevents them from spending more than two hours on the digitization project. Out of the 13 (61.9%) respondents that indicated that they spent less than two hours, three (14.3%) did not respond and the 10 (47.6%) that responded indicated that they had other responsibilities/duties to perform, either as subject librarians or metadata librarians. They were only assisting with the digitization section. Some of the respondents' comments include that they:

- “Spend more time on information service delivery and attending to users’ queries, as well as performing other subject librarian’s duties.”
- “Pressure of being a subject librarian. Your staff and students come first and there were continuous requests for assistance from users. We were assisting with digitization, it wasn’t our primary role, so it had to fit into our busy schedules and work demands. We have many areas of responsibility”.
- “I am a full time cataloguer”;
- “I have other tasks”;
- “Have other duties to perform”; and
- “I am a SL [Subject Librarian] and I can only spend 15% of my time to the IR [Institutional Repository]”.

4.3.2.2 Cross-tabulation

The researcher did a comparison on different variables to check if there is any relationship between the variables. Below are three frequency tables comparing whether or not age has any effect on the time spent on the digitization project,

whether or not the section each participant works in and time spent on the project has an effect on the project, and to compare if there's any relationship between the sections respondents work and age.

Table 17: A cross-tabulation between age and time per day spent on the digitization project
N=21

Age group of respondents	Time each participant spent on the digitization project					Total
	Less than 2 hours	Between 2 to 4 hours	Between 4 to 6 hours	More than 6 hours	Other	
30 years and below	2	0	0	0	0	2
31 to 40 years	3	0	0	1	0	4
41 to 50 years	5	4	1	0	0	10
Above 50 years	2	0	0	0	2	4
Missing	1	0	0	0	0	1
Total	13	4	1	1	2	21

The above results show that out of the six (28.6%) respondents who are 40 years and below, five (83.3%) of them indicated that they spent less than two hours and one (16.7%) of them spent more than six hours on the digitization project. Out of 14 (66.7%) respondents above the age of 40, seven (50%%) spent less than two hours, four (28.6%) spent between two and four hours, one (7.1%) spends between four and six hours and two (14.3%) indicated that they spend other hours not specified. One (4.7%) of the respondents did not indicate their age.

Table 18: A cross-tabulation between section of the library in which participants work and time they each spent on the digitization project per day

N=21

Section in which each participant worked	Time each participant spent on the digitization project					Total
	Less than 2 hours	Between 2 to 4 hours	Between 4 to 6 hours	More than 6 hours	Other	
Information Services	10	4	0	0	2	16
Technical Services	3	0	0	0	0	3
Digitization Section	0	0	1	1	0	2
Total	13	4	1	1	2	21

Table 18 shows that out of the 16 (76.2%) respondents who are in the Information section, 10 (62.5%) of them spent less than two hours, four (25%) spent between two and four hours, and two (12.5%) selected other hours. The three (14.3%) respondents from Technical services indicated that they spend less than two hours, and out of the two (9.5%) from the Digitization section, one (50%) indicated that (s)he spent between four and six hours and the other (50%) spent more than six hours.

Table 19: A cross-tabulation between section of the library in which participants work and age group

N=21

Section in which each participant worked	Age group of participants					Total
	30 years and below	31 to 40 years	41 to 50 years	Above 50 years	Missing	
Information Services	0	3	9	3	1	16
Technical Services	2	0	0	1	0	3
Digitization Section	0	1	1	0	0	2
Total	2	4	10	4	1	21

Table 19 shows that out of the 16 (76.2%) who are in Information services, three (18.8%) are 40 years and below and 13 (81.2%) are above the age of 40. Out of the three (14.3%) from the Technical services, two (66.7%) are 40 years and below and

one (33.3%) was above the age of 40. Of the two (9.5%) from the Digitization section, one (50%) was 40 years and the other (50%) was above the age of 40.

In questions 24, 25 and 27 respondents were asked if they had a work-plan to follow for their digitization functions. If they did, did it help to better plan their digitization functions? If they did not have one, did they think of having a work-plan that would help them be more organized?

Table 20: Availability of work-plans to follow in performing digitization functions

N=21

Availability of work-plan	Frequency	Percent
Yes	7	33.3
No	14	66.7
Total	21	100.0

Table 20 shows that all 21 respondents responded to the question. Seven (33.3%) indicated that they have a work-plan and 14 (66.7%) indicated that they did not have a work-plan to follow in performing digitization functions.

Table 21: Whether work-plans help to better plan digitization function(s)

N=7

Responses showing if the work-plan help towards better planning	Frequency	Percent
Yes	7	100
Total	7	100

Table 21, in response to question 25, the seven respondents who indicated that there was a work-plan to follow for their digitization functions were asked to indicate whether or not having a work-plan helps to plan digitization functions better. All seven (100%) respondents indicated that having a work-plan helps.

Table 22: Need for work-plan

N=14

Need for work-plan	Frequency	Percent
Yes	4	28.6
No	7	50
Not Sure	2	14.3
Non-response	1	7.1
Total	14	100

Table 22 above shows that out of the 14 that indicated they do not have work-plan for digitization function, four (28.6%) thought it was necessary to have a work plan, seven (50%) thought it was not necessary and two (14.3%) were not sure whether or not it was necessary. One (7.1%) did not respond.

In response to questions 26 and 28, nine (81.8%) respondents out of the 11, who indicated in questions 25 and 27 that having a work-plan is necessary, they indicated that having a work-plan helped them or would help them to properly plan their daily work production and to monitor backlogs.

4.3.3 Strategies and policies

In this section the researcher asked 11 questions regarding the library/digitization strategies and policies guiding the digitization processes. This was in line with the first research question for the study, which asked “what digitization strategies and policies are in place at UKZN?” The first six questions, from question 29 to question 34, covered digitization policy, whether or not the library has a digitization policy, whether or not respondents were involved in the policy development, when did they become aware of it and if they know what the digitization policy entails.

Table 23: Digitization policy

N=21

Availability of digitization policy	Frequency	Percent
Yes	8	38.1
No	2	9.5
Not Sure	11	52.4
Total	21	100.0

Table 23 shows that all 21 respondents responded. Eight (38.1%) indicated that the library had a digitization policy, two (9.5%) indicated that the library did not have a digitization policy and 11 (52.4%) were not sure whether or not the library had a digitization policy.

Table 24: Respondents involvement in the digitization policy development

N=8

Involvement in digitization policy development	Frequency	Percent
Yes	1	12.5
No	7	87.5
Total	8	100

Table 24 shows that out of the eight respondents who indicated that the library has a digitization policy, one (12.5%) indicated that he or she was involved and seven (87.5%) indicated that they were not involved.

Table 25: Awareness of the digitization policy

N=8

Awareness of the digitization policy	Frequency	Percent
At its inception	2	25
When I became part of the project	5	62.5
Non-response	1	12.5
Total	8	100.0

Table 25 shows that seven (87.5%) responded and one (12.5%) respondents did not respond to the question regarding when they became aware of the digitization policy. Two (25%) indicated that they became aware at the inception of the project and five (62.5%) indicated that they became aware when they became part of the project.

Table 26: Digitization policy awareness process

N=8

Digitization policy awareness	Frequency	Percent
At a meeting	5	62.5
From a colleague	2	25
Other	1	12.5
Total	8	100.0*

The results in Table 26 show that all eight respondents (100%) who indicated that the library has a digitization policy responded. Five (62.5%) indicated that they became aware of the digitization policy at a meeting, two (25%) heard from a colleague and one (12.5%) became aware by other means.

Table 27: Respondents knowledge of what the digitization policy entails

N=21

Knowledge on what the digitization policy entails	Frequency	Percent
Yes	4	19.0
No	10	47.6
Not Sure	6	28.6
Non-response	1	4.8
Total	21	100.0

Table 27 shows that 20 (95.2%) responded and one (4.8%) did not respond to the question whether or not respondents know what the digitization policy entails. Four (19.0%) indicated that they knew what the digitization policy entails, 10 (47.6%) indicated that they did not know what the digitization policy entails and six (28.6%) were not sure what the digitization policy entails.

Question 34 asked respondents who indicated that they knew what the digitization policy entails, to specify what it entails. Out of the four respondents who had indicated that they knew what the digitization policy entails, three (75%) indicated that they were either not sure of the details or not sure how to respond to the question. One (25%) respondent stated that it covers the plan of the collections that need to be digitized.

Questions 35 and 36 asked respondents to indicate if the library had a strategic plan in place and, if they do is the theses and dissertation digitization project included in the strategic plan.

Table 28: Strategic plan for UKZN library

N=21

Responses	Availability of the strategic plan		Inclusion of the digitization project in the strategic plan	
	Frequency	Percent	Frequency	Percent
Yes	16	76.2	6	28.6
No	1	4.8	1	4.8
Not Sure	4	19.0	12	57.1
Non-response	0	0	2	9.5
Total	21	100.0	21	100.0

Table 28 shows that all 21 respondents responded to the question on the availability of the strategic plan. Sixteen (76.2%) indicated that the library has a strategic plan, one (4.8%) indicated that the library does not have a strategic plan and four (19.0%) were not sure whether or not the library has a strategic plan in place. Table 28 further shows that 19 (90.5%) responded to the question whether or not the UKZN theses and dissertation project was referenced in the strategic plan and two (9.5%) did not respond. Six (28.6%) indicated that the UKZN theses and dissertation digitization project is included in the strategic plan, one (4.8%) indicated that it is not included and 12 (57.1%) were not sure whether or not the UKZN theses and dissertation digitization project was included in the strategic plan.

A follow-up question was asked in question 37 to indicate how the library digitization was included in the library's strategic plan. Out of the six respondents who indicated that the theses and dissertation digitization project was included in the library's strategic plan, three (50%) did not respond and the other three (50%) indicated that it was included as the important part of the library's access to information and as the library's flagship programme.

Questions 38 and 39 were asked to ascertain whether or not the digitization strategy and policies positively contribute to the digitization processes and, if they did, respondents were asked to specify how.

Table 29: Digitization strategy and policies contribution to the digitization progress
N=21

Digitization strategy and policies contribution to the digitization progress	Frequency	Percent
Yes	14	66.7
Not Sure	6	28.6
Non-response	1	4.8
Total	21	100.0*

**The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.*

Table 29 shows that 14 (66.7%) indicated that having a digitization strategy and policies positively contribute to the digitization progress, six (28.6%) were not sure whether or not having digitization strategy and policies positively contributed to the digitization progress and one (4.8%) did not respond.

Out of the 14 respondents who indicated that digitization strategy and policies contribute positively to the digitization progress, nine (64.3%) responded to question 39. This question enquired how the policies and strategies contribute to the digitization processes. Responses included reasons like:

- It helps with smoother operations control. And further provides the organization a direction in terms of its focus on digitization plans.
- Assist with implementation and commitment to the carrying out of the project.
- It adds focus and direction to the project workers and prohibits management from changing diverting from the rules and the goals.

- People will know exactly what is expected of them when digitizing, and they'll be able to answer some questions concerning what they do and like any other department policy is important to follow.
- It will make it more efficient.
- The number of staff members will be increased, and the IR will move from the subject librarian to the people employed for digitization only.
- All work flows will be standardised.
- Direction.
- Better planning

4.3.4 Equipment/facilities

Six questions were asked regarding equipment or facilities. These were asked in line with the second research question, which was “What facilities are in place or needed for the UKZN library theses and dissertations digitization project?”

Respondents were asked in question 40, 41 and 42 if they had the necessary equipment to perform their digitization tasks and, if yes, to specify what equipment they had, and if no, to indicate what equipment they thought was necessary to perform their tasks.

Table 30: Basic equipment required for digitization tasks

N=21

Basic equipment	Frequency	Percent
Yes	19	90.5
No	1	4.8
Not Sure	1	4.8
Total	21	100.0*

**The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.*

The results in Table 30 above show that 19 (90.5%) respondents had the necessary basic equipment to perform their digitization tasks unhindered, one (4.8%) did not

have the basic equipment necessary to perform digitization tasks unhindered and one (4.8%) did not respond.

In response to questions 41 and 42, out of the 19 respondents that indicated they have the basic equipment to perform their digitization tasks, 14 (73.7%) responded to the question relating to what equipment they had. They all mentioned a computer/laptop, four (21%) of them mentioned a scanner and two (10.5%) mentioned a printer and software, in addition to the computer/laptop.

The respondents were further asked to indicate in questions 43, 44 and 45 whether or not they were satisfied with the equipment they had, and to indicate what made them satisfied or dissatisfied.

Table 31: Respondents satisfaction of the digitization equipment

N=21

Responses on satisfaction of the digitization equipment	Frequency	Percent
Yes	13	61.9
No	4	19.0
Not Sure	3	14.3
Non-response	1	4.8
Total	21	100.0

Table 31 shows that 20 (95.2%) respondents answered the question and one (4.8%) did not respond. Out of the 20 that responded, 13 (61.9%) indicated that they were satisfied with their working equipment, four (19.0%) were not satisfied and three (14.3%) were not sure whether they were satisfied with their digitization equipment or not.

When asked what made them satisfied or not satisfied with their digitization equipment, out of the 13 that were satisfied, 11 (84.6%) responded that their

computers/laptops were in good working condition and, out of the four that were not satisfied, three (75%) responded. Two (50%) indicated that their computers are too slow and one (25%) indicated that the library needed state-of-the-art equipment to produce results faster.

4.3.5 Staff training

Eight questions were asked under the heading staff training, in line with the third research question which asked “What training skills does the UKZN library staff have to handle the theses and dissertation project?” The researcher aimed at finding out if staff participating in the digitization project were trained and/or skilled to work for the digitization project.

In questions 46 to 53, respondents were asked whether or not they received training regarding digitization, as well as the type of training received and how it conducted. They were asked whether or not the training received, benefited them. Below are their responses to the questions.

Table 32: Digitization training acquired

N=21

Training on digitization	Frequency	Percent
Yes	16	76.2
No	4	19.0
Not Sure	1	4.8
Total	21	100.0

Table 32 shows that all 21 respondents answered the question on whether they received training or not. Out of the 21 respondents, 16 (76.2%) indicated that they received training on digitization, four (19.0%) indicated that they did not receive training, and one (4.8%) was not sure whether or not they received training.

Table 33: Digitization training method**N=16**

Training method	Frequency	Percent
By colleague	12	75
By colleague; By attending workshop	2	12.5
By colleague; External trainer; By attending workshop	1	6.3
Non-response	1	6.3
Total	16	100.0*

*The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.

Table 33 shows that out of the 16 respondents who indicated that they received training on digitization, 15 (93.7%) responded to the question and one (6.3%) did not respond. From the 15 that responded, 12 (75%) indicated that they were trained by a colleague, two (12.5%) indicated that they received training from both a colleague and by attending a workshop; one (6.3%) was trained by a colleague, external trainer and by attending a workshop.

Table 34: Digitization training

Relevance of training and additional training needs	Relevance of digitization training received N=16		Additional digitization training N=21	
	Frequency	Percent	Frequency	Percent
Yes	15	93.8	6	28.6
No	0	0	10	47.6
Not Sure	1	6.2	3	14.3
Non-response	0	0	2	9.5
Total	16	100.0	21	100.0

Table 34 shows that all 16 respondents who indicated that they received training on digitization responded to the question whether or not training received was relevant to assist them carry out their work on digitization. Fifteen (93.8%) indicated that the training they received was relevant and one (6.2%) was not sure.

