LIBRARY AND INFORMATION SCIENCE EDUCATION IN TANZANIA: PROPOSING A CURRICULUM MODEL FOR THE DIGITAL AGE

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Submitted in accordance with the requirements for the degree of

Doctor of Philosophy

In the subject

Information Science

at the

UNIVERSITY OF SOUTH AFRICA, PRETORIA

SUPERVISOR: PROFESSOR MABEL K. MINISHI-MAJANJA

2023

ABSTRACT

Library and Information Science (LISc) is undergoing rapid technological transformations. For LIS professionals to have a competitive edge in light of these technological advancements, they must be adequately trained to excel in the competitive digital workplace. This study explored LISc education in relation to the digital age needs in Tanzania. Punctuated equilibrium theory and curriculum development model concepts were used as conceptual underpinnings for this study.

This study adopted the pragmatism paradigm and used mixed methods research employing a convergent research design that allowed concurrent collection of quantitative and qualitative data. A sample population of 779 individuals, including students, academic staff, employers and employees in the LIS sector, were the primary sources of data. The study employed non-probability purposive sampling and the census method on the study group, which had relatively few populations. The study's response rate was 574 (71.83%), which was very good for concluding the findings.

The study discovered a significant disparity between the competencies taught by Higher Learning Institutions (HLIs) and those required in the digital age job market. This indicates that the LISc programmes do not adequately equip graduates for the digital era. The study found that although most LISc curricula had some digital competency content, their focus remained primarily on traditional librarian skills. Furthermore, HLIs were found to have inadequate LISc academic staff with requisite expertise in digital content and in addition, ICT facilities were insufficient to support teaching and learning. Other challenges revealed by the study include the lack of involvement of professional boards/stakeholders, no/limited standard guidelines in developing LISc curricula, a gap between teaching and practical experience and obsolete national policies.

This study's recommendations primarily aim to revamp the curriculum to address emerging trends and provide need-based specialisations that align with the job market in the digital age. Strategies such as attracting diverse and competent LISc academic staff, consulting relevant stakeholders, enhancing teaching methodologies, establishing governing and professional accreditation boards, conducting regular curriculum reviews and focusing on practical competencies were found to be necessary to improve

the LISc curriculum. A framework was proposed to guide the alignment of LISc curricula with the digital age's needs.

Keywords:

Curriculum Development; Digital age; Digital competencies; Library and Information Science Curriculum framework; Model; Library and Information Science; Model; Punctuated Equilibrium Theory; Tanzania.

ACKNOWLEDGEMENTS

As much as this doctoral thesis is in my name, I would like to thank God Almighty for giving me the opportunity, guidance and good health to achieve my goal and succeed in this long journey of doctoral studies.

I sincerely thank my supervisor, Professor Mabel K. Minishi-Majanja, for her academic support, supervision, motherly advice and encouragement. This research was a success thanks to her selfless support, guidance and constructive criticism.

Special thanks go to my employer, the management of the Institute of Accountancy Arusha, for permitting me to pursue my doctoral study at the University of South Africa.

I sincerely appreciate the University of South Africa for granting me the financial aid that supported me throughout my study. I also sincerely appreciate the management of Tumaini University Dar es Salaam College, University of Dar Es Salaam, Mzumbe University, Sokoine University of Agriculture and the Open University of Tanzania for permitting me to collect data in their institutions.

I also thank final year LISc bachelor degree students, academic staff and academic Department representatives from the HLIs under study and heads of librarians (Employer) as well as LISc-employed graduates in the LISc job market in Tanzania who together allocated their valuable time and participated during the data collection of this study.

I extend my sincere gratitude to Ms Munity Odera for editing this thesis, Dr Msafiri Jaffari Ponera and Dr Eva Solomon for their technical and professional support and Mr Hulilo Lutaha, who assisted with the data collection activities of this study.

May God bless you all!

DEDICATION

I dedicate this work to my late father, Solomon Joseph Daudi, who could not witness the fruits of his own hands. Without his guidance, I would not have made it this far. May his soul rest in eternal peace. I also dedicate this work to my mother, Gladys Solomon Daudi. I am grateful to her for being my cheerleader and shining armour during this daunting PhD journey. I equally dedicate this work to my brother CPA(T) Paul Solomon; my sisters Dr Eva Solomon, Ester Solomon and Salome Solomon; my children, Solomon Joseph and Gladys Joseph; and last but not least, my wife Augenia, for their patience throughout the study.

DECLARATION

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I declare that the above thesis is my original work and all sources used or cited have been acknowledged using complete references.

Moreover, I affirm that I submitted the thesis to the Turnitin similarity check software for checking originality and that it falls within the accepted requirements for originality.

Furthermore, I declare that this work or part of it has never been submitted for examination at UNISA for another qualification or at any institution of higher education.

30th of September 2023

Mr Joseph Solomon Daudi **Date**

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LIST OF ACRONYMS AND ABBREVIATIONS

ADRs	Academic Department Representatives
AI	Artificial Intelligence
ALA	American Library Association
ALIA	Australian Library and Information Association
ALISE	Association for Library and Information Science Education
BOT	Bank of Tanzania
CARL	Canadian Association of Research Libraries
CBE	College of Business Education
CDM	Curriculum Development Model
CILIP	Chartered Institute of Library and Information Professionals
COTUL	Consortium of Tanzania Universities and Research Libraries
CSS	Cascading Style Sheets
EASL	East Africa School of Librarianship
EUCLID	European Curriculum Reflections of Library and Information Science Education
HLI	Higher Learning Institution
HOD	Head of Department
HTML	Hypertext Markup Language
IAA	Institute of Accountancy Arusha
ICT	Information Communication Technology
IFLA	International Federation of Library Association
IFM	Institute of Finance Management
IoT	Internet of Things
IT	Information Technology
KALIPER	Kellogg–ALISE Information Professions and Education Renewal project
KCMC	Kilimanjaro Christian Medical College
LA	Library Association
LCD	Liquid Crystal Display

LIS	Library and Information Services
LISc	Library and Information Science
MARC	Machine-Readable Cataloging
MOCU	Moshi Cooperate University
MS	Microsoft
MU	Mzumbe University
MUC	Mwenge University College
NACTEVET	The National Council for Technical and Vocational Education and Training
NBAA	National Board of Accountants and Auditors
No.	Number
OECD	Organisation for Economic Co-operation and Development
OUT	Open University of Tanzania
PET	Punctuated Equilibrium Theory
PHD	Doctor of Philosophy
Prof.	Professor
PSPTB	Procurement and Supplies Professionals and Technicians Board
RUCO	Ruaha University College
SLA	Special Libraries Association
SLADS	School of Library Archives and Documentation Studies
SPSS	Statistical Package for Social Sciences
SQL	Structured Query Language
SUA	Sokoine University of Agriculture
TCU	Tanzania Commission for Universities
TDV	Tanzania Development Vision
TLA	Tanzania Library Services
TPSC	Tanzania Public Services College
TUDARCO	Tumaini University Dar es Salaam College
UDSM	University of Dar es Salaam
UGC	University Grants Commission

CHAPTER ONE

BACKGROUND TO THE STUDY

This chapter aims to establish a fundamental base for the study by providing the reader with the background of the study, problem statement, research objectives and questions, rationale and significance, limitations and delimitations and operational definitions of the key terms used. The background provides context and a current Library and Information Science (LISc) overview. The statement of the problem defines the issue and emphasises its importance. The research objectives and questions outline the specific goals and research questions to be answered. The justification justifies the research and highlights its value to the field and society. The limitations and delimitations identify potential constraints and outline the scope of the study. The operational definition of terms ensures that the reader understands the critical concepts clearly and promotes the study's precision. The conceptual framework and research methodology provide the foundation of theories and research methods bonded in this study. The structure and organisation offer a roadmap for the reader to understand the study's main sections and content.

1.1 Introduction

Prior to the last two decades, possessing digital competencies was not considered a requirement for students pursuing non-information technology courses, as the job market did not require such skills for non-computing graduates. However, with the rapid integration of technology in the current workplaces, possessing digital competencies has become increasingly crucial as the key to success in the new working environment (Kivunja 2015:167; Saari et al. 2021:1). The application of information communication technologies (ICT) has tremendously transformed how information can be managed regardless of time and distance. This ICT age which is synonymously referred to as the digital age or information age, has made the application of ICT to be part and parcel of almost all aspects of human activities (Tella et al. 2020:74). The rapid proliferation of digital technologies has made it imperative for individuals to possess digital competencies in order to retain their positions in the digital age (Agava 2017; Velmurugan 2019).

Libraries, as one of the reputable centres which support access to information, have not been left behind by this technological drift. Today ICT solutions have enhanced library operations in an electronic environment through sophisticated information systems where users can communicate needs and receive services without visiting the physical library facility. The changes of services provision in libraries have had a considerable impact on the competence required of library and information science (LIS) professionals due to the growing demand for digital capabilities in order to properly carry out their roles and responsibilities in the modern library setting. Today, it's no longer an option, digital skills have become an essential requirement that LIS professionals should be equipped with once they graduate (Wyman & Imamverdiyev 2018:215). As technological innovations continue to grow, it is crucial to ensure that Library and information science (LIS) curricula are properly developed to bring on board qualified LIS professionals who can effectively provide services to users in the digital age. It is thus essential to incorporate digital technologies into the curriculum and upgrade teaching methods to produce students proficient in the 21st century's digital skills (Akanwa 2020). According to Phuapan et al. (2016:24) has emphasised that education should prepare students for the current and future roles in the job market, as individuals who lack such competencies may likely face limited career advancement opportunities and reduced employability in the long run. Thus, Higher Learning Institutions (HLIs) should invest in identifying the needs of the job market in order to identify the weakness in the programmes they provide. Identifying areas of weakness and developing programmes that support digital skills integration to graduates can help to build a workforce with the necessary digital competencies to succeed in the modern job market (Funes 2018). Moreover, improving digital competencies among the workforce can stimulate productivity and economic growth, thus driving innovation as more organisations leverage digital technologies to enhance their services.

Despite literature highlighting the importance of digital skills and frameworks for digital literacy in the Digital Age, there is still limited literature on the digital skills market needs of LIS professionals of the Digital Age and how HLIs can absorb such requirements and infuse them into their curriculum to enhance digital competencies, especially in developing countries. In addition, most frameworks are at the national level providing benchmarking and are not grounded at the professional level. Therefore,

it is crucial to explore the current digital skills requirements of the LIS job market to understand the necessary competencies needed in the field. This will enable HLIs to align their curriculum with job market demands, ensuring students are well-equipped to meet the job market needs. To achieve this goal, the investigation was narrowed to focus on the digital competencies required for LISc Bachelor degree graduates in the LISc job sector in Tanzania. Bachelor's degree graduates were found to be the most prominent working level in Tanzania, which is highly required in managing and running library operations.

1.2 Background of the study

According to Tumuhairwe (2013), LISc is an academic discipline that aims to equip professionals with the necessary skills to manage information, including selection, acquisition, organisation, storage, retrieval and dissemination. The evolution of LISc education programmes is a fascinating journey that spans over a hundred and thirty years since its establishment by Melvil Dewey in 1887 (Raju 2013:254; Wyman & Imamverdiyev 2018:221). In the early days, these programmes focused on the "library economy," emphasising practical skills such as book selection, cataloguing and circulation. As librarianship grew and changed, so did the educational programmes designed to prepare professionals for this field, where the programme focus shifted from a narrow focus on libraries to a broader focus on information (Onyancha & Minishi-Majanja 2017).

According to Onyancha and Minishi-Majanja (2017) as well as Roy and Simons (2017:4), for many years, the term "librarianship" was used to describe the profession and the educational programmes that trained individuals for this work, where it was upgraded later, to the term "library science", reflecting the increasing emphasis on the scientific study of information management and afterwards, it was transformed into "Library and Information Science". In recent years, the term "iSchool" has emerged to describe LISc education programmes, which reflects the growing importance and dependence on digital technologies in the LIS field as well as the changing interdisciplinary nature of the LISc programme (Onyancha & Minishi-Majanja 2017; Sawant & Yadav 2021:2).

With the innovation in the LIS field, having proper skills is essential. The Statistics provided by the Bureau of Labour Statistics (BLS) in the United States of America indicate that between 2019 - 2029, there will be a 4% decline in LIS professionals' jobs, such as circulation librarians, library assistants and technical librarians, due to much reliance on the use of ICT in libraries (United States Bureau of Labor Statistics 2021). United States Bureau of Labor Statistics (2021) further indicates that there will be an overall 5% growth of librarians and media specialists with a bachelor's degree and above based on an advantage they can apply within and outside the libraries due to the ICT competencies and knowledge they obtained through well-designed LISc curricula. Based on this analysis, it is recognised that ICT skills have added value to LIS professionals and it is a component that needs to be considered as the LIS profession has dramatically changed from a traditional approach of managing operations to a modern ICT management approach (Loganathan & Sekar 2015:66; Joseph & Aneesh 2018:2). LIS professionals today are associated with diverse activities which require digital skills, such as web development, computer networking, institutional repository development, database design and development, information systems and computer software engineering (Loganathan, Sekar & Kasirao 2015:66; Younus & Sajjad 2019:38 ; Joseph & Aneesh 2018:2 ;Thool 2020). To thrive in the digital age, LISc schools must change their focus and those already practising must continuously up skill and reskill themselves (Mole, Chibuzo & Horsfall 2016; Raju 2019). According to Raju (2015) and Raju (2019), reskilling is critical to capacitate employees to manage LIS operations using digital platforms effectively. It is a continuous process that enables LIS professionals to remain relevant, develop new competencies and become valuable assets in the rapidly changing job market.

As identified by Younus and Sajjad (2019), Joseph and Aneesh (2018), Raju (2017) and Loganathan, Sekar and Kasirao (2015), the LISc job market is continuously undergoing transition, which is posing new challenges to the competencies that should be taught in LISc education. International associations of LISc, such as the Chartered Institute of Library and Information Professionals, the International Federation of Library Associations and Institutions (IFLA), the American Library Association (ALA), the Association for Library and Information Science Education (ALISE), Chartered Institute of Library and Information Professionals (CILIP) and the Australian Library

and Information Science Association (ALIA), have been monitoring this transformation in developing nations and evaluating the response of the LISc schools that these associations accredit to the changes (Hutley, Hardy & Brooker 2017; American Library Association, 2015; Chartered Institute of Library and Information Professionals 2012; International Federation of Library Association 2012). These associations worked on projects like the European Curriculum Reflections of LISc Education (EUCLID) project of the European Curriculum in 2005, the Kellogg–ALISE Information Professions and Education Renewal project (KALIPER) project in North America in 2000, the LIPER project in Japan in 2006 and the Australian project for re-conceptualising and re-positioning LISc education for the 21st century to track the changes occurring in the field and develop plans for its sustainable future. Based on the projects' initiatives, it was discovered that LISc programmes are addressing a broad information landscape, experiencing an increase in their educational offerings and specialisations and incorporating more ICT into their curricula as well as other disciplines (KALIPER 2000). The emergence of these trends has been observed in developing countries as well, albeit more slowly than in developed nations which results in a need for drastic measures to ensure the LISc schools revise or redevelop their curricula to reflect the dynamic shifts brought about by technological advancement (Ocholla & Shongwe 2013; Katuli-Munyoro 2014; Yadav & Gohain 2015; Raju 2017; Onyancha & Minishi-Majanja 2017; Wyman & Imamverdiyev 2018).

In Tanzania, LISc education started as a non-graduate certificate training programme in 1972 offered by the University of Dar es Salaam, the College of National Education. Before its establishment, Tanzanian professionals were trained at the East African School of Librarianship (EASL) at Makerere University and others were sent overseas by the government. In 1989, the first School of Library, Archives and Documentation Studies, in association with the National Archives, was established to offer LISc education and training at non-graduate diploma programmes (Olden & Mcharazo 2002:121). However, there was a dispute between the University of Dar es Salaam, the College of Education and the Tanzania Library Services on who should offer the degree programme. Each institution believed it had the right to provide the bachelor's degree programme (Olden & Mcharazo 2002:121). It was not until 1997 that Tanzania, through the University of Dar es Salaam, had its first postgraduate degree in the LISc

programme without having a bachelor's degree programme due to the unresolved dispute.

With the increased need for LISc graduates, several HLIs introduced LISc programmes to meet the growing demand from public and private institutions. Among the HLIs with certificates and diploma, LISc programmes are; The School of Library, Archives and Documentation Studies (SLADS) Bagamoyo; The Moshi College of Cooperatives and Business Studies (MOCU); The Jordan University College (JUC); The Ruaha University College (RUCO); The Tanzania Public Service College (TPC), Mzumbe University (MU) and Sokoine University of Agriculture (SUA). Tumaini University Dar es Salaam College (TUDARCO) was the first one to offer LISc programme at the bachelor's degree level in 2003, followed by the Open University of Tanzania (OUT) in 2013, Mzumbe University (MU) in 2013, University of Dar es Salaam (UDSM) in 2014 and Sokoine University of Agriculture (SUA) in 2017. The UDSM, SUA, MU and TUDARCO have run these bachelor programmes for at least three years. Some institutions such as the TUDARCO, UDSM and the OUT now offer LISc programmes at Masters and PhD levels.

Despite progress in LISc education in Tanzania, only a few empirical studies have been conducted (Burnett 2013; Muneja 2013; Otike 2017; Onyancha & Minishi-Majanja 2017) in Africa that have depicted the overall state of affairs of LISc education in Tanzania. The research done almost a decade ago by Muneja (2013:15) on the "reflection of Tanzania libraries in the digital age" identified a weakness in the preparedness of HLIs, specifically staffing skills in Tanzania libraries. Lukwale et al. (2013), in a tracer study of LISc education in Tanzania, assert that despite efforts, the quality of library and information services provided in Tanzania is still poor; moreover, the performance of most LISc graduates employed in Tanzania is still questionable. Brunett (2013) conducted a study that established that the LISc programme in Tanzania is weak and therefore requires a review to incorporate new courses to enhance LISc graduate competencies. This study could not establish relevant research on assessing bachelor's degree LISc programmes; however, a recent study by Kassim, Katunzi-Mollel and Mwantimwa (2022); Buarki, Hepworth and Murray (2011) found that the curriculum on offer does not meet the needs requirements of the graduates, employers and society. Their findings suggested a mismatch between what the curriculum offers

and current job market requirements (Kassim, Katunzi-Mollel & Mwantimwa 2022). Although most bachelor's degree programmes have been established in the last decade, no systemic, holistic effort has been made to explore if they meet the needs of the digital age. This study was an attempt by the researcher to fill this gap.

1.3 Statement of the problem

Studies conducted by Rukwaro and Bii (2016), Rosa (2016), Raju (2017), Wood and Evans (2018), Malik and Ameen (2021) and Sibiya (2022), have shown that LISc education programmes are failing to produce graduates with the required skills to work in the digital age job market effectively. These new skills required have been accelerated by the rapid changes brought by the technological advancements that have significantly changed how information is created, processed, stored and disseminated (Katuli-Munyoro 2014; Raju 2017). These new ways of managing information in a variety of formats and sources, dynamic delivery channels and sophisticated technologies have resulted in new challenges for the LISc programme as the changes require the programme to transform to the needs of the emerging trends in order to ensure competencies of its graduates in the current LISc job market.

International LIS associations such as the IFLA, ALISE, CILIP and ALA have not been far behind in actively monitoring the transformation happening in LISc education and how LISc schools respond to these changes (Smith, Hallam & Ghosh 2012; Australian Library and Information Association 2014; American Library Association 2015; Chartered Institute of Library and Information Professionals 2017). Through their initiatives and programmes, the associations have called upon revisiting the LISc education programmes and framing strategies that will enable the discipline to sustain and retain its position in the galaxy of other disciplines. However, the experience shows that the adoption of such initiatives from these associations by the LISc schools is lower, especially in developing countries compared to developed countries (Kaur 2015; Rukwaro & Bii 2016; Xiu et al. 2019:42).

In the context of Tanzania, studies have shown that LISc schools provide inadequate education in digital skills needed in the current LISc job market. In support of this statement, earlier studies indicated that the curricula were ineffective in meeting

employers' current digital skills needs (Muneja 2013, Kassim, Katunzi-Mollel & Mwantimwa 2022). Although Muneja (2013), Kassim, Katunzi-Mollel and Mwantimwa (2022) have identified that the curricula were not fulfilling the needs of the digital skills in the Tanzania LIS workplace, the scope of their studies could not establish the digital skills requirements of Tanzania LIS job market and the underlying pattern and needs that can ensure successful implementation of LISc programme that meet the needs for the digital age.

The concerns about LISc graduates being unprepared for the digital age job market remain an area of interest for research in LISc education not only in Tanzania but also in other developing countries of similar nature and if this persisting problem is left unattended, learners will continue to graduate without the required skills and HLIs offering LISc education will lose their relevance in the market (Raju 2015; Ayinde & Kirkwood 2020). In addition, inadequate digital competencies in the digital library landscape can lead to subpar delivery of library services (Sibiya & Ngulube 2023). Raju (2017), Malik and Ameen (2021), as well as Sibiya and Ngulube (2023) further pointed out that it is essential for HLIs offering LISc courses to find a way to bridge the gap between the LISc programme offerings and market requirements, as failing to address this disparity could potentially result in other professional fields like information technology and computer science encroaching upon LISc job opportunities. This indicates that the future of the LISc academic field might be uncertain, thus, calling for drastic measures to ensure the programme's and profession's survival.

A number of studies have provided suggestions for digital competencies incorporation in LISc education; however, none of them was found relevant to the context of this study (Tammaro 2011; Kamba 2011; Raju 2018; Fatima & Ansari 2021; Sibiya 2022). Among of the reasons which were found to be substantive to carry out further study, first, none of these studies were conducted in the context of Tanzania, which means that their findings might not directly apply to the specific educational setting and needs of students and institutions in the context of Tanzania. Second, these studies were found to have a general focus on digital competencies rather than being specific about the technical ICT skills required which implies that the studies have addressed broader digital literacy or information management skills, which might not align with the specific technical demands as needs of LIS employers have shifted towards technical

competences. Third, the studies appeared to have focused on the general perspective of LISc education without specific targeting the level of integration of digital competences, leaving alone what which working class is highly required and what technical digital skills they should be equipped with. Therefore the findings from these broader studies that have been carried out may not provide the necessary granularity required to understand and address the specific needs in different graduate levels of LISc education. Likewise, the reviewed literature did not present any research that had explicitly designed a curriculum framework for a bachelor's degree in LISc. Therefore, the researcher recognised the gap, which prompted the need to analyse LISc education and proposed a framework that can assist HLIs in Tanzania to reshape their curricula and programmes so as to align with the current digital dynamics and the job market requirements.

1.4 Purpose of the study

The main objective of this study was to assess the current state of bachelor's degree education in LISc in Tanzania in light of the demands of the digital era and propose a curriculum model that would encompass the digital skills needs of the LIS digital age market.

1.4.1 Specific objectives of the study

In order to achieve this purpose, the study had five specific objectives:

1. To audit the LISc bachelor degree curricula alignment with the digital age.
2. To establish digital competencies that Tanzanian LISc bachelor degree graduates must acquire for the digital age.
3. To explore digital competencies and teaching methodologies of academic staff teaching LISc bachelor degree programmes in Tanzania.
4. To uncover challenges hindering HLIs in Tanzania from effectively developing curricula that aligns with the demands of the digital age.
5. To propose the LISc Bachelor degree curriculum model that responds to the needs of the digital age in Tanzania.

1.4.2 Research questions

The research objectives of the study, as outlined in section 1.4.1, were guided by the following research questions;

1. What competencies are available in the current LISc bachelor's degree curricula aligning with the digital age?
2. Do the current LISc bachelor's degree curricula in Tanzania adequately prepare students with the digital skills required in the digital age job market?
3. What digital skills are required by the LIS employers in the LIS job market in Tanzania?
4. Do the digital skills possessed by LISc graduates working in the job market align with the digital skills requirements of LIS employers in Tanzania?
5. What competencies do academic staff teaching LISc in Tanzania possess?
6. What methodologies are employed in teaching LISc bachelor's degree courses in Tanzania for enhanced digital competencies?
7. What policies and procedures do HLIs teaching LISc in Tanzania employ in developing LISc curriculum that meets the needs of the digital age?
8. What challenges do HLIs teaching LISc in Tanzania face in aligning their curricula with the digital age requirements?
9. What courses should be introduced into the bachelor's degree curricula for LISc education in Tanzania to enhance alignment with the digital age requirements?
10. How can a curriculum model be proposed for LIS bachelor degree programme to address the digital competencies required in the LIS job market?

1.4.3 Research dashboard

Damyanov and Tsankove (2019:424) define a research dashboard as a table that clearly and concisely represents how and where data were collected to address the main research question. The research dashboard for this study, as presented in **Table 1.1**, as presented on page 11, effectively summarises the research objectives and questions and connects them to the research approach, data collection tools and respondents. This table aids in giving a general overview of the research procedure and the systematic approach to answering the research questions. It helps readers understand the overall

structure and flow of the research process and how each works together to answer the research questions systematically step.

Table 1. 1: Research matrix

Sn	Objectives	Research questions	Research methodology	
01	To audit the LISc bachelor degree curricula alignment with the digital age. .	What competencies are available in the current LISc bachelor's degree curricula aligning with the digital age?	Quantitative and Qualitative	Document analysis Interview Questionnaire (ADR, LISc academic staff, LISc final year students, LISc graduates, LISc Bachelor degree curriculum)
		Do the current LISc bachelor's degree curricula in Tanzania adequately prepare students with the digital skills required in the digital age job market?		
02	To establish digital competencies that Tanzanian LISc bachelor degree graduates must acquire for the digital age.	What digital skills are required by the LIS employers in the LIS job market in Tanzania?	Quantitative	Questionnaire (LISc graduates, LIS employers)
		Do the digital skills possessed by LISc graduates working in the job market align with the digital skills requirements of LIS employers in Tanzania?		
03	To explore digital competencies and teaching methodologies of academic staff teaching LISc bachelor degree programmes in Tanzania	What competencies do academic staff teaching LISc in Tanzania possess?	Quantitative and Qualitative	Interview Questionnaire (ADR, LISc academic staff, LISc final year students)
		What methodologies are employed in teaching LISc bachelor's degree courses in Tanzania for enhanced digital competencies?		
04	To uncover challenges hindering HLIs in Tanzania from effectively developing curricula that aligns with the demands of the	What policies and procedures do HLIs teaching LISc in Tanzania employ in developing LISc curriculum that meets the needs of the digital age?	Quantitative and Qualitative	Interview Questionnaire (ADR, LISc academic staff)
		What challenges do HLIs teaching LISc in Tanzania face in aligning their curricula with		

Sn	Objectives	Research questions	Research methodology	
	digital age.	the digital age requirements?		
05	To propose the LISc Bachelor degree curriculum model that responds to the needs of the digital age in Tanzania	What courses should be introduced into the LISc bachelor's degree curricula in Tanzania to enhance alignment with the digital age requirements?	Quantitative and Qualitative	Interview Questionnaire (ADR, LISc academic staff, LISc final year students, LISc graduates)
		How can a curriculum model be proposed for LIS bachelor degree programme to address the digital competencies required in the LIS job market		

Source: Researcher (2023)

1.5 Justification of the study

The justification of a study is a critical aspect of research, as it clearly explains why the research is being conducted and its intended outcomes. It helps to identify the research gap in a particular area and explain how the study aims to fill that gap (Mugenda & Mugenda 1999:214). Fisher and Foreit (2002:17) suggest that researchers should consider a set of questions when justifying a study, such as the extent of the problem, whether it relates to ongoing programme activities and whether it relates to broader social, economic and health issues.