Table 34 also shows that out of 21 respondents, 19 (90.5%) responded to the question whether they need additional training on digitization or not and two (9.5%) did not respond. Six (28.6%) indicated that they need additional training on digitization, 10 (47.6%) indicated that they do not need additional training on digitization and three (14.3%) were not sure whether or not they need additional training.

Follow-up questions were asked to the six respondents who indicated that additional digitization training was needed. Question 51 asked what further training do they still need and question 52 asked how that additional training will help the digitization project. Out of the six respondents, five (83.3%) responded to the two questions and one (16.7%) did not respond. From the five responses, two indicated that they need training on scanning to improve and speed up the process, one indicated that he/she needs training on uploading and archiving theses to be sure of what he/she is doing and to be able to archive and the other two were not specific and clear as to what training they needed. Their responses were:

- All training that is necessary so that more staff members will have an idea of what to do concerning digitization
- For growth and up to date to improve on processes,

Table 35: The number of digitization training sessions undergone by the respondents

N=21

Training sessions on digitization	Frequency	Percent
Less than 3 training sessions	11	52.4
Between 3 and 6 training sessions	4	19.0
More than 6 training sessions	1	4.8
Not aware of any training	5	23.8
Total	21	100.0

Table 35 shows that all 21 respondents answered the question. Eleven (52.4%) indicated that less than three training sessions were conducted for library staff on digitization, four (19.0%) indicated that there were between three and six training sessions conducted, one (4.8%) indicated that more than six training sessions were conducted and five (23.8%) were not aware of any training.

4.3.6 Staff support

Three questions were asked regarding the university and library management support, library staff support and university community support in line with the fourth research question, which was asked “How much support does the digitization of theses and dissertations project have from staff?” With this question the researcher intended to find out how the digitization was supported by library staff and the university as a whole, as well as how it was publicized/advertised to inform staff and management about the project for awareness and support purposes.

Table 36: Support received from the university management and university community

N21

Support	University management		University community	
	Frequency	Percent	Frequency	Percent
Very Weak	8	38.1	6	28.6
Weak	5	23.8	6	28.6
Neutral	5	23.8	4	19.0
Strong	2	9.5	3	14.3
Very Strong	0	0	0	0
Non-response	1	4.8	2	9.5
Total	21	100.0	21	100.0

Table 36 shows that 20 (95.2%) respondents responded to the question on university management support and one (4.8%) did not respond. Eight (38.1%) of the respondents feel that support from the university management is very weak, five (23.8%) indicated that university management support is weak, another five (23.8%)

were neutral and two (9.5%) indicated that the university management support is strong.

Table 36 further shows that 19 (90.5%) respondents responded to the question on university community support and two (9.5%) did not respond. Six (28.6%) feel that the university community support is very weak and the same number of respondents, six (28.6%) indicated that university community support is weak, four (19.0%) were neutral and three (14.3%) indicated that the support is strong.

Table 37: Support received from the library management and library staff

N21

Support	Library management		Library staff	
	Frequency	Percent	Frequency	Percent
Very Weak	2	9.5	2	9.5
Weak	8	38.1	9	42.9
Neutral	5	23.8	5	23.8
Strong	2	9.5	3	14.3
Very Strong	2	9.5	1	4.8
Non-response	2	9.5	1	4.8
Total	21	100.0*	21	100.0*

**The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.*

Table 37 shows that 19 (90.5%) respondents responded to the question on library management support and two (9.5%) did not respond. Two (9.5%) respondents feel that support from the library management is very weak, eight (38.1%) indicated that support is weak, five (23.8%) were neutral, two (9.5%) indicated that support is strong and two (9.5%) indicated that the library management support is very strong.

Table 37 further shows that 20 (95.2%) respondents responded to the question on library staff support of the theses and dissertations digitization project and one (4.8%) did not respond. Two (9.5%) respondents feel that library staff support for the digitization project is very weak, nine (42.9%) indicated that support is weak, five

(23.8%) were neutral, three (14.3%) indicated that the support is strong and one (4.8%) respondent feel that library staff support is very strong.

Table 38: Marketing method

N=21

Responses	Marketing digitization library-wide		Marketing digitization university-wide	
	Frequency	Percent	Frequency	Percent
Posters	1	4.8	1	4.8
Pamphlets	1	4.8	1	4.8
University/library website	1	4.8	3	14.3
Email alerts	1	4.8	0	0
Meetings	2	9.5	1	4.8
Word-of-mouth	1	4.8	2	9.5
Does not promote	12	57.1	10	47.6
Non-response	2	9.5	3	14.3
Total	21	100.0*	21	100.0*

**The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.*

Table 38 shows that 19 (90.5%) respondents responded to the question on the library digitization project promotion and maintenance library-wide and two (9.5%) did not respond. One (4.8%) indicated that the digitization project was promoted library-wide by means of posters, one (4.8%) by pamphlets, one (4.8%) by the university/library website, one (4.8%) by email alerts, two (9.5%) by meetings, one (4.8%) by word of mouth and 12 (57.1%) indicated that the library does not promote and maintain library-wide staff support for the digitization project.

Table 38 further shows that 18 (85.7%) respondents responded to the question on the library digitization project promotion and maintenance university-wide and three (14.3%) did not respond. One (4.8%) indicated that the digitization project was promoted university-wide by means of posters, one (4.8%) by pamphlets, 3 (14.3%) by university/library website, one (4.8%) by meetings, two (9.5%) by word-of-mouth and 10 (47.6%) indicated that the library does not promote it.

4.3.7 Technical support

Twelve questions were asked regarding technical support in line with the fifth research questions which was “What is the level of the technical support, for digitization of theses and dissertations?” Respondents were asked in questions 57, 58 and 60 to indicate whether or not the library has a technical person who understands the technical needs/issues for the digitization project. If yes, does it help to solve digitization-related technical issues and if not, would it help to have a technical person.

Table 39: Availability of a technical person

N=21

Technical person helping with digitization project	Frequency	Percent
Yes	7	33.3
No	10	47.6
Not Sure	4	19.0
Total	21	100.0*

**The percentages are rounded off to one decimal place and therefore may not add up to exactly 100%.*

Table 39 shows that all 21 respondents responded to the question on whether or not the library has a technical person who understands the technical needs of digitization. Seven (33.3%) respondents indicated that the library has a technical person who understands the technical needs of digitization, 10 (47.6%) indicated that the library does not have a technical person and four (19%) were not sure whether or not the library has a technical person who understands the technical needs of digitization.

A follow-up question 58 was asked to the respondents who indicated in question 57 (see Table 39 above) that the library has a technical person. It sought to discover whether or not having a technical person for the library helped solve digitization-related technical issues.

Table 40: Benefits of technical person

N=7

Benefits of having a technical person	Frequency	Percent
Yes	6	85.7
Not Sure	1	14.3
Total	7	100.0

Table 40 shows that all seven respondents responded to the question whether or not having a technical person for the library helped to solve digitization-related technical issues. Six (85.7%) of the respondents indicated that having a technical person for the library helps to solve digitization-related technical issues. One (14.3%) was not sure whether or not having a technical person for the library helps solve digitization-related technical issues.

Seven (33.3%) of the 21 respondents who indicated in question 57 (see Table 39) that the library does not have a technical person responded to question 59 on how the library deals with technical related issues. Four (19%) indicated that they do not know or are not sure how the technical related issues are handled, and the other three indicated that the technical related issues are referred to the digitization section and IT department.

Question 60 was asked to the 14 respondents who were not sure or indicated in question 57 (see Table 39 above) that the library does not have a technical person and whether or not it would help to have a technical person.

Table 41: Benefits of technical person

N=14

Benefits of a technical person	Frequency	Percent
Yes	11	78.6
Not Sure	3	21.4
Total	14	100.0

Table 41 shows that all 14 respondents responded to the question whether or not having a technical person would help resolve digitization-related technical issues. Results show that 11 (78.6%) respondents indicated that it would help to have a technical person in the library and three (21.4%) were not sure whether or not having a technical person in the library would help.

In question 61, respondents were asked to specify how having a technical person for the library helps in solving digitization related technical issues. The seven (33.3%) respondents who responded indicated that the person would be immediately available to solve server issues and fix other problems related to ResearchSpace, which would improve on the speeding-up of the uploading and archiving of theses and access to the database. On the issue of how they currently deal with technical related issues, only three responded to the question. One respondent indicated that they refer the matter to their digitization representative and the other two indicated that they do not do anything about it but wait until the problem is resolved and ResearchSpace is up and running.

From questions 62 to 67, respondents were asked questions which aimed at finding out how often they experience certain digitization problems, to find out how long does it usually take to solve technical issues, downtime issues, and to discover whether or not such issues affect the digitization processes.

Table 42: Digitization problems**N=21**

Responses	ResearchSpace not accessible		Handle* not available (theses not accessible)	
	Frequency	Percent	Frequency	Percent
Always	16	76.2	9	42.9
Hardly	4	19.0	11	52.4
Never	1	4.8	0	0
Non-response	0	0	1	4.8
Total	21	100.0	21	100.0

*Handle is the unique identification number allocated to each item archived in the repository

Table 42 shows that all 21 respondents responded to the question on how often they experience problems with ResearchSpace being not accessible. 16 (76.2%) indicated that they always experienced problems with ResearchSpace not accessible, four (19.0%) indicated that they hardly experience problems and one (4.8%) indicated that they never experienced problems with ResearchSpace not being accessible.

Table 42 further shows that 20 (95.2%) responded to the question on how often they experience problems on handle not available. Nine (42.9%) indicated that they always experience problems with regards to handle not available (theses not accessible) and 11 (52.4%) indicated that they hardly experienced problems with the handle not being available.

Table 43: Other problems**N=21**

Other technical related problems	Frequency	Percent
Always	3	14.2
Hardly	1	4.8
Non-response	17	81.0
Total	21	100.0

Table 43 shows that 4 (19%) responded to the question on how often they experience other technical-related problems and 17 (81%) did not respond. Three (14.2%) indicated that they always experience other technical problems related to the digitization project and one (4.8%) hardly experienced other problems. Three (14.2%) of the respondents specified 'slow response time' as the other problem experienced.

In question 63, respondents were asked to indicate how long it takes to sort out digitization-related technical issues.

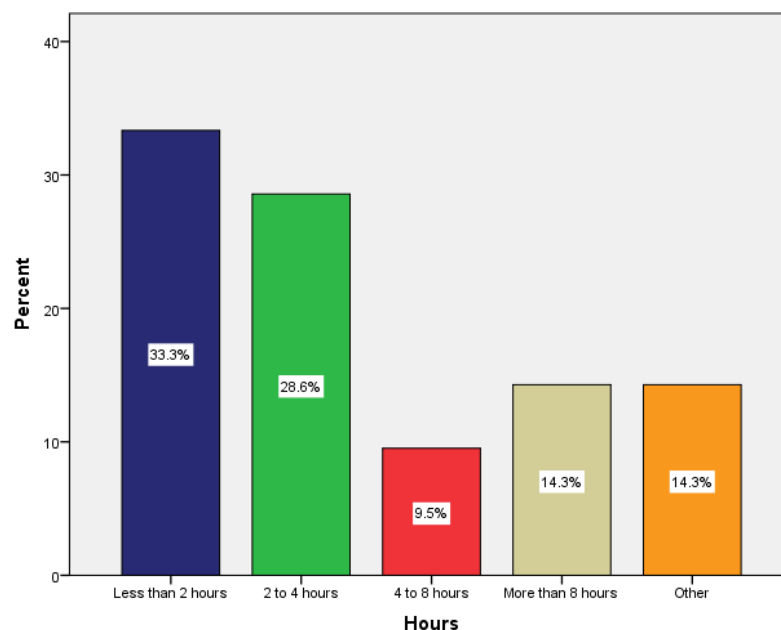


Figure 4: Period it takes to sort out digitization-related technical issues

N=21

Figure 4 shows that all 21 respondents responded to the question on how long it usually takes to sort out the digitization-related technical issues. Seven (33.3%) indicated that it usually takes less than 2 hours to sort out digitization-related technical issues, six (28.6%) indicated that it usually takes 2 to 4 hours, two (9.5%)

indicated that it takes 4 to 8 hours, three (14.3%) indicated that it takes more than 8 hours to sort out digitization related technical issues and 14.3% indicated other.

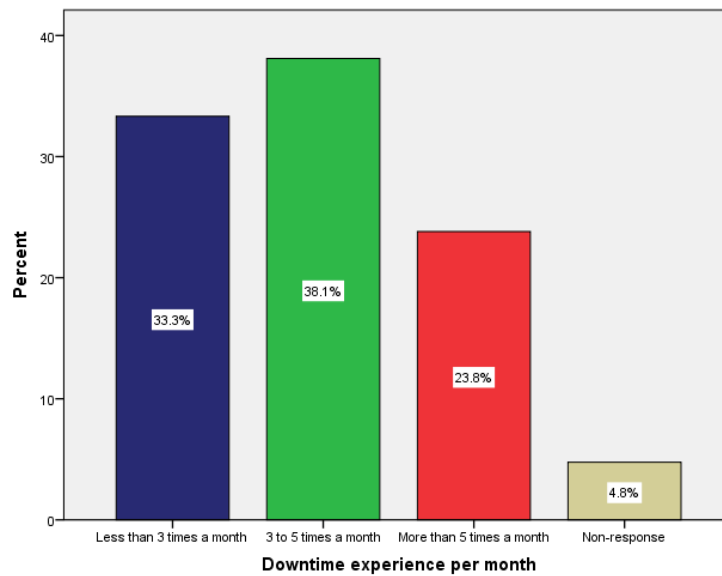


Figure 5: Showing downtime period experienced per month
N=21

Figure 5 shows that 20 (95.2%) respondents responded to the question on how much downtime they normally experience in a month and one (4.8%) did not respond. Seven (33.3%) indicated that they experience downtime less than 3 times a month, eight (38.1%) indicated that they experience downtime 3 to 5 times a month, five (23.8%) experience downtime more than 5 times a month.

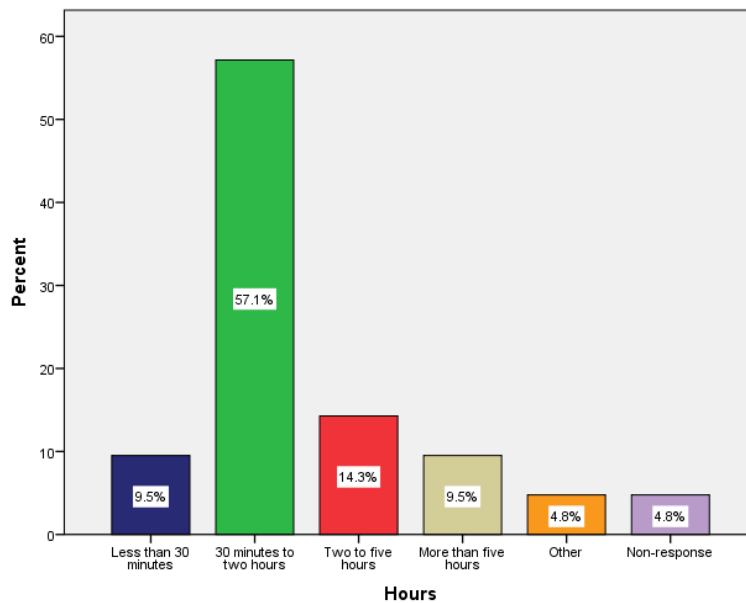


Figure 6: Showing period it usually takes to resolve downtime issues
N=21

Figure 6 shows that 20 (95.2%) respondents responded to the question on how long it takes to resolve downtime issues and one (4.8%) did not respond. Two (9.5%) indicated that it takes less than 30 minutes to resolve downtime issues, 12 (57.1%) indicated that it takes 30 minutes to two hours to resolve downtime issues, three (14.3%) respondents indicated that it takes two to five hours to resolve downtime issues, two (9.5%) indicated that it takes more than five hours and one (4.8%) selected other.

Table 44: Effect of downtime issues on digitization processes
N=21

Downtime effect on digitization process	Frequency	Percent
Yes	15	71.4
No	1	4.8
Not Sure	4	19.0
Non-response	1	4.8
Total	21	100.0

Table 44 shows that 20 (95.2%) respondents responded to the question on whether or not downtime issues negatively affect digitization processes. One (4.8%) did not respond. Fifteen (71.4%) indicated that downtime issues negatively affect digitization processes, one (4.8%) indicated that downtime does not negatively affect digitization processes and four (19.0%) were not sure whether or not downtime issues affect digitization processes.

4.3.8 Library challenges

Three questions were asked on the success rate and challenges experienced in the theses and dissertation project. Respondents were asked how they rate the success of the theses and dissertations digitization project and what they consider the challenges faced by the library.

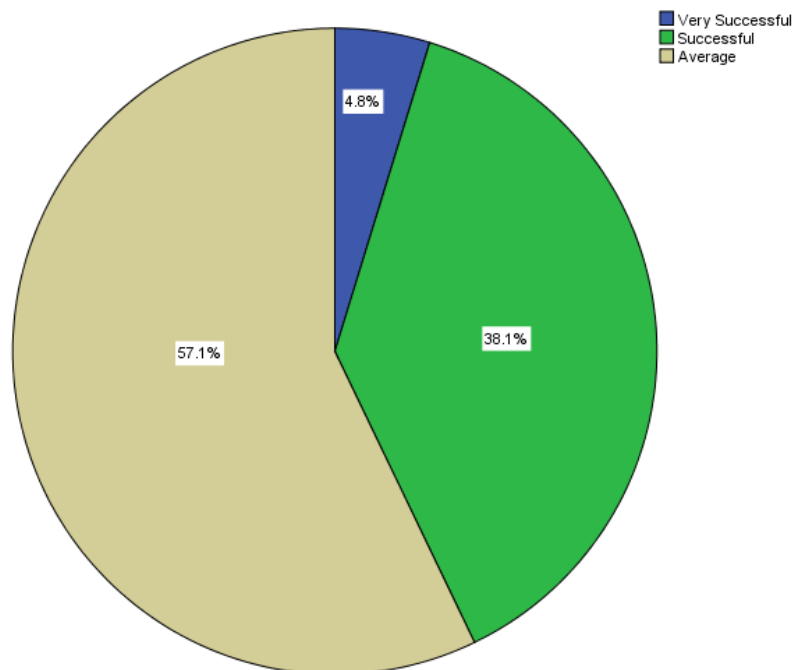


Figure 7: Rating for the theses and dissertations digitization project

N=21

Figure 7 shows that all 21 respondents responded to the question on how they rate the success of the theses and dissertation digitization project. One (4.8%) rated the

theses and dissertations digitization project as very successful, eight (38.1%) rated the project as successful and 12 (57.1%) rated the project as average.

Respondents were asked to indicate what they consider the major challenges in relation to understaffing, budget, library staff support, university community support, technical support, planning and workflow and any other issue they consider as a challenge.

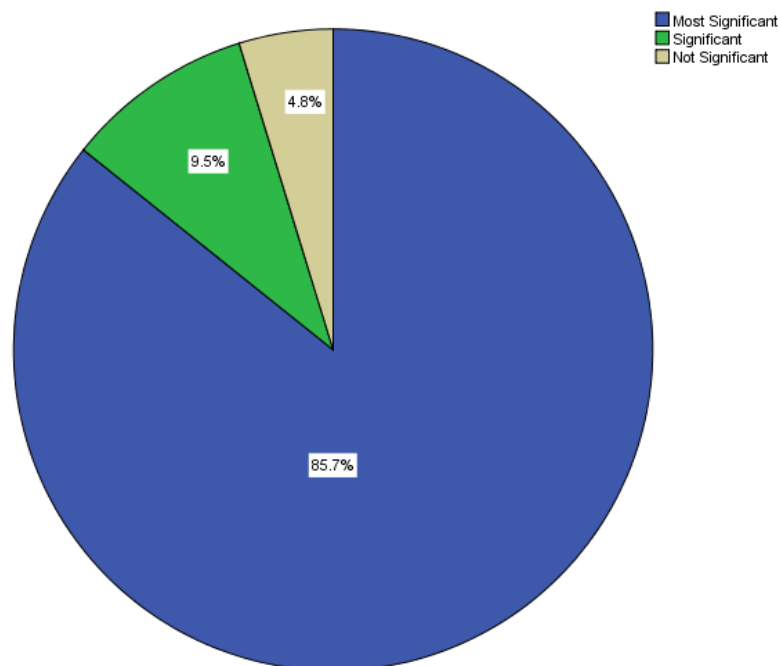


Figure 8: Understaffing
N=21

Figure 8 shows that all 21 respondents responded to the question on how significant understaffing it is as a major challenge; 18 (85.7%) respondents rated understaffing as a major challenge (most significant); two (9.5%) rated it as significant and one (4.8%) rated understaffing as not significant.

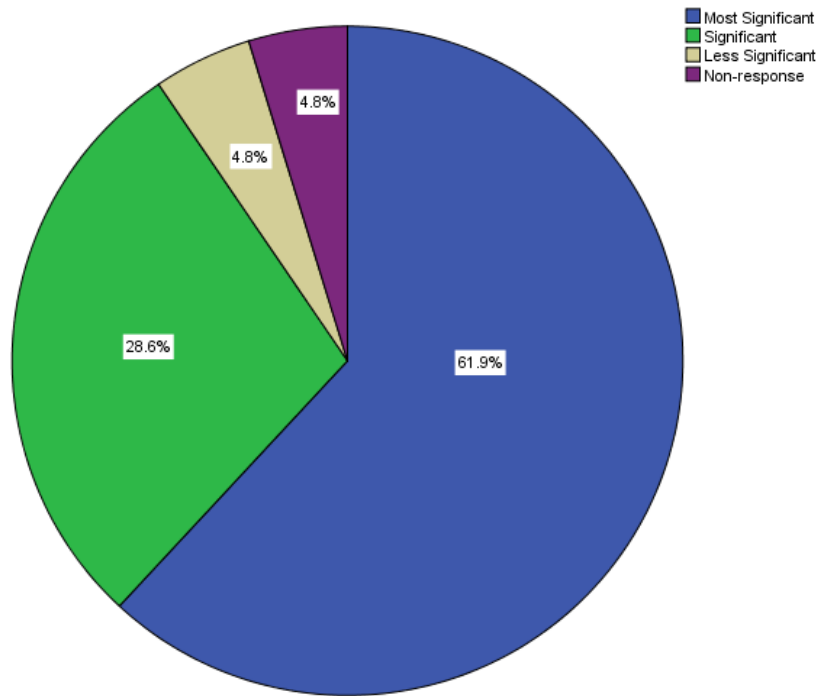


Figure 9: Budget
N=21

Figure 9 shows that 20 (95.2%) responded to the question on how significant the budget it is as a major challenge and one (4.8%) did not respond. Thirteen (61.9%) rated the budget as a major challenge (most significant) faced by the library, six (28.6%) rated the budget as significant and one (4.8%) indicated that the budget is less significant.

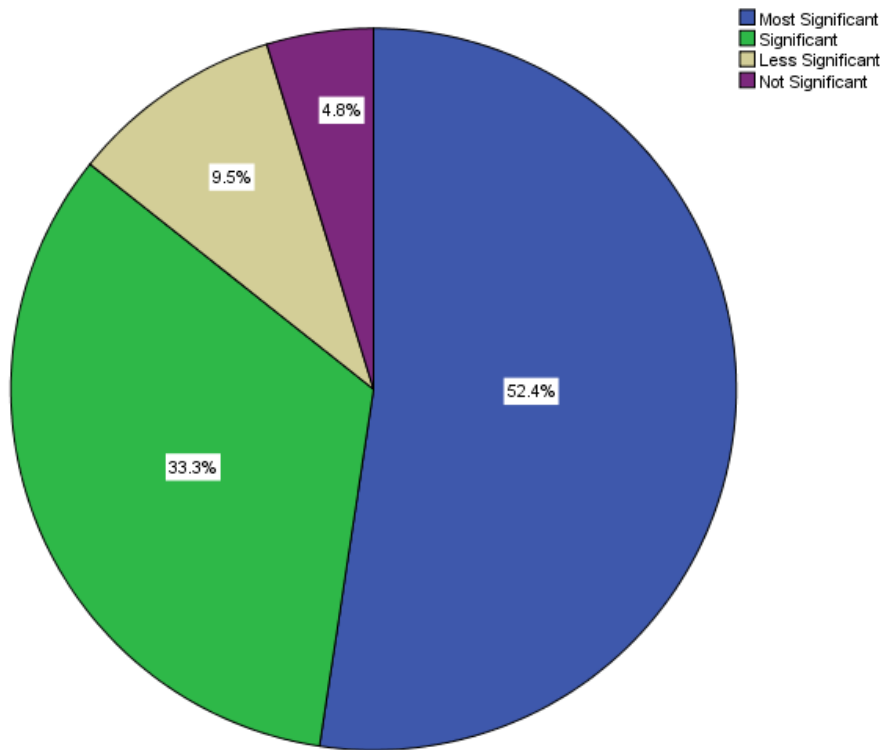


Figure 10: Library staff support
N=21

Figure 10 shows that all 21 respondents responded to the question on how significant library staff support is as the major challenge. Eleven (52.4%) rated library staff support as a major challenge (most significant) faced by the library, seven (33.3%) rated library staff support as significant, two (9.5%) rated library staff support as less significant and one (4.8%) indicated that library staff support is not significant.

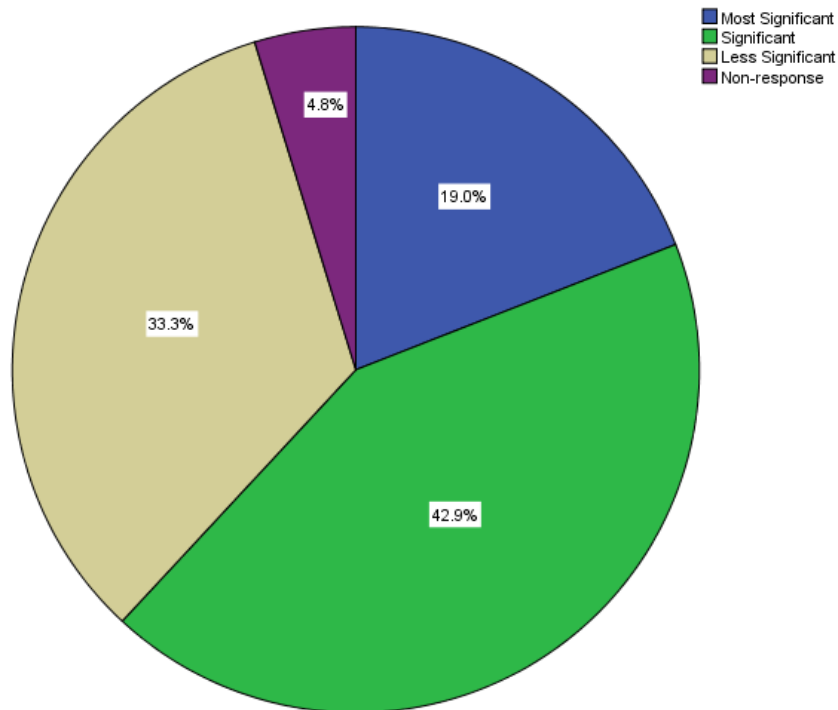


Figure11: University community support
N=21

Figure 11 shows that all 20 (95.2%) respondents responded to the question on how significant university community support is a major challenge. One (4.8%) did not respond. Four (19.0%) rated university community support as a major challenge (most significant) faced by the library, nine (42.9%) rated university community support as significant and seven (33.3%) indicated that university community support is less significant.

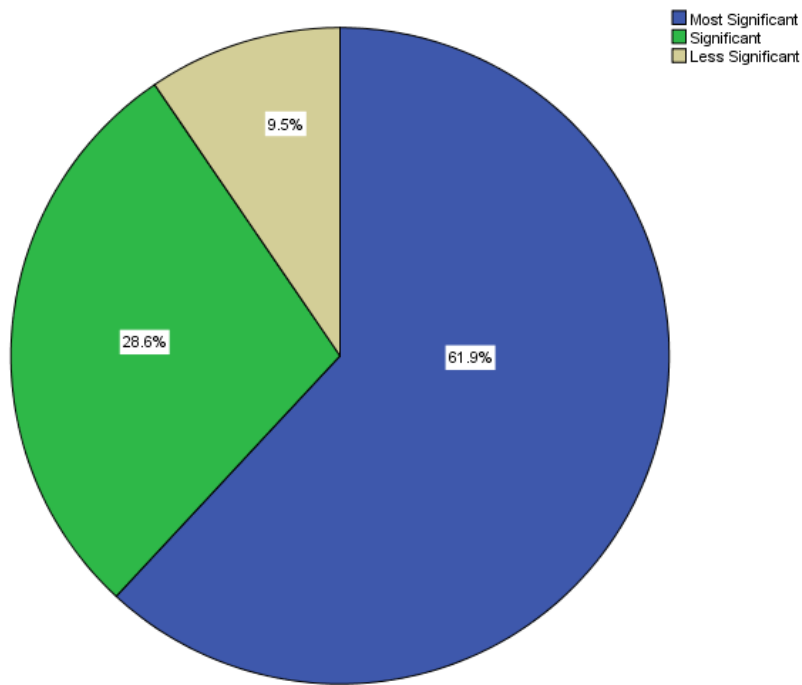


Figure 12: Technical support
N=21

Figure 12 shows that all 21 respondents responded to the question on how significant technical support it is, as a major challenge. Thirteen (61.9%) rated technical support as a major challenge (most significant) faced by the library, six (28.6%) rated technical support as significant and two (9.5%) indicated that technical support is less significant.