The current study focused on evaluating the status of bachelor's degree education in LIS in Tanzania in relation to the requirements of the digital age. The intention was to propose a curriculum framework for digital competencies that enable graduates to acquire the necessary skills and competencies for the digital age. The study aimed to address the knowledge gap of what is required in the LIS profession due to the changing technological innovations taking place, including the internet, which has resulted in managing information becoming more complex and dynamic, making the need for professionals who can manage and organise digital information effectively crucial.

Furthermore, like many developing countries, Tanzania is facing challenges in meeting the needs of the digital age, with a gap between the skills of LIS graduates and job market demands. A curriculum framework addressing the needs of the digital age will help bridge this gap and produce graduates who are better equipped to face modern challenges. The study's findings can also help identify areas for improvement and policymakers and higher learning institutions can work towards enhancing the quality of education and graduates' competencies. Moreover, the research's results can contribute to the field of LISc, enabling LIS professionals to understand the current state of LIS education in Tanzania, employers' needs, existing challenges and prospects and provide areas for further research in other contexts.

1.6 Originality of the study

Kearns and Finn (2017:167) assert that doctoral research, by its very nature, is intended to expand the boundaries of knowledge in a particular discipline and this can be achieved through the development of new theories, the exploration of new areas of research, or the application of existing knowledge to new contexts. They further opine that for doctoral research to make a meaningful contribution to knowledge, it must also be original (Kearns & Finn 2017:167). This means that the research must be new and innovative and provide a fresh perspective or insight into the existing body of knowledge in the discipline. The dependence on originality is essential because it ensures that doctoral research is not simply a rehashing of existing ideas and concepts; instead, it challenges established ways of thinking and opens up new avenues for exploration and inquiry and by doing so, it enriches the discipline, expands the boundaries of knowledge and contributes to the advancement of society as a whole (Kearns & Finn 2017). Baptista et al. (2015:57) posit that originality is not only related to the outcome of the research but the overall process of coming up with the findings. Yin (2018) further adds that the originality of a study is determined by its potential to contribute to existing scholarly research, introduce new literature in the field of study and improve policies and practices in the relevant speciality.

Based on the opinions of Kearns and Finn (2017), Baptista et al. (2015) and Creswell and Creswell (2018), this study was original as it contributes to the existing body of knowledge in the LISc field in Tanzania. This study proposed a framework to support

the inclusion of digital competencies in the bachelor's degree programme for LISc. If implemented as proposed, this framework could directly impact the national qualification framework through the Tanzania Commission for Universities and, subsequently, the respective HLIs. Furthermore, this framework could shape the curriculums of individual HLIs at an international level if initiated effectively. In addition, this study's unique approach was taken by combining the Punctuated equilibrium theory with a Curriculum development model. This novel combination of theories sets this study apart from previous studies conducted in this area and highlights the innovative thinking and originality applied to this research. Combining a theory and a model provided a new perspective on the subject matter and uniquely contributed to the body of knowledge in the field.

1.7 Scope and delimitation of the study

To ensure research transparency, the researcher needs to acknowledge the study's limitations and the extent to which the findings could be generalised to other settings, as recommended by Creswell and Creswell (2018). The study concentrated on HLIs in Tanzania that offer LISc Bachelor's degrees programmes. The study's sample size was limited to academic department representatives from the faculty hosting LISc Bachelor degree programmes, academic staff responsible for teaching digital competencies, final-year students and employers of LISc graduates from Consortium of Tanzania University and Research Libraries (COTUL)-registered libraries in Tanzania and LISc graduates who are currently working in COTUL-registered libraries. Tanzania's mainland and Zanzibar were the general areas of study. As for the aforementioned scope, the findings of this study may not apply to other contexts outside of the scope of the research.

The findings of this study were obtained using data collection tools that supported the combination of qualitative and quantitative research methods. Academic department representatives were interviewed, while academic staff, LISc graduates', employers and final-year students were polled via questionnaires. The study also analysed curriculum documents from the five HLIs to determine whether the programmes aligned with the digital age. The Punctuated Equilibrium Theory and Wolf Curriculum Model served as a framework for the study and a pragmatic convergence research approach was used to increase the study's rigour.

1.8 Definition of terms

Key terms used in this study were defined in this section and applied consistently throughout the research to ensure a common understanding and meaning.

a) **Academic department representative**

Academic Department Representative (ADR) was used in this study to refer to the person responsible for driving the academic activities of the department or faculty offering the LISc Bachelor's degree programme. The term was used instead of other common titles such as Head of Department, Associate Head of Department, Dean of Faculty, or Associate Dean of Faculty, which may vary in different academic settings or institutions.

b) **Curriculum**

Tanner and Tanner (1980:25) define curriculum as a purposeful and structured process that involves organising knowledge and experiences to create planned learning opportunities. These experiences are designed to facilitate the learner's ongoing and voluntary development of personal and social skills, with the school acting as the facilitator (Tanner & Tanner, 1980). Mizan (2020) defines a curriculum as all the planned educational activities designed to foster the development of the learner and optimise their potential, including extracurricular activities like sports, debates and library visits. In this study, curriculum refers to a document that contains information about the course's purpose, outcomes, content, teaching and learning strategies, evaluation, assessment and resources.

c) **Digital age**

According to Haris (2016), the digital era represents a shift from an industrial-based economy to an information economy facilitated by computers and other technological communication devices. In literature, the terms "digital age", "information age" and "fourth industrial revolution" are frequently used interchangeably to describe this era. However, in relation to this study, the term "digital age" has been used, as suggested by Haris (2016) to explain the new

working environment where technology is the central back born of running operations and services.

d) **Graduate**

A graduate is someone who has completed undergraduate studies at a university or college. Furthermore, the term "graduate" can be used to describe someone who has completed a higher level of education, such as a Master's or Doctorate program (Webster 2023). LISc graduates in this study were used to mean students who have completed a LISc Bachelor's degree programme.

e) **Information and Communication Technology**

Ratheeswari (2018:45) defines Information and Communication Technology (ICT) as a set of technologies and tools that enable individuals, businesses and organisations to communicate and share information over long distances. These technologies include computers, mobile phones, the internet, satellite systems and other forms of digital communication. The term ICT is often used interchangeably with Information Technology (IT), which refers to using computers and software to process, store and transmit information. However, ICT focuses more on communication technologies such as email, instant messaging, video conferencing and social media platforms.

f) **Library and Information Science**

Rahman and Jana (2019) define Library and Information Science (LISc) as a study that focuses on creating, organising, managing, disseminating and using information resources in different formats, including print, electronic and digital media. LISc encompasses the theoretical and practical aspects of library science, information science and related disciplines, such as computer science, communication studies and management (Tumuhairwe 2013:2).

g) **Model**

According to the Collins dictionary, a model is a physical replica that depicts the appearance or function of an object; usually, it is smaller in size than the actual

object it represents (Collins 2023). In addition, a model serves as a reference point for individuals seeking similar outcomes (Collins 2022). Schwarz et al. (2009) further concur that a model can represent an object, concept or phenomenon used to explain, understand, or predict its behaviour. In the essence of this study, the term model was used as defined by Collins (2022) and Schwarz et al. (2009) as a reference point or framework that can guide aligning, developing and implementing digital skills content in the LISc bachelor degree curriculum. In addition, this study employed the terms model and framework interchangeably throughout the study to mean the same meaning because they both refer to a structure and provide a way to simplify ideas into a more manageable and understandable form.

h) **Student**

A student is an individual who is participating in an organised educational or training programme Mothatha, (2005:94). This can refer to both formal and non-formal learning environments. Formal education includes learning that takes place in schools, colleges, universities and other accredited institutions, where students engage in structured coursework and receive instruction from qualified educators. Non-formal education, on the other hand, typically takes place outside of traditional classroom settings and may include vocational or job training programmes, continuing education courses, or community-based learning initiatives. In either case, a student is actively seeking to acquire new knowledge, skills, or competencies to improve their personal or professional prospects.

1.9 Conceptual framework

Ngulube (2018) defines the conceptual framework as the holder or glue that keeps the components of social research together and provides focus and direction to empirical research. According to Ngulube (2020), the researcher must combine the constructs borrowed from each theory or model used if more than one theory or model is employed in one study. However, if a study is confined to one theory or model, it can be referred to as having a theoretical framework (Ngulube 2020).

Theories and models have been developed to comprehend, clarify and forecast change processes as well as curriculum development. Examples include Tyler's original 1949 curriculum design model, the Wolf Curriculum Development Model of 2007, the Punctuated Equilibrium Theory of 1985, the Theory of Practice by Bourdieu of 1977, the Theory of Practice by Gersick of 1991, Wheeler's design of 1967 and Kerr's theory of 1968 (Tyler 1949; Kerr 1968; Bourdieu 1977; Tushman & Romanelli 1985; Wolf 2007). These theories and models have been used as inquiry frameworks across a number of disciplines, such as information science, education, agriculture, health sciences, organisation and policy studies and have proven to be effective and reliable for studying curriculum evolution and other forms of changes. Based on the adaptability of this study objective, the punctuated equilibrium theory (PET) of 1985 and Wolf curriculum development model (CDM) of 2007 formed the study's conceptual framework. The integrative theoretical framework and model facilitated methodological pluralism. Chapter two details PET and CDM and how this study used their constructs.

1.10 Research methodology overview

According to Saunders, Lewis and Thornhill (2019) techniques employed in conducting research are referred to as research methods. Research methods or methodologies encompass research design that guides the researcher in carrying out the study. The research methods provide the research philosophy, which shows the stance of the researcher; the research approach, whether the study is a qualitative, quantitative or mixed method; data collection methods and analysis of the collected data (Wilson 2014; Creswell & Creswell 2018).

A pragmatism paradigm informed this study. Pragmatism is a philosophical approach that emphasises the practical component of knowledge and the need to mix diverse research approaches (Wilson 2014:10). As the study was confined to a pragmatism stance, both qualitative and quantitative methods were employed on this study for which its flexibility provided different levels of data analysis. The study used convergence parallel design because it enables the simultaneous collection of quantitative and qualitative data within a limited time and is considered suitable for researchers new to mixed methods research. This study used a convergence-parallel design, as Creswell

and Creswell (2018) suggested because it allowed for the flexible application of qualitative and quantitative data collection processes and analysis within a pragmatism stance, which was central to the research approach.

This study was conducted in Tanzania. Five HLIs which provide LIS bachelor's degree education were purposively selected. These HLIs include the University of Dar es Salaam (UDSM), Tumaini University Dar es Salaam College (TUDARCO), Sokoine University of Agriculture (SUA), Mzumbe University (MU) and the Open University of Tanzania (OUT). The census method was used to get insight from LIS employers in Tanzania. Therefore, the study population comprised the ADRs, LISc academic staff, LISc final-year students, LIS employers and LISc graduates. Data collection was optimised by carefully selecting ADRs and academic staff through purposive sampling.

On the other hand, the census method was applied to LIS employers, LISc graduates and LISc final-year students as their population was small. This study utilised interviews and questionnaires as primary data collection tools. Document analysis was also employed in gathering data. The data collection tool were pretested and adjustments were made based on recommendations received from the pretest of the tools. Ethical principles, as pointed out by Saunders, Lewis and Thornhill (2019:258) and as recommended by the UNISA handbook (UNISA 2013:9), were implemented. The ethical principles were included to ensure that participants are well informed about the study and what the study intends to archive; participation in the study is voluntary and they have the right to withdraw at any time; as well as data retrieved is kept private and that individuals stay anonymous throughout the research process. The data obtained qualitatively were analysed using Atlas TI software, while the quantitative data underwent analysis with the Statistical Package for Social Science (SPSS). The findings were presented in two ways: thematically for the qualitative data and through descriptive statistics for the quantitative data. Chapter four of the study extensively discusses the research methodology implemented, providing comprehensive details.

1.11 Structure of the thesis

The study is structured into seven chapters, each comprising an introduction, a body and conclusions. These chapters include the introduction and background; conceptual

framework; literature review; research methodology; data analysis and presentation of findings; discussion; summary, conclusions and recommendations. This structure is further briefly highlighted in the following subsections below;

1.11.1 Chapter one: introduction to the study

This chapter presents the introduction and background of the study, including the overview of LISc Bachelor degree education developments in Tanzania, the problem statement and purpose of the study, the study's objective and the research questions. It also provides the research dashboard, which shows the links to the research objectives, questions, theories, research approach and data collection tools. The chapter further discusses the justification and originality of the study and the scope and delimitation, followed by defining key items. A brief discussion of the conceptual framework and research methodology is also presented in this chapter, followed by the structure of the thesis.

1.11.2 Chapter two: theoretical and conceptual perspectives of the study

In this chapter, the theoretical framework of the Punctuated Equilibrium Theory and Curriculum Development Model is examined and its relevance to the study is justified. The study's conceptual framework is also presented, aligning each construct utilised in Wolf's Punctuated Equilibrium Theory and Curriculum Development Model with the study's primary objectives. These frameworks encompass all the constructs investigated by the researcher.

1.11.3 Chapter three: a review of literature

This chapter comprehensively reviews the existing empirical literature concerning LISc education in alignment with the digital age. The researcher reviewed literature from publications, including books, journal articles, conference proceedings and other available information sources. This chapter identifies gaps in the literature on LISc education on digital competencies. The review of the relevant literature was based on the main research objectives.

1.11.4 Chapter four: research methodology

This chapter is confined to the methodologies used to implement this study. It discusses the research philosophy assumptions confined in the ontology and epistemology stance, research paradigms, research approach, research design, study population, sampling procedures, data collection techniques, data analysis and presentation of research findings, validity and reliability of the study and ethical considerations of the study.

1.11.5 Chapter five: presentation and analysis of the findings

This chapter presents the study's findings obtained through interviews, questionnaires and document analysis.

1.11.6 Chapter six: discussion of the findings

This chapter discusses the study findings obtained through interviews, questionnaires and document analysis presented in Chapter Five. The layout of the discussion is based on the study objectives. Theories chosen to guide the study and literature are used to discuss the findings.

1.11.7 Chapter seven: summary of the findings, conclusions and recommendations

This chapter summarises the findings and gives the conclusions and recommendations of the study. Furthermore, the chapter presents a framework for integrating digital competencies into the LISc Bachelor's degree curriculum. The chapter further provides the study's implications and the areas for further research.

1.12 Summary of chapter one

This chapter started by providing the introduction and background of the study in order to provide understanding to the readers on the focus area of the study. The chapter also discussed the problem statement, provided the aim of the study, outlined the objectives and specific questions and further presented in brief the conceptual framework and research methods employed in this study. The justification, scope and delimitations of the study were also highlighted in this chapter. The definition of key terms and structure of the whole thesis were further presented to provide the readers with the floor plan of

the research but also provided readers with the meaning of the key terms used so as to understand the consistency of the terms and how they have been used in this study. The next chapter presents the theoretical perspectives of the study.

CHAPTER TWO

THEORETICAL AND CONCEPTUAL PERSPECTIVES OF THE STUDY

2.1 Introduction

In any research study, it is crucial to clearly understand the research problem, develop research objectives and questions and justify the study, as presented in the previous chapter. Theoretical perspectives also play a vital role in grounding the research and providing a framework for understanding the research findings. This chapter discusses the theoretical perspectives and model used to ground the study. The theoretical framework adopted in this study assisted the researcher in gaining a better understanding of the research problem. The theoretical perspectives also guided the research methodology by assisting the researcher in selecting appropriate research methods and techniques relevant to the research problem. Additionally, the theoretical perspectives provided a basis for data interpretation, enabling the researcher to explain the relationships among variables and make meaningful inferences about the research findings.

2.2 Theoretical frameworks

According to Kivunja (2018:46), a theoretical framework is made up of theories that have been developed and validated by professionals across disciplines. Researchers rely on these theories to guide their investigations and the communication of their research findings. Theoretical frameworks play a crucial role in research by providing a systematic guide for research operations, disseminating new information and contributing to existing practices and policies (Ngulube 2020b). They help researchers formulate research objectives, outline research procedures, guide the selection of relevant data and allow researchers to examine data and provide explanations for observed occurrences (Kivunja 2018). Theories seek to answer "why" inquiries by explaining why things happen and predicting future happenings. Selecting an appropriate theory for a study enables researchers to understand the relationship between concepts, ideas and knowledge while also identifying the variables in the study (Kivunja 2018). A failure to incorporate a theory into a study can result in insufficient

findings, making it crucial to establish a relationship between what is currently known in the subject and new information from study findings.

In research, a theoretical framework is utilised when all the concepts, in theory, are employed to elucidate phenomena. However, if one theory cannot fully answer the research question, researchers can utilise multiple theories or models to construct a conceptual framework based on theories, models and literature (Ngulube 2020b). This approach allows researchers to synthesise multiple theories to construct a framework that best explains the research problem. Ngulube (2020b) narrates that when a conceptual framework is based on a theory, only specific aspects of the theory or model are used as the foundation for the study. This enables researchers to focus on relevant concepts and relationships pertinent to their research rather than attempting to apply a broad and potentially unwieldy theoretical framework (Ngulube 2020b).

This study used the PET by Tushman and Romanelli in 1985 and the CDM by Peter Wolf in 2007 to form the study's conceptual framework. These tools were chosen based on their relevance to the study aims and their potential to provide epistemological and ontological viewpoints. The theory and model were used to guide the literature review, create research questions, choose appropriate research procedures and data-gathering methods, present and evaluate data and discuss the findings. The employed theory and model are further discussed in the following subsections below.

2.2.1 Punctuated equilibrium theory

Eldridge and Gould established the first PET to explain biological species transitions (Eldridge & Gould 1972). Their theory stated that organisms could live in an equilibrium condition for an extended period, but at the midpoint of equilibrium, they encounter changes or revolutions that cause organisational turmoil (Eldridge & Gould 1972). According to Eldridge and Gould (1972), during environmental changes, species evolve into new ones that can survive in the new ecosystem. Their survival depends on their ability to accept and transform in response to environmental changes. However, in 1985, Tushman and Romanelli employed the theory to explain the characteristics of organisational transformation that the organisations have periods of stability and incremental change broken by short times of dramatic change caused by external shocks

or crises (Tushman & Romaneli 1985). As suggested by Tushman and Romaneli (1985), the organisation transformation chain is relevant in the context of LISc education in the digital age since the discipline is undergoing substantial changes due to technological improvements. According to the theory, it can be argued that the equilibrium era of LISc education is being interrupted and the programme must change to meet the changing needs of the field. Therefore the PET provides a framework for comprehending developments in LISc education and how the discipline will continue to evolve in response to continuous technological advancements and changes in user needs.

Tushman and Romanelli (1985) proposed three key concepts within the PET, including equilibrium phase, deeper structure and revolutionary period. These constructs play a crucial role in studying and understanding changes in LISc education. The equilibrium phase, as termed by Tushman and Romanelli (1985), involves incremental changes and adaptations aimed at addressing internal and external disruptions within the system. During this stage, organisations tend to reject indications for change and failure to adopt changes can lead to instability. The deeper structure highlights the underlying ideas and values influencing an organisation's behaviour and decision-making processes, while the revolutionary period is a period of rapid change that upsets the equilibrium, which occurs when an organisation's underlying structure is misaligned with changing environmental needs (Tushman & Romanelli 1985). This study used two constructs of PET theory, including the revolutionary period and deeper structure. These constructs are further discussed in detail.

2.2.1.1 Revolutionary period

Tushman and Romanelli (1985:175) opine that brief but profound periods of transformation are called a revolution period. Tushman and Romanelli (1985:175) further opine that revolution can either come from internal or external pressure, whereby internal can be viewed as the inability of the system or organisation to meet demands, which substantiate a need for revolution while the external pressures are those forming the revolution on the system or organisation due to changes on the environmental element. In the context of LISc education, a period of revolution has been observed due to technological innovation and changes in user needs and

information-seeking behaviour. Because of these changes, the LIS principles, standards, practices and professional skills of the LIS profession have undergone changes. Libraries now have access to licensed electronic resources that the library does not even own, expanding their collections beyond just books. The services offered by LIS professionals now extend into cyberspace, connecting libraries globally. Since the deinstitutionalisation of libraries, library services have spread beyond their physical locations. LIS now work in a wide variety of fields, including system management, web design, web administration, system development, knowledge management, training and publishing. Scholars began to question the status quo of LIS education in light of these shifts. Table 2.1 presented on page 31 shows how the construct was integrated in the research objective.

2.2.1.2 Deeper structure

Tushman and O'Reilly (1996) argue that every organisation or profession has a fundamental structure composed of core values, products, markets, technology, power distribution, internal structure and control systems. This deep structure restricts organisational change during equilibrium and can only be altered through significant upheavals. Deep structure, as defined by Gersick (1991), refers to the fundamental decisions made by a system concerning the vital components of its units and the patterns of activity that sustain its existence. In the context of LISc education, the principles; standards; structures; culture; ethics; and control systems, among other elements, are the deeper structure which differentiates LIS professionalism from other professions. In addition, the deeper structure in the context of LISc education could be understood as the essential ideals and beliefs that have traditionally governed the discipline, such as a commitment to intellectual freedom, equal access to information and cultural heritage protection. The expanding body of LIS knowledge and evolving competencies create uncertainty about core competencies in LIS education. Incorporating new fields in the LISc curriculum indicates that the deeper structure has been altered to allow the integration of new competencies in LIS education. Table 2.1 presented on page 31 shows how the construct was integrated in the research objective.

As discussed above, PET (1985) was unable to fulfil all the objectives of this study. Consequently, specific components of Wolf's CDM (2007) as further discussed in section 2.2.2 below were incorporated to fill this gap.

2.2.2 Curriculum development model

The Peter Wolf Curriculum Development Model (CDM) was developed in 2007 at the University of Guelph to aid individual educators in enhancing their course design process (Wolf 2007). This model, devised by Wolf, is faculty-driven, data-informed and supported by educational development. According to Wolf (2007), the model is organised into three phases of development: envisioning the curriculum, developing and aligning it and coordinating and further enhancing its development. As the study's primary aim was to propose a curriculum model, the CDM was purposely chosen to guide in preparing research questions, selecting a population sample, applying appropriate tools for data collection and supporting the discussion of study findings**.** **Figure 2.1** presents the CDM and a more detailed discussion of the phases presented.

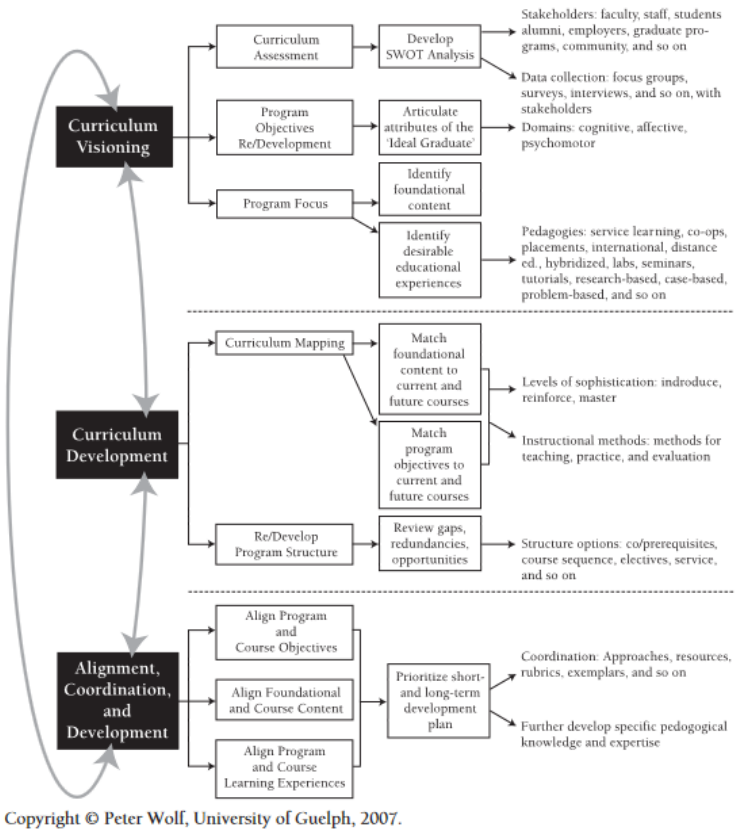

Figure 2. 1: Curriculum development model (Adopted by Wolf, 2007)

The Wolf (2007) model as depicted in figure 2.1 is a specific model that assists in the creation of educational programmes in higher education and its components enable researchers to identify, analyse data and achieve the intended outcomes. The way the model is design is driven by faculty, informed by data, and supported by educational developers. Based on its constructs, it was determined that not all components of the model were suitable for this particular study. As a result, the researcher only selected specific components that were relevant to the research objective, which are further detailed in the following subsections.

2.2.2.1 Curriculum assessment

Curriculum assessment is the process of evaluating and determining a curriculum's effectiveness, relevance and alignment with educational goals and objectives (Wolf, 2007). It entails collecting and analysing data to evaluate the curriculum's strengths and weaknesses, identifying areas for improvement and making well-informed decisions to improve student learning experiences. As described in Wolf's (2007) model, the concept of curriculum assessment centred on evaluating the course's program and identifying its foundational content and educational experiences. Table 2.1 illustrates the incorporation of the concept into the research objective.

2.2.2.2 Curriculum mapping

Curriculum mapping is a process that involves systematically aligning the components of a curriculum, such as learning objectives, instructional activities and assessments, to ensure coherence and progression in student learning. While I'm not familiar with a specific "Wolf" model in relation to curriculum mapping, I can provide you with a general overview of the curriculum mapping process, which can be applied in various educational contexts.

The constructs of curriculum mapping were utilised to inform four research questions, including to find out if the current LISc bachelor's degree curricula in Tanzania are adequate in equipping students with the digital skills necessary for the LISc job market in the digital age, to find out methodologies used to teach LISc bachelor's degree courses in Tanzania for enhanced digital competencies, policies and procedures employed by HLIs, to find out Which courses should be added to Tanzania's LISc

bachelor's degree curricula to align better with the job market digital skill requirements as well as to find out how can a digital competencies curriculum model for a bachelor's degree LISc programme be proposed. Wolf (2007) describes this construct as one where the researcher aligns foundational contents with current and future courses and programme objectives with current and future courses, considering the level of sophistication that includes an introduction, reinforcement and mastering. Table 2.1 shows how the construct was integrated in the research objective.

2.2.2.3 Programme objectives re/development

The construct of the Programme objective re/development is construct under the component of curriculum visioning which has a direct out of articulating attributes of ideal graduate which has been used to inform this study. According to Wolf (2007) the articulating attributes of ideal graduate aims to identify the knowledge, skills and competencies a graduate must possess upon graduation. The model is based on the cognitive, effective and psychomotor domains, which together provide a comprehensive understanding of the attributes of the ideal graduate. This construct was used in this study to inform the question, which aimed to investigate the alignment between the digital skills possessed by LISc graduates in Tanzania and the digital skills requirements of employers in the LISc sector. The aim was to determine whether LIS schools infuse digital skills content in their graduate programmes.

According to Wolf (2007), the cognitive domain refers to the intellectual abilities and skills an ideal graduate must possess, including critical thinking, problem-solving and decision-making skills. Wolf (2007) further pointed out that the effective domain refers to the attitudes, values and beliefs an ideal graduate must possess, including ethical and professional behaviour, effective communication skills and an appreciation of diversity. Finally, the psychomotor domain refers to the physical skills and abilities that an ideal graduate must possess. This includes technical skills, manual dexterity and physical coordination (Wolf 2007). By using this construct to investigate the alignment between the digital skills possessed by LISc graduates in Tanzania and the digital skills requirements of LIS employers, the study aims to identify gaps between the two. This helped determine whether LIS schools are adequately equipping their students with the necessary skills required for the digital age job market through infusing digital skills

content into their LISc programmes. Table 2.1 shows how the construct was integrated in the research objective.

These CDM constructs allowed the researcher to evaluate the current LISc bachelor's degree curricula in Tanzania and identify areas for improvement in alignment with the digital age.

2.3 Conceptual framework

A conceptual framework serves as a structure for understanding the connection between the study's independent and dependent variables. In this study, the independent variable is the LISc education provided by the HLIs. The researcher examined how this education influences the dependent variable, which is the preparedness of LIS graduates to meet the demands of the digital age job market. To evaluate the graduates' level of digital skills acquired from the HLIs, the researcher assessed their digital skills and compared them to the requirements of the digital age job market. The findings helped in clarifying the variability in the dependent variable, which is the graduates' readiness for the digital age job market.

The conceptual framework developed in this study provided a systematic way of analysing the relationship between LIS education and graduates' preparedness to meet the needs of the digital age job market. **Figure 2.2** presents the conceptual model.

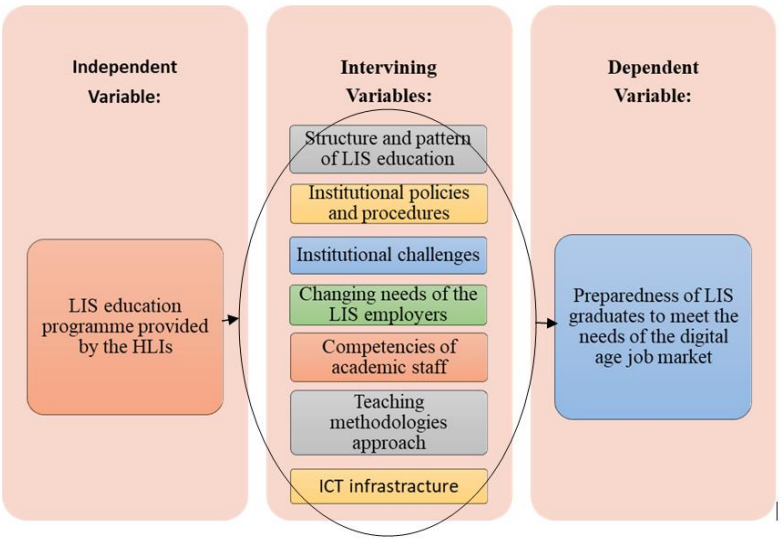

Figure 2. 2: Conceptual model
Source: Researcher (2023)

Based on the presented conceptual model, **Table 2.1** further shows the mapping of a research question on constructs of PET and CDM.

Table 2. 1 Mapping of a research question on constructs of punctuated equilibrium theory and curriculum development model

Sn	Objectives	Research questions	PET and CDM Variables	
01	To audit the LISc bachelor degree curricula alignment with the digital age.	What competencies are available in the current LISc bachelor's degree curricula aligning with the digital age?	Curriculum assessment	CDM & PET
		Do the current LISc bachelor's degree curricula in Tanzania adequately prepare students with the digital skills required in the digital age job market?	Revolutionary Period Deeper structure	
02	To establish digital competencies that Tanzanian LISc bachelor degree graduates must acquire for the digital age.	What digital skills are required by the LIS employers in the LIS job market in Tanzania?	Revolutionary Period	PET & CDM
		Do the digital skills possessed by LISc graduates working in the job market align with the digital skills requirements of LIS employers in Tanzania?	Ideal Graduates	
03	To explore digital competencies and teaching methodologies of academic staff teaching LISc bachelor degree programmes in Tanzania	What competencies do academic staff teaching LISc in Tanzania possess?	Curriculum assessment	CDM
		What methodologies are employed in teaching LISc bachelor's degree courses in Tanzania for enhanced digital competencies?		
04	To uncover challenges hindering HLIs in Tanzania from effectively developing curricula that aligns with	What policies and procedures do HLIs teaching LISc in Tanzania employ in developing LISc curriculum that meets the needs of the	Curriculum Mapping) Revolution	CDM & PET

Sn	Objectives	Research questions	PET and CDM Variables	
	the demands of the digital age.	digital age?	Period	
		What challenges do HLIs teaching LISc in Tanzania face in aligning their curricula with the digital age requirements?		
05	To propose the LISc Bachelor degree curriculum model that responds to the needs of the digital age in Tanzania	What courses should be introduced into the LISc bachelor's degree curricula in Tanzania to enhance alignment with the digital age requirements?	Curriculum Mapping	CDM & PET
		How can a curriculum model be proposed for LIS bachelor degree programme to address the digital competencies required in the LIS job market	Revolutionary Period Deeper structure	

Source: Researcher (2023)

2.4 Summary of chapter two

This chapter discussed the theoretical perspectives of the study. The chapter focused on the PET and CDM as well as provided a detailed discussion of their associated key constructs used to inform the study. The PET posits that change occurs in bursts or punctuations rather than as a gradual and continuous process. On the other hand, the CDM emphasises the importance of integrating the cultural context into the curriculum design process. The chapter then discusses how these two theoretical perspectives were used to develop a conceptual framework for the study. The framework helped to identify the key variables and their relationships, providing a structure for understanding the research problem and guiding the research methodology. The chapter concluded by setting the stage for the next chapter, which provides a literature review of this study.

CHAPTER THREE

LITERATURE REVIEW ON LIBRARY AND INFORMATION SCIENCE EDUCATION

3.1 Introduction

The goal of this study, as stated in Chapter One, was to investigate the situation of LISc education in Tanzania in the context of digital changes. Chapter Two reviewed the theoretical framework employed in this study and the conceptual framework generated from the theory and model that support the study. This chapter presents literature on the trends of LISc education and the needs of the digital age. This literature review was conducted to provide an understanding of the current situation of LISc education in the context of digital changes and to identify the challenges and opportunities that this situation presents. The literature review covered aspects of LISc education, including the historical development of LISc education, the current status of LISc education in Tanzania, the competencies required by LISc professionals in the digital age and the challenges faced by LISc educators and professionals in adapting to the changing landscape of the field among others.

3.2 Purpose of literature review

According to Matthews and Ross (2010:93), performing a literature review aims to broaden the researcher's expertise on the chosen issue, select a suitable research approach and identify relevant data sources. Literature reviews can also assist researchers in conceptualising their study design (Yin 2018; Siddaway, Wood & Hedges 2019:750). Snyder (2019:333), Mengist, Soromessa and Legese (2019:4) argue that conducting a literature review is essential for researchers as it allows them to identify, evaluate and assess existing knowledge gaps pertaining to a particular phenomenon. By reviewing already published works, researchers can determine what has already been explored in their field of study and identify areas that have not yet been thoroughly investigated. This helps researchers to establish a foundation of understanding that can guide their research and ensure that they contribute new insights to their field.

Similarly, Pelosi, Sandifer and Sekaran (2001:321) state that a literature review ensures that researchers do not overlook essential variables when examining a problem. This ensures that researchers comprehensively understand the research problem and are equipped to identify the most relevant variables to include in their research. Furthermore, Fisher et al. (2010:140) suggest that the purpose of reviewing the literature is to provide researchers with access to information that can assist them in developing a conceptual framework. By examining existing literature, researchers can identify key themes and theoretical perspectives relevant to their research and use this information to formulate a conceptual framework that guides their research design and analysis. This ensures that researchers have a strong theoretical foundation upon which to build their research, which can help enhance their findings' validity and reliability.

Scholars have pointed out different approaches to conducting a literature review. According to Grant and Booth (2009), a critical literature review presents analyses and synthesises information from many sources to build and test hypotheses or models. A critical literature review can provide a more thorough understanding of a topic by carefully examining existing research and combining multiple views, revealing gaps in knowledge and recommending new areas for exploration. Yin (2011:64) suggests three methods: gathering qualitative studies from other researchers to create a study bank, reviewing similar studies to identify the position for a new study and conducting an extensive literature review to summarise existing knowledge on a topic. Siddaway, Wood and Hedges (2019:751) propose the systematic literature review (SLR) as another approach. This involves well-organised search procedures to identify relevant published and unpublished documents that answer research questions. Armitage and Keeble-Allen (2008:103) refer to SLR as a structured literature review involving consulting any published or unpublished documents when assessing previous studies. The reasons why researchers may choose to conduct a systematic review are stated by Petersen, Vakkalanka and Kuzniarz (2015:1) that systematic reviews aim to summarise the findings of previous studies while considering the rigour and strength of their research findings. A systematic review also helps to structure the topic under investigation. Petticrew (2001) and Petticrew and Roberts (2006) suggest that systematic literature reviews begin with clear questions or hypotheses, strive to locate all relevant published and unpublished studies, involve an explicit description of the

types of studies to be included, examine the methods used in primary studies systematically, investigate potential biases in those studies and sources of heterogeneity between study results and base their conclusions on the most methodologically sound studies. Considering this goal, a systematic literature review was deemed a suitable approach for this study because it allowed for a rigorous and systematic investigation of existing research on LISc education and digital skills, laying the groundwork for the later construction of the suggested curricular model and, thus addressing the research objectives and research questions of the study.

3.3 Library and information science education

According to Malik and Ameen (2018:79), LISc has experienced a notable increase in job prospects due to the emergence of the information economy in recent decades. The transition towards a society reliant on information has generated an increasing need for individuals with the digital expertise and abilities to handle, process and disseminate information efficiently. The employment opportunities are not limited to traditional library roles but extend to diverse areas. Hence, the profession needs to adapt to these changes to effectively manage and provide access to information resources to users in the digital age. Tumuhairwe (2013) defines LISc as an interdisciplinary field that encompasses the study of managing information resources, including print, electronic and digital media and covers their creation, organisation, management, dissemination and utilisation. As with any other education programmes offered in HLIs, LIS education follows a set curriculum that outlines what, why, when, where and how students should study, who should learn and how the course of study should be evaluated and trainees assessed (Raju 2017). Much of today's LISc education curricula are being transformed due to technological innovations in the LISc field (Bappah 2021; Fatima, Shafique & Firdous 2012:3).

According to Spotti and Windelband (2020) and the World Economic Forum (2017), the digital age has transformed our lives and work. HLIs must keep up with the rapid changes that are taking place as the integration of advanced technologies into aspects of life, such as Artificial Intelligence (AI), robotics, Internet of Things (IoT) and big data analytics, are expected to bring significant changes to the job market and many traditional jobs will be replaced. To address this gap, LISc curricula must be updated to

reflect the new trends in order to meet the profession's demands and contribute to the ever-evolving landscape of information management (Raju 2017).

3.3.1 The trend of Library and Information Science education in the digital age

There is currently a thorough and widespread dramatic transformation in LISc education. In other words, the rapid expansion of ICT and social networks since the 1990s has altered how information is utilised and the pattern of library services and LISc education in general. LISc education has evolved from a crude apprenticeship and informal training system to a defined academic programme. Melvil Dewey's School of Library Economics at Columbia University was an essential milestone in the development of LISc education in the United States. This school provided a formal training programme to produce professionals capable of managing library collections and providing information access. In 1886, the University of Gottingen in Germany introduced a library science degree at the university level, ushering in a new era in library education worldwide (Khurshid 1992). According to Tonta and Seadle (2016), the emphasis on research in universities during the nineteenth century resulted in a growing demand for professionals who could manage and provide access to information sources, necessitating the establishment of more LISc programmes globally during the first half of the 20th century.

Since the 1990s, fast advances in ICT and social media have drastically altered the nature of LIS and how information is accessed, handled and disseminated. This transition has resulted in a considerable shift in the focus of LISc education, with a more significant emphasis on digital technology, data management and information dissemination via the Internet. To improve efficiency and cut expenses, libraries began to computerise the cataloguing and indexing of materials. This technological revolution in information storage and retrieval significantly altered the information management paradigm in LISc, with a shift in emphasis from physical books to digital information. As a result, library schools have expanded their curricula to include new courses in ICT, automation, computer programming and database management (Jaeger, John & Mega 2013; Raju 2017). Ganaie (2013) also pointed out that another advancement in LISc education was the incorporation of the Internet, the World Wide Web and open-access

archives. These advancements have shifted LISc school's orientation from library-centric to information-centric (Gruszka 2020).

In the United States, there has been a shift in the naming conventions of LISc schools to encompass the term "information" rather than solely focusing on "library." Institutions that were previously known as the School of Library Science, Librarianship, or Information Studies have now adopted names such as the School of LIS, the School of LISc and other titles associated with Information Management, Technology and Knowledge Management (Tonta 2016:4). The Library School at Pittsburgh University was the first to change its name in 1964 and in the 1980s, more than eighty per cent of library schools changed their names (Raju 2017). These changes include name changes from Library Studies to Library Science, Information Science, LISc and, more recently, digital library education, curriculum revisions, new programmes and the introduction of blended and online education (Wyman & Imamverdiyev 2018:221).

Chakrabarti and Mandal (2017) described the emergence of the 'Information Schools' (iSchools) movement to promote the information field in the 21st century. In the United States, this movement was embraced by some LISc schools, where they adopted the iSchool name, replacing names such as Information Science, Information Studies, Library Studies and LISc. The iSchools movement has led to changes in the structure and content of LISc programmes, including joint degree programmes with other faculties, new academic staff hires, new courses and new delivery modes, all aimed at providing graduates with the necessary skills and competencies for the evolving field of information management. Abubakar (2021:57) notes that the interdisciplinary nature of LISc has prompted some schools to change the names of their programmes and degree titles and to offer joint degrees with other faculties, particularly in advanced nations like the United States. Salawu and Igwe (2018) suggest that such changes reflect the diverse careers requiring information and knowledge management expertise.

According to Jain and Jorosi (2017:44), in an analysis of LISc education in Africa, universities in Ethiopia, South Africa, Uganda and Namibia saw significant rebranding from Library Science to Information Science. For example, in Uganda, LISc for the East African School of Librarianship was renamed the East African School of LISc (Jain & Jorosi 2017:44). In Tanzania, many of the LISc programmes still use Library Studies

and Library and Information Studies as the primary names of the programme. The essence of broadening the name reflects the broader spectrum of information professions (Onyancha & Minishi-Majanja 2009:129) as a trend to expand the field of LISc has led to being interdisciplinary. According to Zins (2017:120), LISc today can be seen as a multidisciplinary field of science. Abubakar (2021:57), Joseph and Aneesh (2018:2-3), Raju (2017:23), Katuli-Munyoro and Mutula (2016), and Chanesta and Ngulube (2016:23) have also added that the inclusion of other disciplines, such as information science, computer science, information systems, knowledge management, information architecture, database administration and management, library systems, institutional repositories, multimedia digitalisation, content management and archiving have led the field of LISc as an interdisciplinary area of study. Jain and Jorosi (2017:243) further suggest that LISc education should change its focus to ICT competencies to help students develop the required competencies upon graduation. With the changing trends in LISc programme titles, LISc departments and schools, the content of LISc curricula has not been spared. Most LISc schools globally have made curricular changes ranging from revamping the curriculum, creating a new curriculum, introducing new LISc courses and new ways to organise LISc education.

3.3.2 Developments of Library and Information Science education in Tanzania

LISc education in Tanzania began in 1972 as a non-graduate certificate training programme at the University of Dar es Salaam College of National Education. Before its formation, Tanzanian professionals were taught at Makerere University's East African School of Librarianship (EASL), while some were transferred abroad by the government. The first School of Library, Archives and Documentation Studies was created in 1989 in collaboration with the National Archives to provide LISc education at the non-graduate diploma level (Olden 2002:121). Due to disagreements between the University of Dar es Salaam, the College of Education and the Tanzania Library Services, LISc education in Tanzania could not easily excel in Bachelor's degree programmes. Each institution felt it had the authority to offer Bachelor's degree programmes (Olden & Mcharazo 2002:121). Due to unresolved conflicts, Tanzania did not have a Bachelor's degree programme until 2003.

The growth of LISc programmes at universities and technical colleges nationwide is the most recent trend in the previous decade. One may say that LISc education in Tanzania is at a crossroads. With the country's rapid expansion, LISc education in Tanzania has reached a pinnacle, with several universities (both public and private) offering a variety of LISc programmes at the diploma, Bachelor's, Master's and doctoral levels, albeit under different faculties. Currently, certain LISc programmes in Tanzanian universities are based in faculties of social sciences, while others are housed in faculties of information and communication (TCU 2020). Tumaini University Dar es Salaam College was the first university in Tanzania to offer an undergraduate degree in LISc in 2003. Today, eleven HLIs offer LISc programmes, including Moshi University College (MUCO), Mwenge University College (MUC), Mzumbe University (MU), the Open University of Tanzania (OUT), Ruaha University College (RUCO), School of Library Archives and Documentation Studies (SLADS), Sokoine University of Agriculture (SUA), Tanzania Public Service College (TPSC), Tumaini University Dar es Salaam College (TUDARCO) and University of Dar es Salaam (UDSM).

Most LISc education programmes in Tanzania are offered in contact learning mode, as opposed to distant learning, which the Open University of Tanzania exclusively offers. Based on the education programmes, a basic Certificate in LISc (a one-year programme), an Ordinary Diploma in LISc (a two-year programme), a Bachelor's degree in LISc (a three-year programme), a Master's degree in LISc (a two-year programme) and a Doctor of Philosophy degree in LISc are among the curricula that have been developed for LISc in Tanzania (a three to five years' programme). No HLIs currently offer a Postgraduate Diploma in LISc education.

With the expansion of HLIs offering LISc education, there have been concerns regarding the quality of Tanzanian students (Luka & Mkonogwa 2018). Whether LISc curricula at Tanzanian HLIs are meeting the needs and demands of the new working environment is of significant concern, which has implications for accreditation and quality assurance in LISc programmes. As with other professional courses offered in Tanzania such as accounting, procurement, engineering, banking and medicine, LISc programmes are as well expected to be assessed and accredited. According to Rehman and Alharithi (2016), accreditation adds value to LISc programmes by keeping them current and relevant. As a result, LISc programmes, whether university or non-

university based, are expected to be scrutinised regularly by the country's regulatory bodies or perhaps the quality assurance agencies, such as the Tanzania Commission for Universities (TCU) for university-based programmes and the National Accreditation Board for Technical and Vocational Training (NACTEVET) for technical schools and colleges. Tanzania currently lacks an established professional board for LISc education.

3.3.3 Competencies in the Library and Information Science education

One of the early reports to identify trends in the LISc field was the KALIPER report, which identified six main competencies in LISc education that have been cited, reviewed and debated in the literature (KALIPER 2000). According to KALIPER, as cited by Abubakar (2021:58), these identified trends include the LISc programme being confined in a broad information environment; focus on user-centeredness, evidence on investment and infusion of information technology into the curricula; offering different training approaches to provide students with more flexibility and expanding the curricula by offering related degrees at the undergraduate, Master's and doctoral levels. The KALIPER Report was optimistic about the route of development that LISc institutions have pursued over the last few decades. The predictions of KALIPER prove to be valuable to present LISc education. These changes posed by the dynamics of the paradigm of the LISc discipline have necessitated LISc institutions around the world to review and revise their departments and programmes.

According to KALIPER's assessment, today's trends are visible in many LISc programmes, as evidenced by literature. Malik and Ameen (2020) surveyed LISc graduate employment chances in Pakistan to investigate present and future job market trends. The study discovered that while the job market for LISc graduates in Pakistan was still largely traditional, there was an increasing trend toward non-traditional job market demands in the country. In addition, the study highlighted the need for LISc graduates to acquire additional skills such as digital literacy, data management and research skills to be competitive in the evolving LISc job market.

3.3.3.1 Global trends of Library and Information Science education

The study by Mole, Dim and Horsfall (2017:316) highlights the importance of LISc education in training professionals for knowledge societies. They state that the function

of LISc experts has become more crucial and complex with the advent of knowledge societies. The study stresses the importance of LISc education, focusing on providing professionals with the skills and abilities needed to address the growing demand for ICT in many industries. Developing competencies in digital content management, data analysis and communication technology is part of this.

Wei et al. (2020) studied trends in LISc education in China. The researchers revealed that China had paid growing attention to LISc education in recent years, mainly focusing on practical ICT knowledge and skills. They discovered that the number of LISc schools in China has increased, with most institutions offering undergraduate and graduate programmes. Saladyanant (2014:124) research compared the curricula of nine different Master's degree programmes in LISc offered by Thai universities. The survey discovered that the bulk of the curriculum courses were focused on increasing students' ICT competencies, suggesting the growing importance of technology in LISc education. Collection development, cataloguing and categorisation courses, as well as those relating to information resources management, were significant in the curriculum.

Yoon, Murillo and Anders (2021) report that the demand for and availability of digital preservation education has expanded over the previous thirty years. The study's findings indicate curricula areas that need to be improved, such as more technology integration into courses, advanced courses, building core sets of literature and developing additional content for teaching topics relating to ethics and diversity (Yoon, Murillo & Anders 2021:84).

Hu (2013) researched the relationship between LISc and IT education in the United States, focusing on the availability of IT-related degrees offered by LISc schools. The survey looked at 14 LISc institutions in the country and discovered that 50% provided IT-related degrees as part of their LISc curricula. This shows that LISc schools acknowledge the need to include IT skills and capabilities in their curricula to prepare LISc graduates for the job market demands. Kamba's (2011) research looked into incorporating ICT competencies in LISc education in Nigeria. The study discovered that while there had been significant progress in incorporating ICT competencies into the LISc curriculum, issues still needed to be addressed. Numerous LISc schools have built pertinent ICT courses and incorporated pertinent ICT knowledge into traditional

curricula. However, due to insufficient laboratory facilities and limited Internet connection, most ICT courses were taught conceptually, according to the report.

Begum (2019:2) states that LISc schools in the United States have changed curricula to accommodate ICT knowledge. This trend in the United States started to appear as far back as 2011, where it was noted on a significant increase in the number of technology-related courses, which vary significantly from programme to programme and the content of individual courses appeared to change. IT courses such as database design, development and maintenance, web architecture, digital libraries, systems analysis and server management, metadata mark-up, digital imaging and automation are highlighted in LISc curricula (Riley-Huff & Rholes 2011:134). Hu (2013:7) quantitatively analysed fourteen LISc schools in the United States and found that seven schools provide IT-related degrees through curricula. He highlighted that some LISc schools have combined Computer Science or Information Technology programmes to enhance their curricula (Hu 2013).

Virkus (2015) investigated change and innovation in European LISc education in five European LISc schools. Virkus (2015) discovered structural changes in LISc programmes and ICT incorporation into the curriculum and the teaching and learning process. Virkus (2015) further highlighted that internationalisation in LISc education had been an important priority for many organisations, governments and HEL for many years. The CILIP, in Europe, has emphasised as one of its standards that ICT skills should be among the core area for which all accredited institutions should equip their graduates. Audunson and Shuva (2016:8) identify that many LISc schools have already integrated digital skills in their Bachelor's and Master's degree programmes in European countries.

Warraich, Haq and Ameen (2016) surveyed the LISc graduates to determine their satisfaction with the courses they studied in Pakistan. The alumni identified problems with the curricula, such as lack of proficiency in written and spoken English, lack of knowledge of office communication, lack of interviewing skills and lack of understanding of advanced library software, lack of IT skills, poor interpersonal skills, lack of leadership skills, lack of presentation skills and lack of research skills, among others. According to the respondents, if these flaws are addressed and included in the

curriculum, LISc graduates will have greater career chances and be able to compete in the market. According to Bansode and Viswe (2017), most library professionals working in university libraries in Maharashtra have acquired the basic ICT literacy skills required to handle day-to-day library operations. Still, a few library professionals must improve their literacy levels in open-source library automation software and digital libraries. A recent study by Cherinet (2018:95) avers that ICT skills are vital for the success of individuals and libraries and colleges should include emerging trends in the curriculum to satisfy the needs of 21st-century librarians and the expectations of future employers.

3.3.3.2 Trend of Library and Information Science education in Africa context

A study conducted by Minishi-Majanja (2007) explored on the use of ICT in LISc education in Sub-Saharan Africa. According to the survey findings, most LISc institutions in Sub-Saharan Africa have made significant progress in incorporating ICT capabilities into their curricula, with many building relevant ICT courses or integrating essential ICT knowledge into traditional courses (Minishi-Majanja (2007:4). Despite this development, many HLIs offering LISc education in the region continued to teach these courses theoretically due to the lack of adequate access to computers and the Internet to provide practical instruction. Her research also identified several barriers to effective ICT integration in LISc education, including insufficient funding, limited ICT infrastructure and resources, insufficient ICT training for the LISc academic staff and a lack of collaboration between LISc schools and other stakeholders in the ICT sector (Minishi-Majanja 2007:4). Similarly, Nalumaga (2016:19) surveyed trends and development in LISc schools in Africa and identified only one Library and Information School in Africa that has formally adopted the iSchool viewpoint. According to Raju (2013:257), LISc departments in South Africa, for example and other parts of the world are now competing with adjacent disciplines to offer advanced programmes in Media Studies, Computer Science, Informatics, Information Systems and Business Information Management.

Kacunguzi and Samuel (2016) did a study to assess Nigeria and Uganda's library and information programmes to meet the digital age demand. According to Kacunguzi and Samuel (2016:717) findings, using a comparison similar to LISc programmes in the

United States, all four curricula designed to provide LISc education in Nigeria and Uganda were not equipped with the required skills. Katuli and Mutula (2017) studied how Zimbabwe's LISc education is designed to close the workforce skills gap. Their investigation discovered that the education and training on LISc provided in Zimbabwe has a knowledge gap, leading to graduates lacking the required employability skills. According to their findings, the gaps are associated with the challenges revolving around LISc education in Zimbabwe and other African countries, such as the lack of a conducive environment where LISc departments operate; outdated educational models; a lack of well-developed multi-stakeholders, mutual partnership and alliance; and an expanding labour environment (Katuli-Munyoro & Mutula 2017:923).

Based on the reviewed literature, an increasing trend of LISc schools is to incorporate and update the LISc curricula by upgrading ICT skills. Published competency from the professional bodies including ALA, IFLA, CILIP among other have insisted on the importance of LISc graduates having ICT competencies as essential in the new working environment (Smith, Hallam & Ghosh 2012; Australian Library and Information Association 2014; American Library Association 2015; Chartered Institute of Library and Information Professionals 2017). The emphasis from the published competency frameworks and literature indicates that the fundamental capabilities of the LISc profession have expanded, which results in ambiguity on what should constitute basic abilities in LISc. Lester (2013:41) indicates that, no matter how comprehensive a competency framework is, the competencies and skills necessary for each profession need to be clearly defined.