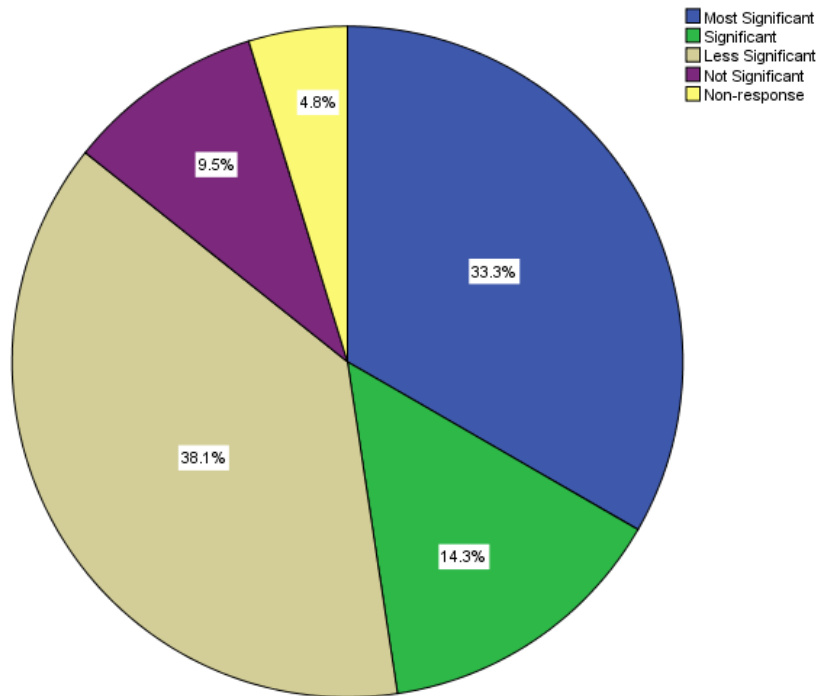


Figure 13: Planning
N=21

Figure 13 shows that 20 (95.2%) respondents responded to the question on how significant planning is, as a major challenge. One (4.8%) did not respond. Seven (33.3%) rated planning as a major challenge (most significant) faced by the library, three (14.3%) rated planning as significant, eight (38.1%) rated planning as less significant and two (9.5%) indicated that planning is not a significant challenge faced by the library.

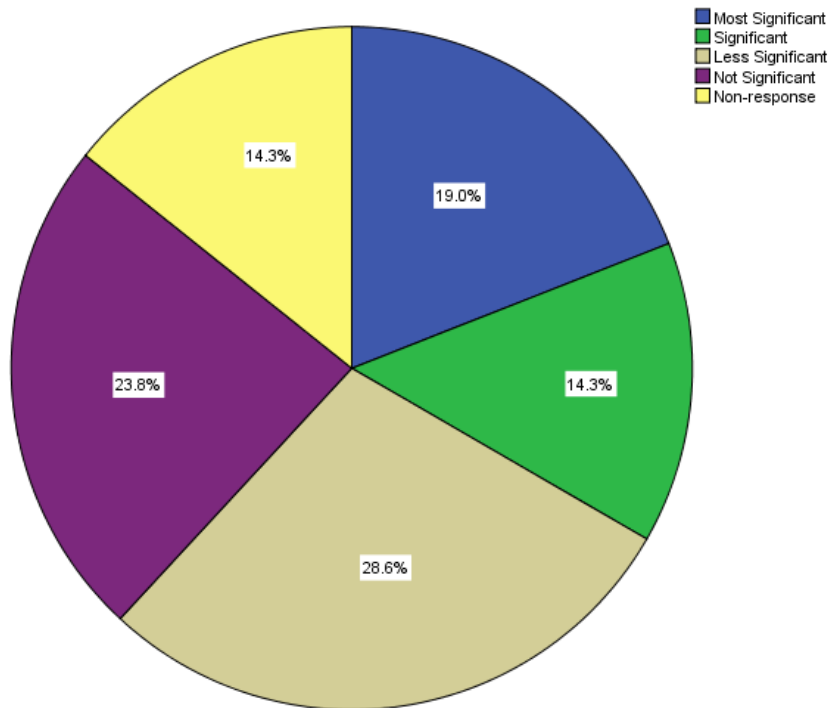


Figure 14: Workflow
N=21

Figure 14 shows that 18 (85.7%) respondents responded to the question on how significant planning it is as a major challenge. Three (14.3%) did not respond. Four (19.0%) rated workflow as a major challenge (most significant), three (14.3%) rated workflow as significant, six (28.6%) indicated that workflow is a less significant challenge faced by the library and five (23.8%) rated workflow as not significant.

Table 45: Other issues as major challenges faced by the library
N=21

Other issues	Frequency	Percent
Less Significant	1	4.8
Missing	20	95.2
Total	21	100.0

Table 45 shows that only one (4.8%) responded and rated other issues as less significant challenge faced by the library. Twenty (95.2%) did not respond to the question concerning whether or not there are other major challenges faced by the library.

Question 70 asked the respondents to provide possible solutions for any of the major challenges identified in question 69. Responses to different categories were the following:

Table 46: Possible solutions to major challenges

CHALLENGE	POSSIBLE SOLUTION
Understaffing	Hire new staff for the project. Let other library staff be involved with the project
Budget	Increase the budget. List the digitization project as a budget item. Do fund-raising for the project.
Library staff support	Do awareness campaigns. Make sure all library staff is aware of the project. Market the project.
University community support	Do awareness campaigns. Make sure all library staff is aware of the project. Market the project.
Technical support	Train more staff in IT. Employ technical staff and get library dedicated technical staff.
Planning	Have more meetings
Workflow	Create a template with step by step.

4.4 FACE-TO-FACE INTERVIEW RESULTS

The face-to-face interview questions were based on the same type of questions as those for the questionnaire. Eleven library staff were requested to participate in the face-to-face interview, based on their positions and involvement in the digitization project, either as Library Management and/or Library Digitization Committee. The targeted 11 included five (45.5%) Library Management (Director and four Campus Librarians), and six (54.5%) members of the Digitization Committee. The researcher was able to secure appointments with nine (81.8%). Questions asked of the interviewees covered nine sections. Responses from the nine interviewees were coded and analysed. These responses are summarized below, according to the nine sections.

4.4.1 Demographics

The interviewees were made up of two (22.2%) males and seven (77.8%) females. Three (33.3%) of the interviewees were above the age of 50, and six (66.7%) were between 41 and 50 years of age. Interviewees were five (55.6%) members from Library Management and four (44.4%) from the Library Digitization Committee. The four members of the Digitization Committee were all from the Information Services section.

4.4.2 General questions

When asked if they were formally informed of the theses and dissertation digitization project, eight (88.9%) responded to the question and one (11.1%) did not respond. All eight (88.9%) respondents indicated that they were briefed about the digitization project during meetings.

On the question of whether or not the library has a digitization department, three (33.3%) of the people interviewed stated that there is a digitization department, one (11.1%) said a definite no, and five (55.6%) indicated that there was a section which operates with two staff on secondment and that there will soon be a fully-fledged digitization department which was reflected in the new library structure.

In relation to concerns relating to the progress on the digitization project with other departments and campuses, the issues that were raised ranged from problems with communication and transporting of theses from other campuses to Howard College where the project is run. Lack of communication within departments and campuses results in theses being scanned more than once and transportation affects the workflow as theses sometimes did not arrive in time for the scanning process to start. This stalls the digitization progress.

One of the interviewees was quoted as saying:

Campuses work in silos. There has to be communication. There is a need to talk and work as a team so as to be part of the library as a whole.

Another one was quoted as saying:

Duplication of theses is happening often because there is no communication. We do not know who to communicate with, and who makes decisions to resolve digitization queries.

4.4.3 Strategies and policies

On the issue of strategies and policies, everyone interviewed was positive of the fact that the library has a strategic plan, but when it came to the digitization policy, only two (22.2%) confirmed that there was a digitization policy in place. Seven (77.8%) interviewees responded that there was no digitization policy in place.

With regards to how the digitization project referenced in the strategic plan, most of them did not have anything to say, and those who did, mainly spoke about the new digitization unit that was about to be established.

4.4.4 Equipment/facilities

The general view on the availability of the equipment for the digitization project was that, even though the computers and scanners are there, the digitization project

needs to have its own offices with high-tech equipment to ensure more speed and efficiency with the processes.

4.4.5 Staff training

Eight (88.9%) interviewees indicated that they received training on the theses and dissertations project even though some of them were not directly involved in the digitization project and one (11.1%) indicated he or she did not receive any digitization training. When asked what the criteria were to decide who should attend training, most of them claimed that all staff involved in the digitization project received training.

They were further asked, as members of library management and/or the Digitization Committee, whether or not they have ever organized training for digitization staff and what training it was they organized. Two (22.2%) of the interviewees indicated that they organized one-on-one training. One (11.1%) indicated that he/she organized the initial training and made sure that everyone involved attended. Six (66.7%) indicated that they had never organized training.

Interviewees were asked if continuous staff training was necessary and why? Most of them felt that continuous training for digitization was necessary, to ensure confidence in staff and more positive attitudes. Database versions change now and then and staff need to be up-to-date with the changes. One was quoted saying “we are dealing with IT, which is very dynamic. Now we are using new DSpace platform which needs training. Trial and error delays progress.”

4.4.6 Staff support

With regards to promoting the digitization project and gaining staff support within the university management, university community, library management and library staff, there were a variety of responses from the interviewees. Three (33.3%) interviewees felt that the theses and dissertations digitization project was well advertised in all of

the four above-mentioned categories. Four (44.4%) interviewees had different views about promotion and support. Some felt that the project was only promoted within the library and only to those involved in the project. They felt that some of the library staff did not know anything about the project. Other interviewees indicated that, even though the project was promoted in the three areas (library management, university management and library staff), it was only in some segments of those areas, like the research office and subject librarians. The last two (22.2%) interviewees stated that the projects were never promoted and, as a result, do not have that much support, especially from academics.

Those who indicated that there was promotion and support for the theses and dissertations digitization project stated that promotion was done by means of user education, meetings and word-of-mouth.

4.4.7 Technical support

The interviewees were asked if the library had library-based technical staff who understands the technical needs of digitization to be able to help out with technical issues, whenever necessary. Eight (88.9%) interviewees indicated that the library did not have a library-dedicated technical person, but a person is being trained to be able to support the project from a technical point of view. One (11.1%) interviewee pointed out that this was catered for in the new structure, which has a systems manager, and the issue of having a library-based technical staff who would be able to take care of the IT-related issues. The person added that the library was heading in that direction.

The technical-related problems usually experienced were identified as DSpace not working, server down or system too slow. Harvesting data was mentioned by one (11.1%) of the interviewees as a problem that needs to be solved. Some of the people interviewed did not know how often and how long it takes to resolve technical problems, because they are not working directly with the project, but are informed

about problem issues in meetings as managers. Those who responded indicated that technical problems did not happen often, and that the length of time to fix them depended on the type of problem, ranging from a couple of hours to a few days.

4.4.8 Library challenges

Most interviewees indicated that the project was 70% to 90% complete. Some of the campuses are completely finished with theses and dissertations that had to be done, based on the decision to digitize all doctoral and masters theses up to the year 2000.

When asked about the success of the project, seven (77.8%) of the interviewees indicated that the project was a success, and the other two (22.2%) were not sure whether or not the project was successful. One (11.1%) interviewee indicated that the project's success was based on the high usage of digitized theses and dissertations, especially the doctoral theses.

The main library challenge that was identified by most interviewees was not having leadership or a supervisor, as well as using staff from other sections, instead of the unit having its own department and staff. Other issues that were identified as challenges are hardware problems, funding and expertise.

4.4.9 Time and budget

The interviewees were asked if they were involved in decision-making concerning the budget and staff support. Three (33.3%) interviewees indicated that they were involved, five (55.6%) indicated that they were not involved and one (11.1%) did not comment. When asked who else was involved in the budget and staff support decisions, the common response by the five (55.6%) interviewees was that it was the Director of Libraries. Other responses ranged from Director and Head of Research, Director and other staff that initiated the project, Director and Library management, and one (11.1%) interviewee indicated that the new library structure would address the issue of handling the budget and staffing issues. At the moment it was not clear.

On responding to the question whether or not the digitization costs fit within the planned budget and if the project was worth the cost, six (66.7%) of the interviewees were positive of the fact that the costs fit with the planned budget and that the project is worth the cost. The remaining three (33.3%) interviewees were not sure of whether the costs fit within the planned budget, but positive of the fact that the project was worth the cost. They all felt that it promoted either visibility and/or accessibility. One (11.1%) interviewee pointed out that it is the university's pride to see its researchers work getting exposure through digitization.

When asked if the library has enough time to complete the retrospective theses and dissertation digitization project, most responses were yes, the project was almost complete. Only one (11.1%) interviewee did not think so because "human resources is becoming thinner and thinner."

4.5 SUMMARY

In this chapter the researcher presented the data analysis of the data collected from both questionnaires and interviewees. The researcher gave an indication of the number of returned questionnaires and the number of conducted interviews. The methods used to analyze both the quantitative and qualitative data were indicated. The results were presented.

Chapter 5 discusses the research findings based on the data analysis dealt with in Chapter 4

CHAPTER 5

DISCUSSION OF THE RESEARCH FINDINGS

5.1 INTRODUCTION

The presentation of the research findings enabled the researcher to make a number of important observations, upon which conclusions were drawn. Each one of these observations is discussed briefly in this chapter.

This study concerned the theses and dissertations digitization project at the UKZN. The motivation for the researcher to do this study was that the UKZN library embarked on a digitization project to enhance access to research. This project was part of the UKZN's vision of being the premier university of African scholarship. The project was scheduled to be completed in a period of two years, from 2009 to 2011. This raised concerns for the researcher to discover whether or not there were any problems and/or challenges experienced. The research problem revolved around investigating and sharing the experiences and challenges encountered by the UKZN library in the digitization project of its theses and dissertations and to use this investigation as a learning curve for other institutions that are yet to embark on projects of this nature.

The researcher hoped to contribute towards improving the digitization processes and address the challenges and prospects of digitization. The researcher also hoped to be able to make recommendations on identified issues to form a basis of providing the way forward to a successful digitization process of theses and dissertations, by looking at the following research questions:

- What digitization strategies and policies are in place at UKZN?
- What facilities are in place or needed for the UKZN library theses and dissertations digitization project?

- What training skills do the UKZN library staff have to handle the theses and dissertation project?
- How much support does the digitization of theses and dissertations project have from the staff involved in the project?
- What is the level of the technical support for digitization of theses and dissertations?

The researcher was guided by two theories and a Data Curation Lifecycle Model. The two theories, Communications and Conversations Theories, helped the researcher to observe the role played by conversations engagements within stakeholders throughout the UKZN digitization project as one of the key issues towards the success of the project. The engagement with stakeholders, as was discussed in section 2.10.14, Communication and co-ordination, was demonstrated by the minutes taken at various meetings on 2 October 2008 and few other meetings in 2010. The Data Curation Lifecycle Model helped the researcher to understand the digitization process and to identify steps implemented in the UKZN digitization project.

In this chapter the researcher presents the findings based on the research conducted at the UKZN library involving staff that were part of the digitization project, in one way or another. Thirty-six staff members were targeted to participate in the study because of their involvement in the project. Out of the 36, 25 (69.4%) were emailed questionnaires to participate in the self-administered questionnaire. Only 21 (84%) responded; 11 (30.6%) were to participate in face-to-face interviews, and only nine (82%) were available. In other words, all-in-all, 30 (83%) participated in the study.

5.2 DEMOGRAPHICS

It is generally assumed that women have more empathy and patience than males. Looking at the nature of the digitization process, it could be argued that it requires staff that are patient and prepared to do a job that is, in a way, monotonous. The

results of this study show that more women were participating in the UKZN library theses and dissertations digitization project. The researcher views this as a positive aspect in the digitization process at the UKZN library.

The results of this study showed that most of the staff members involved in the digitization project were above the age of 40, with only a small number of respondents below the age of 40. It is a known fact that young people are relatively more energetic than older people. According to Wells (2008-2014:Who's looking forward...), young people are usually future-oriented and they see their life ahead of them. As a result they are more enthusiastic about technologically related work than older people, who see their life in the past, and therefore tend to be more enthusiastic about the past than the future. Digitization of theses and dissertations is seen to be one of the future innovations of the library. The results of this study based on comparisons of sections and time spent on digitization (Chapter 4, Tables 18 and 19 under section 4.3.2.2), for instance, show that staff above the age of 40 working in the digitization section spent fewer hours on digitization in comparison with staff below the age of 40. It can therefore be reasoned that age plays a role in the enthusiasm of staff in relation to technology.