Literature reveals efforts made to adopt courses and curricula in the LISc programme, as well as to develop curricular models for designing such curricula that correspond with societal demands (Connaway 1997; University Grants Commission model curriculum 2001; Lester 2013; Abubakar 2014; Seneviratne, Gunasekera & Balasooriya 2017). however, it is essential to note that a framework or a model established from one country is likely not to be effective in another country because the framework or curriculum established is usually based on the experiences, the strategic objective of the nation and Institutions, methods, requirements, resources and ICT infrastructure widespread in that particular country it was designed. Cyriaano and Osman (2011) argue that curricula produced in developed countries are not necessarily suitable for

developing countries because of socioeconomic, cultural and technological differences. Katuli-Munyoro (2014) further opines that adopting and implementing such curricula from the developed world would be difficult in implementing it is developing nations which will, in turn, affect the quality output of the graduates. Thus developing countries like Tanzania need to build their framework or model to remove themselves from a continuing risk of adopting LISc education in the Western world, which does not match the local context.

3.3.4 Quality assurance of Library and Information Science education

Quality assurance (QA) and accreditation are key areas in LISc education that have been actively debated in developed and developing countries. According to Moran (2016:323), the practice of analysing an institution or programme using systematic and planned techniques to verify whether acceptable standards of instruction, scholarship and infrastructure are being maintained and enhanced is known as QA. Accreditation, audits, quality assessments and benchmarking are examples of educational quality assurance activities to ensure that programmes have well-defined learning outcomes and that students' achievement of these outcomes is validated at the course and programme levels.

According to Moran (2016), QA in LISc education has been extensively researched in numerous regions of the world, including industrialised countries such as the United States, the United Kingdom and Australia. Ocholla, Dorner and Britz (2013) investigated quality assurance practices in LISc programmes and found out that most LISc programmes were implementing some form of QA where three methods were identified which include: professional associations and government education regulatory authorities, government regulatory authorities and HLIs and solely HLI. Despite the prevalence of QA practices in LISc programmes, Ocholla, Dorner and Britz's (2013) findings noted that the effectiveness of professional associations in developing countries was limited. There findings have also been supported by Xiu et al. (2019) and Rukwaro and Bii, (2016). The fact that professional association are limited in many developing countries, this hinders effective quality control of the programme as such organs ensure the quality of education by ensuring that standards are met.

Despite the challenges of achieving global QA in LISc education, it remains a crucial issue that needs to be addressed. This is particularly important in developing countries such as Tanzania, where there is a need to ensure that LISc programmes are providing students with the required competencies to thrive in the digital age. Therefore, efforts should be made to establish effective QA mechanisms appropriate for the local context and aligned with global best practices.

3.4 Employability skills for Library and Information Service professionals

The digital age has significantly changed the setting of employment in the job market, including libraries and information centres. Incorporating disruptive technologies, such as robotics, virtual reality, artificial intelligence and the Internet of Things, has revolutionised how work is conducted within these organisations (Holland, 2020). In the LISc field, the digital age is a significant technological innovation milestone. As Ahmat and Hanipah (2018) note, the digital age has provided the LISc sector with new opportunities to innovate and improve service delivery. The use of technology in the LIS profession has improved efficiency, facilitated access to information and enhanced user experience. The use of disruptive technologies in LISc has enabled the automation of tasks such as cataloguing and indexing of resources. Artificial intelligence has enabled personalised services to library users, such as customised recommendations based on their reading history. Virtual reality technology has also been utilised to provide immersive experiences for users, such as virtual tours of library facilities. Integrating the Internet of Things in libraries has facilitated using intelligent technologies to enhance the user experience. For example, smart shelves have been used to monitor the movement of library resources and notify staff when restocking is necessary. This technology has also enabled the implementation of self-checkout systems, reducing the need for staff to handle routine circulation roles. Employer reviews of LISc graduates are critical in determining what gaps can further be addressed to enhance the competencies of LISc graduates. It is thus essential to involve employers when examining and redesigning LISc education curricula, as they are crucial personnel who can impact developing curricula that respond to market needs.

Traditional LISc positions, such as librarianship and traditional library operations, such as cataloguing, circulation and collection development, have been automated to varying

degrees today (Shingle 2015:197). Bughin et al. (2018) categorise workplace skills in the digital era into five groups: physical and manual skills, foundational cognitive skills, advanced cognitive skills, social and emotional skills and technological skills. The report also suggests that AI and automation may reduce low-skilled and physical labour jobs that revolve around basic and cognitive skills.

3.4.1 New roles of Library and Information Service professionals

Literature reveals that LIS professionals today are taking on new roles such as content manager, consultant, facilitator, consortia manager, web designer, service provider, mediator, site manager, collector and database developer, system designers, publishers, technology officers, cyber librarians, system librarians, information analysts and data architects, for which everything has to be looked at with a new approach (Ocholla 2013:7; Muneja 2013:5; Loganathan Sekar & Kasirao 2015:66; Raju 2017; Joseph & Aneesh 2018:2). Such skill enables LIS professionals to understand and apply higher thinking to solve information problems and shift from access librarian to thinker cybrarian (Koya & Gopakumar 2018; Cansu & Cansu 2019; Mahapatra & Das 2019). therefore LISc curriculum developers need to understand the market needs, thus including the consideration of employers' reviews before shaping further professional education (Shingle 2015:198).

However it important to note that in curriculum development, skills required vary from one organisation or institution to another. The skills vary due to the services provided, the type of library, the type of users and the library's context enhance forth it’s important to establish what should be compulsory but what should be elective competence to ensure the curriculum is well balance to meet both technical and special skills need in accordance what the organisations advertise their work . Raju (2017:753) identified that between seventy to seventy-five per cent (70% – 75%) of the jobs advertised for LIS professionals require advanced computer skills. Rehman and Alajmi (2017) and Mthembu and Ocholla (2019) opine that LIS professionals should continually enhance their technological skills since it is the only weapon geared towards improving library services as technology changes.

3.4.2 Digital skills and competences required in the digital age

According to Sathe (2020), LIS professionals need a wide range of practical ICT abilities to succeed in the digital library environment. These include scanning techniques, computer operation, building online databases, telecommunication media, Internet skills, website design, library automation, updating databases and the ability to manage computer communication network protocols. Sathe (2020) narrates that techniques for scanning are essential when digitising printed resources for Internet access, including books, journals and other papers. To produce high-quality digital copies of these items, academic librarians need to have a solid understanding of how to use scanning hardware and software and the ability to develop and maintain databases to support users in searching and retrieving information. This includes knowing data entry and management and database design and development. In addition, Sathe (2020) also pointed out that LIS professionals must be proficient in using several forms of communication to interact with clients and co-workers, that is, the ability to use the Internet, including searching for information online and determining the reliability of websites and also be able to create user-friendly websites that make it simple to navigate and access online content.

Pawar and Kaur (2015:9), LIS professionals should have a basic understanding of library operating systems, the ability to download and install simple programmes for supporting devices such as printers and scanners, troubleshooting skills to solve simple technological problems by navigating and finding solutions on the web and be proficient in using MS-Office, as well as the ability to conduct web-based research. Pawar and Kaur's assertion regarding the skills that LIS professionals should possess is relevant and practical. With technological advancements, LIS professionals must have a basic understanding of library operating systems, as these systems are the backbone of library management. A basic understanding can help professionals to use the available tools effectively. A malfunction or update required could result in delays and disruptions in service delivery. Therefore, LIS professionals should have troubleshooting skills to solve simple technological problems by navigating and finding solutions on the web. As the authors also noted, MS Office and web-based applications are ubiquitous in most libraries and the ability to use them proficiently is essential for everyday tasks such as creating reports, presentations and spreadsheets, as well as finding information that is

not readily available in the library's collection which enhances effective service delivery.

According to Narasappa and Kumar (2016:57), essential ICT skills for LIS professionals include website design, video conferencing, computer security, email management, scanner expertise, electronic presentation, database abilities, computer security and email management. While websites are now a must for libraries in the digital age to exhibit their materials and services, LISc personnel should have a basic understanding of website design to successfully create and maintain library websites. According to Narasappa and Kumar (2016), with the advent of remote work and virtual meetings, email management and video conferencing have become crucial communication tools that can promote efficient communication with co-workers, stakeholders and library users. For LISc practitioners, database skills are essential. When managing data effectively through database systems, including creating, managing and searching databases, LIS professionals should have the necessary competencies to keep up with the growth of information, including research data, user information and library resources. Additionally, the data store needs to be secured, so LIS professionals should have a fundamental understanding of computer security to safeguard this information from cyber threats.

Raju (2015:168) identified competencies such as research librarianship, digital curation, research data management, content management systems and repositories, open scholarship movement, HTML and XML, virtual reference and competencies related to electronic resources administration, reference and instruction. Raju (2015:168) further states that understanding mark-up languages is essential as they are used to create and manage digital materials, including websites and electronic resources. Raju (2017) further highlights that it is not just enough for LIS professionals to know how to manage data electronically; they must also be able to communicate this data virtually. Virtual reference involves providing reference services to library users through online channels, including email, chat and video conferencing. Raju (2017:28) emphasises the importance of ICT knowledge and skills for academic librarians on advanced IT skills such as integrated library systems, advanced computer skills, web design and development, IR, repositories, digitisation and research data curation. The digital library environment is rapidly evolving and academic librarians must keep pace. Academic

librarians must possess technical and non-technical skills to support their institutions' digital library initiatives. Furthermore, the increasing use of technology in academic libraries means that librarians must also have skills in project management, data analysis and digital content creation; not only that, but they must also understand metadata creation, cataloguing and digital preservation techniques to ensure that electronic resources are easily accessible and preserved for future use. They must also be proficient in database management as well as legal and ethical issues associated with digital content and effective communication skills (Raju 2017:28).

Oza and Mehta (2016:248) also emphasise the importance of LIS professionals possessing advanced technical skills, including the need for expertise or familiarity with SQL and relational databases, where they must have the skills to install, customise and maintain these databases and use SQL to retrieve and manipulate data. According to Oza and Mehta (2016), digital repository and indexing systems are also essential for managing digital content in the digital library environment.

In his research, Wise (2011:291) identified programming and web design as among Australia's most frequently stated ICT abilities in LISc-advertised jobs. This highlights the growing need for advanced technical skills in the library profession. This implies that the knowledge of traditional library skills alone is insufficient for LIS professionals in the digital library environment. According to Wise (2011), programming skills are critical for developing customised software applications to meet the unique needs of academic libraries, similar to web design skills such as creating and managing websites and web-based applications. This suggests that LIS professionals must understand programming languages, experience in software development and abilities to maintain websites.

In Zimbabwe, LISc graduates were required to pursue extra training in system administration design, knowledge management, web design administration and problem-solving skills (Pedzisai & Mutula 2016:133). This implies that the impact of technology on libraries is not just limited to developed countries but also developing countries. This transformation has significantly impacted the knowledge and skill requirements for LIS professionals. As pointed out by Pedzisai and Mutula (2016:133), LIS professionals must have a deep understanding of information architecture and

knowledge management principles to manage digital content effectively, be able to curate, organise and disseminate information in a digital format that is easily accessible to users as well as have the ability to troubleshoot technical issues that may arise with digital resources.

Perkins and Slowik (2013:154) identified general skills such as project management, outreach, lifelong learning, research and evidence-based practice and individual traits such as communication skills, interpersonal skills, flexibility and adaptability and customer service skills as the most important. As the library environment expands beyond the typical library walls, employers seek LISc graduates who have skills in community outreach and engagement, cultural programming, the ability to work with diverse communities, evaluation and assessment skills, marketing skills, cultural competencies, management, teamwork and leadership (Ikechukwu & Clementina 2015; Singh & Vorbach 2017; Saunders, Lewis & Thornhill 2019).

While studies have been conducted on the knowledge and abilities required for the digital era in library settings, no comprehensive research has been shown in Tanzania. This study intended to provide an extensive skills statement to establish a curriculum model for professional LISc practitioners in Tanzania's modern library environment.

3.5 The teaching of digital competencies in Library and Information Science education

The importance of educators in the educational process, particularly in the subject of LISc, cannot be overstated. Educators and students are critical stakeholders in determining whether LISc education succeeds or fails. Quality LISc education may be judged by three essential elements: curriculum content and standards, physical facilities and educator quality. Among these three factors, the quality of educators is of high priority in determining the success of an educational programme. Educators are critical persons in LISc education because they are in charge of teaching the curriculum. They are the driving force behind a global educational programme's ultimate goal. As a result, LISc instructors must have the necessary skills, knowledge and abilities to carry out their responsibilities effectively. According to Malik (2021:196), essential skills for LISc educators include Information and Communication Technology (ICT) knowledge

and competencies. Furthermore, they should be completely aware of the instructional abilities that will allow them to effectively engage with students, research, managerial and communication skills. In accordance with this, the IFLA and ALA have developed guidelines and standards for LISc educators, which emphasise the importance of educators possessing the skills and competencies required to deliver quality education, as well as the need for educators to keep up to date with the trends of the LIS field to ensure that they are adequate.

As articulated by Bhasin (2012:25), it is an acknowledged fact that in the job market, the most invaluable asset is the human resource as the skills, knowledge and expertise possessed by individuals constitute the cornerstone of success and prosperity within the employment landscape. In aligning with Bhasin (2012) opinion, LISc academic staff should have high qualifications as they are responsible for building curriculum, providing learning tools, assessing students, teaching, mentoring and shaping LISc education. This point of view is supported by Minishi-Majanja (2004:111), as she argues that LISc academic staff should be well qualified and should continuously be trained and re-training with the modern philosophy and principles of in order to be in a position to train students in order for them to be able to competent in the job market.

According to Kinash, Knight and McLean (2015), the requirement to teach digital content has disrupted traditional pedagogy, hastening the transition from didactic lecturing to constructive learning. According to Prasetyo, Suryono and Gupta (2021), novel teaching pedagogies like project-based, problem-based and experiential learning have proven helpful in LISc education. These teaching pedagogies enable students to engage in hands-on learning experiences, allowing them to acquire the skills, knowledge and competencies required to thrive in the field of LISc. This change is crucial in LISc education because it enables educators to employ innovative teaching methods that fit the needs of 21st-century students. Furthermore, the employment of creative teaching pedagogies in LISc education allows students to acquire critical thinking and communication skills, which all skills are necessary for today's jobs (Prasetyo, Suryono & Gupta 2021). These abilities are vital in preparing students for the workforce, where they will be asked to collaborate, think critically and communicate effectively to solve difficult challenges.

The academic curriculum, institutional mission and vision, teaching environment and the lecturer's teaching ability all influence teaching pedagogies. According to Jayashree (2017), the philosophy entrenched in the institution's vision and mission determines the choice of teaching style. Furthermore, Henard and Roseveare (2012) emphasise that instructional pedagogies should be ecologically responsible while meeting students' profiles and job market needs. The choice of teaching pedagogy is critical in preparing pupils for future issues. A study by Sajjad (2018) identified classroom teaching as the most dominant mode in higher education. This is attributable to the lecturer's delivery of the topic and the student's concentration in class, listening to and taking notes. In his thesis, Phuritsabam (2008) selected the lecture technique as the most preferred strategy to other ways such as practical work, project work, assignments and tutorials. A study by Mbagwu, Okoye and Anyanwu (2018:16) also revealed that in Nigeria, most LISc professors favoured traditional lecture instruction in the undergraduate LISc programme, which did not produce the skills demanded by librarians. This method is more centred on the teacher, offers few opportunities for assessment and feedback and can lead to learner overload and boredom, among other things. Such drawbacks have also been supported by Gill (2017), who also adds that the lecture technique is insufficient for all learners because it does not meet the specific needs of students in larger classrooms and is also insufficient for the participants' varying learning rates; thus, using more than one training methodology is essential for effective delivery of the intended learning outcome. The study by Mbagwu, Okoye and Anyanwu (2018:18) recommends that the LISc school administration should select a teaching technique that is more engaging, current and diversified than the lecture method. They add that the teaching approach should combine hands-on practice, teamwork, assignment and demonstration approaches (Mbagwu, Okoye & Anyanwu 2018).

Chitra (2016) contends that using a group of teachers, working as a team of two to five teachers, teaching the same course is a better technique than having a single teacher because students get actively engaged mentally and physically and it increases the freedom of being in class. It is the most effective teaching technique, but it can only function if all teachers share the same spirit, talents, teaching styles and thoughts about class preparation. In addition, Ferguson et al. (2017:4) describe an online environment known as a 3D virtual immersive world, where there are no limitations to learner

interaction under this technique, which means that students can interact with other instructors and classmates from within and outside their courses or programme areas. However, the method is complex, particularly for individuals who cannot interact effectively due to insufficient technological skills. Eliks and Byers (2010:235) also identify blended pedagogy as an appropriate technique incorporating additional instructional delivery methods.

A research study by Bell (2010:40) further identified Project-Based Education (PBT) as one of the most excellent innovative teaching methods. Jayashree (2017:32) explores various inventive teaching techniques for undergraduate students in his study and established innovative approaches that can be integrated into LISc education, including the Z to A approach, collaborative teaching, role-play, screencasts and problem-based learning. Jayashree (2017) opines that collaborative teaching, role-play and problem-based learning effectively integrate competencies and skills where students are likely to acquire hands-on skills because they learn by interacting and doing.

A recent study by Mahalakshmi and Rangaswamy (2020:56) on innovative teaching methods in LISc education identified teaching methodologies that they believe could favour building the capacity and competencies of LISc students, including problem-based learning, simulation, project-based teaching and case study method. According to their arguments, there are many teaching tools and technologies that one can use for teaching LISc that are focused on themes and scenarios; however, the primary goal of any application of the teaching approach should be central to actively engaging students, piquing their interest and encourage them to study while having fun.

Jayashree (2017) highlight the importance of involving students in real-life projects that enable them to apply theoretical concepts to practical situations. They argue that such projects can enhance the student's learning experience by allowing them to understand the relevance and applicability of theoretical concepts in real-world problems. Furthermore, internships, practicums and volunteering are vital in ensuring that LISc graduates possess the necessary skills and competencies to succeed. According to Bauer and O'Connell (2015), internships enable students to acquire practical experience, enhance their understanding of the LISc profession and develop professional networks. Additionally, they allow students to develop and practice essential skills such as

communication, teamwork and problem-solving, which are necessary for success in the workplace.

Moreover, digital pedagogy emphasises the importance of collaboration, which can be fostered through internships, practicums and volunteering. In addition, Ocholla and Ocholla (2014) contend that practice is the most effective teaching approach in the current era, which involves repeating an activity until the desired objectives are met. This approach emphasises the importance of allowing students enough time to practice and engage in practical activities. Ideally, the number of students in the class should be limited to facilitate this teaching strategy, which could be useful in promoting the practical aspect of digital scholarship. Redmond (2011) also adds that collaborative learning promotes critical thinking, problem-solving and effective communication, all essential skills in the LISc profession.

Nicolaides (2012) indicates that this teaching and learning method incorporates multiple technologies, such as web-based training programmes, to convey LISc information. According to Purwanto (2020), the advantage of distance learning is that it allows students and academic staff to perform their activities in any location with the help of the Internet. This makes it an excellent teaching method for those unable to attend traditional sessions owing to distance or other factors. This flexible learning mode allows students to pace themselves according to their schedules. Moreover, it provides an option for students unable to attend traditional classes to pursue their studies and acquire information.

On the other hand, Mbagwu, Okoye and Anyanwu (2018) argue that distance learning can be difficult in non-developed countries due to a lack of technological skills and infrastructure; for which at such cases, students may find it difficult to access online materials and participate in online discussions. As a result, when deciding to use distance learning as a pedagogy for teaching, LISc institutions and educators must consider the local context and the technological resources available.

Despite these different teaching approaches, library schools are expected to pioneer teaching methods that will generate a trained workforce capable of meeting the demands of the 21st century. Ferguson et al. (2017:2) argue that library schools have not done

enough to update their instructional methods and teaching approaches, which results in poorly trained LISc graduates who lack the necessary skills and competencies for the job market. Mbagwu, Okoye and Anyanwu (2018) attribute this to the lack of implementation of new instructional methods by LISc schools' management and educational administrators. As the digital age demands new skills and knowledge, Ferguson et al. (2017:2); Ali and Bakhshi (2013) stress the importance of adopting new teaching methods that provide students with practical experience and incorporate technology. This includes using technology for teaching and conferencing and providing practical experience through internships, practicums and volunteering (Mbagwu, Okoye & Anyanwu 2018). By doing so, LISc schools can bridge the gap between theory and practice and equip students with the required competencies in the job market.

3.6 Concern on digital competencies integrations in Library and Information Science curriculum in Tanzania

LISc education faces many challenges in today's rapidly advancing society. Kaur (2015:14) highlighted several challenges faced by LISc education in India, including a shortage of funds, inadequate facilities and infrastructure, lack of a comprehensive LISc policy, inadequate academic staff, theoretical learning oriented and limited hands-on experience and internships and scarcity of funds in the LISc schools. According to Kaur (2015), the LISc course, like any other HLIs courses, requires sufficient resources and infrastructure to support teaching and research, but funding is currently unavailable; additionally, facilities such as computer laboratories with internet connectivity and web-based resources are limited and there is a lack of updated hardware and software. Kaur (2015) further points out that the government has not implemented any policy to support LISc education and there is a shortage of experienced and capable academic staff. Kaur (2015:15) further narrates that there is a gap between theory and practice in LISc education, meaning the education is more oriented to theory rather than practice, resulting in graduates having limited practical knowledge.

Abubakar (2021:63), LISc education in Nigeria is hampered by a number of issues, including insufficient funding, insufficient infrastructure and learning resources, a lack of stakeholder participation, the proliferation of sub-standard LISc schools, confusion in

nomenclature and organisational placement of LISc departments, a lack of information technology facilities, improper development, implementation and review of LISc curricula and insufficient collaborative efforts. According to Paulley (2019), funds are the most crucial concern confronting Nigerian education and the government has not met the UNESCO recommendation of dedicating 26% of its yearly revenue to education. Abubakar (2021) highlights that in Nigeria, inadequate funding has led to underinvestment in LISc education, resulting in substandard facilities and instructional materials. Additionally, Abubakar (2021) emphasises stakeholders' lack of active engagement in curriculum development and the absence of involvement from professional bodies in accrediting LISc programmes. According to Abubakar (2021), there is also a scarcity of qualified academic staff, which has a negative impact on the training provided.

According to Malik and Ameen's (2018:564) research on the problems of LISc education in Pakistan, all 17 interview participants cited numerous barriers to designing and implementing collaborative programmes. These difficulties were divided into material resources and collective behavioural elements. Inadequate infrastructure, academic staff shortage in LISc departments, insufficient money and administrative processes were among the material resource challenges. Participants stated that weak communication infrastructure, internet access and frequent power outages impeded successful collaboration. A notable difficulty cited was a paucity of academic staff in LISc departments and insufficient funds for joint initiatives. Participants also identified complex bureaucratic procedures at the university and department levels and incompatible organisational structures as significant administrative problems (Malik & Ameen 2018:564)

In addition to the challenges of LISc education discussed by other researchers, Saka et al. (2015:213) , Kaur (2015:354), Rukwaro and Bii (2016:143) and Xiu et al. (2019),also identified the lack of a LISc accreditation system as a significant challenge that hinders LISc education. This lack of accreditation has resulted in a lack of standardisation and inconsistency in the curriculum taught in library schools across the country; consequently, each school produces graduates with varying levels of in-depth expertise, leading to the establishment of double standards for LIS professionals in the labour market. According to Saka et al. (2015), without a standard accreditation system,

the quality of LISc education is uncertain and it becomes difficult for employers to assess the competency level of LISc graduates, which ultimately affects the perception of LIS professionals. A study by Katuli-Munyoro (2018:3) highlights that numerous countries have implemented accreditation systems, while others have established external review bodies or centres, depending on their home country policies, political and cultural inclinations, for which those who have not established such bodies face challenges towards producing quality education.

Research carried out by Kaur (2015:15) also revealed an acute shortage of experienced and capable academic staff members in most developing countries, including South Asia and India. Kaur (2015) further highlights a critical need for further education for those currently teaching primarily in emerging technologies and applications in libraries. In this context, Nkanu et al. (2013), for example, suggest that LISc academic staff in Nigeria should acquire ICT competencies to stay current in their pedagogy.

Raju (2017:42) also sees financing as a critical barrier to expanding LISc education. According to Raju, quality education depends on funds to acquire adequate information resources and facilities to support teaching and research. However, many LISc schools in developing countries are underfunded, making it difficult to deliver excellent education and training to their students (Raju 2017). According to Raju (2017:23), another challenge that affects LISc education is a lack of appropriate learning resources. Many LISc schools lack libraries with adequate print and non-print information resources and ICT facilities to build practical skills, as such due to a lack of learning materials, students struggle to get the essential knowledge and abilities to flourish in their area, affecting their future employment chances (Raju 2017).

Muneja (2013) research on the "reflection of Tanzania libraries in the digital age" about a decade ago highlighted a gap in infrastructure preparedness and, notably, staffing abilities in Tanzania libraries. Tanzania currently faces challenges as there is no uniformity among the LISc programmes offered by the country. This problem is not situated in Tanzania alone; it has been previously reported in other countries, including South Africa and Kenya as well as developed countries such as China (Rukwaro & Bii 2016:143; Xiu et al. 2019). Such findings were also similarly reported previously on a study by Minishi-Majanja (2007:4), who found that LISc schools provide courses that

appear not to be standardised – neither across the region nor within specific countries; in this case, each institution makes an effort to provide what they consider to be critical competencies for their graduates. When Tanzania introduced the Tanzania National Qualification framework in 2010, it was believed to be among the solution towards strengthening the country's education system; however, no regional mechanisms have been put in place, especially for LISc education.

3.7 Established digital skills frameworks

The changing work environment has resulted in a shift in the skills and abilities demanded of employees, especially those in the LISc sector. As a result, defining the competencies that LISc school graduates should possess to enter the job market successfully has become increasingly critical. However, due to a lack of agreement on what should be included in a generic curriculum for the area, defining a consistent list of competencies has proven difficult. Notwithstanding this challenge, professional associations have developed frameworks that explain the essential competencies, knowledge base, abilities and values required for persons aspiring to become LIS professionals.

Katuli-Munyoro (2014) highlighted that prominent LIS associations, including ALA, IFLA and CILIP, along with others, have all established comprehensive frameworks for LIS education. These frameworks delineate the essential professional and technical knowledge, skills and competencies required for individuals aspiring to enter the field. Despite the pivotal role played by these frameworks in shaping LIS education, there is a noticeable divergence in their adoption between developed countries like the USA, Europe and Australia and developing nations (Katuli-Munyoro 2014). In developed countries, adherence to these frameworks is imperative, as it is a mandatory requirement for program accreditation guidelines unlike in many developing countries (Lester & Van Fleet 2008). According to Lester and Van Fleet (2008) their study suggested that international organisations such as IFLA should take proactive steps to globally promote their competency framework through effective marketing initiatives, thereby fostering its widespread of the use of the frameworks and thus enhancing LIS education.

The IFLA competency framework for example; offers guidance for library and information professional programs by delineating essential areas of focus. These encompass various aspects of the information environment, the societal implications of the information society, information policy and ethics, the historical context of the field, information generation, communication and utilisation. Additionally, it includes components related to assessing information needs, designing adaptable services, the information transfer process and information resource management, as well as research and analytic services (IFLA Education and Training Section 2012:6). **Figure 3.1** depicts the published IFLA framework (IFLA 2012:2).

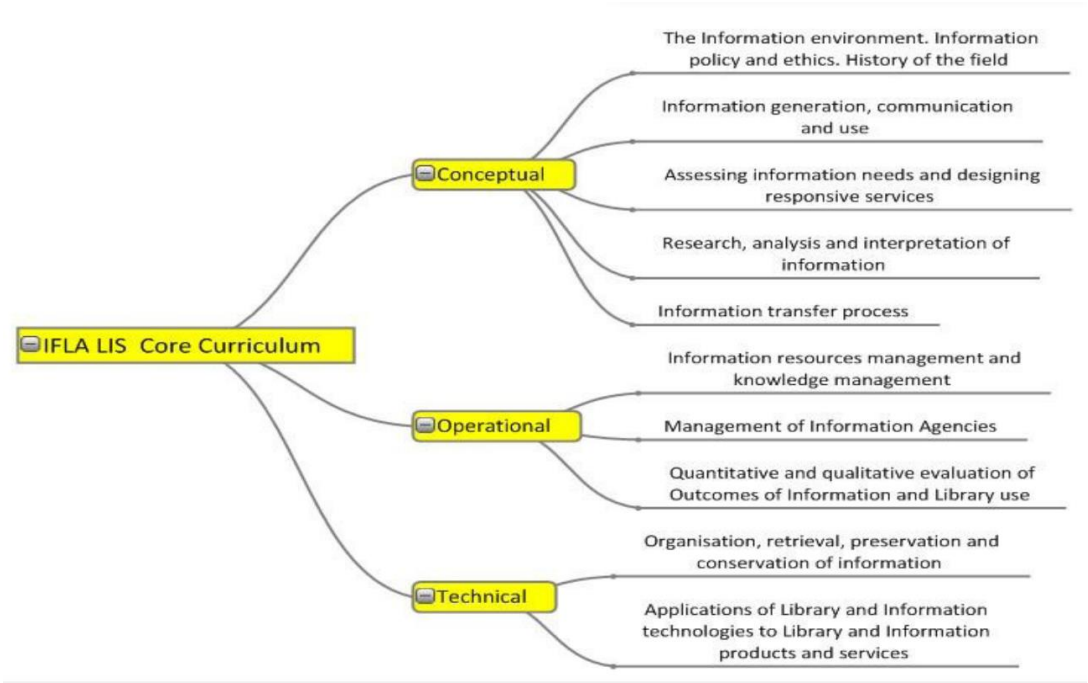

Figure 3.1: International Federation of Library Association core elements (Adapted from IFLA, Section Education and Training, 2012:2)

In addition, IFLA recognises the value of internships as part of the LISc curriculum and emphasises the relevance of practical, transferable generic skills. These abilities enable graduates to comprehend the relationship between professional ideas and their application in professional practice, as well as to build analytical and problem-solving skills that may be utilised in the workplace (Smith, Hallam & Ghosh 2012:6). IFLA recommends that LISc programmes provide chances for practical professionals to upgrade their competencies regularly through continuing education.

The IFLA competency frameworks for LISc education, according to Smith, Hallam and Ghosh (2012), are designed to serve as a comprehensive reference for curriculum designers to understand and use in their specific areas of specialisation. These competencies can be customised to unique circumstances and linked with students and community needs. The fundamental purpose of these competencies is to promote internationalisation and quality assurance in LISc education by harmonising LISc curricula across nations and offering uniform methods for qualification equivalency. The competencies encourage LIS professionals to refresh their knowledge and abilities on a regular basis and adapt to new challenges and opportunities in the continuously expanding information world by stressing transferable skills and continuing education. They seek to foster the development of a globally competent workforce capable of operating effectively in the LISc job market.

According to American Library Association (2015), the competency framework is a complete reference for LISc curriculum designers to ensure that their programmes fit with the knowledge and competencies required for LISc practitioners to flourish in their area. The framework places a premium on lifelong learning and professional growth, encouraging LIS professionals to adapt to the ever-changing information landscape and effectively fulfil the changing requirements of their communities. The ALA Accreditation Standards span a wide variety of knowledge and abilities, focusing on recordable information and knowledge and the services and technology required for their effective management and use. The ALA competency framework defines the fundamental qualifications expected of those who have completed an ALA-accredited Master's programme in LISc. The framework is intended to align with the knowledge and competencies developed by the country's relevant specialised professional organisations and it identifies the core components of LISc education (American Library Association 2015).

The ALIA has developed a competency framework outlining the eight categories of essential knowledge and abilities required for professionals in the job market. The framework recognises the need to know the broad context of the information environment, which includes variables such as culture, society, economics and technology that influence information generation, diffusion and consumption. It also emphasises the ability to perform effective information-seeking using a variety of

search tactics and sources and ability to create information structures that support accessibility and retrieval (Australian Library and Information Association 2014). The Australian Library and Information Association (2014) competency framework emphasises the importance of information organisation and access, including classification and metadata standards, to ensure that information is organised to facilitate discovery and retrieval. The framework highlights the ability to provide effective information services to user groups through reference and research assistance, planning and delivering training programmes and other activities. Furthermore, the ALIA competency framework emphasises the importance of information management, which includes defining rules and procedures for information generation, storage, preservation and disposal. The competency framework also emphasises employability skills and attributes, recognising that success in the job market necessitates personal and professional characteristics such as communication skills, adaptability, teamwork and a commitment to lifelong learning (Australian Library and Information Association 2014).

Raju (2017b) developed a professional competency index that outlines library ICT competencies that LISc practitioners must have in the digital era. According to Raju (2017b:11), LIS professionals must have the following skills:

a) Assess technological changes affecting academic library services and advise relevant library and related stakeholders.

b) Demonstrate knowledge of the employed library services platform, including workflows, periodic evaluations, operating and database systems and software functions.

c) Offer library ICT training and assistance for personnel using library hardware, software and networks.

d) Set up, configure and maintain computer hardware and peripheral devices and resolve emerging issues. They should also be familiar with computer hardware, internal components, peripherals, external storage devices and audio and video equipment.

e) Verify that all essential software is correctly installed, licensed and ready to use in the library's sections. This includes assessing and selecting suitable software programmes for library personnel and patrons.

f) Verify that the library's wired and wireless network is in good working order for optimal connectivity. This includes installing, setting and maintaining the library's local and wide-area networks and providing telecommunications assistance.

g) They should also understand the principles of identity and access management, integrate the library's need for authentication and authorisation with the university's identity management and access system and use network security practices to protect the library's systems, staff and user information.

h) Set up and manage servers relevant to the library's needs, such as email, web, file, print and database.

i) Install, set up, manage and troubleshoot library computers, including open-source and mobile systems and public access computers.

j) Maintain the library's digital resource collection, using standards and best practices to guarantee effective digital content organisation, access, preservation and delivery. They should also be familiar with multimedia file formats, digital file format conversion tools and methodologies, content management and preservation systems and programming languages pertinent to digital resources.

k) Provide interface services for seamless access to the library's digital resources.

The Canadian Association of Research Libraries (CARL) developed the basic competency abilities for 21st-century librarians and their affiliated members (Soutter 2016). As indicated by Soutter (2016), the goal of CARL was to provide a comprehensive guide for librarians to improve their abilities and knowledge. The CARL essential competencies for 21st-century librarians listed six areas: information technology skills, foundational knowledge, interpersonal skills, leadership skills, collection development skills, information literacy, research and contributions to the profession (Soutter 2016). In addition, these knowledge areas emphasise the importance

of librarians having a broad understanding of the field of library science and the diverse needs of library users.

In Europe, the CILIP has emphasised as one of its standards that ICT skills should be among the core area for which all accredited institutions should develop curricula that equip their graduates with such skills. CILIP released the Professional Knowledge and Skills Base (PKSB) in 2012, which describes professional and technical competencies and the general skills and capabilities necessary throughout the LIS profession. The PKSB is represented by concentric cycles, reflecting distinct professional elements that the CILIP professional body considers significant (Chartered Institute of Library and Information Professionals 2012).

Figure 3.2: Chartered Institute of Library and Information Professionals: professional knowledge and skills base (**Adopted from CILIP Professional Knowledge and Skills Base 2012)**

As depicted in Figure 3.2, the PKSB significantly emphasises ethics and values. CILIP acknowledges that ethics and values are fundamental to the work of practitioners in the field, thus making them indispensable in the profession (Chartered Institute of Library

and Information Professionals 2012). The schema's second wheel encompasses professional expertise and generic skills, with generic skills holding similar value as professional competencies within CILIP. The third wheel incorporates a range of broad professional competencies, including ICT, knowledge and information management, collection management and development, information governance and compliance, records management and archiving, research skills, knowledge and information organisation, service design, marketing and customer focus (Chartered Institute of Library and Information Professionals 2012). The schema's final two wheels provide the context for understanding the competencies outlined in the PKSB.

The Frameworks, as well as associated curricula, signifies that there is significant evolution and expansion of the LIS education into the new emerging domains. Much enhancement for many of the review competencies has been pointed out in the integrations of ICT skills living along with other skills mentioned in the above discussion. Multi- and trans-disciplinary courses and subjects and ICT-related courses and subjects have been introduced into the study and curricula are constantly being revised to align them with labour market demands (Katuli-Munyoro 2014:55).

Kar, et. al. (2018) stated that India's University Grants Commission (UGC) had created a Model Curriculum for LISc since its establishment in 1956. The latest UGC Model Curriculum (2001), led by Prof C.R. Karisiddappa, was developed with a modular framework to reflect the current job market in India. This curriculum recommends six competency areas, which include foundations of library and information science, knowledge organisation, information processing and retrieval, information sources, products and services course, management of library and information Centres/institutions, information technology: basics and applications, research methods and statistical techniques and information systems. The UGC Model Curriculum (2001) also proposed a 60:40 ratio for practical and theoretical courses, with the flexibility for departments to adjust the curriculum to meet local needs.

Sibiya (2022) proposed that a framework for digital competencies incorporation is a valuable contribution to the field, as it outlines the key components needed for effective digital competencies incorporation. The framework consists of four key elements: digital competencies as a concept, internal stakeholders, external stakeholders and

relevant infrastructure and resources. Overall, Sibiya's framework provides a comprehensive and holistic approach to incorporating digital competencies, recognising the importance of considering multiple factors to ensure effectiveness. By focusing on digital competencies as a concept, internal and external stakeholders and the relevant infrastructure and resources, institutions can better support the development of digital competencies initiatives and prepare students for the digital age. However, from the framework, it is unclear what competencies should be learned and how they should be learned in the LISc profession to enhance efficiency in the digital age.

The frameworks in light that the LISc education and associate curricula have developed in new areas. Much enhancement for many of the review competencies has been pointed out in the integrations of ICT skills living along with other skills mentioned in the above discussion. Multi- and trans-disciplinary courses and subjects and ICT-related courses and subjects have been introduced into the study and curricula are constantly being revised to align them with labour market demands (Katuli-Munyoro 2014:55). However, although the literature has revealed studies on LISc education and relation to the digital skills needs and associated frameworks and challenges, there is a need to examine if the situation of LISc education in the trends of the digital age is consistent with the current situation in Tanzania HLIs offering LISc education.

3.8 Summary of chapter three

According to the reviewed literature, LISc education is undergoing substantial revolutionary changes worldwide due to societal transitions, enhanced ICT development, shifting forms of information production accelerated by ICT and changing user behaviour patterns. These trends have significantly changed the LISc profession and LISc education in terms of jobs, technologies, working circumstances and required skill sets. These changes have impacted the objectives of LISc education, the curriculum content, the resources necessary, the academic staff competencies needed and the pedagogical approaches used.

The literature review reveals that substantial educational transformations are on the horizon. The only realistic option for LISc educational programmes is for them to change. LISc education has been extensively researched and discussed, as identified in

the literature above; however, a similar study has not been undertaken in Tanzania. No studies have focused on developing a model curriculum for the LISc Bachelor's degree programme. The next chapter presents the research methodology employed in this study.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

Chapter three provided a comprehensive overview of the pertinent literature review for this investigation. The current chapter centers on examining the research methodology, which is a crucial element of any research study. It provides a systematic framework researchers use to guide their research process and helps ensure the study is conducted rigorously and organised. According to Creswell and Creswell (2018), research methodology is also essential because it helps anchor the study and ensures that it is grounded in established research principles and practices.

This chapter explains the study's research design, data-gathering techniques, instruments and procedures. It begins by discussing the study's philosophical viewpoints, which gave a foundation for comprehending the research process and how the research approach was chosen in light of the study objectives. This chapter is organised into ten sections that emphasise the complete nature of the study's research methods. The chapter is organised logically, beginning with the research's philosophical assumptions. This overview sets the context for the other parts of the chapter, which explore the research strategy, research design, study population, data collection methods, data presentation and data analysis.

4.2 The research philosophy assumptions

The nature of social research is a complex and constantly debated topic centred on the philosophical concepts of epistemology and ontology. These concepts embody distinct viewpoints regarding the essence of knowledge, our connection with the natural world and our modes of thinking (Saunders, Lewis & Thornhill 2019). Ontology is a crucial aspect of any research study, as it refers to the researcher's fundamental assumptions about the nature of reality (Creswell & Creswell 2018). This belief shapes how researchers view and approach the research problem and their understanding of what constitutes valid knowledge. Ontology deals with fundamental questions about what exists in the world, how things are related and what is considered objective or subjective

(Creswell & Creswell 2018; Saunders, Lewis & Thornhill 2019:136). Epistemology is a theory of knowledge closely linked to research methodology. Dalha (2023) emphasises that it is essential for researchers to consider both epistemology and ontology in their research endeavours, as they play a fundamental role in shaping the fundamental beliefs about the nature of reality and the suitable methods for constructing knowledge.

Research philosophies have been characterised in a variety of ways by different scholars. Ontology and epistemology are viewed as the two main types of philosophical perspectives in social scientific research, according to some, including Neuman (2014) and Creswell and Creswell (2018). Others, like Denzin and Lincoln (2018) and Saunders, Lewis and Thornhill (2019), categorise research philosophies as ontology, epistemology, methodology and axiology. Ontology pertains to the nature of reality and it deals with the researcher's assumptions about the nature of the world (Saunders, Lewis & Thornhill 2019). According to Creswell and Creswell (2018) there are two primary ontological positions, including Realism which involves an objective reality that exists independently of human perception or interpretation and the second ontological position is Constructivism, where this position, asserts that reality is constructed by individuals based on their perceptions and interpretations.

On looking at epistemology, this philosophical position, deals with the nature of knowledge and how it can be acquired (Creswell & Creswell 2018). According to Saunders, Lewis and Thornhill (2019), there are two epistemological positions; where the first one is positivism which holds that knowledge can be obtained through empirical observation, measurement and the application of scientific methods, the second position is Interpretivism which suggest that knowledge is context-dependent and socially constructed.

Methodology on the other hand, refers to the specific methods and procedures used to conduct research (Kothari 2019). It is concerned with how researchers collect, analyse and interpret data, where one can decide to use methodological approaches such as quantitative methods, qualitative methods or both. Depending the epistemological and ontological beliefs.

Axiology as a research philosophy deals with values and ethics in research as it explores the researcher's stance on ethical considerations, values and the role of subjectivity in

the research process (Kothari 2019). Saunders, Lewis and Thornhill (2019) further cement the axiology philosophical position in the study by indicating that researchers must consider questions related to ethics, such as informed consent, confidentiality and the potential impact of their research on participants. These research philosophies represent four research paradigms: constructivism or post-positivism, interpretive paradigms and post-positivism or pragmatic paradigms (Kothari 2019; Creswell & Creswell 2018). The following section further discusses these research paradigms and show were this study has been confined to.

4.2.1 Research paradigms

The research paradigm is the guiding principle that shapes the researcher's worldview, assumptions and beliefs about reality and how research is conducted. According to Lincoln, Lynham and Guba (2011), the research paradigm serves as a framework that provides a comprehensive understanding of how knowledge is constructed, evaluated and validated. They further assert that the research paradigm determines the research design, data collection and analysis techniques.

The paradigm serves as a foundation for investigating phenomena and selecting suitable methodologies, research designs, research techniques and related literature reviews (Saunders, Lewis & Thornhill 2019). Choosing a research paradigm is critical as it provides the basis for examining phenomena and guides the researcher in selecting an appropriate methodology, research design, research methods and literature review. The choice of a paradigm depends on factors such as the researcher's drives, interests, beliefs, experiences and sociocultural phenomena (Creswell & Creswell 2018).

Scholars have categorised paradigms differently. Kumar (2011) distinguished paradigms into three types, systematic, scientific and qualitative. However, regardless of the chosen paradigm, they all have specific research problems to inform. Therefore, the purposes of the study and the research problem play a crucial role in determining the research paradigm to guide the study. Furthermore, selecting a research paradigm depends on whether the study employs quantitative or qualitative methods. Several paradigms can guide researchers' studies, including positivism, post-positivism, interpretative and pragmatism paradigm. Positivism is a scientific approach emphasising observable, measurable and objective data.

On the other hand, post-positivism recognises the limitations of positivism and emphasises the importance of subjective experience and interpretation. The interpretative paradigm is focused on understanding and interpreting subjective experiences and meanings. Finally, the pragmatism paradigm is concerned with practical problem-solving and emphasises the importance of context and action. These paradigms are further discussed in alignment with this study (Kothari 2019; Saunders, Lewis & Thornhill 2019).

4.2.1.1 Positivism paradigm

The positivist paradigm is founded on the principles that natural science, hypothesis testing, observation and reasoning are the ways to comprehend individual attitudes and behaviours. According to the positivism paradigm, knowledge is directly related to visible and measurable occurrences that can be proven through theories. According to Saunders, Lewis and Thornhill (2019), positivism also holds that multiple researchers examining the same factual event produce identical results that may be universally extended to other contexts, cultures, or environmental conditions. However, when implemented quantitatively without subjective experiences and individual observations, the paradigm has significant limitations and biases. According to Hussain, Elyas and Nasseef (2013), positivism is biased in constructing knowledge and reality since it relies on participant observations that might be influenced by the researcher's objectives rather than the realities observed in the world.

Furthermore, it ignores humanistic, attitudinal, and behavioural dynamics and regards humans as objects, ignoring the distinction between natural and social sciences. Due to these flaws, the positivist paradigm was supplanted by post-positivism, constructivism, or post-empiricism, which affirmed the impossibility of demonstrating the truth and reality of phenomena in the absence of subjective norms. As a result, this study did not employ the positivist paradigm due to its failure to account for subjective norms, such as attitudes and actions, when analysing a phenomenon.

4.2.1.2 Post-positivism paradigm

According to Creswell and Creswell (2018), post-positivism is a research paradigm frequently associated with quantitative approaches. It entails employing tools to investigate the relationship between variables and interpret statistical data. It arose from

the works of philosophers and thinkers, including Aristotle, Isaac Newton and Emile Durkheim (Creswell & Creswell 2018). Post-positivism holds that reality exists outside the researcher's mind and can be observed and reasoned about. It recognises, however, that subjective phenomena such as attitudes and emotions cannot be readily assessed and may necessitate research into people's experiences and perspectives.

Post-positivism, like positivism, believes that the social world can be explored scientifically. On the other hand, post-positivism has been chastised for failing to properly acknowledge the subjective character of knowledge formation, which also entails subjectivity. Saunders, Lewis and Thornhill (2019) says post-positivism cannot be considered a philosophical worldview because it simply extends positivism and contains positivist views. Based on the world perspectives, Post-positivism was deemed unsuitable for studies focusing on subjective realities and perceptions, such as this study and hence was not included.

4.2.1.3 Interpretive paradigm

Interpretivism, also known as relativism, idealism, constructivism, or constructionism, is an epistemology that holds that to understand and interpret the phenomenon being examined, a researcher must be related to the social reality under investigation (Wilson, 2014:10). According to interpretive researchers, it is impossible to attribute meaning to data if the researcher is not related to the social reality being investigated (Creswell & Clark 2018:48). Ngulube (2015:127) contends that ontologically, interpretivism views reality as produced by people's experiences in multiple realities, while epistemologically, interpretivism believes that reality comes from people's perceptions, beliefs, values and experiences about the world (Ngulube 2015).

Because human beings are fundamental to research, interpretivism is related to a qualitative approach. This paradigm bases its explanation of observable and non-observable events on personal understanding. It is subjective and directed by the researcher's interpretation of social reality as expressed through people's perceptions, experiences, observations, values, beliefs and relationships (Denscombe 2014). Nevertheless, despite its advantages in thinking compared to positivism and post-positivism, interpretive research can cost a significant amount of the researcher's time, especially when the research needs to span a larger context. However, because this

paradigm is limited to qualitative data, researchers cannot use quantitative methodologies to collect research data (Ngulube 2015). Considering such drawbacks, the paradigm was not used in this study because it was deemed unsuitable for studies that are not exclusively qualitative.

4.2.1.4 Pragmatism

Pragmatism is a philosophical approach that emphasises the practical component of knowledge and the need to mix diverse research approaches. Pragmatism may be traced back to John Dewey and William James in the early 1860s and it examines social reality using positivist and interpretive philosophical assumptions (Wilson 2014:10). Pragmatism contends that a single quantitative or qualitative approach has limitations in tackling complex issues in social sciences and so blended methodologies are required (Creswell & Creswell 2018). Saunders Lewis and Thornhill (2019) narrates that pragmatists believe knowledge is coined in actions, consequences, social problem-oriented, mixed method approach and real-world practices. As a result, Pragmatism allows researchers to choose methods from different worldviews and apply diverse paradigms to answer research issues appropriately. However, according to Kothari (2019) and Harwell (2011), there are difficulties in using a pragmatic approach in research, particularly when applying a mixed methodology approach in a single study, as well as how to deal with cause and effect, subjectivity and relativity. Notwithstanding these obstacles, the advantages of Pragmatism in research are substantial, particularly in acquiring a deeper understanding of the phenomenon from both quantitative and qualitative perspectives (Creswell & Creswell 2018). Pragmatic researchers that employ both qualitative and quantitative research approaches to acquire a more profound knowledge of the phenomenon frequently endorse the usage of the pragmatism paradigm in research (Ngulube 2019:6). In this study, Pragmatism was found to meet the needs of the study because the study intended to gain insight on the problem by using both qualitative and quantitative data, allowing the researcher to use multiple sources of data to gather information and different techniques for data collection and analysis. The researcher also used different theories that addressed the study's objectives.

4.3 Research approach

According to Saunders, Lewis and Thornhill (2019) research methodology refers to the approach adopted from the beginning to the end of a research endeavour. It focuses on the "how" of the research process and assists in determining the best strategies for data collection. According to Neuman (2013: 91), research technique is critical in establishing the best methods for data collection. In the social sciences, research methodologies are classified as quantitative or qualitative. According to Saunders, Lewis and Thornhill (2019:132) and Kothari (2019) qualitative, quantitative and mixed methodologies are the three primary categories of research approaches. Saunders, Lewis and Thornhill (2019:132), indicate that qualitative research focuses on exploring and understanding the subjective experiences and perceptions of individuals, groups, or communities and involves data collection through methods such as interviews, observations and focus groups. The data is usually analysed through interpretive and narrative methods. In contrast, the quantitative research approach stresses objective and measurable data gathering and analysis, with statistical tools used to examine numerical data gathered through surveys, experiments and other structured approaches.

The research approach in this study was grounded on a pragmatism philosophical framework, which stresses the practical relevance of research findings. Qualitative and quantitative approaches were judged appropriate for this study to meet the research aims. The following section discusses further the research approaches and how they align with this study.

4.3.1 Quantitative approach

The concentration on numerical data that may be studied using statistical and other numerical approaches distinguishes quantitative research. This study is firmly based on positivist ideals of objectivity and attempts to give meaning to the phenomenon by evaluating and measuring the relationship between variables.

One of the significant advantages of quantitative research is its ability to evaluate ideas and hypotheses objectively, devoid of biases caused by the researchers' values. Quantitative research also begins with advancing and testing a theory, which is accomplished through the collection and analysis of data. According to Creswell and Creswell (2018) and Kothari (2019), applying statistical methods allows the researcher

to systematically analyse enormous volumes of data, contributing to the reliability and validity of the findings. Verma and Sharma (2017:24) and Haslam (2020:2) argue that a quantitative approach is advantageous for researchers because it enables the collection of large volumes of data that can be statistically analysed. This makes it a powerful method for investigating complex phenomena. Furthermore, as Esperon (2017:1) shows, quantitative research is preferable when time is limited.

In the study context, a quantitative approach was used to collect data from LISc final-year students, LISc graduates currently employed as LIS staff and LISc academic staff. Nevertheless, qualitative data was also required to supplement the quantitative data which is further discussed in section 4.3.2 below.

4.3.2 Qualitative approach

Qualitative research helps researchers to investigate complicated and nuanced elements of a phenomenon in depth, which quantitative research may not allow. It allows the researcher to collect rich and descriptive data that provides a deep knowledge of the participants' experiences, beliefs and attitudes regarding a specific subject (Cohen, Manion & Morrison 2018:287). Qualitative research also allows the researcher to identify new difficulties and produce new theories, which leads to a better knowledge of the subject being examined (Creswell & Creswell 2018).

However, qualitative research has limits, such as the possibility of researcher bias and subjectivity, which can alter data interpretation. Qualitative data is also challenging to examine statistically, making it difficult to reach firm conclusions (Rahman 2017:103). Therefore, qualitative research may not be appropriate for investigating cause-and-effect relationships or establishing broad generalisations about a group (Saunders, Lewis & Thornhill 2019:179).

This study used qualitative methodologies to provide the researcher with extensive insights into the participants' experiences and perspectives. In addition, document analysis was employed to obtain qualitative data that enhanced greater comprehension of the study in linking with the quantitative data, resulting in more robust and insightful findings.

Combining qualitative and quantitative approaches in one study is a mixed-method approach. The mixed method approach is further discussed in the following subsection as the primary approach that was used in this study.

4.3.3 Mixed method research approach

The study employed the mixed method research (MMR) approach, allowing the researcher to thoroughly investigate a study problem by gathering and analysing quantitative and qualitative data. By employing both qualitative and quantitative approaches, the researcher in this study was able to address the limitations associated with relying on a single method (Green et al. 2015; Kothari 2019). This methodological combination facilitated a more comprehensive comprehension of the research problem by triangulating data from various sources and methods, thereby enhancing the validity and reliability of the research findings (Romm & Ngulube 2015; Forero et al. 2018).