In view of the quantity of theses that are already with the University, but still not yet digitized, and the fact that the digitization project requires technologically-wise individuals, it could be concluded that a relatively young staff is required in this section. The digitization project would benefit more people if there were younger staff involved. Comparatively speaking, younger people are relatively more knowledgeable about electronic equipment than older people. Asogwa and Ezema (2012:123) revealed that, due to inadequate skills in information technology in Africa, many traditional librarians and archivists are conservative and have phobias about computers. Because of the generation gap between the new and old professionals, computers are perceived as a threat to their status as experts. According to Nickson (2013:How a young generation ...), the younger generation do not know any life

without technology; it has it's been part of their lives from an early age. Nickson, (2013:How a young generation ...) stated that:

Where older people fear they'll either break something or change the settings beyond repair, the young understand that everything can be put back the way it was, quite easily. Technology doesn't scare them.

Results showed that more staff involved in the digitization project were from other departments, namely, information and technical services. The literature reviewed, using the University of Stellenbosch's guidelines, indicated that there has to be personnel working on the digitization project. The digitization section has only two staff members, who, as learnt from their responses, are seconded on a temporary basis. The digitization of theses and dissertations relies more on library staff from other sections who have other responsibilities and the digitization of theses and dissertations was not necessarily their first priority. It is important that a proper staffing model, which includes digitization, is devised when formulating the digitization process. For example, if the university library decides on engaging in the digitization project(s), proper planning as to how the staffing model will work must be discussed and decided prior to the actual start of the digitization process.

Experience is very important in any project one can be involved in. An experienced person learns from past mistakes and becomes better prepared for similar challenges in the future. The researcher's assumption was that staff members who had been involved in the digitization project before would be able to identify possible challenges, even if circumstances were different. Such staff members could use their experience to predict possible challenges and possible solutions to them. In this study, the majority of the respondents indicated that they had been involved with the digitization project for at least a year, which puts them in a better position to understand the processes in the digitization project. It can be concluded that the theses and dissertation digitization project was indirectly (in the sense that staff that

were involved in the digitization project belonged to technical and information services, even though they had been part of the digitization project for a long period) equipped with staff who have experience in the digitization processes and understand the procedures.

5.3 BACKGROUND

The researcher had to be familiar with the background of the theses and dissertation digitization project. The researcher asked a number of questions using self-administered questionnaires and interviews. The first step was to find out whether or not respondents had anything to do with the digitization project. From the 21 who responded to the questionnaire, 18 (85.7%) had something to do with the digitization project. The remaining three (14.3%) indicated that they were not involved. The researcher was confused by the three (14.3%) who indicated that they were 'not involved' because, when asked to indicate the functions they perform in the project, all of them except one (4.76%), who did not respond, selected one or more from seven options, which ranged from selecting theses for digitization, preparing theses, scanning, submitting, creating metadata, archiving and doing quality control. Regarding the question about time spent on the digitization project per day, all respondents indicated the amount of time spent. Based on these responses, the researcher believes that all respondents were involved in the digitization project, otherwise they would not have been involved in any of the functions performed or indicated time spent on the digitization project.

From the interview responses, most of the library management team indicated that their involvement goes as far as discussion and decision-making meetings in relation to the digitization project. They indicated that they were not directly involved, but are aware of the project, with the exception of two, who responded that they were directly involved. The four members of the Digitization Committee answered that they were part of the digitization project and were directly involved. The researcher therefore concludes that, regardless of the confusion in responses, all staff that participated in

the study were somehow involved in the digitization project and therefore eligible for inclusion according to the selection criteria that were used, as indicated in Chapter 3, sections 3.3.7 and 3.3.8.

Regardless of the fact that most of the respondents were directly or indirectly involved in the digitization project, there were different responses concerning whether or not the library has a digitization section. Most of them, from both the questionnaire and interview responses, said that the library has a dedicated digitization section, even though most from the interview responses indicated that there are people seconded to work in the digitization, not as a department *per se*, and that there are proposed plans for a digitization section in the future. There was, however, a that small percentage from both groups that indicated that there was no dedicated digitization department. These contradicting responses were confusing and of concern, more especially coming from the Digitization Committee members and library management. One would expect at least a uniform response from this group, rather than completely contradicting responses, as one believes that that is where management and digitization related planning and decisions were made, then spread and discussed with other staff members, particularly those involved in the project. From these contradicting responses, the researcher is of the opinion that not much liaison was happening with regards to the digitization project, for staff members to know whether or not they have a digitization section, or to understand the organization of the digitization project.

By implication, the researcher assumes that respondents were aware of the poor communication, planning and control of the digitization process. This was gathered from their responses when they were asked how having a dedicated digitization department helps to improve digitization processes. Those who responded indicated that having a dedicated department would help improve on communication, planning and control of the processes.

The two theories, Communication and Conversation theories, guiding this study refer to the exchange of information between at least two people and further indicate that individuals, organizations and even societies build knowledge through conversation; specifically, by interacting and building commonly held agreements.

Lack of communication within the digitization project was further revealed by the responses in relation to the concerns they have regarding the digitization progress with other departments within the library and with other campuses within the university. As indicated in Chapter 2, under Communication Theory in relation to this study, section 2.2.1.1, Levy and Marshall (1995:77) pointed out that dialogue engagement is the most crucial element in a library digitization project. The issue of no communication and proper planning were raised as some of the concerns which affected the digitization processes, both in the different libraries and on the five campuses. These concerns relate to duplicate scanning of theses and workflow, due to lack of teamwork and transportation of theses and dissertations from one campus to another because there were no clear communication lines as to who to refer issues to whenever there were queries.

The fact that most respondents felt positive about a dedicated digitization section (department) having a great impact on improving digitization process makes one believe that a lot of issues, such as better control and planning that were identified or pointed out throughout the questioning, would improve. The assumption is that, with the existence of a fully-fledged digitization department, the digitization processes of theses and dissertations would have been completed within the period that was stipulated, or would have been completely finished not far from the indicated deadline of two years. This is supported by the number of hours spent by each of these respondents at a time. Time spent obviously indicates that respondents from other sections spend less time in the project, as they have other responsibilities to attend to, than those who are in the digitization section.

The respondents were asked to indicate what functions they perform in the digitization project. Looking at their responsibilities and considering the overlapping of functions, the results showed that, out of the 20 responses from the questionnaires, four selected theses and dissertations to be digitized, three prepared them for digitization, two scanned theses and dissertations, 16 submit or upload the theses to the database, six create metadata, five archived the theses and dissertations, one did not explain what he or she did, and three carried out quality control.

Based on these results, the researcher was of the view that the digitization project had uneven and unclear distribution of some tasks, especially taking into account that the respondents working on the project are mainly from other sections. It is assumed that if roles were distributed evenly, there would have been better output on the digitization processes instead of having one or two people with more responsibilities than others, and yet the project seemed to be an additional workload for all of them, except for the two based in the digitization section.

The results of the study show that there was much overlapping and imbalance of roles for the UKZN digitization project, whereby some staff had to either upload, archive, do quality control or perform more than one of the digitization roles, in addition to their daily duties as subject or metadata librarians. The Library Digitization Committee was aware of this issue as a concern, as it was recorded in the minutes of the Institutional Repository meeting, held on 23 November 2011, that “there is an imbalance in terms of the number of submitters and archivers”. This needed to be addressed as it resulted in delays when it came to the archiving process (UKZN Library Institutional Repository Committee Meeting, 2011).

5.4 STRATEGIES AND POLICIES

The first research question of this study involved strategies and policies. It aimed to investigate whether or not the digitization strategies and policies are in place at

UKZN? According to DCC Curation Lifecycle Model, the initial stages must include preservation strategy and guiding policies. The literature reviewed in Chapter 2 under section 2.8, guidelines for starting an institutional repository (IR), showed that the University of Stellenbosch library provided seven steps to consider when starting an IR, whereby digitization policy formulation is regarded as a priority and the very first thing to do when starting an IR.

As discussed in Chapter 2, digitization strategy and policies, section 2.10.4, a digitization strategy is a document, the main aim of which is to provide focus and vision concerning how the whole process of digitizing whatever information that must be digitized is carried out. It also provides direction as to which activities must be prioritized, given the challenges of budgetary constraints and shortage of adequately trained staff members. It is a document that provides the way forward in terms of linking the whole digitization process with the overall vision and mission of the institution, in this case the UKZN. The literature review in Chapter 2, under digitization strategy and policies, section 2.10.4, showed that communication among all the stakeholders is paramount in the formulation of the digitization strategy. In view of these considerations, it would be inadequate to answer this research question without investigating whether or not the UKZN *did* adequately consult with its stakeholders.

Information made available to the researcher in the study revealed that there was sufficient consultation amongst stakeholders at the UKZN. This was shown by the minutes taken at the Institutional Repository Committee Meeting made on various dates in 2010 (for example, 23 March; 18 May; 1 June, 6 July). The UKZN consulted extensively with regard to the policy that would be adopted on copyright issues and there was also a visit of one academic doctor from the Ivory Coast, who was consulted on his experiences with regards to the digitization project. Furthermore, as mentioned in the literature reviewed in Chapter 2, under communication and co-ordination, the UKZN library ensured that the requirements of the Department of

Education (DoE) were met. This was demonstrated by the minutes taken at the meeting to discuss the Electronic Theses and Dissertation (ETD) pilot project, on 2 October 2008. These minutes indicated that various faculties that were involved, for example, a professor suggested at the Senate Advisory Committee Meeting that the various Higher Degrees Committees in every faculty had to be involved. The mere fact that there were a number of meetings with the Registrar of the University and the Professor of Health and Demographic Surveillance Systems (HDSS), Graduate School, also suggests that stakeholders *were* consulted.

There was also extensive communication between the UKZN's Copyright office and Digital Innovations South Africa (DISA), who were tasked the by UKZN to help in this digitization process.

In view of what could be construed as extensive consultation amongst stakeholders, it would be expected that the same kind of consultation was done with library staff members. One would have thought there would not be any confusion on whether or not there was a library strategic plan referencing the digitization project and digitization policies in place. However, from responses to the availability of the library digitization policies and the strategic plan, the study shows that there is much confusion from both questionnaire results and face-to-face interview results. Eight of the interviewees agreed that the library strategic plan was in place and the quantitative data shows that, out of the 21 respondents, six (28.6%) of them were not sure whether or not UKZN had a library strategic plan referencing digitization and 14 (66.7%) said there was one. These results are cause for concern, because the library strategic plan does exist, as shown by information provided in Chapter 1, under the digitization of theses and dissertations at UKZN, section 1.5. Perhaps the university library management needs to communicate it even more vigorously, for everyone to see.

The majority of the interviewees that were interviewed are managers and those that are not managers are part of the Digitization Committee. In view of this fact, one would have thought all of them knew whether or not the UKZN library has a digitization policy, yet all of them, with the exception of one, were not sure whether the policy existed or not. This casts doubt on the quality of communication that was discussed above. The quantitative data obtained from the study showed that, out of the 21 respondents, only eight (38.1%) indicated that the library has a digitization policy, 11 (52.4%) were not sure and two (9.5%) said the policy did not exist. Looking at these contradicting answers, one really cannot tell whether the digitization policy does exist or not. It must be noted though that most of the participants were not members of the management team but were library staff, mostly librarians. Perhaps these contradicting responses between management and library staff should make one question the quality of the consultation process that initially was thought to be extensive.

In short, the answer to the above research question was that the UKZN library does have a digitization strategy, but it needs to be better communicated to stakeholders, especially library staff members. Based on the responses relating to the availability of digitization policies, it must be concluded that the UKZN library does not have digitization policies and that, if it does, they are not visible and/or well communicated to library staff members, regardless of their positions or sections. This was a challenge faced by university libraries in Nigeria, according to the study on the digitization of past question papers, dissertations and theses in the 30 Nigerian university libraries conducted by Alhaji (2007:233). Alhaji (2007:233) stated that, even though the librarians were aware of the importance of digitization, they did not have policies guiding the process. This is exactly what seems to be the problem for the digitization project at the UKZN library.

5.5 EQUIPMENT/FACILITIES

The second research question of the study asked what basic facilities the UKZN library needs for the digitization of theses and dissertations.

It has been discussed in the literature review that setting up ICT infrastructure is one of the main components in the planning of a digitization project. The digitization of theses and dissertations requires that the library must have the necessary equipment in order to enable staff to be able to perform their duties adequately. The basic equipment for digitization includes hardware equipment, in the form of at least a working computer and at least a flat-bed scanner for scanning the hard-copy theses. The results of the study show that the majority of respondents were satisfied with the equipment they have, which includes computers and scanners. It can be concluded that the theses and dissertations digitization project were satisfactorily equipped.

5.6 STAFF TRAINING

The third research question asked what training skills the UKZN library staff have to handle the theses and dissertation project? Even though, as pointed out by Hammond and Davies (2009:16), staffing requirements for digitization projects differ from most roles in a university, specific skills are required for digitization projects. Sometimes it is not easy to get the right people with such skills. Hammond and Davies (2009:16) advised that more time be invested in staff training, before the start of the project, for the smooth running of the project. One of the six actions in the Conversation Theory refers to identifying skills in which, as pointed out by Klemm (2002:4), workers can pool their skills to solve the problem at hand.

The results of the present study revealed that most of the staff involved in the digitization project received training. Out of all the staff who responded, either through a questionnaire or interview, only one indicated that he/she did not receive training and gave the reason that he/she was not going to be directly involved in the

digitization project. Six (28.6%) of the respondents did not respond. This could be because they either did not have training or they just decided not to respond.

Based on these responses, the researcher concluded that digitization training was carried out. A follow-up question was how they were trained and how many times they were trained. The results show that most of the respondents, 15 (71.4%), indicated that they were trained by a colleague. Three (20%) of the 15 respondents that were trained by a colleague attended a workshop and/or were trained by an external trainer, in addition to the training by a colleague. The researcher was, however, confused by the fact, that when asked how often they received training, 16 (76.2%) responded and yet only 15 (71.4%) had indicated that they had received training. This confirms the researcher's assumption that the six (28.6%) respondents did not respond because they either did not have training, or they simply decided not to respond.

Eleven (52.4%) of the respondents indicated that they received fewer than three training sessions, four (19%) received between three and six training sessions and one (4.8%) received more than six training sessions. Regardless of the training received, 15 (71.4%) responded that the training received was helpful and one (4.8%) was not sure if the training was helpful or not. The researcher concluded that training of staff involved in the digitization project was done efficiently for the staff to be able to work effectively and with understanding of their roles in the new environment of digitization.

As was discussed in Chapter 2, staff training for digitization projects, section 2.10.5.2, staff training was one of the most crucial elements in the digitization project. It was necessary for digitization staff to have continuous training. In support of this statement, Amollo (2011:23) indicated that there is much new technology emerging and library staff involved in digitization must be trained continually. This was also discussed in the face-to-face interviews, where interviewees felt that continuous

training was necessary, to ensure confidence and more positive attitudes in staff. The interviewees pointed out that database versions change constantly and staff need to be up to date with the changes. Amollo (2011:23) suggested that local and national workshops must be organized for digitization staff, not only to digitize, but also to “address issues related to copyright law in a digital environment and how digital libraries can address copyright issues.” It was also important for staff to have “the skills to actively promote the benefits of publishing in the local digital libraries” (Amollo, 2011:23).