According to Cohen, Manion and Morrison (2018), MMR is a realistic technique because it is connected with a paradigm incorporating views from numerous methods. This paradigm, known as Pragmatism, emphasises that research topics, rather than being dictated by a particular philosophical or theoretical viewpoint, should influence the choice of methodology. Ngulube, Moktwalo and Ndwandwe (2009) argue that MMR plays a vital role within the pragmatism paradigm as it assists the researcher in bridging the divide between quantitative and qualitative methods, enabling comprehensive resolution of research issues. According to Romm and Ngulube (2015:7), using mixed methods in research can result in a more thorough and precise understanding of reality.

Adopting a mixed methods approach in this study was quite advantageous because it raised the rigour of the research. The researcher was able to compensate for any shortcomings that neither method alone could address by combining the two methods. While qualitative research gave rich and nuanced insights into the research problem, it lacked the statistical rigour that quantitative research provided. Nevertheless, while quantitative research supplied numerical data that could be statistically evaluated, it lacked the depth of knowledge that qualitative research could. The researcher triangulated the data acquired from both methodologies by employing a mixed methods strategy, resulting in more effective findings. The qualitative data helped to discover patterns and themes in the study problem, while the quantitative data supplied statistical

analysis to back up the results. Furthermore, using a mixed methodologies approach allowed the researcher to address study objectives that could not be addressed by either methodology alone. This method gave the researcher a more comprehensive grasp of the research problem, which would not have been achievable with a single research method.

4.4 Research design

Factors such as the research problem, philosophical assumptions and time constraints influence selecting a research design. The research design refers to the structure that a research project is built upon, which is determined by the theory and nature of the research problem Saunders, Lewis and Thornhill (2019). The purpose of research design is to provide the researcher with a framework for collecting and analysing data, to connect the design to the research objective (Creswell & Creswell 2018)). The research aim, guides the selection of a research design that is appropriate for achieving the objectives and answering the research questions. In mixed methods research, there are three strategies to choose from: convergent parallel, explanatory sequential and exploratory sequential (Cohen, Manion & Morisson 2018:39).

This study selected the convergent parallel design because it enables the simultaneous collection of quantitative and qualitative data within a limited time and is considered suitable for researchers new to mixed methods research. The other designs were not appropriate due to their inherent characteristics regarding purpose, procedures and paradigmatic issues. For example, explanatory sequential designs have a solid quantitative orientation with a post-positivist worldview, while exploratory designs are based on constructivist and post-positivist theoretical frameworks (Creswell & Creswell 2018; Saunders, Lewis & Thornhill 2019).

4.4.1 Convergent mixed method research design

Convergent design is a widely used and well-known research strategy that involves collecting qualitative and quantitative data during the same phase of the research process (Saunders, Lewis & Thornhill 2019:182). Researchers employed this approach because it allows for the comparison and contrast of findings derived from both types of data, resulting in a comprehensive comprehension of the research question (Ngulube,

2020a:9). One of the advantages of convergent design that the researcher experienced is that it helps to mitigate the weaknesses of individual methods. For instance, although qualitative methods offer valuable insights into human behaviour and experiences, they are frequently criticised for their limited generalizability. On the other hand, quantitative methods are useful in identifying patterns and trends across large datasets, although they can sometimes miss the nuances of individual experiences. The convergent design allows researchers to address these limitations by combining the strengths of both methods, resulting in more robust and comprehensive findings (Saunders, Lewis & Thornhill 2019).

Moreover, convergent design is particularly useful when studying complex phenomena that cannot be adequately understood through a single method (Creswell & Creswell 2018; Saunders, Lewis & Thornhill 2019). In such cases, using multiple methods can help to triangulate the findings, providing a more accurate and complete understanding of the phenomenon under investigation. This approach also helped to increase the reliability and validity of the research findings by cross-checking the results obtained from different sources. Furthermore, the convergent design in this study was effective as it helped the researcher better understand the research question, identify patterns and trends and provide in-depth insights into human behaviour and experiences. In addition, convergent design in research was essential as it enables researchers to mix quantitative and qualitative data, leading to a better understanding of the topic under investigation. This approach strengthened the research process, improving the reliability and validity of the research findings and enhanced transparency throughout the methodological process.

4.5 Study population

The target population, which refers to the group of people or items from which research data is collected, is an essential component of any research effort. Neuman (2014: 252) defines the target population as a specific collection of items a researcher wants to study. This definition emphasises the need to select the target population before initiating research. The study population consists of people, events, items, or records that provide information relevant to the study's goal (Kothari 2019). The target population enables the researcher to decide whether to use the entire population or to

choose samples to represent the population's characteristics (Saunders, Lewis & Thornhill 2019).

Tanzania has five HLIs that provide LISc Bachelor's degree programmes (TCU 2022). These HLIs include four public universities – the University of Dar es Salaam (UDSM), Sokoine University of Agriculture (SUA), Mzumbe University (MU) and the Open University of Tanzania (OUT) – and one private university, Tumaini University Dar es salaam College (TUDARCO). The University of Dar es Salaam (UDSM), the Open University of Tanzania (OUT) and Tumaini University are all located in Dar es Salaam, approximately 658 kilometres from Arusha, while Sokoine University of Agriculture (SUA) and Mzumbe University (MU) are located in Morogoro, approximately 187 kilometres from Dar es Salaam and 712 kilometres from Arusha, where the researcher resides. The targeted populations were ADRs from the LISc programme, LISc final-year students, academic staff, LIS employers and LISc graduates. Because the population of this study was on the receiving end of LISc education and included practising librarians (employers and graduates working in the field) in the field of interest, it was useful to learn about their perceptions of LISc school curricula. The curricular material was also used as a focus for learning more about its contemporary relevance with digital age advances. Questionnaires and interviews were utilised on the human population, while document analysis was employed on the documents. **Table 4.1** presents the study population.

Table 4.1: Study population

Targeted respondents	**Population**	**Percentage**
LISc employed graduates	484	55.8%
LISc final-year students	241	27.8%
LISc academic staff	84	9.7%
COTUL-registered LIS employers (academic, special and public libraries)	50	5.8%
Academic department representative	9	1.0%
Total	**868**	**100%**
Curriculum	**5**	**100%**

Source: Researcher (2023)

4.5.1 Sampling procedures

Cassel, Cunliffe and Grandy (2018:485) state that a sample refers to a representative subset of the population under investigation, encompassing individuals, organisations, groups, or documents. Similarly, Neuman (2014:252) defines a sample as a smaller group of individuals or a specific assortment of components that serve as the focal point of the research, such as humans, animals, literature, or artefacts. Sampling aims to choose from the study population demonstration units representing the overall population (Saunders, Lewis & Thornhill 2019; Mujere 2016). To guarantee that the sample accurately represents the general population, it must be large enough and proportionate to the population size (Christensen, Johnson & Turner 2015:162).

Each research design, whether quantitative, qualitative or hybrid techniques, must include a sampling procedure. Quantitative research uses probability sampling, whereas qualitative research uses non-probability sampling (Ngulube 2020a:441). While conducting mixed methods research, researchers can employ either probability or non-probability sampling methodologies based on the study aims and research questions (Ngulube 2020a:442). Creswell and Creswell (2018) explains that simple random, systematic, stratified and cluster sampling are all probability-based sampling methods that aim to minimise researcher bias by giving every population element an equal opportunity to be included in the study sample. In contrast, non-probability sampling does not offer an equal opportunity for every individual in the population to be included in the study sample. It encompasses three types of sampling: convenience sampling, purposive sampling and snowball sampling (Creswell & Creswell 2018; Kothari 2019). Non-probability sampling may be influenced by study questions, aims and techniques, according to Saunders, Lewis and Thornhill (2019). This study employed non-probability purposive sampling to sample ADR and academic staff in the selected HLIs. The census method was employed for the LISc graduates and library directors/ managers working in Tanzania's academic, special and public libraries. **Table 4.2** on page 81, shows the sample size for this investigation.

Table 4.2: Sample

Targeted respondents	Population	Percentage	Sample	Percentage	Sampling technique
LISc employed graduates	484	55.8%	484	62.1	Census method
LISc final-year students	241	27.8%	241	6.4	Census method
LISc academic staff	84	9.7%	19	2.4	Purposive sampling
COTUL-registered LIS employers (academic, special and public libraries)	50	5.8%	50	30.9	Census method
Academic department representative	9	1.0%	5	0.6	Purposive sampling
Total	**868**	**100%**	**779**	**100.0**	
Curriculum	5	100%	5	100%	Census method

Source: Researcher (2023)

Because the population of final-year students was small, all third-year students were sampled; thus, a census approach was used to explore the complete population. Saunders, Lewis and Thornhill (2019) argued in favour of this method, stating that conducting a census of a relatively small population helps reduce the error caused by sampling and provides information on all population members. The selection of all third-year students from the five HLIs decreased any sample bias, resulting in more reliable data for the study. The number of academic staff teaching traditional and digital skills courses at the five HLIS was eighty four, with sixty five removed because they were teaching non-ICT courses and just nineteen purposively sampled due to their qualification because they were involved in teaching ICT courses.

There were nine academic department representatives including faculty deans, department heads or associate department heads – in the five HLIS. Only five persons were purposively chosen for semi-structured interviews since the researcher intended to gain insight from this group, one from each department/school or faculty.

Based on data obtained from the COTUL, the researcher analysed fifty libraries registered in the consortium by examining their website, company profile and prospectus. The researcher identified four hundred and eight four librarians within these institutions with Bachelor's degree qualifications or higher (COTUL 2022). Among them, fifty librarians served as Library heads/directors, while the remaining four hundred and thirty four worked in various sections of the libraries. Because the number was small, no sample approach was used; the researcher used the census method. Employers of LISc graduates' opinions and perspectives play an important role in designing and planning LISc education that meets the needs of the digital age. Similarly, LISc graduates working in the field were able to give complete information to the investigation.

4.6 Data collection techniques

The choice of data collection techniques are determined by the research approach used (Cohen, Manion & Morrison 2018:186). Data for this study was gathered through interviews, survey and documentary analysis. Because of the study's pragmatic paradigm and mixed methods approach, these data collection techniques were appropriate because they supplemented each other's strengths and shortcomings, allowing the researcher to gain comprehensive information from the participants. Furthermore, these data collection techniques were appropriate for capturing the participants' viewpoints, feelings, perceptions and opinions. These data collection tools are further discussed in the following sub-sections.

4.6.1 Questionnaire

A questionnaire is a structured tool comprising a sequence of thoughtfully constructed questions or prompts and its purpose is to systematically gather responses from study participants or respondents (Yin 2018). The questions within the questionnaire are meticulously designed to extract information, insights, opinions, or experiences relevant to the research objectives (Creswell & Creswell 2018). Questionnaires can be structured, with respondents selecting from established response options, or unstructured, with respondents responding based on their own experiences and opinions (Yin 2018). Open-ended questions, which allow respondents to express themselves in their own words, are sometimes included in questionnaires (Yin 2018:127). According

to Fisher et al. (2010:10), when designing a questionnaire, a number of factors must be considered, including ensuring that the questionnaire is not overly long, that it has an appealing appearance, that it is arranged in a logical sequence, that questions are categorised into sections based on the study objectives and that it begins with simple questions before progressing to complex ones. The researcher worked with the supervisor to construct the questionnaire for this study, which was then tested on a small sample of people at a nearby institution to see if the questions effectively addressed the research objectives. Before developing the final version of the questionnaire, unclear or ambiguous questions were amended. As a result, questionnaires were used to collect data from participants, including students, academic staff, employers and graduates.

In this study, the researcher collected quantitative data using a combination of structured and unstructured questions to gain a more profound knowledge of the study phenomenon (Thomas 2010; Battacherjee 2012). As can be referred in appendix VIII to XI the structured questions on the questionnaire comprised closed-ended questions with a list of suggested responses, including ranking and Likert scales. Respondents ranked their level of agreement with a series of answers using a number value on the Likert scale. Unstructured questions permitted respondents to offer their answers on their terms, decreasing bias.

Furthermore, the questionnaires for this study were created in English to eliminate language hurdles for the respondents. The questions were selected to comply with the research objectives and were assigned numbers to encourage respondents to answer them in the correct sequence. The questionnaire began with general instructions to help respondents fill it out correctly and an introduction to explain the study's goal and assure ethical concerns.

4.6.1.1 Administration of questionnaires

Questionnaires can be implemented using a variety of approaches. The distribution of questionnaire can be facilitated by employing the method of mailing them to the intended recipients, so enabling the collection of their valuable input or by presenting them physically to the respondents (Creswell & Creswell 2018). In the present study, the implementation of questionnaires was carried out utilising two separate methodologies. Initially, printed questionnaire documents were directly sent to

individuals who lacked electronic means of access. Furthermore, the remaining participants were sent with the questionnaires in electronic format through email and what sup application respectively. The decision to prioritise electronic distribution was primarily influenced by the prevailing circumstances during the later phase of the COVID-19 outbreak in Tanzania. During this time frame, the government implemented regulations on un-necessary meetings as a precautionary measure of fighting against the COVID-19 pandemic. This approach assisted in reaching a wider context of the target population in a timely and more efficient manner.

4.6.2 Interview

An interview is an effective method of gathering data that enables researchers to elicit in-depth information from participants. According to Sekaran and Bougie (2016:2), interviews are frequently used in qualitative studies and are considered an ethical way to gather data. The ability for researchers to ask follow-up questions, clarify responses and gain deeper information is one of the key advantages of interviews over other data collection tools like questionnaires or observations (Tracy 2013:133). Additionally, interviews provide a more intimate and interactive method of gathering data because researchers can interact with participants directly and develop a rapport with them. This rapport may encourage participants to be more open and truthful in their responses during a one-on-one interview (Denzin & Lincoln 2018:43).

Olsen (2012:34) indicate three types of interviews; Structured, semi-structured and unstructured. Unstructured interviews are more flexible and give participants more freedom to express themselves than structured interviews, which use predetermined closed-ended questions (Olsen 2012:34). With predetermined open-ended questions that permit more freedom in responses, semi-structured interviews strike a balance between structured and unstructured interviews. The researcher used a Semi-structured interview approach in this study to collect data because it offers a structured framework and allows participants to provide their views more flexibly. The interview guide was designed per the study's objectives and research questions, ensuring the data collected was relevant and useful.

4.6.3 Document review

Dalglish, Khalid and McMahon (2020:2) suggest that a researcher can use documents to gather data and address research inquiries. According to Kothari (2019), document analysis systematically examines and assesses printed and electronic materials, such as policies, reports, meeting minutes, manuals and performance reports. As with other qualitative research data collection techniques, document analysis requires researchers to scrutinise and interpret data to extract meaning, gain comprehension and develop empirical knowledge (Yin 2018; Saunders, Lewis, & Thornhill 2019). This approach can save researchers time and money compared to collecting primary data (Sherif 2018). Additionally, Sherif (2018) identified several benefits of using document analysis as a research method, including non-reactive data collection, the ability to study the past and cost-effectiveness since the information has already been produced. Bowen (2013:29) further adds that there are five functions that documentary materials can fulfil: firstly, they provide data about the context in which research participants operate; secondly, they present inquiries that researchers should pose and circumstances that warrant observation; thirdly, documents can provide additional research data, contributing valuable information and insights to the knowledge base; fourthly, documents can serve as a means of tracking changes and developments over time; and finally, documents can be analysed to confirm findings or support evidence from other sources.

Document analysis is often combined with other qualitative research methods to triangulate findings, which means using multiple methodologies to examine the same phenomenon (Denzin & Lincoln 2018:291). This study used multiple sources of data, including a review of documents such as the LISc Bachelor's degree curriculum, institutional ICT policies and guidelines, Tanzania National ICT Policy 2016, Tanzania Education Policy 2014, standards and guidelines for university education in Tanzania and Tanzania Science Technology Policy of 1996, to ensure the accuracy of the research findings. The study also used frameworks from LISc professional organisations and published digital skill frameworks. All these documents were reviewed using a document review guide which was aligned with the research objectives. **Table 4.3** depicted on page 86 below presents the relationship between research objectives, questions and data collection tools.

Table 4.3: Relationship between research objectives, questions and data collection tools

Sn	Objectives	Research questions	Data Collection Tools
01	To audit the LISc bachelor degree curricula alignment with the digital age. .	What competencies are available in the current LISc bachelor's degree curricula aligning with the digital age?	Document analysis Questionnaire Interview
		Do the current LISc bachelor's degree curricula in Tanzania adequately prepare students with the digital skills required in the digital age job market?	
02	To establish digital competencies that Tanzanian LISc bachelor degree graduates must acquire for the digital age.	What digital skills are required by the LIS employers in the LIS job market in Tanzania?	Questionnaire Interview Document analysis
		Do the digital skills possessed by LISc graduates working in the job market align with the digital skills requirements of employers in the LISc sector in Tanzania?	
03	To explore digital competencies and teaching methodologies of academic staff teaching LISc bachelor degree programmes in Tanzania	What competencies do academic staff teaching LISc in Tanzania possess?	Questionnaire Interview
		What methodologies are employed in teaching LISc bachelor's degree courses in Tanzania for enhanced digital competencies?	
04	To uncover challenges hindering HLIs in Tanzania from effectively developing curricula that aligns with the demands of the	What policies and procedures do HLIs teaching LISc in Tanzania employ in developing LISc curriculum that meets the needs of the digital age?	Document analysis Questionnaire Interview

Sn	Objectives	Research questions	Data Collection Tools
	digital age.	What challenges do HLIs teaching LISc in Tanzania face in aligning their curricula with the digital age requirements?	
05	To propose a curriculum framework for the re-/development of the LISc bachelor degree programme that responds to the needs of the digital age in Tanzania	What courses should be introduced into the LISc bachelor's degree curricula in Tanzania to enhance alignment with the digital age requirements?	Questionnaire Interview Document analysis
		How can a curriculum model be proposed for LIS bachelor degree programme to address the digital competencies required in the LIS job market	

Source: Researcher (2023)

4.7 Data analysis and presentation of research findings

Researchers must review and analyse the data for themes, patterns and meanings to derive meaning and interpretations from enormous amounts of data collected from instruments (Christensen, Johnson & Turner 2015:376). This entails interpreting the acquired data to answer the study questions. Creswell and Creswell (2018:260) outline a series of steps involved in data analysis, including reporting the number of participants who did not return questionnaires, identifying any biases that may exist, developing a descriptive analysis plan for both dependent and independent variables, specifying the computer programme used for measuring variables or testing hypotheses and presenting findings in the form of tables or figures. In the course of undertaking this study, both data which are in the quantitative and qualitative form were gathered since the study adopted MMR. Therefore, both quantitatively and qualitatively data were analysed differently because each of them has its data analysis technique.

4.7.1 Analysis and presentation of Quantitative data

According to Creswell and Creswell (2018), in analysing quantitative data, researchers should clearly explain the variables to be investigated, the method of analysis, the cross-tabulation to be used, variables that can be combined to express concepts and variables that will be statistically analysed. Wilson (2014:232) also contends that a variety of analytical approaches, ranging from simple tables to multivariate tests, can be utilised to examine and present quantitative data.

There are several tools available for analysing and presenting quantitative data, including Excel, basic calculators and specialised statistical applications. Statistical software, such as the Statistical Package for Social Sciences (SPSS), is regarded as an excellent tool for data analysis and presentation, according to Saunders, Lewis, & Thornhill (2019) and Cohen Manion and Morrison (2018:505). Importantly, using these software tools does not necessitate advanced mathematical knowledge on the part of the researcher (Cohen Manion & Morrison 2018). In this study, the researcher employed SPSS version 24 to analyse quantitative data. This use of SPSS facilitated data display methods such as frequencies, percentages and tables, as presented in chapter five.

A methodical strategy was used in the study in analysisng and presenting quantitative data, which included numerous critical procedures to assure correctness and reliability throughout the analysis process. Initially, data entries were methodically copied into Microsoft Excel for the few cases where data submissions were made manually. This was done for all the questionnaires that were physically submitted and retuned. Following that, these manually gathered records were combined with data retrieved through electronic submissions via email/ google forms to form a consistent dataset.

The next phase required the construction and implementation of codes, which is an important part of the analytical process. The analysis was carried out utilising statistical tool, SPSS version 24. This software aided in the investigation of data correlations, patterns and trends, allowing for a thorough review of the research objectives.

A rigorous data cleaning process was carried out to ensure data integrity. This entailed locating and correcting any flaws or inconsistencies in the dataset, hence improving the accuracy of the findings. Following data cleaning, the actual data analysis commenced

and finally, the findings resulting from the data analysis were effectively communicated, both visually and descriptively, to convey the key outcomes of the study.

4.7.2 Analysis and presentation of qualitative data

According to Saunders, Lewis and Thornhill (2019:640), qualitative data should be stored in patterns and codes that represent them. Creswell and Creswell (2018) aver that qualitative data collected at the beginning may be completely unorganised therefore there would be no codes and categories. The data analysis stage, therefore, formed the basis for the assignments of the codes and categories.

A set of precise processes were meticulously followed in the process of analysing and presenting qualitative data within this study to ensure the comprehensive examination and meaningful interpretation of the acquired information. Initially, replies from research participants collected through in-depth interviews and documentation examination were methodically documented in an organised worksheet. This was the initial stage in organising the raw data.

Following that, the datalog was refined and efforts were made to ascribe significance and depth to the obtained data. This process attempted to clarify and contextualise the material acquired, allowing for a more in-depth comprehension of the research topic. The next critical step involved interpretation. To provide a more detailed description, it was necessary to go deeper into the obtained data, so increasing the trustworthiness of the study conclusions. The data was examined for underlying meanings, patterns and nuances during this procedure. The responses were then coded to verify the analysis's robustness. This coding approach was carried out methodically in order to categorise and label various features of the data, effectively translating qualitative content into organised and analysable format. The developing ideas were then methodically categorised. This stage was critical in creating links between participants' stated statements and their implicit grasp of the topic matter. A coherent narrative evolved as a result of recognising and categorising these themes, providing light on the relationships and insights inherent in the qualitative data. Wordart.com software was employed in presented in summary form with narrative descriptions.

4.8 Validity of quantitative and qualitative research

According to Creswell and Creswell (2018:306), evaluating validity and reliability can improve the quality of research findings by controlling for or eliminating irrelevant variables. Both validity (the extent to which research tools effectively measure the desired notion) and reliability (the consistency of data collecting or analysis processes in providing similar results) contribute to this development of comprehensive research findings, as validity evaluates the competencies of research tools to measure variables, whereas reliability examines the consistency of measurement results. According to Leavy (2017:113), validity analyses the instrument's ability to measure the desired variables and qualitative research is susceptible to bias due to respondents' subjective opinions, attitudes and viewpoints. As a result, validity should be seen as a degree of correctness rather than an absolute state (Cohen, Manion & Morrison 2018:270).

The researcher worked with qualified individuals and supervisors to enhance the tools and reduce ambiguities to ensure the study's validity and reliability. In addition, the researcher pre-tested the data collection tools on a small sample of participants to assess their applicability and comprehension. Pre-testing allows researchers to identify any problems with the questionnaire or interview parameters that may hamper the collection of necessary data (Sekaran & Bougie 2016). Pre-testing is done to improve the instrument's reliability, validity and usability (Cohen, Manion & Morrison 2018). The researcher created a questionnaire and semi-structured interview guide based on predetermined criteria and pre-tested them at the University of Dar es Salaam. Students, teachers and library staff provided feedback for improvements.

According to Cypress (2017:257), qualitative researchers must assure their investigations' credibility, transferability, dependability and conformability, just as quantitative researchers must ensure internal and external validity, reliability and objectivity. Cypress (2017) suggestions are discussed further, as well as how they relate to the study:

a) Credibility entails comprehending the particular reality of participants, which may not lead to universal truth (Lemon & Hayes 2020:606). In this study, credibility was generated by establishing rapport with participants and telling them about the purpose of the study. Data gathering methods, sources and

analysis approaches were triangulated and applicable theories were incorporated. Qualitative data from semi-structured interviews and document reviews were processed using interpretative techniques to determine codes, sub-categories, categories and themes. Quantitative data from an open-ended questionnaire were statistically analysed using the SPSS version to draw conclusions.

b) Dependability, a crucial term in qualitative research, shares similarities with reliability in quantitative research. According to Johnsen (2020:67), dependability concerns the consistency or stability of study results across time. The trustworthiness of the current study was ensured by providing a thorough background to the study, including the problem statement and objectives as presented in section 1.3 and 1.4 respectively in chapter one, establishing the conceptual framework in section 2.3 in chapter two, reviewing relevant literature in section 3.3 in chapter three and describing the methodology used to collect and analyse both qualitative and quantitative data in section 4.3 in chapter four of this study.

c) Conformability refers to the amount to which findings reflect participants' experiences rather than the researcher's bias, which was accomplished by keeping records of interviews and materials studied (Ibiamke & Ajekwe 2017:165). Conformability was ensured in this study by using the Member Checking list, which the researcher returned to the participants to verify the accuracy of their responses. Furthermore, the researcher kept a record of who was interviewed and why and a list of the documents studied to verify the study's conclusions.in addition, similar questions were framed in all tools of data collection tools in order to get multiple answers from different sources.

d) Transferability was established, comparable to external validity in quantitative research, by providing a full context of the study and methods utilised, making the study adaptable to the populations (Korstjens & Moser 2018:121). Creswell and Creswell (2018) also narrated that the researcher must describe the study setting and include it in the final report to give readers confidence in the applicability and transferability of the findings. The setting and population of this study were described in section 4.5 of chapter four in this study. The methodology employed for data collecting and analysis was also described in

section 4.6 of chapter four to ensure the study's transferability to similar or related contexts

4.9 Reliability of quantitative and qualitative research

According to Cohen, Manion and Morrison (2018:43), quantitative researchers assume that similar findings can be replicated if identical approaches are employed with the same sample. However, the researcher can use different techniques to improve the trustworthiness of data and interpretations (Mohajan 2017:2). In this study; the researcher established dependability in the current study by using MMR, which helped to ensure consistency between what was recorded and what happened in the natural context. The data collection tools were tested before they were officially used in order to increase the research's reliability.

4.10 Ethical consideration

Maintaining the secrecy and privacy of study participants is critical in every research endeavour and it is the researcher's job to uphold these standards. Cassell, Cunliffe and Grandy (2018:24) underline the importance of researchers in ensuring that participants' information is kept secure and their privacy is protected. This can be accomplished by implementing suitable safeguards for data collected, such as ensuring that data collected from participants is securely maintained and that access is restricted to authorised individuals only.

Howitt (2016:456) emphasises the necessity of maintaining participants' privacy, especially when sensitive or personal information is provided. This necessitates researchers develop clear data collection, storage and dissemination methods that protect participants' privacy. Saunders, Lewis and Thornhill (2019:258) emphasise various additional factors researchers should consider when initiating a research project. These factors encompass guaranteeing voluntary participation, providing participants with comprehensive information regarding the study's objectives and ensuring their right to withdraw at any given point (Saunders, Lewis & Thornhill 2019:258).

Getting informed consent from participants is also essential to safeguarding study confidentiality and privacy. Furthermore, researchers must ensure that any data submitted by participants is kept private and that individuals stay anonymous

throughout the research process. They should also be aware of potential reactions of data-gathering participants, such as humiliation, stress, discomfort, pain, or harm and take appropriate steps to mitigate any negative impacts (Saunders, Lewis & Thornhill 2019).