5.7 STAFF SUPPORT

The fourth question asked how much support the digitization project has from staff. The DCC Curation Lifecycle Model showed that there is no individual member of staff that has all the required skills. There must be collaboration among staff, to complement each other. According to Hammond and Davies (2009:10), organizational support is one of the key elements for the success of the digitization project. It was crucial for the success of digitization within the library that support was received from other university sections such as ICT and research. The results of this study revealed that support from university management, the university community, library management and library staff was weak. Based on the combination of very weak and weak responses from respondents, the results, for instance, indicate that out of the 20 (95.2%) respondents on university management support and library staff support, 13 (65%) indicated that university management support was very weak/weak. Eleven (55%) indicated that library staff support was very weak/weak; and out of 19 (90.5%) respondents on university community support and library management support, 12 (63.2%) indicated that university community support was very weak/weak and 10 (52.6%) indicated that library management support was very weak/weak.

The researcher got the opinion that the lack of support was a result of not enough promotion of the project. Even though some of the respondents from the

questionnaire indicated that the project was promoted, most of them answered that the project was not promoted. Twelve (57.1%) indicated that the project was not promoted library-wide and 10 (47.6%) that it was not promoted university-wide. Those that answered that it was promoted mentioned different methods ranging from posters, pamphlets, website, email alerts and meetings, to word-of-mouth.

When it came to face-to-face interviews, only three (33.3%) responded that the digitization project was well-promoted in all sections, four (44.4%) were not sure about promotion, but felt that the project was promoted to only those involved within the library. They indicated that some of the staff did not know anything about the project. According to some of the interviewees, the project was mainly promoted to some, mainly the Research Office and subject librarians, as they were the key players in the project. Two (22.2%) of the interviewees indicated that the project was never advertised and therefore did not have support, especially from academics.

Judging from the responses from questionnaire respondents and face-to-face interviews, the researcher concluded that there was lack of support for the project from the university, because there was not much communication with staff and the project was not well-promoted to the university community as a whole. One of the six actions identified by Klemm (2002:4) regarding the Conversation Theory indicates that things need to be explained to staff. As stated in the literature, reviewed under section 2.2.1.1.3, explaining things promotes better understanding. Klemm (2002:4) stressed that explaining things to staff plays an important role in getting buy-in from staff from the very start. By understanding and knowing why certain decisions are made, or why certain changes are made, the chances of resistance from staff are reduced and the chances of better support for initiatives is increased. Gaining the full support of staff is very important.

5.8 TECHNICAL SUPPORT

The fifth and last question asked what the level of technical support for digitization of theses and dissertations was. According to Klemm (2002:4), the digitization process requires a number of specialized skills, from scanning of documents right through to archiving the completed material. Technical skills are some of the skills that the digitization project requires. What was noted from the responses was that the library does not have a technical person who understands the technical needs of the digitization project. This came out clearly from both the interviewees and the questionnaire respondents.

From the questionnaire responses, for instance, only seven (33.3%) indicated that the library had a technical person. Out of the remaining 14 (66.7%), 10 (47.6%) indicated that the library did not have a technical person and four (19%) were not sure whether the library had a technical person or not. From the interview responses, eight (88.9%) indicated that the library did not have a technical person; however the person was still being trained to be able to support the project technically. One (11.1%) interviewee indicated that the availability of the technical person was catered for in the new structure.

In the literature reviewed, under the organizational support section, 2.10.3, in Chapter 2, Hammond and Davies (2009:10) advised that the digitization process must also involve other departments, such as Information Technology (IT), for all IT-related issues. In the literature, under the guidelines for starting an institutional repository section, Stellenbosch University discussed seven steps to consider. Under personnel, they stressed the importance of having at least, as part of the digitization staff, a Library Repository Manager, System Administrator and Web Developer for the project.

The responses on how staff handled technical-related issues indicated a great need for having a technical person, as it becomes difficult to deal with such issues.

Responses from the 21 respondents indicated that they always experience technical problems. There were mixed responses concerning the period it takes to resolve technical-related issues. There were seven (33.3%) respondents who indicated that it took less than two hours to resolve digitization-related technical issues, six (28.6%) that it took two to four hours, two (9.5%) that it took four to eight hours, three (14.3%) that it takes more than eight hours and the last three (4.8%) did not specify hours.

Even though most of the respondents indicated that it takes less than two hours to resolve technical-related issues, there was a high percentage of respondents who indicated that resolving technical issues took more than two hours. In the researcher's opinion, more than two hours was too long, considering the fact that there were also downtime issues and most respondents indicated that downtime took 30 minutes to two hours to solve and occurred between three and five times a month. There was a lot of time wasted solving technical-related issues, time which could have been used in the digitization process.

5.9 LIBRARY CHALLENGES AND OTHER PROBLEMS

The main objective of this study was to present the experiences and challenges in the digitization project at the UKZN and to use lessons learnt for similar projects in the future. In relation to this question, most of the interviewees did not point out any particular challenge. Most of the respondents from the questionnaire rated the success rate of the project as average, while most interviewees indicated that the project was almost complete and was a success.

The main challenge which most of the interviewees picked out was the lack of leadership in the project. Rating responses from the respondents, it became obvious that the issues they consider as major challenges are understaffing, lack of library support, budget, technical support and university community support. These issues relate to the elements pointed out in the DCC Lifecycle Curation Model. They include important steps like "building preservation strategy, collaborating, supervising and

participating in data creation activities” (Heidorn, 2011:667-668). The DCC Lifecycle Curation Model states that there must be support from staff in order to complement each other.

The researcher picked up a number of challenges from the responses for both questionnaire and interview. Most of them have already been highlighted, such as the lack of a digitization policy, little or no support for the digitization project and the lack of a technical person in the project. The latter resulted in processes being delayed and/or taking longer, due to downtime and other technical errors. Respondents specifically indicated in Table 44 in the technical support section, 4.3.7 in Chapter 4 that downtime issues negatively affected the digitization process.

Lack of communication seems to be the key point for most of the challenges encountered in the project. Success behind the digitization projects Theses Alive, in the United Kingdom, was mainly because of proper communication channels and close co-ordination with each other (see Chapter 2, Communication Theory in relation to this study, section 2.2.1.1). As a result, the project was conducted successfully and completed in time. Looking at the UKZN theses and dissertation project, there seemed to be no or very little conversation with staff, either engaged in the project or not. This was highlighted by the contrasting responses that were picked up from the responses of participants.

The DCC Curation Lifecycle Model encourages institutions to look at the digitization processes holistically in terms of action and policies. Such actions and policies can be decided on through conversations and co-ordination throughout the project. Working in isolation, as was the case with the UKZN digitization project, did not help in speeding up the project, as it resulted in duplication of work. Instead of working progressively, results in Chapter 4, under the face-to-face interviews, general questions section 4.4.2, indicate that time was wasted scanning and digitizing theses that were already scanned and digitized, due to lack of communication.

5.10 TIME AND BUDGET

This section was included to get a clear indication on how the budget for the digitization project was decided upon and who handles it. The researcher also wanted to find out whether the digitization project was worth the cost of the allocated budget or whether it was a waste of money. The seven questions were only for the face-to-face interviews, as the researcher believed that these were the people who would know more about the budget and time issues, as they were either part of the Management Team and/or members of the Library Digitization Committee, and therefore handled most of the planning and decision-making for the project.

The responses from interviewees indicated that not everyone from the Library Management and Digitization Committee members were involved in the budget planning. From the nine people interviewed, only three (33.3%) were involved. A higher percentage of five (55.6%) people were not involved and one (11.1%) decided to reserve his/her comment on the question. Otherwise, regardless of whether the digitization project remained within the budget or not, they were all positive that the project was worth the cost, as it promoted visibility and was more accessible to users within and outside the university. According to Ratanya (2010:20), the Electronic Thesis and Dissertation (ETD) projects may be costly and time-consuming, but ultimately, the advantages outweigh the disadvantages. Digital theses and dissertations increase the impact of institutional research.

The Conversation Theory indicates that for a project to succeed there must be good debate to understand the importance of digitization in relation to finance, marketing, planning and other aspects. The fact that only three interviewees indicated that they were involved, gave the researcher the impression that there was not much engagement of the Library Management and/or Digitization Committee as far as the budget was concerned. It was also not clear how only those three people were involved. It cannot be concluded that they were involved because they were in the Library Management or in the Digitization Committee.

5.11 SUMMARY

The research findings analyzed and presented in Chapter 4, were interpreted and discussed in detail in Chapter 5. The results were interpreted in relation to the five research questions, guiding theoretical framework and other studies and opinions on library digitization projects.

Chapter 6 discusses conclusions and recommendations based on the literature review, data analysis and interpretations.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter presents the conclusions and recommendations of the study, according to the literature reviewed, data analysis and interpretations. The researcher engaged in this study out of concern about the digitization of theses and dissertation project of the UKZN which started in 2009 and was scheduled to be completed by 2011, two years from the start. The project took longer than expected and, as a result, the researcher wanted to investigate and share experiences and challenges, if any, encountered by UKZN. Even more surprisingly, the researcher discovered that the project was still not complete in 2013 during data collection.

The main objective of the study was to present the experiences and challenges in the digitization of theses and dissertations project at the UKZN and make recommendations using lessons learned for future projects of this nature. The aim was to try and address the issues and challenges encountered in the UKZN project to help ensure that new digitizing projects fulfil the expectations of libraries, students and scholars. The researcher believed that by sharing these experiences and challenges, it will help UKZN and other institutions planning to embark on a project of this nature in future, to improve and avoid making similar mistakes.

6.2 CONCLUSIONS

The following conclusions were made based on the findings of the study in relation to the research questions of the study. There were five key research questions that the researcher used as a base for this study. The five research questions stemmed from the objectives, rationale and statement of the problem. These are:

- What digitization strategies and policies are in place at UKZN?

- What facilities are in place or needed for the UKZN library theses and dissertations digitization project?
- What training skills does the UKZN library staff have to handle the theses and dissertation project?
- How much support does the digitization of theses and dissertations project have from the staff involved in the project?
- What is the level of technical support for digitization of theses and dissertations?

Each one of these questions is answered below and the conclusion will provide an indication whether or not the researcher was able to achieve the main aim and objective of the study.

6.2.1 Background to the study

The researcher examined the background of the theses and dissertations digitization project before focusing on the five research questions. The researcher felt that it was important to study that background to gain an idea of how the project was started and the planning that was involved in preparation for the start of the project.

Based on the findings and discussions of the study, the researcher came to the conclusion that the project started well, with most of the initial stages in place, such as involving stakeholders. It was delayed, however, because there was no staff dedicated to the project. The results further show that staff members were informed of the project. About 18 (85.7%) indicated that they were formally informed of the project and 14 (66.7%) indicated that they were informed at a meeting.

The findings of the study show that the digitization section was understaffed for the amount of work required to be done. As a result, the library use staff from other sections to assist in the digitization processes. This put pressure on staff, as they ended up not having enough time to concentrate on their primary duties as they had

to divide their working hours to accommodate the digitization project. What made it worse was the fact that there was no work-plan guiding them, to at least know how much time they should spend on the project. Planning in terms of how the project was going to be co-ordinated was inadequate from the beginning. There were no proper guidelines as to how to incorporate the project within the busy schedules of involved staff members.

6.2.2 Digitization strategies and policies at UKZN

The first research question was “what digitization strategies and policies are in place at UKZN?” The results of the study showed that there were strategies in place but when it comes to policies, there were either there or no visible digitization policies guiding the project in the UKZN library. The questionnaire results indicated that 8 (38.1%) said the library has the digitization policy and 11 (52.4%) were not sure if there is or not, and responses from interviews indicated that 2 (22.2%) indicated that the library has digitization policy and seven (77.8%) indicated that there is no digitization policy. On the other hand there were 16 (76.2%) questionnaire respondents and 9 (100%) interview respondents indicated that strategies are in place. The literature reviewed on guidelines for starting an institutional repository showed that policy formulation is the first thing that needs to be done when engaging in digitization projects. This was not done for the UKZN digitization project. The University of Stellenbosch, for example, stated, under the seven steps to consider when digitizing library materials, that digital reservation policy formulation is the first step to take (University of Stellenbosch library, N.d.:Guidelines).

The literature further revealed that the problem of formulating digitization strategies and policies was a common challenge faced by libraries and institutions engaged in the digitization projects. The UKZN library was no exception to that. Regardless of the fact that UKZN was one of the 20 South African and three German institutions which attended the South African Digitization Initiative (SADI) workshop on ways to overcome policy issues, it still does not have digitization policies, or the policies are

not readily available. The workshop was hosted by the University of the Witwatersrand, from 27 February to 1 March 2013.

The researcher realized from the results that the library has a library strategy whereby the digitization project was referenced, but there was no indication that the library has a digitization strategy and policies. As a result, the project did not have the direction to take or guiding document and this became a challenge on its own. The fact that 13 (62%) from the questionnaire responses reveal that respondents either did not know or were not sure if the library had a digitization policy, and seven (77.8%) from the interviewees were positive of the fact that there was no digitization policy, is of great concern.

Digitization policies and strategy are the backbone of the digitization project. Without these elements, the project does not have a direction. One of the comments from interview responses, for example, was that staff had a problem to whom and how to address digitization-related issues because of the lack of guidelines and project leadership. It is therefore important that each and every digitization project must have set policies and strategy in place, as a guide and to give direction to staff participating in the project on how to handle and deal with issues.

6.2.3 Basic facilities for the digitization project

The second question the researcher looked at was “What facilities are in place or needed for the UKZN library theses and dissertations digitization project?” The fact is that for anyone to be able to perform his/her duty is that they must at least have basic tools/facilities. Without these they will not be able to work. As with the digitization project, for staff to be able to digitize materials, they must have the right tools.

In relation to the theses and dissertations digitization project at the UKZN, it has been indicated in Chapter 5, under equipment/facilities, section 5.5, that staff

involved in the digitization project were satisfied with the tools they had, to be able to perform their duties. It can be concluded that the theses and dissertations digitization project at UKZN was well prepared and planned to at least cater for the basic facilities needed to take the project forward. The results of this study, as indicated in Chapter 4, under equipment/facilities section 4.2.4 showed that 19 (90.5%) from the questionnaire responses were happy with the equipment they had. Only two (9.5%) were either not satisfied with the equipment they had or were not sure. The interviewees were generally happy with their equipment. The only point that was raised with this group was that the digitization project needs to have high-tech equipment, like the state-of-the-art scanner, to ensure more speed and efficiency with the digitization processes.

6.2.4 Training skills for the UKZN library staff

The third research question was “what training skills does the UKZN library staff have to handle the theses and dissertation project?” According to Beagrie (N.d:Training), a digitization process, as a complex process, requires that staff receive good training as early in the project as possible. Investing more time training staff at the beginning of the project can make a valuable contribution to equip and prepare staff to either undertake or manage digitization projects (Hammond and Davies, 2009:16; Beagrie, N.d.:Training). Staff participating in the digitization project must be well-trained, to be able to have the required skills, knowledge and understanding of the project.

According to the results of this study, most of the staff who participated in the questionnaire and interviews received training, mostly from a colleague. Even though the results did not indicate if the colleague was an expert on digitization, with professional qualifications or extensive training, they were, according to the results, satisfied with the training. There were also responses which indicated that some of the staff went for workshops and received external training. This is a positive outcome which shows that staff training was incorporated in the planning for the digitization project. Based on the responses from participants in Chapter 4 and

research discussion in Chapter 5, the researcher can conclude that staff received the training which gave them an idea of what the project required them to do.

Staff seemed to be happy and satisfied with the training they received. Most of them indicated that they did not need additional training. The researcher therefore believes and concludes that the training received was good, up to standard and able to satisfy staff.

6.2.5 Staff support for the digitization project

The fourth question was “how much support does the digitization of theses and dissertations project have from the staff involved in the project?” Staff support is one of the crucial elements in the library digitization projects. The theses and dissertations digitization project may be happening in the library, but the planning and processes involves the whole university community, and all these people need to understand its importance and support the project. Some of the ways to co-operation involves communicating with staff and all stakeholders. This could be done by means of, for example, meetings, posters, banners, workshops and sending information via emails.

The results of the study indicate that even though there was initial conversation with some of the library staff and stakeholders, somewhere along the line the communication lines broke down and staff lost track of proceedings. It is concluded that the theses and digitization project did not have strong support from within the library and the university as a whole, because there was not enough promotion and staff involvement in the project. What is surprising and disturbing is the fact that even the staff who participated in the project were not aware of most things about the project, except what they had to do as part of their roles in the project.

6.2.6 Technical support for the digitization project

The fifth and last question the researcher looked at was “what is the level of technical support for digitization of theses and dissertations?” IT infrastructure is one of the main instruments necessary for the success of the digitization of thesis and dissertations project and, for it to function properly, technical support is required. Technical support plays a crucial role in making sure that everything is up to date, and ensuring that help is available to take care of things in times of technical problems.

Based on the results of the study, the UKZN library digitization project did not have enough and/or proper technical support. Some of the participants, 10 (47.6%) from questionnaire responses and eight (88.9%) participants from interviews indicated that the project did not have library-based technical staff who understood the technical needs of the project. As a result it took longer to rectify technical-related issues, thus causing delays in the processes to complete the retrospective digitization of theses and dissertations.

6.3 RECOMMENDATIONS

The results of this study elicited the following recommendations on how to improve the project:

6.3.1 Background to the study

A lack of communication seemed to have played an important role in some of the problems experienced in the project. This was picked up from both questionnaire and interview responses. The following are the author’s recommendations:

- There must be improved communication channels within and outside the library, to ensure that all library staff, the university community and other stakeholders are informed about the project from the beginning and throughout the project. This would, in future, help to promote understanding of

what the project is about and ensure that staff know and understand their involvement in the project. It will also be easy to obtain co-operation from staff and all stakeholders and reduce the chances of sabotaging of the project.

- In a case where materials to be digitized are in different locations, as was the case with the UKZN theses and dissertations, there must be better co-ordination with the workflow of batches from the different campuses to where digitization is to take place. There must also be better follow-up and communication of the whereabouts of batches, so as to be aware of unforeseen problems in time to be able to sort them and avoid delays. According to Menges (2014:Materials transfer), the Triangle Research Libraries Network (TRLN) established practices, standards and documents, agreed and signed by the four library directors, for the workflow and procedures to follow when transferring materials among the four universities, Duke University, North Carolina Central University, NC State University and the University of North Carolina at Chapel Hill. UKZN can use TRLN as an example, and establish and agree on suitable standards and guidelines to follow for moving items from other campuses to Howard campus and back based on their location.
- The library must consider having a fully-fledged digitization section with its own staff, who will be able to dedicate their time to the project. The researcher recommends that the section must have at least four staff members, and at least one of whom has technical IT skills and expertise to be able to communicate with the university IT section or to solve related problems.
- In the absence of the dedicated digitization staff, there must be at least a work-plan to assist staff with planning their work and incorporating the digitization project. Staff must at least dedicate a certain number of hours a week to the project to at least ensure consistency and better planning.

6.3.2 Digitization strategies and policies at UKZN

Policies and digitization strategy play a big role in the digitization projects to address the direction the digitization process will take and follow. It has been identified through the literature reviewed in Chapter 2, under digitization strategy, section 2.9.4 and policies, that many libraries, including the UKZN library, digitizing their materials lack digitization strategies and policies. It is therefore recommended that:

- Digitization strategies and policies must be formulated and decided on before engaging in the digitization project. The existence of the strategies and policies will provide a framework for guiding processes in the project. It is recommended that the UKZN before engaging in other digitization projects, and any other library or institution planning to digitize its materials, looks at existing digitization strategies and policies, and adjusts according to their situations, instead of starting from scratch and re-inventing the wheel.

6.3.3 Basic facilities for the digitization project

Regardless of the fact that participants were satisfied with the basic facilities/equipment they have to perform their digitization duties, it is recommended that the library keeps up-to-date and purchases the state-of-the-art equipment, such as, for example, flatbed scanners, with capacity ranging from A4 size paper to A1 sizes or more. One of the respondents indicated that some of the problems which cause delays include theses that come with maps much bigger than A4 in size. In such cases they had to ask for assistance from the Architecture Department, which has bigger scanners. These were not always available for use. If the library had its own bigger and faster scanner, it would reduce the time spent waiting for the availability of scanners from other departments.

6.3.4 Training skills for the UKZN library staff

The study showed that staff received training for the digitization project. It is, however, recommended that staff get regular training on digitization processes,

especially in relation to IT-related matters, so that they know how to deal with problems encountered on a daily basis.

- There must be ongoing training in the form of conferences, workshops, courses, in-service training, and seminars. There are a number of such platforms which happen on annual basis, both locally and internationally, such as the Electronic Theses and Dissertations (ETD) international conference, which takes place every year and deals with digitization of theses and dissertations. Locally, there is an annual Library and Information Association of South Africa (LIASA) conference and staff can be part of LIASA interest groups, such as the like Information and Communication Technology in Libraries Interest Group (ICTLIG), which covers, among other things, digitization issues. Staff must be encouraged to register and explore opportunities for gaining the latest trends in library digitization. UKZN, for example, has a Post-Graduate Diploma in Information Studies (PGDIS), offering a module on digital libraries and repositories.
- The UKZN digitization project has older staff members that are not far from retirement, than younger members of staff. For this reason, training sessions to 'train the young' must be conducted to prepare for when older members of staff retire. This will prepare younger ones to take over the roles, instead of waiting until the older ones retire. There must always be a backup when it comes to digitization skills.
- The library management should also look into the idea of getting IT-literate personnel, for example, librarians with IT backgrounds or who work very close with the IT department and who will have expertise in computer and network engineering. Other academic institutions engaged in the digitization projects made sure that they had skilled personnel who were part of the digitization team. McGill University, in Montreal, Canada, for instance, has a digital collections librarian, thesis administrator, Web developer and programmer, digital scanning manager and library technical co-ordinator for cataloguing theses, as part of their ETD project (Park and Zou, 2007:83). The University of

Stellenbosch in South Africa suggested that the digitization staff must at least have a library repository manager, a systems administrator and a Web developer, specifically for the project. This was discussed in Chapter 2, under section 2.6, guidelines for starting an institutional repository.

6.3.5 Staff support for the digitization project

Inadequate support from staff is one of the issues that has been identified as challenges for the digitization project. One of the problems the researcher views as a major challenge is lack of support from library staff. This is a major problem and a cause for concern, especially when it comes to retrospective digitization, because library staff are the ones who make it possible to see the project through to completion.

To encourage staff support, the researcher has recommended the need to improve on communications and staff involvement from the onset. By communicating with staff, they will have understanding and confidence in engaging in, and thus supporting, the project.

There is a great need for the library to promote the digitization project by means of advocacy programmes. Staff within and outside the library must be aware of the digitization project and its benefits. The library must be in a position to promote digitization and disseminate the information through the library newsletter, university circulars, exhibitions, workshops, meetings and emails. As suggested by Alhaji (2007:235), there must be “periodic awareness programmes for different categories of stakeholders and users of the digitization.” It is important for the digitization project to get support from within and outside the university library.

6.3.6 Technical support for the digitization project

It is important to have functional IT resources and technical support for the digitization project to be successful. At the time of conducting this study, the

participants indicated that there was no technical support for the digitization project. It is also recommended that library management consider hiring IT-literate personnel, or have close relations with the IT section, which has IT skilled IT personnel to assist where and when necessary.

- In a case where the library forms a close relationship with the IT section of the university, the library must work towards securing a signed agreement, binding the IT department to provide them with prompt assistance.
- The person must also have training in understanding of, the basics of digitization.
- In a case where the library considers having its own IT-literate person, the library must have sufficient finances to cater for this.

6.4 FURTHER RESEARCH

The main aim of this study was to identify whether or not the theses and dissertations digitization project at UKZN encountered problems which prevented the project to be completed on time. The study focused only on the UKZN digitization project. The results of this study relate to the UKZN theses and dissertations library digitization project and cannot necessarily be generalized to other academic institutions. Even though there are similar challenges with other African countries, it is recommended that further study be conducted to include other academic institutions, particularly in South Africa. This will alert policy-makers, government and the private sector to the challenges, concerns and problems faced by institutions in their quest to promote easy access to information for everyone.

One of the reasons for the digitization of theses and dissertations was to allow wider and increased accessibility to the “literature that previously required trips to the library, inter-library loan delays, or substantial effort in locating the source information that was only accessible to a limited audience” (Evans, 2006:8). This study concentrated mainly on the processes involved in making this literature universally

easily available and accessible. It did not cover whether the theses and dissertations were visible and accessible to the audiences, as was intended. From the research results, most of the interviewees indicated that the digitization of theses and dissertations was worth the time and money spent on the project. It would be interesting to find out from the user perspective if the project was really worth the effort and if it really did improve accessibility.

6.5 SUMMARY

In chapter six the researcher discussed conclusions based on the research findings and made recommendations which the researcher believes will effectively help plan and implement the digitization project(s). The chapter made suggestions for further research, to reveal even more in-depth knowledge on digitization of library materials.

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APPENDICES

APPENDIX 1

REQUEST FOR GATEKEEPER'S PERMISSION

20 Kilbruck Road
Bisley
Pietermaritzburg
3201
17 May 2013

Director of Libraries
University of KwaZulu-Natal
Howard College Campus library
King George V Avenue
Durban
4041

Director of Libraries: UKZN

Request for Gatekeeper's permission

I am a student at the University of KwaZulu-Natal in the School of Social Sciences doing Master of Information Studies. I am writing to ask your permission to conduct research in the UKZN library for a study entitled: The digitization of theses and dissertations at the University of KwaZulu-Natal (UKZN).

My intention, through this study initiative, is to investigate experiences and challenges encountered in the digitization project and applying lessons learnt thus improving on the processes for similar projects in future. The study will be conducted

through interviews and questionnaires and the process will involve library staff as participants of the study.

Your consideration in granting me permission to conduct the study in the library will be highly appreciated.

Thank you.

B.C. Nyide
iSHARE Data Librarian: INDEPTH
Africa Centre for Health and Population Studies
R618 en Route to Hlabisa
Somkhele
Mtubatuba
Tel: +27 35 550 7557
Cell: +27 84 370 9290
Email: nyideb@gmail.com

Supervisor: Zawedde Nsibirwa
Faculty of Humanities, Development and Social Sciences
School of Social Sciences: Information Studies
Pietermaritzburg Campus
University of KwaZulu-Natal
Tel: +27 33 260 5685
Email: nsibirwaz@ukzn.ac.za

APPENDIX 2

COVERING LETTER FOR COLLECTING DATA



Covering letter to the respondents

Dear Respondent,

My name is Bongiwe Nyide. I am a Master of Information Studies student at the University of KwaZulu-Natal. I am inviting you to participate in the research project entitled: The digitization of theses and dissertations at the University of KwaZulu-Natal (UKZN).

The aim of this study is to establish experiences and challenges encountered in the digitization project and applying lessons learnt thus improving on the processes for similar projects in future. The study will be conducted through interviews and questionnaires and the process will involve library staff as participants of the study.

Through your participation I hope to understand the successes and challenges faced by staff in the ongoing digitization project. The results of the survey are intended to contribute to the body of knowledge on digitization of library information and could be used as a way forward to improve on future digitization projects.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this survey group. Confidentiality and anonymity

of records identifying you as a participant will be maintained by the School of Social Sciences, UKZN.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me or my supervisor at the numbers listed below.

The survey should take you about 20 minutes to complete. I hope you will take the time to complete this survey.

Thank you for your assistance

Sincerely

Bongiwe Nyide

Tel: +27 35 550 7557

Email: nyideb@gmail.com

Supervisor: Zawedde Nsibirwa

Tel: +27 33 260 5685

Email: nsibirwaz@ukzn.ac.za

APPENDIX 3

INFORMED CONSENT

Informed Consent form for the sample population

INFORMED CONSENT FORM

Title of study:

The digitization of theses and dissertations in the University of KwaZulu-Natal (UKZN).

I,, hereby consent to participate in the study as outlined in the document about the study/ as explained to me by the researcher.

I acknowledge that I have been informed about why the questionnaire/interview is being administered to me. I am aware that participation in the study is voluntary and I may refuse to participate or withdraw from the study at any stage and for any reason without any form of disadvantage.

I,, acknowledge that I understand the contents of this form and freely consent to participating in the study.

Participant

Signed: Date:

Researcher

Signed: Date:

APPENDIX 4

QUESTIONNAIRE

Self-administered questionnaire for data collection on the theses and dissertations digitization project at the University of KwaZulu-Natal (UKZN).

I am a student at the University of KwaZulu-Natal doing a Masters in Information Studies. I would like to ask you a few questions about the study I am conducting on the digitization project of theses and dissertations at the University of KwaZulu-Natal. The study is designed to collect data on experiences and challenges encountered in the digitization project, reflect on lessons learnt and make suggestion towards improving on the processes for similar projects in future. Your responses will be treated with utmost confidentiality and will not be linked to any particular respondent or department. I realize that there are many other demands on your time, but the results will be beneficial to all those conducting similar projects

Instructions for filling in the questionnaire:

- i) Please tick or mark with an 'X' the applicable answer(s)
- ii) Use spaces provided to write your answers to the questions. If a question does not apply, please indicate 'N/A'.

SECTION 1: DEMOGRAPHICS

1. Gender:

☐

Male

☐

Female

2. Age group:

☐

30 years and below

☐

31 to 40 years

☐

41 to 50 years

☐

Above 50 years

3. How long have you worked with/in the digitization project?

- ☐ Less than 1 year ☐ 1 to 5 years ☐ 6 to 10 years ☐ More than 10 years

4. Indicate which section of the library you work in?

- ☐ Information Services
☐ Technical Services
☐ Digitization section
☐ Library Management
☐ Other (Specify):

SECTION 2: BACKGROUND QUESTIONS

5. Do you have anything to do with the digitization project (e.g. scanning, loading, archiving, etc.)?

- ☐ Yes ☐ No

6. Were you formally informed of the digitization project at the UKZN?

- ☐ Yes ☐ No, go to question 8 ☐ Not sure, go to question 8

7. If yes to question 6, please indicate how:

- ☐ By email
☐ At a meeting
☐ Other (Specify):

8. Does the library have a dedicated digitization department?

- ☐ Yes ☐ No, go to question 11 ☐ Not sure, go to question 11

9. If yes to question 8, does it help to improve digitization processes?

☐ Yes ☐ No, go to question 13 ☐ Not sure, go to question 13

10. If yes to question 9, please provide details how?

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.....
.....