The researcher took precautions to guarantee that ethical considerations were strictly observed throughout the investigation. The researcher used introductory letters that outlined the study's objective and relevance. The researcher obtained formal consent and authorisation from all relevant participants. The participants were told their responses would remain anonymous and code names were employed to ensure confidentiality. In addition, the researcher handled the information acquired from the participants with caution to maintain data confidentiality and privacy, as advocated by Sekaran and Bougie (2010:22) and De Vaus (2010:23). Furthermore, the researcher followed the rights, privacy and confidentiality of research participants as indicated in the UNISA handbook (UNISA 2013:9). To avoid any copyright breaches, the researcher thanked all authors referenced in the report, as stipulated in the UNISA standards (UNISA 2013). These safeguards guaranteed that the study's ethical considerations were followed correctly and that the participant's rights and privacy were respected. Furthermore, the study aimed to ensure respect for the participants' autonomy by providing them with detailed information about the study, including its purpose, benefits and risks associated with participation, to obtain informed consent, as recommended by Pease (2018:15). The study also upheld the principle of benefit by ensuring that the study delivered the most significant possible benefit to the participants or society while minimising any potential harm that could emerge from their involvement. Finally, the ideal of justice was respected by assuring an equitable allocation of the study's advantages, risks and obligations.

4.11 Summary of chapter four

In this chapter, the researcher discussed the mixed research methodology employed in the study. This methodology enabled the gathering of quantitative and qualitative data at the same stage of the research process, which was critical for data triangulation in the study. The chapter also discussed the pragmatist philosophical position employed in the study and how it align with the research approach and design employed in this study.

The chapter also discussed population and the choice of sampling including purposive and census method sampling that were employed in the study, data collection methodologies and tools including questionnaire, interview and document analysis, validity, reliability and data analysis techniques including the use of SPSS and word cloud, as well as ethical considerations, as it was critical for the researcher to follow ethical norms throughout the research procedure. The research methodology adopted was deemed appropriate for answering the research questions. The following chapter presents the findings of the study.

CHAPTER FIVE

PRESENTATION AND ANALYSIS OF THE FINDINGS

5.1 Introduction

The current chapter focuses on presenting and analysing the data collected through the methodology discussed in chapter four. This chapter starts by presenting background information on the research respondents and participants, including their gender, level of study, age and education qualifications. This information is crucial in understanding the demographic characteristics of the participants and how they relate to the research objectives. The chapter then presents the research findings in line with the study's objectives outlined in Chapter One, section 1.4.1. These objectives included:

a) To audit the LISc bachelor degree curricula alignment with the digital age.

b) To establish digital competencies that Tanzanian LISc bachelor degree graduates must acquire for the digital age.

c) To explore digital competencies and teaching methodologies of academic staff teaching LISc bachelor degree programmes in Tanzania

d) To uncover challenges hindering HLIs in Tanzania from effectively developing curricula that aligns with the demands of the digital age.

e) To Propose the LISc Bachelor degree curriculum model that responds to the needs of the digital age in Tanzania.

This study obtained qualitative and quantitative data based on the research objectives. Quantitative data was collected using a questionnaire that was primarily emailed to LIS employers, LISc graduates in the LIS sector in Tanzania and LISc academic staff and LISc final-year students from the five HLIs studied. The quantitative data were analysed using SPSS statistical package application and presented in this chapter. Qualitative data were partly obtained by collecting LISc curricula and prospectuses and searching the websites of LISc departments to gather information on programme details, department organisation, academic staff and curriculum content. Other qualitative data was obtained through scheduled interviews with academic department representatives (ADRs) from five LISc departments to obtain factual data on curriculum, academic staff, teaching,

challenges and future plans. Qualitative data were analysed thematically and findings were presented in the form of summaries and narrative descriptions. Word art software was also used in presenting the findings in a diagram form. Confidentiality and anonymity were maintained by assigning code numbers and pseudonyms to participants and the curriculum reviewed, which supported the researcher from directly mentioning the names of HLIs or respondents in the analysis.

The structure of the presentation of the findings focused on five main sections and sub-sections aligned with the research objectives of this study, as presented in section 5.1. **Table 5.1** provides an overview of the sections and sub-sections used as headings to present the findings.

Table 5.1: Layout of presentation of findings

The layout of the presentation of the findings	
Main Section	**Sub-Sections**
5.2 Response rate on sources of data	5.2.1 Demographic profile of the participants 5.2.1.1 Age of respondents 5.2.1.2 Gender of respondents 5.2.1.3 Educational qualifications of respondents 5.2.1.4 Institutional affiliation of respondents
5.3 The Library and Information Science curriculum	5.3.1 Profile of Library and Information Science Bachelor's degree programme 5.3.2 Quality control of Library and Information Science education 5.3.3 Coverage of the Library and Information Science Bachelor's degree curriculum 5.3.3.1 Library and Information Science core competencies 5.3.3.2 Technological competencies 5.3.3.3 Generic competencies 5.3.3.4 Practical workplace competencies 5.3.4.Digital competencies covered in Library and Information Science Bachelor's degree curriculum 5.3.5 Relevance of Library and Information Science curricula content 5.3.6 Information Communication Technology facilities available at Higher Learning Institution selected for the study
5.4: Changing competencies and skills in managing libraries in the digital age	5.4.1 Digital competencies required in the Library and Information Science job market 5.4.1.1 Efficacy in digital information management 5.4.1.2 Digital technical skills 5.4.1.3 Advanced digital skills 5.4.2 Digital skills preparedness of Library and Information

The layout of the presentation of the findings	
Main Section	**Sub-Sections**
	Science graduates 5.4.2.1 Efficacy in digital information management 5.4.2.2 Digital technical skills 5.4.2.3 Advanced digital skills 5.4.3 Comparison of Library and Information Service employers and Library and Information Science graduates' findings on digital skills competencies 5.4.3.1 Z-Test for the efficacy in digital information management 5.4.3.2 Z-Test for digital technical skills 5.4.3.3 Z-Test for the advanced digital skills
5.5 Academic staff competencies and teaching methodology	5.5.1 Library and Information Science department academic staff capacity 5.5.2 Academic staff teaching digital skills 5.5.3 Preference of teaching methodologies 5.5.4 Needed competencies for Library and Information Science academic staff
5.6 Concerns on digital competencies integrations in Library and Information Science curriculum	5.6.1 Procedures for identifying desirable content for developing the Library and Information Science curriculum 5.6.2 Challenges affecting the development of the Library and Information Science curricula in Tanzania
5.7: Digital skills framework for the Library and Information Science Bachelor's degree curriculum	5.7.1 National and institutional policies governing digital skills integration in the Library and Information Science curriculum 5.7.2 Digital skills published frameworks 5.7.3 Digital competencies contents required 5.7.4 Curriculum development and implementation strategies 5.7.4.1 Assessment instruments 5.7.4.2 Assessment of practical courses 5.7.4.3 Education delivery approach

***Source*:** Researcher (2023)

5.2 Response rate and profile of respondents

The overall response rate from 799 participants in this study was 574 (71.83%), comprising a mixture of LISc graduates and LIS employers from the job market, LISc academic staff, LISc Academic department representatives (ADRs), as well as LISc final-year students from the five HLIs selected for the study. LISc academic staff, LISc graduates, LIS employers and LISc final-year students responded through a

questionnaire, which was the primary data collection instrument, while LISc ADRs responded through interviews, as the second data collection methodology. **Table 5.2** present the response rate of the study.

Table 5.2: Response rate

Response rate				
Targeted respondents	**Sample population**	**Response rate**	**Percentage**	**Data collection tool**
LIS professionals	484	382	78.92%	Questionnaire
LIS employers	50	39	78.00%	Questionnaire
LISc final-year students	241	135	56.01%	Questionnaire
LISc academic staff	19	13	68.42%	Questionnaire
Academic department representative	5	5	100.00%	Interview
Total	**799**	**574**	**71.83%**	

Source: Field Data (2023)

As depicted in Table 5.2, the response from LISc graduates was high, with 382 (78.92%) out of the 484 targeted respondents completing the questionnaires. The response from LIS employers was also good, with 39 (78%) of the intended sample participating. Most of the academic staff who teach digital skills competencies also participated in this study, with 13 (68.4%) responses out of the targeted population. However, the responses from the final-year students were lower than expected, with only 135 (56%) out of the targeted population filling out the questionnaires. This was due to delays in obtaining clearance to collect data from the selected HLIs. Nevertheless, all five interviewees participated, resulting in a 100% response rate of the interviews. Overall, the study's response rate was 574 (71.83%), which was considered valid and reliable.

The study did not only involve human participants; documents, mainly curriculum documents, were also a focus of the study, among other documents. To get an in-depth analysis of the LISc Bachelor's degree programme, there was a need to collect curriculum documents from the respective HLIs under study. The study established that all five (N=5) expected curriculum documents were available from the respective HLIs

in Tanzania. This indicates that the study ensured that findings from all five curricula were included, strengthening the results' accuracy, dependability and trustworthiness.

5.2.1 Demographic profile of the participants

The participants in this study comprised ADRs, LISc academic staff, LIS employers, LISc graduates and LISc final-year students. Respondents were asked about their Age, Gender, Educational qualifications and Institutional affiliation. The findings are further presented in the sub-section below.

5.2.1.1 Age of respondents

The findings of the age characteristics of LISc academic staff, LISc graduates, LISc final-year students and Academic department representatives (ADRs), as presented in figure 5.1, indicated that most 321 (55.9%) respondents were born in the millennia, followed by 138 (24.04%) of respondents who were born in the generation z. The least of respondents, 115 (20.03%), were born in generation X. **Figure 5.1** presents the findings**.**

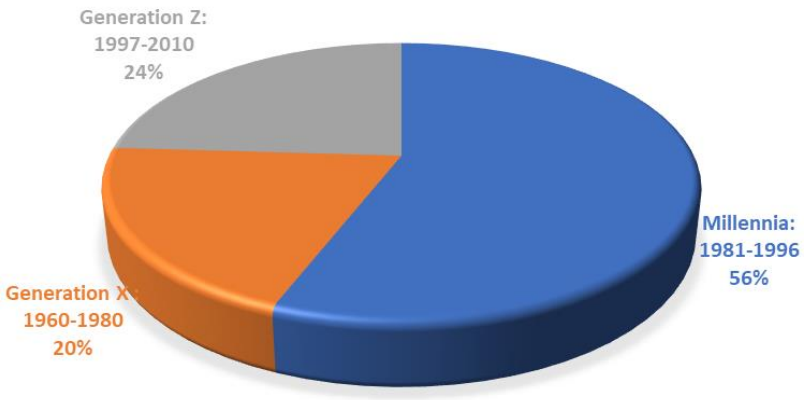

Figure 5.1: Age characteristics of respondents

Source: Field Data (2023)

Table 5.3 presented on page 100 below, provide further descriptive statistic of the age characteristics of each category of respondents.

Table 5. 3: Generation profile of respondents

Generation profile	N=574											
	LISc graduates N=382		LISc academic staff N=13		LISc students N=135		LIS employer N=39		LISc ADRs N=5		Cumulative total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Millennia: 1981 –1996	253	66.2%	13	100%	31	23%	22	56.4%	2	40%	**321**	**55.9%**
Generation Z: 1997 – 2010	34	8.9%	0	0.0%	101	74.8%	3	7.7%	0	0.0%	**138**	**24.0%**
Generation X: 1960 – 1980	95	24.9%	0	0.0%	3	2.2%	14	35.9%	3	60%	**115**	**20.0%**
										Total	**574**	**100%**

Source: Field Data (2023)

The data presented in Table 5.3 shows that out of the 574 respondents surveyed, 321 (55.9%) fell into the Millennial age group, making it the largest cohort. Generation Z had 138 (24%) respondents, while Generation X had the least representation with 115 (20%) respondents. Millennials, also known as Generation Y, are considered a technologically savvy and diverse group that grew up during the digital age. The significant representation of Millennials in the study could indicate a high level of interest or engagement in the subject matter and that being in a position to respond to the theme of the study efficiently and thus enhanced the study's credibility.

5.2.1.2 Gender of respondents

The study also investigated the gender of the questionnaire respondents. **Table 5.4** on the page 101 below, presents the gender of LISc graduates, LISc academic staff, LISc students, LIS employers and LISc ADRs.

Table 5. 4: Gender of respondents

Gender of Respondents	N=574											
	LISc graduates N=382		LISc academic staff N=13		LISc students N=135		LIS employer N=39		LISc ADRs N=5		Cumulative total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Male	198	51.8%	9	69.2%	73	54.1%	22	56.4%	4	80%	**306**	**53.3%**
Female	184	48.2%	4	30.8%	62	45.9%	17	43.6%	1	20%	**268**	**46.7%**
										Total	**574**	**100%**

Source: Field Data (2023)

As depicted in Table 5.4, the findings revealed more males 306 (53.4%) respondents than female 268 (46.6%) respondents. However, a closer look at the gender representation for each category of respondents showed a slight statistical difference between males and females, implying that even though there were fewer women, they were not left far behind in participating in the LISc profession.

5.2.1.3 Educational qualifications of respondents

The study also gathered data regarding the educational qualifications of respondents. **Table 5.5** shows the consolidated educational qualifications of the respondents.

Table 5.5: Qualification of respondents

Qualification of respondents	N=439									
	LISc graduates N=382		LISc academic staff N=13		LIS employer N=39		LISc ADRs N=5		Cumulative total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Bachelor degree	273	71.5%	0	0.0%	2	5.1%	0	0%	**275**	**62.6%**
Master's	104	27.2%	4	30.8%	28	71.8%	1	20%	**137**	**31.2%**
Ph.D.	5	1.3%	9	69.2%	9	23.1%	4	80%	**27**	**6.2%**
								Total	**439**	**100%**

Source: Field Data (2023)

As depicted in Table 5.5 above, the data collected from LISc academic staff, LISc graduates, LISc final-year students and Academic Heads Representatives revealed that 275 (62.6%) of the respondents had Bachelor's degree qualifications, with the majority of them coming from the category of LISc graduates in the LISc job market. In comparison, the least 27 (6.2%) of respondents were found to have a PhD. Respondents' qualifications were crucial in this study as they helped enhance its credibility. The researcher contends that qualified respondents are more likely to give valid, reliable, credible responses in the area of their specialisation. Students were not posed with this question as they were all known to be in their third year of study. These findings also show that targeted academic staff from the respective HLIs under investigation who were teaching digital skill competencies courses were well-qualified, with the majority, 9 (69.2%) of the academic staff, having attained a PhD in a related field.

5.2.1.4 Institutional affiliation of respondents

The research also found that respondents were selected from the five HLIs that provide LISc education in Tanzania. This indicates that the study ensured that participants from all categories (including current and former students and academic staff) were included from each of the five HLIs, thereby strengthening the results' accuracy, dependability and trustworthiness. The results are shown in **Table 5.6 and** the names of the HLIs were coded with labels like HLI-01, HLI-02, to HLI-05 to maintain confidentiality and protect the participants' privacy.

Table 5. 6: Respondent's affiliation with Higher Learning Institutions under study

Respondents' affiliation with HLIs under study	N=574											
	LISc graduates N=382		LISc academic staff N=13		LISc students N=135		LIS employer N=39		LISc ADRs N=5		Cumulative Total	
	Fq.	%	Fq	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
HLI-01	113	29.6%	5	38.5%	43	31.9%	9	23.1%	3	60%	**173**	**30.1%**
HLI-02	95	24.9%	3	23.1%	42	31.1%	4	10.3%	1	20%	**145**	**25.3%**
HLI-03	74	19.4%	2	15.4%	31	23.0%	7	17.9%	0	0%	**114**	**19.9%**

Respondents' affiliation with HLIs under study	N=574											
	LISc graduates N=382		LISc academic staff N=13		LISc students N=135		LIS employer N=39		LISc ADRs N=5		Cumulative Total	
	Fq.	%	Fq	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
HLI-04	59	15.4%	2	15.4%	12	8.9%	2	5.1%	1	20%	**76**	**13.2%**
HLI-05	41	10.7%	1	7.7%	7	5.2%	1	2.6%	0	0.0%	**50**	**8.7%**
Others	0	0.0%	0	0.0%	0	0.0%	16	41.0%	0	0.0%	**16**	**2.8%**
										Total	**574**	**100%**

Source: Field Data (2023)

As depicted in Table 5.6, the data collected from LISc academic staff, LISc graduates, LISc final-year students and ADRs revealed that 173 (30.1%) of the respondents were affiliated with HLI-01, either once being a student, currently being a student or working for the HLI, while HLI-05 had the least respondents 50 (8.7%) affiliated to it. The researcher contends that respondents connected with the HLIs under study are likely to give valid, reliable and credible responses, so based on the data, the majority being affiliated with HLIs under study was of an advantage towards getting the right and relevant responses. A few respondents 16 (2.8%) were not affiliated with any HLI under study. Having such a category gives more insight into the study.

From the foregoing profile of respondents, it is noted that the variety and numbers of respondents who provided data for this study are satisfactory for providing dependable data. On this basis, the researcher presented and analysed the results with confidence.

5.3 The Library and Information Science curriculum

The curricula for the Bachelor's degree in LISc were audited to address the study's first objective. The researcher posed two research questions to gather insight into the alignment of the curricula with current trends in the digital age. The aim was to identify any gaps or deficiencies in the curricula that might hinder students from acquiring the skills and knowledge necessary to meet the demands of the digital age. The study's

findings were presented under four sub-headings, including the profile of LISc departments offering the Bachelor's degree programme, the curriculum coverage, the digital competencies included in the programme and the relevance of the curricula. Through these sub-headings, the researcher aimed to provide a comprehensive analysis of the current LISc Bachelor's degree curricula in Tanzania, as well as an evaluation of its alignment with the latest technological advancements in the field.

5.3.1 Profile of Library and Information Science Bachelor's degree programme

To establish the LISc Bachelor's degree programme profile in Tanzania, the researcher reviewed the LISc curricula documents obtained from the HLIs. The review guide was targeted to establish the nature and context of the LISc programme in the HLIs in Tanzania.

As presented in **Table 5.7** on page 106**,** the findings established that when the study was conducted, the LISc Bachelor's degree programmes were offered by five HLIs in Tanzania. The findings established that the oldest programme in Tanzania began in 2003 and was offered by HLI-03. Information on programme placement within faculties was obtained from the departments' prospectuses and websites and the findings revealed that most of the LISc programmes were located within social sciences faculties. Only one programme was affiliated with the Faculty of Science and Technology. In addition, four programmes had the same name, Library and Information Studies/Management. However, HLI-05 was found to have adopted a different name, Information and Records Management.

The findings, as presented in Table 5.7**,** established that all programmes took three years and the majority used a semester system for evaluation, except for HLI-02, which used an annual evaluation system because it provides the LISc education through distance learning. The findings also established that the education delivery by most HLIs was done using the class mode, where its evaluation system is throughout the semester.

Table 5.7 further reveals that the required core and elective courses to qualify for a Bachelor's degree in LISc in Tanzania varied from one institution to another. HLI-03 required LISc students to accomplish thirty-nine courses before graduating, followed by HLI-01 and HLI-05, which required students to complete thirty-seven and thirty-six

courses, respectively. The HLI with the least number of courses was HLI-02, with nineteen courses which implied that students coming from this HLI covered fewer competencies compared with the other HLIs. A further review of the document analysis of the curriculum also established that HLI-04 had only twenty-seven courses and had a practical attachment of four months, unlike other HLIs, which were found only to provide a practical attachment of between four to six weeks.

The findings also in Table 5.7, established that most LISc programmes were hosted under the Faculty of Social Sciences. In contrast, only one programme was hosted under the Faculty of Science and Technology, which implies that most programmes have been treated as Arts degrees rather than Science degrees. In the current digital age, LISc education is expected to be more oriented towards Science than Arts because of the technological innovations in the LISc workplace. On the same note, the findings further established that all programmes were recognised and accredited by the Tanzania Commission of Universities (TCU), which is the main regulator of all academic programmes offered in the Tanzania HLIs and it is the one which set the time frame of curriculum revision and re-accreditation.

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Table 5.7: Profile of Library and Information Science Bachelor's degree programmes in Tanzania

Sn	HLI	Programme	Faculty	Establishment	Duration	Evaluation system	Accreditation	Curriculum review period	Delivery mode	No. of Courses		
										Core	Elective	Required courses to accomplish
01	HLI-03	Bachelor of Library and Information Studies	Humanities and Social Sciences	2003	3	Semester system	TCU	Five years	Class learning	39	–	39
02	HLI-01	Bachelor of Arts in Library and Information Studies	Social Sciences	2014	3	Semester system	TCU	Five years	Class learning	31	19	37
03	HLI-05	Bachelor of Information and Records Management	Natural and Applied Sciences	2017	3	Semester system	TCU	Five years	Class learning	30	22	36
04	HLI-04	Bachelor of Science in Library and Information Studies	Science and Technology	2013	3	Semester system	TCU	Five years	Class learning	25	4	27
05	HLI-02	Bachelor of Library and Information Management	Arts and Social Sciences	2013	3	Annual system	TCU	Five years	Distance learning	17	4	19

Source: Field Data (2023)

5.3.2 Quality control of Library and Information Science education

The respondents were asked about the quality of LISc academic programmes available in the country. They were of the opinion that the overall quality of HLIs had improved in the country since the establishment of the TCU on the first of July 2005. Based on the interview findings, all respondents (N=5) mentioned three key elements that currently form the quality of LISc education and other education programmes offered in HLIs. These elements are (i) the TCU, (ii) the HLI itself and (iii) the respective academic department where the programme is offered.

Participant **ADR-02** contended that:

> *The TCU oversees quality control, establishing minimal programme development and accreditation requirements. However, the HLI maintains that the standards are regularly met by evaluating the programme. A university must also establish policies that ensure departmental participation in program evaluation.*

Participant **ADR-03** pointed that:

> *TCU has taken good steps to ensure quality in HLIs in Tanzania.*

Participant **ADR-04** contended that:

> *TCU contributes to quality improvement by giving frameworks and guidelines to institutions. The university and department both play an essential role in ensuring the criteria are satisfied. However, in certain cases, it has been observed that LISc, programme have been given without regular academic personnel or sufficient physical infrastructure.*
>
> *ADR-04 also pointed that; a professional accreditation mechanism is required to increase the quality of LISc education. ADR-04 also cited that there are now professional boards in Tanzania, such as the National Board of Accountants and Auditors, which governs the quality of accounting programmes, the Procurement and Supplies Professionals and Technicians Board; and the Certified Professional Banker (CPB), which governs and controls banking program standards, therefore, LISc professional should learn from other professionals.*

Participant **ADR-05** stated that:

> *TCU serves as the foundation for all university programmes in Tanzania. This is equivalent to the NACTVET, which establishes criteria for all technical education institutions in Tanzania. TCU creates the structure and eventually accredits the curriculum the HLI's department offers. The relevant university is responsible for ensuring that all program standards are met. However, the department has a higher duty to ensure that the program is effectively taught and evaluations are carried out in accordance with university policy via the quality assurance unit.*
>
> *ADR-05 additionally pointed that; Tanzania needs a professional accrediting board for LISc.*

5.3.3 Coverage of the Library and Information Science Bachelor's degree curriculum

LISc curricula were reviewed in order to establish the broad competencies covered in the programme. The review was done by gathering all courses that should be taught in each curriculum, combining them and identifying the broad competencies covered. Based on the findings of this study, LISc curricula can be categorised into three broad competencies: technological competencies, generic competencies and practical workplace competencies. These competencies are discussed further in the sub-sections below.

5.3.3.1 Library and Information Science core competencies

The study's results indicated that all the LISc curricula emphasised traditional technical competencies, with fewer (HLI-01) and (HLI-04) revealing evidence of incorporating ICT-related competencies in the core courses of LISc as units or topics within the courses. Additionally, all of the curricula reviewed had minimum credit and content requirements for courses such as Collection management; Classification; cataloguing; reference sources and services; information storage, retrieval and dissemination; information society and user needs, indicating a continued focus on traditional information provision roles in Tanzanian LISc education. The analysis revealed that most curricula were oriented towards traditional librarianship and had yet to align with the digital age trends. The study's findings also identified some specialised

competencies, such as providing information services for specialised and disadvantaged groups, which were present in (HLI-01) and (HLI-03) curricula. Other specialised courses included records management and information studies.

5.3.3.2 Technological competencies

The findings revealed that digital skills courses were covered in the reviewed curricula, although the extent of integration varied across different curricula; for example, HLI-01 was found to have integrated broader competencies in ICT compared to HLI-02. The presence of ICT courses was evident in a number of courses, including web design; Open Source Software, networking; an introduction to computers, collaborative web technologies automation, information retrieval systems information systems management and administration; database design and management, troubleshooting, hardware; application of information technology tools, geographic information systems and software, among others.

5.3.3.3 Generic competencies

The study found that all LISc curricula had generic courses. These courses encompassed management, marketing; customer care; budgeting; information and communication theory; information science supervisory skills, strategic planning, human resources management, project management; entrepreneurship; communication; comparative and international librarianship; libraries and society; research methods; statistical analysis, mathematics, as well as the legal framework and related courses.

5.3.3.4 Practical workplace competencies

In addition to the aforementioned findings, the study revealed that all the reviewed curricula included a practical attachment as a mandatory requirement for students to fulfil to obtain their Bachelor's degree. This indicates that the curricula were designed to provide students with hands-on experience and an opportunity to apply the theoretical knowledge they acquired in a practical setting.

5.3.4 Digital competencies covered in Library and Information Science Bachelor's degree curriculum

To establish the comprehensiveness of digital content in LISc curricula in the selected HLIs in Tanzania, the researcher reviewed the LISc curricula documents obtained from the HLIs for an in-depth analysis of what was presented in sub-section 5.2.2.2. The

document review guide was targeted to establish the context of the digital content integrated into the LISc Bachelor's degree curricula at the selected HLIs in Tanzania. The findings established the existence of courses offering skills required for the digital age. However, based on the document reviews, each curriculum differed as the ICT courses' concentrations varied. In addition, the results of the documentary review identified that each of the LISc curricula examined included both core and elective courses in ICT.

Table 5.8 shows that the HLI-01 curriculum had the highest number of digital skills courses compared to other HLIs under study. The HLI-01 curriculum comprised sixteen courses; seven were core and nine were elective. Students had to select four courses to meet the required credits to accomplish the programme. Despite HLI-01 having the highest number of courses, students could select elective courses in a pool of digital and non-digital skills courses, which implies a substantial weakness in the curriculum in ensuring students are adequately equipped with digital skills rather than traditional ones. The weakness in selecting a course to study among the elective courses was also observed in the other LISc curricula. Unlike other curricula reviewed, HLI-2 was found to offer the fewest digital skills courses, indicating that students graduating from this institution would likely possess fewer digital skills than their competitors. Apart from the compulsory courses offered by HLI-2, it offers only one elective course which is ICT based and provide option to students to either enrol in it or select from alternative non-digital skills courses. The findings established a repetition of the courses, for example, ICT and its Application I and ICT and its Application II, among others, for which there was no significant difference when the course contents were reviewed; this suggests a need to combine such courses to provide more room for additional digital skill courses. These findings are presented in **Table 5.8** as depicted on page 114 below.