11. If no to question 8, will having a dedicated digitization department help to improve on digitization processes?

☐ Yes ☐ No, go to question 13 ☐ Not sure, go to question 13

12. If yes to question 11, please provide details how?

.....
.....
.....

13. Do you have any concerns relating to digitization processes with other departments in the library?

☐ Yes ☐ No, go to question 17 ☐ Not sure, go to question 17

14. If yes to question 13, please specify what concerns you have?

.....
.....
.....

15. If yes to question 13, do those concerns affect the digitization progress?

☐ Yes ☐ No, go to question 17 ☐ Not sure, go to question 17

16. If yes to question 15, please provide details about how those concerns affect the digitization progress?

.....
.....
.....

17. Do you have concerns relating to digitization processes with other campus libraries?

☐ Yes ☐ No, go to question 21 ☐ Not sure, go to question 21

18. If yes to question 17, please specify what concerns you have?

.....
.....
.....

19. If yes to question 17, do these concerns affect the digitization processes?

☐ Yes ☐ No, go to question 21 ☐ Not sure, go to question 21

20. If yes to question 19, please provide details how these concerns affect digitization processes?

.....
.....
.....

21. Which function(s) do you perform for the digitization project? (Mark all the applicable options)

- ☐ Select/collect theses/dissertations from shelves to digitize
 - ☐ Prepare theses/dissertation to digitize
 - ☐ Scan theses/dissertations
 - ☐ Submit theses/dissertation
 - ☐ Create metadata
 - ☐ Archive theses/dissertations
 - ☐ Do quality control
 - ☐ Other (Specify):
-

22. How much of your time a day do you normally spend on the digitization project?

- ☐ Less than 2 hours
- ☐ Between 2 to 4 hours
- ☐ Between 4 to 6 hours
- ☐ More than 6 hours
- ☐ Other (Specify):

23. If you spend less than 2 hours on the digitization project a day, please indicate what prevents you from spending more time?

.....

.....

24. Do you have a work-plan to follow in performing your digitization function?

- ☐ Yes ☐ No (proceed to question 27) ☐ Not sure (proceed to question 27)

25. If yes to question 24, does having a work-plan help to better plan digitization function(s)?

☐ Yes ☐ No (proceed to question 28) ☐ Not sure (proceed to question 28)

26. If yes to question 25, please specify how does it help to better plan digitization function(s)?

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.....
.....

27. If no or not sure to question 24, do you think it is necessary to have a work plan?

☐ Yes ☐ No ☐ Not sure

28. Please support your answer to question 27 and explain.

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.....

SECTION 3: STRATEGIES AND POLICIES

29. Does the library have a digitization policy?

☐ Yes ☐ No, go to question 33 ☐ Not sure, go to question 33

30. If yes to question 29, were you involved in the digitization policy development?

☐ Yes ☐ No

31. If yes to question 29, when did you become aware of the digitization policy?

- ☐ At its inception
☐ When I became part of the project
☐ Other (Specify):

32. How did you become aware of the digitization policy?

- ☐ At a meeting
☐ From a colleague
☐ Library website
☐ Email
☐ Other (Specify):

33. Do you know what the digitization policy entails?

- ☐ Yes ☐ No, go to question 35 ☐ Not sure, go to question 35

34. If yes to question 33, please specify what the digitization policy entails.

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.....
.....

35. Does the library have a strategic plan?

- ☐ Yes ☐ No, go to question 38 ☐ Not sure, go to question 38

36. If yes to question 35, is the theses and dissertation digitization project included in the library's strategic plan?

- ☐ Yes ☐ No, go to question 38 ☐ Not sure, go to question 38

37. If yes to question 36, please specify how is theses and dissertations digitization project referenced in the library's strategic plan?

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.....

38. In your opinion, will having digitization strategy and policies positively contribute to the digitization progress?

☐ Yes ☐ No, go to question 40 ☐ Not sure, go to question 40

39. If yes to question 38, please specify how will strategies and policies contribute to the digitization progress?

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.....

SECTION 4: EQUIPMENT/FACILITIES

40. Do you have the basic equipment necessary for you to perform your digitization tasks unhindered?

☐ Yes ☐ No, go to question 42 ☐ Not sure, go to question 42

41. If yes to question 36, please specify what equipment do you have?

.....
.....
.....

42. If no or not sure to question 40, please specify what equipment do you think is necessary for you to perform your digitization tasks unhindered?

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.....

43. Are you satisfied with the digitization equipment you have?

☐ Yes ☐ No, go to question 45 ☐ Not sure, go to question 46

44. If yes to question 43, what makes you satisfied with the available equipment?

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.....

.....

45. If no to question 43, what makes you not satisfied with the available equipment?

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.....

SECTION 5: STAFF TRAINING

46. Have you ever received/attended any training on digitization

☐ Yes ☐ No, go to question 50 ☐ Not sure, go to question 50

47. If yes to question 46, please briefly describe what training did you receive?

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.....
.....

48. If yes to question 46, how was the training done? (Mark all the applicable options).

- ☐ By colleague
☐ External trainer(s)
☐ By attending workshop(s)
☐ Other: Please specify

49. If yes to question 46, was the training you received helpful/relevant to assist you to carry out your work as far as digitization is concerned?

☐ Yes ☐ No ☐ Not sure

50. Do you think you need (more) training on digitization?

☐ Yes ☐ No, go to question 53 ☐ Not sure, go to question 53

51. If yes to question 50, what training do you still need?

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.....
.....

52. With reference to your answer to question 51, how will that training help the digitization project?

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.....
.....

53. How many training sessions have been conducted for library staff on digitization so far?

- ☐ Less than 3 training sessions
- ☐ Between 3 and 6 training sessions
- ☐ More than 6 training sessions
- ☐ Not aware of any training sessions
- ☐ Other, please specify

SECTION 6: STAFF SUPPORT

54. On the scale on Very Weak to Very Strong, please rate the support received from staff for the theses and dissertations digitization project:

	Very weak	Weak	Neutral	Strong	Very strong
University management?					
University community?					
Library management?					
Library staff?					

55. How does the library promote and maintain library-wide staff support for the digitization project? (Select all that's applicable)

- ☐ Posters
- ☐ Pamphlets
- ☐ University/library website
- ☐ Email alerts
- ☐ Meetings
- ☐ Word of mouth
- ☐ Does not promote
- ☐ Other (Specify):

56. How does the library promote and maintain university-wide staff support for the digitization project? (Select all that's applicable)

- ☐ Posters
- ☐ Pamphlets
- ☐ University/library website
- ☐ Email alerts
- ☐ Meetings
- ☐ Word of mouth
- ☐ Does not promote
- ☐ Other (Specify):

SECTION 7: TECHNICAL SUPPORT

57. Do you have a technical person for the library who understands the technical needs of digitization to help with technical issues whenever necessary?

- ☐ Yes ☐ No, go to question 59 ☐ Not sure, go to question 59

58. If yes to question 57, does having a technical person for the library help solve digitization related technical issues?

- ☐ Yes ☐ No, go to question 62 ☐ Not sure, go to question 62

59. If no to question 57, how do you deal with technical related issues (like server not working, handle not available, etc.)

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.....

.....

60. If no or not sure to question 57, would it help to have a technical person for the library?

☐ Yes ☐ No, go to question 62 ☐ Not sure, go to question 62

61. If yes to question 57 and 58, please specify how does having a technical person for the library help in solving digitization related technical issues?

.....

62. Please indicate how often you experience the following problems for the digitization project?

	Always	Hardly	Never
ResearchSpace not accessible			
Handle not available (Theses not accessible)			
Other (Specify)			

63. How long does it usually take to sort out digitization related technical issues?

☐ Less than 2 hours
☐ 2 to 4 hours
☐ 4 to 8 hours
☐ More than 8 hours
☐ Other (Specify)

64. How much downtime do you normally experience in a month?

<input type="checkbox"/>	Less than 3 times a month
<input type="checkbox"/>	3 to 5 times a month
<input type="checkbox"/>	More than 5 times a month
<input type="checkbox"/>	Other (Specify):

65. How long does it usually take to resolve downtime issues?

<input type="checkbox"/>	Less than 30 minutes
<input type="checkbox"/>	30 minutes to two hours
<input type="checkbox"/>	Two to five hours
<input type="checkbox"/>	More than five hours
<input type="checkbox"/>	Other (Specify):

66. In your opinion, do the downtime issues negatively affect the digitization processes

<input type="checkbox"/> Yes	<input type="checkbox"/> No, go to question 67	<input type="checkbox"/> Not sure, go to question 67
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67. If yes to question 65, how does downtime affect the digitization processes?

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SECTION 8: LIBRARY CHALLENGES

68. How would you rate the success of the theses and dissertations digitization project?

Very successful	Successful	Average	Unsuccessful	Not successful at all

- 69. What do you consider the major challenges this library faces? (Please, tick the challenge(s) that apply to you and rate its significance to you on a scale of 1 – 4 where 1 is most significant and 4 is not significant)?**

	Major Challenges		Minor Challenges	
	1 Most Significant	2 Significant	3 Less Significant	4 Not Significant
Understaffing				
Budget				
Library staff support				
University community support				
Technical support				
Planning				
Workflow				
Other (Specify, as many)	1 Most Significant	2 Significant	3 Less Significant	4 Not Significant

- 70. If you have identified any major challenges in question 69, please indicate what you think is/are the possible solution(s).**

CHALLENGE	POSSIBLE SOLUTION	NOT SURE
Understaffing		
Budget		
Library staff support		
University community support		
Technical support		
Planning		
Workflow		
Other (Specify)	POSSIBLE SOLUTION	NOT SURE

SECTION 10: CONCLUSION

71. Do you have any other comments/suggestions you would like to add?

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THANK YOU FOR PARTICIPATING

APPENDIX 5: INTERVIEW SCHEDULE

Interview schedule for data collection on the theses and dissertations digitization project at the University of KwaZulu-Natal (UKZN).

Interviewer: Bongsiwe Nyide

Date of interview:

I am a Master of Information Studies student at the University of KwaZulu-Natal. I am asking your help for my research topic on the digitization project of theses and dissertations at the University of KwaZulu-Natal. The study is designed to collect data on experiences and challenges encountered in the digitization project, reflect on lessons learnt and make suggestion towards improving on the processes for similar projects in future. I would like to ask you some questions related to this study, and hereby humbly request your participation. Your responses will be treated with utmost confidentiality and will not be linked to any particular respondent or department. I realize that there are many other demands on your time, but the results will be beneficial to all those conducting similar projects. Thank you for your time

SECTION 1: DEMOGRAPHICS

1. Gender: ☐ M ☐ F

2. Age group:
☐ 30 years and below ☐ 31 to 40 years ☐ 41 to 50 years ☐ Above 50 years

3. How long have you worked with/in the digitization project? _____

4. Which section of the library do you work? _____

5. What is your position in the library? _____

SECTION 2: GENERAL QUESTIONS

6. Are you part of the:

<input type="checkbox"/>	Digitization Unit	<input type="checkbox"/>	Digitization Committee	<input type="checkbox"/>	Library Management
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7. Have you been formally orientated/introduced to the theses and dissertations digitization project at the UKZN?
8. How were you orientated/introduced?
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.....
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9. Does the library have a digitization department?
10. Does having a digitization department/ not having a digitization department help in improving digitization processes?
11. Please explain how the digitization department help improve digitization processes?
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.....
12. Do you have any concerns in relating to digitization processes with other departments in the library/ other campus libraries?
13. What concerns do you have?
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14. How do these concerns affect the digitization progress?

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SECTION 3: STRATEGIES AND POLICIES

15. Does the library have a strategic plan?

16. Does the library strategic plan include theses and dissertations digitization project?

17. How is the digitization project included in the library strategic plan? Please explain.

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18. Are you involved in developing or changing the digitization strategic plans?

19. Does the library have a digitization policy?

20. What does the digitization policy entail?

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21. Are library staff members made aware of the digitization strategy and policies?

22. How are library staff members made aware of the digitization strategy and policies?

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23. In your opinion, will having digitization strategy and policies positively contribute to the digitization progress?

24. How will digitization strategy and policies contribute to the digitization progress?

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SECTION 4: EQUIPMENT/FACILITIES:

25. In your opinion, do you think the library digitization project is well equipped for the smooth running of the digitization project of theses and dissertations?

26. What equipment does it have that you regard as well equipped?

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27. What makes you say/think library digitization is well equipped?

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28. What makes you say/think library digitization is not well equipped?

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SECTION 5: STAFF TRAINING

29. Did you or other staff involved in the digitization project receive any training on theses and dissertations digitization?

30. Please briefly describe what training did you/they receive?
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.....
.....
31. Did the training help meet digitization expectations?
32. Have you ever organized any digitization training for staff involved in the digitization project?
33. What training did you organize?
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34. Why have you never organized any training?
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35. Do you think staff needs (further) training on digitization?
36. What makes you think staff needs further training on digitization?
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37. What makes you think staff does not need further training on digitization?
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.....
38. In your own opinion, will continuous staff training on digitization positively improve on the project's progress?

39. How will continuous staff training help in improving on the project's progress?

.....
.....
.....

SECTION 6: STAFF SUPPORT

40. Does the library promote and maintain support for the digitization project in any of these areas?

Library management/University management/Library-wide support/University-wide support?

41. How does the library promote and maintain support for the digitization project?

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.....
.....

42. If you do not promote, please indicate why are you not promoting and maintaining staff support for the digitization project?

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.....

43. Do you think promoting digitization and gaining staff support contributes positively towards the success of theses and dissertations digitization project?

44. How will promoting and gaining staff support to digitization contribute to the success of the theses and dissertations digitization project?

.....
.....
.....

SECTION 7: TECHNICAL SUPPORT

45. Do you have library based technical support staff who understands the technical needs of digitization to help with technical issues whenever necessary?

46. Does this help to resolve technical related issues?

47. If you do not have library based technical support staff, how do you normally address your technical related issues?

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48. What technical problems related to digitization do you normally experience?

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49. How often do you usually experience such problems?

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50. How long does it usually takes to sort out digitization related technical issues?

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51. How much downtime as a result of software/hardware issues, etc., do you normally experience in a month?

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52. How long does it normally take to resolve such issues?

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53. In your opinion, will having a library based technical person help towards the success of the digitization project?

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54. How will having a library-based technical person help towards the success of the digitization project?

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SECTION 8: LIBRARY CHALLENGES

55. How much percentage of theses and dissertations digitization is done so far?

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56. Does this indicate success or failure of the project? Please explain.

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57. What is the biggest challenge of the digitization project for the library?

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58. How can this challenge be addressed?

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59. What are the other digitization challenges the library is facing?

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60. How and to what extent do these challenges affect the success of digitization?

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61. How can these challenges be addressed?

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.....

SECTION 9: TIME AND BUDGET

62. Are you involved in the decision making (or discussions/suggestions) about the budget and staff support allocation for digitization efforts?

63. If not you, who is involved in the decision making about the budget and staff support allocation for the digitization project?

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64. Does the cost of the digitization project fit within the planned budget? Please explain your response.

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65. Is the project worth the cost? Please explain your response.

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66. Will additional monies be needed to complete the project? Please explain your response.

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67. Do you have enough time to complete the retrospective theses and dissertations digitization project? Please explain your response.

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CONCLUSION

68. Is there anything else you would like to add about the project?

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THANK YOU FOR YOUR PARTICIPATION.