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Table 5.8: Digital competencies [Core vs elective courses]

Sn	HLI	Compulsory digital skills courses	Elective digital skills courses	Total Courses
01	HLI-01	ICT and its applications I ICT and its applications II Systems analysis, design and evaluation Website designing for libraries Database management systems Multimedia librarianship Management of electronic resources	Fundamentals of graphic design Fundamentals of printmaking PC maintenance Digital library Networking Introduction to computer, editing, layout and graphics Automation of library and information systems Geographical information systems New media technologies	Sixteen
02	HLI-03	Computer studies I Computer studies II Digital library Information technology I Automation of library information systems Information technology II Management of information systems and services Planning and designing information infrastructure	Web-based information services Multimedia technologies for libraries Geographic information systems Information system analysis and design, I Electronic commerce I Information system analysis and design II Electronic commerce II	Fourteen

Sn	HLI	Compulsory digital skills courses	Elective digital skills courses	Total Courses
03	HLI-05	Introduction to microcomputers and applications Database management systems Automating Information services Managing electronic records and archives Web technology Information security	Desktop publishing Fundamentals of computer networks ICT for development Management information systems Information architecture	Eleven
04	HLI-04	Introduction to information technology System organisation Management of digital libraries Principles of web design	Introduction to database systems Library automation Networking Library databases management	Seven
05	HLI-02	Introduction to microcomputer studies Information technology 1 Information technology and its application in LISc Multimedia studies Digital libraries	Database management	Six

Source: Field Data (2023)

5.3.5 Relevance of Library and Information Science curricula content

In probing the relevance of LISc curricula offered at the selected HLIs in Tanzania, LISc graduates, LIS employers, as well as LISc final-year students were asked through questionnaires to indicate the relevance of LISc curricula offered in Tanzania. The following consolidated results of respondents were obtained. **Table 5.9** presents the findings.

Table 5.9: Relevance of Library and Information Science curriculum content

Relevance status	N=569									
	LISc graduates N=382		LISc academic staff N=13		LISc students N=135		LIS employers N=39		Cumulative Total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Out of date	243	37.4%	6	46.1%	109	80.7%	23	58.9%	**381**	**66.9%**
Partially up-to-date	128	33.5%	3	23.0%	21	15.5%	12	30.7%	**164**	**28.8%**
Up-to-date	11	2.8%	4	30.7%	5	3.7%	4	10.2%	**24**	**4.2%**
								Total	**569**	**100%**

Source: Field Data (2023)

As presented in Table 5.9, the majority, 381 (66.9%) respondents, indicated that the curricula offered by the selected HLIs are outdated. Only 24 (4.2%) respondents indicated that the curricula are updated. This study's findings imply that the majority are of the view that the perceived skills of the current curricula on offer need reviewing if they are to produce competent graduates in the market.

In addition to the findings presented in Table 5.9, a follow-up question was used to establish core courses that either needed to be updated or removed from the LISc education. A preliminary investigation was performed to find similar core courses taught in all five LISc Bachelor's degree programmes offered at the HLIs under study. Respondents were provided with three options: indicating that no changes were needed, implying that they were satisfied with the courses; suggesting the need for changes,

indicating that the courses were essential but required improvement; and dropping the courses from the curriculum, indicating that they were no longer relevant to the LISc Bachelor's degree programme. The findings are presented in **Table 5.10**.

Table 5.10: Suggestion of existing Library and Information Science courses

Name of Courses	Suggestions to the existing Courses					
	No change		Change		Drop	
	Fq.	%	Fq.	%	Fq.	%
Electronic commerce	8	5.93%	17	12.59%	110	**81.48%**
Information in society	29	21.48%	34	25.19%	72	**53.33%**
Information and communication theory	29	21.48%	53	39.26%	53	**39.26%**
Records management and archives administration	65	48.15%	29	21.48%	41	**30.37%**
Computer studies/ information technology II	24	17.78%	92	68.15%	19	**14.07%**
Library user studies	8	5.93%	109	80.74%	18	**13.33%**
Preservation and conservation of library resources	45	33.33%	75	55.56%	15	**11.11%**
Information packaging and repackaging	2	1.48%	121	89.63%	12	**8.89%**
Information storage and retrieval	32	23.70%	92	68.15%	11	**8.15%**
Management of libraries and information centres	59	43.70%	65	48.15%	11	**8.15%**
Computer studies/ information technology I	35	25.93%	90	66.67%	10	**7.41%**
Publishing and book trade	43	31.85%	83	61.48%	9	**6.67%**
Knowledge management	47	34.81%	79	58.52%	9	**6.67%**
Information literacy	31	22.96%	97	71.85%	7	**5.19%**
Collection developments and management	65	48.15%	65	48.15%	5	**3.70%**
References and information services	56	41.48%	75	55.56%	4	**2.96%**
Foundations of library and information science	27	20.00%	105	77.78%	3	**2.22%**
Library operations and information services	59	43.70%	73	54.07%	3	**2.22%**
Library administration and management	61	45.19%	71	52.59%	3	**2.22%**

Name of Courses	Suggestions to the existing Courses					
	No change		Change		Drop	
	Fq.	%	Fq.	%	Fq.	%
Cataloguing/ knowledge organisation I	43	31.85%	90	66.67%	2	**1.48%**
Classification/knowledge organisation II	37	27.41%	98	72.59%	0	**0.00%**

Source: Field Data (2023)

Table 5.10 reveals diverse levels of student suggestions regarding the current courses offered within the LIS programme in the selected HLIs. Notably, "Electronic Commerce" and "Information in Society" stand out with the highest responses of 110 (81.48%) and 72 (53.33%) of students recommending the courses be dropped, indicating significant dissatisfaction. On the other hand the findings as indicated in table 5.10 show, courses like "Information literacy", Information storage and retrieval", Information packing and repacking, cataloguing and classification I and II", Computer Studies/Information Technology I and II" as well as "Library User Studies" have garnered a substantial percentages of students suggesting changes, highlighting the need of the courses and the need for improvements. Furthermore, "Information and Communication Theory" appears to divide student opinion, with nearly equal responses of 53 (39.26%) advocating for changes and dropping of the course. It's also noteworthy that some courses, like "Foundations of Library and Information Science" and "Library Operations and Information Services," have relatively lower levels of suggestions for changes or dropping, indicating a higher degree of student satisfaction.

During the interviews conducted for this study, the ADRs (N=5) were asked to provide their perspective on whether their curriculum was up-to-date and aligned with the trends of the digital age. The responses corroborated with the findings established in Table 5.10. Most interviewee participants reported that their curriculum was outdated or partially outdated and did not conform to the current trends, indicating a need for a revision of the curriculum. Only one participant was confident that their programme was up-to-date, as digital competencies were integrated as a single course and into the traditional LISc courses, such as cataloguing and classification. Upon further analysis,

the majority of the interviewees confirmed that their HLIs were in the process of revising their current curriculum to align it with the digital age trends.

Most respondents indicated that the course objectives focused on providing a knowledge-based education, with limited emphasis on practical training in delivering digital competencies. These study findings imply that while the participants recognised the need to update their curriculum to include digital competencies, they also acknowledged the need to balance theoretical and practical training to ensure that graduates are competent with the needs of changing job market.

Participant **ADR-02** contended that:

> *Our programme has limited digital competencies covered; however, we are planning [stage] to redevelop the curriculum to meet the current needs. After deep research and careful situational analysis, we are sure the redesigned programme will provide more competencies that will align with local and international needs.*

Participant **ADR-01** contended that:

> *Our programmes have been established in the science department. We are confident that the digital skill competencies found in the curricula are satisfactory for the Bachelor's degree level of LISc students because they are not expected to have an in-depth knowledge of ICT competencies as they are expected to work hand in hand with the ICT department in the LISc job market. We, however, give our students basic digital skills so that they are familiar with most of the digital age trends brought by ICT innovation. However, plans are in place to revise the course content of traditional LISc courses.*

Participant **ADR-02** contended that:

> *Recently, the available curricula were examined. The majority of digital abilities are now covered, including networking, database management systems, computer maintenance, ICT and its applications, systems analysis, design and evaluation, website design for libraries and ICT and its applications. Since it was argued that the LISc course is training librarians rather than IT specialists,*

the students are currently not limited in the number of optional courses they can pick from, as they were previously.

ADR02 also pointed that; some traditional courses have been revised to incorporate elements of digital competencies, including cataloguing, collection development, reference services, information retrieval and classification, where students are taught how to use ICT to improve the efficiency of services and information management.

ADR-02 additionally pointed that; traditional courses such as cataloguing, collection development, reference services and information retrieval and classification, among others, have been upgraded and students are trained to use ICT in these courses to enhance effective services and information management.

Participant **ADR-05** pointed that:

Our curricula provide basic competencies; however, it is being revised to include competencies and advanced courses in digital skills to prepare graduates for the workforce. We are also revising traditional courses, such as cataloguing and classification, to incorporate modern concepts and enhance competencies rather than just knowledge.

Participant **ADR 04** pointed out that:

We have few courses that offer digital competencies in our curriculum because the curriculum has not been reviewed for five years. The university board is planning to call for revision of its whole curriculum. Since we still have traditional libraries in Tanzania, the library still carries out the traditional functions; thus, we need to retain the traditional courses in our curriculum. The world is changing and our curriculum is not current; thus, the institution must review it.

5.3.6 Information Communication Technology facilities available at Higher Learning Institution selected for the study

This sub-section aimed at establishing types of ICT facilities available at the universities to facilitate the education of digital skills**. Table 5.11** presents the findings.

Table 5.11: Information Communication Technology facilities available at Higher Learning Institution selected for the study

ICT facilities available at the HLIs under study	N=148					
	LISc academic staff N=13		LISc students N=135		Cumulative total	
Responses	**Fq.**	**%**	**Fq.**	**%**	**Fq.**	**%**
Liquid Crystal Display projectors	7	7.0%	72	72.0%	**79**	**53.3%**
Computers	5	38.5%	64	64.0%	**69**	**46.6%**
Internet/Wi-Fi	9	69.2%	51	37.7%	**60**	**40.5%**
Printer	8	61.5%	40	29.6%	**48**	**32.4%**
Library software	6	46.1%	8	5.9%	**14**	**9.45%**
Scanners	5	38.5%	9	6.6%	**14**	**9.45%**
Laptops	3	23.1%	0	0.0%	**3**	**2.02%**

Source: Field Data (2023)

As presented in Table 5.11, the findings revealed moderate computer facilities available in the selected HLIs. The cumulative findings established that 79 (53.3%) respondents indicated that HLIs have Liquid Crystal Display (LCD) projectors, followed by computer workstations. Sixty-nine (69) respondents (46.4%) indicated that they have computer workstations and 60 (40.5%) indicated that they have available internet/Wi-Fi services, which implies that the HLIs have Wi-Fi/internet infrastructure in place. The findings also established that 48 respondents (32.4%) have printers, while 14 respondents (9.45%) and three respondents (2.02%) indicated that they have scanners, library software and laptops, respectively. These data established that ICT facilities are moderately adequate; however, with the growth of the student population, as was identified by ADRs, HLIs need to further invest in ICT if they want students to graduate with the necessary skills and competencies.

5.4 Changing competencies and skills in managing libraries in the digital age

The study's second objective was to identify digital competencies that LISc Bachelor's degree graduates need to acquire for the new working environment in Tanzania. Two research questions were used to address the second research objective. The study aimed to provide insight into the expectations of employers regarding the required competencies and help LISc-expected graduates to acquire the necessary digital competencies to succeed in the changing landscape of LISc. For this study, the directors of academics, special research libraries and public and school libraries were regarded as the employers of LIS professionals/graduates. The findings for this objective were presented in two sub-headings: (i) Digital competencies required in the LISc job market and (ii) Digital skills preparedness of LISc graduates. The following section presents the findings.

5.4.1 Digital competencies required in the Library and Information Science job market

To determine the necessary digital skills and competencies for LISc graduates in Tanzania, employers in the LISc job market were given a list of digital skills competencies and asked to rate each item using a five-point Likert scale (ranging from 1=Not important to 5=Very important). The mean score was used to interpret the results, with scores falling within certain ranges indicating the level of importance of the skill (e.g., 1 to 1.8 meant the skill was not important, while 4.21 to 5 indicated the skill was very important). The study found that a combination of digital information processing and technical and advanced digital skills were deemed crucial for LISc graduates. These results are discussed in more detail in the subsequent sub-sections.

5.4.1.1 Efficacy in digital information management

LIS employers from the LISc job market were asked to indicate digital information management skills important for LISc graduates to be equipped. This skill category had seven statements that respondents were required to indicate through a Likert scale question in the questionnaire, ranging from very important to not important. **Table 5.12** on page 123 below, presents the findings.

Table 5.12: Efficacy in digital information management

Efficacy in digital information management	**LIS employers N=39**	
Ability to	**Mean**	**Std. D**
Share digital information	**5.00**	**0.000**
Select, search and retrieve digital information	**5.00**	**0.000**
Use the information in different digital formats	**5.00**	**0.000**
Process, organise and store digital information to facilitate retrieval and use	**4.97**	**0.160**
Generate, organise, integrate and analyse digital content and knowledge	**4.97**	**0.160**
Evaluate digital information	**4.97**	**0.160**
Decode, restructure and protect digital information	**4.92**	**0.269**
Note: M;1 to 1.8 = Not important skill, 1.81 to 2.60 = Slightly important skill, 2.61 to 3.40 = Moderately important skill, 3.41 to 4.20 = Important skill, 4.21 to 5 = Very important skill		

Source: Field Data (2023)

The data presented in Table 5.12 indicates that most LIS employers from the LISc job market consider all items under efficacy in digital information management as very important to the LISc job market. The findings established that all tested competencies had a mean score (M= 4.92 to M= 5.00), implying that the skills are very important for a LISc professional expecting to work in the digital age. These findings also imply that a graduate entering the LISc job market with this set of skills will be more comfortable creating and using information via electronic means.

5.4.1.2 Digital technical skills

LIS employers were requested to provide important digital technical skills graduates must acquire to work effectively in the new work environment. This skill category had nineteen statements that respondents were required to indicate through a Likert scale question in the questionnaire, ranging from very important to not important. **Table 5.13** on page 124 below, presents the findings.

Table 5.13: Digital technical skills

Digital technical skills	**LIS employers N=39**	
Ability to	**Mean**	**Std. D**
Use collaboration tools such as Facebook, Google and YouTube for communication and social networking	**5.00**	**0.000**
Use library software for library data management and services provision	**5.00**	**0.000**
Use presentation application software such as MS PowerPoint to present data	**5.00**	**0.000**
Use word application software such as MS Word to prepare word documents	**5.00**	**0.000**
Use operating systems such as Windows and Mac	**5.00**	**0.000**
Secure personal information against threats	**4.38**	**0.492**
Manage access to the systems	**4.28**	**0.759**
Use cloud computing applications to store, retrieve and work online, such as Google docs	**4.17**	**0.790**
Use spreadsheet application software such as MS Excel for computing data	**4.15**	**0.779**
Use data management software such as SPSS for computing data	**3.97**	**0.742**
Software application evaluations	**3.97**	**1.307**
Maintain user IDs and passwords in the information system	**3.82**	**0.790**
Install security software like firewalls and essential data encryption programme to safeguard the organisation's vital data	**3.43**	**1.071**
Use multimedia and publisher application software for preparing promotion materials and listening to or viewing information	**3.33**	**0.982**
Use design software to prepare flow charts and diagrams, e.g., MS. Visio	**3.05**	**1.468**
Use project management software to prepare project work plans, such as MS Project	**2.79**	**1.173**
Use database software and applications	**2.33**	**1.363**
Verifying the security of third-party vendors to meet security requirements	**2.30**	**1.195**
Conduct internal and external system security audits	**2.25**	**1.093**
Note: M;1 to 1.8 = Not important skill, 1.81 to 2.60 = Slightly important skill, 2.61 to 3.40 = Moderately important skill, 3.41 to 4.20 = Important skill, 4.21 to 5 = Very important skill		

Source: Field Data (2023)

As presented in Table 5.13, the findings indicate that most digital technical skills listed are essential for a LIS employer. However, as shown in Table 5.13, some digital technical skills were more highly preferred than others. Based on the results, it can be interpreted that the following skills, including the use of collaboration tools for communication and social networking, the Use of library management software for library data management and services provision, the Use of presentation application software such as MS PowerPoint, Use of word application software such as MS Word, Use of operating systems such as Windows and Mac, Secure personal information against threats, Manage access to the systems, Use of data management software such as SPSS, Software application evaluations, Maintain user IDs and passwords in the information system, Install security software to safeguard the organisation's vital data, Use of cloud computing applications and Use of spreadsheet application software such as MS Excel had a mean score range in between (M= 3.41 to M= 5.00) which implied that respondents valued the skills as important and very important, respectively for a LISc professional to be equipped.

The findings from the LIS employers, as presented in Table 5.13, also established that skills which were found to be moderately preferred for LIS professionals include the ability to: Use multimedia and publisher application software for preparing promotion materials, Use design software to prepare flow charts and diagrams and Use project management software to prepare project work plans such as MS Project. These skills had a mean score of (M=2.79 to M=3.33). Depending on the advancement of technology in each library and how they apply technology, one LIS employer can have a different opinion from another. However, skills such as using multimedia and design software are prominent in marketing and promoting library services, but also project skills are essential in implementing library projects.

Table 5.13 also shows skills with a mean score between (M=2.25 to M=2.33), which are considered unimportant for LIS professionals. These skills include: Using database software, e.g., Oracle, Verifying the security of third-party vendors to meet security requirements and conducting internal and external system security audits.

It is important to note that these findings were confined to the perception of LISc employees in Tanzania and the current situation of the libraries. The importance of skill

also depends on the stage of technological transformation and the extent of ICT usage in the respective libraries. These findings imply that employers valued all nineteen skills at varying degrees and that a graduate entering the LISc job market with this set of skills will be more comfortable using computer software and application in library and information services operations.

5.4.1.3 Advanced digital skills

LIS employers were asked to provide opinions on advanced digital skills crucial for a LISc graduate to be equipped. Advanced digital technical skills are a particular set of skills that support one to integrate effectively with computer systems and associated applications for effective service delivery. This skill category had ten statements that respondents were required to indicate through a Likert scale question in the questionnaire, ranging from very important to not important. **Table 5.14** presents the descriptive statistics.

Table 5.14: Advanced digital skills

Advanced digital skills	**LIS employers N=39**	
Ability to	**Mean**	**Std. D**
Perform troubleshooting issues	**4.58**	**0.498**
Maintaining and upgrading existing systems as required	**4.23**	**1.037**
Perform data backup locally and through the cloud	**4.20**	**1.030**
Perform data migration	**4.02**	**1.135**
Develop library website	**3.94**	**0.971**
Manage servers and technology tools	**3.76**	**1.202**
Manage to set up users' accounts and workstations	**3.76**	**1.062**
Assist in system development and customisation	**3.74**	**0.965**
Designing new computer systems and frameworks	**2.97**	**1.135**
Write software codes	**2.61**	**1.205**
Note: M;1 to 1.8 = Not important skill, 1.81 to 2.60 = Slightly important skill, 2.61 to 3.40 = Moderately important skill, 3.41 to 4.20 = Important skill, 4.21 to 5 = Very important skills		

Source: Field Data (2023)

Table 5.14 shows that most skill sets are considered very important by LIS employers. LIS employers indicated that LIS professionals should have the ability to resolve system problems, maintain and upgrade existing systems, perform data backup, handle data

migrations, develop library websites, manage servers and technology tools, set up users' accounts and workstations and assist in system development and customisation. These skills had a mean score in between (M= 3.74 to M= 4.58), which implies the skills are important and very important, respectively.

However, the findings from the LIS employers, as can be viewed in Table 5.14, established that the ability to design new computer systems and frameworks as well as write software codes received a relatively low rating, ranging from a mean score of (M=2.61 to M=2.97), indicating that the skills are slightly important for a LISc professional.

The findings of this study suggest that LISc schools should find a way to integrate advanced digital skills into the LISc Bachelor's degree course for the graduates to be proficient in areas such as troubleshooting, maintaining systems and performing data backup, but also may need improvement in other areas, such as designing new computer systems and writing software codes. However, they were indicated as slightly important. It is anticipated that being slightly important does not mean the skills are not important, but instead, they can be covered in the curricula to provide LIS professionals with an understanding of the theories and practices of competencies.

In this study, all thirty-nine (N=39) employers were asked an open-ended question to provide their perspectives on the competencies required in the LISc job market. However, only 12 (30.1%) respondents answered this question. The responses identified several essential competencies for LISc graduates to work in the digital age, similar to those provided in the questionnaire, confirming the findings' originality. These included sharing, selecting, searching, retrieving, using, processing, organising, storing, generating, integrating, analysing and evaluating digital information in different formats. Respondents also highlighted the need for proficiency in software applications such as word processors, multimedia tools, database software and operating systems. Troubleshooting skills, website development and managing library collections and services electronically were crucial competencies identified. **Figure 5.2** on page 128 below presents the most pointed competencies from the LIS employers.

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Figure 5. 2 Digital skills required

Source: Field Data (2023)

LIS employer **01** articulated that:

> *Graduates should be able to know how to navigate digital competencies activities. They do not have to know everything because they will know once they have been employed, but they must have basic knowledge and be able to identify the gap in what they know.*

LIS employer **02** articulated that:

> *I expect that a graduate should be able to know how to navigate digital competencies activities. They should also know how to manage databases, as libraries depend on databases. Therefore, having knowledge of database systems, such as SQL and the ability to use these systems to store, organise and manage large amounts of information is essential. They should also be able to analyse data.*

LIS employer **03** articulated that:

> *Graduates should be able to know how to navigate digital competencies activities as the Covid-19 pandemic has ushered in a new way of working where online LISc service delivery has become mandatory. They should be familiar with metadata standards, such as MARC, RDA,Dublin Core and be able to*

apply these standards in cataloguing and classifying library materials electronically. However, be familiar with library management software and database systems and the ability to use these tools to catalogue and classify library materials.

LIS employer **04** articulated that:

Graduates need various technical and interpersonal skills. Some of the skills typically required for this role include managing large amounts of information and organising it to make it easily accessible to others. They must be proficient in using various digital tools and technologies, including databases, content management systems and digital preservation tools. The need to have advanced computer troubleshooting skills, as other professionals, such as IT support staff, may support the library in this area.

LIS employer **05** articulated that:

Graduates must be able to use technology to communicate effectively with various stakeholders, including library patrons and researchers. They must also be able to analyse and evaluate data and sources of data. They should be familiar with basic programming languages, metadata standards and web development tools. In addition, they should be able to manage library systems.

LIS employer **06** articulated that:

Graduates should be aware of Information security, knowledge of cloud computing technologies issues and the ability to use these technologies to store, manage and share information are essential competencies. You should be able to plan ICT projects, budget, manage risk and write projects and manage time using project management software.

*LIS employer **07** articulated that:*

LIS professionals should have basic knowledge of programming languages in order to automate information management tasks. They should be able to adapt to new technologies and changing demands in the field of information

management in order to stay current and relevant in this dynamic field. Should have more advanced web design skills, such as HTML, CSS and JavaScript, to create an engaging and user-friendly site.

LIS employer **08** articulated that:

Graduates should be able to maintain library websites, but also be familiar with information security policies and procedures and understand the importance of maintaining the privacy and confidentiality of library patrons' information.

LIS employer **09** articulated that:

Librarians need ICT technical skills because libraries heavily depend on ICT infrastructure to support and manage facilities such as computers, printers and other digital devices.

LIS employer **10** articulated that:

Should have basic computer troubleshooting skills to quickly and effectively resolve technical problems.

LIS employer **11** articulated that:

LIS professionals should have in-depth knowledge of computer networking and information security.

5.4.2 Digital skills preparedness of Library and Information Science graduates

A total of 382 LISc graduates in the sector completed the questions that aimed to assess their preparedness for digital skills. The question consisted of three sections, namely digital information processing skills, digital technical skills and advanced digital skills, the same competencies the employers were asked to provide their preference. The questions were based on a five-point Likert scale (Excellent skills=5, Good skills=4, Fair skills=3, Poor skills=2, Very poor skills/Do not know=1). The respondents' views were analysed based on mean and standard deviation. The scale's interpretation was as follows: a score of 1 to 1.8 indicated very poor skills, 1.81 to 2.60 indicated poor skills, 2.61 to 3.40 indicated fair skills, 3.41 to 4.20 indicated good skills and 4.21 to 5

indicated excellent skills. The findings are further interpreted in the following sub-headings.

5.4.2.1 Efficacy in digital information management

LISc graduates were asked to indicate their competencies in efficacy in digital information management through a Likert scale question ranging from excellent skills to very poor skills provided in the questionnaire. **Table 5.15** presents the frequency distribution.

Table 5.15: Efficacy in digital information management

Efficacy in digital information management	**LISc graduates N=382**	
Ability to	**Mean**	**Std. D**
Share digital information	**4.79**	**0.405**
Use the information in different digital formats	**4.38**	**0.823**
Evaluate digital information	**4.04**	**0.913**
Process, organise and store digital information to facilitate retrieval and use	**3.92**	**1.011**
Select, search and retrieve digital information	**3.84**	**0.938**
Generate, organise, integrate and analyse digital content and knowledge	**3.24**	**0.847**
Decode, restructure and protect digital information	**2.98**	**0.959**
Note: M; 1 to 1.8 = Very poor skills, 1.81 to 2.60 = Poor skills, 2.61 to 3.40 = Fair skills, 3.41 to 4.20 = Good skills, 4.21 to 5 = Excellent skills.		

Source: Field Data (2023)

As presented in Table 5.15, the findings on the abilities of LISc graduates in managing digital information show that LISc graduates had good and very good skills in sharing digital information, ability to use digital information in different formats, ability to evaluate digital information, abilities in processing, organising and storing digital information and skills in selecting, searching and retrieving digital information. These skills had a mean score of between (M= 4.79) and (M= 3.84), respectively. The graduates show a lower ability in generating, organising, integrating, analysing digital content and knowledge and decoding, restructuring and protecting digital information with a mean score of (M= 3.24) and (M= 2.98), respectively. The findings suggest that the LISc graduates were familiar with a majority of the competencies. This study's

findings can be used to strengthen the training and education of LISc graduates and help improve the curriculum to better meet the digital age's demands.

5.4.2.2 Digital technical skills

LISc graduates were probed to indicate their competencies in digital technical skills through a Likert scale question ranging from excellent skills to very poor skills provided in the questionnaire. **Table 5.16** provides the descriptive statistics, which had nineteen measured categories.

Table 5.16: Digital technical skills

Digital technical skills	**LISc Graduates N=382**	
Ability to	**Mean**	**Std. D**
Use online collaboration tools such as Facebook, Google and YouTube for communication and social networking	**4.45**	**0.718**
Use cloud applications to input, store and disseminate information	**4.30**	**1.207**
Use word application software such as MS Word to prepare word documents	**4.25**	**0.627**
Use presentation application software such as MS PowerPoint to present data	**4.24**	**1.068**
Use operating systems such as Windows and Mac	**4.21**	**0.804**
Use library software for library data management and services provision	**3.82**	**0.999**
Manage access to the systems	**3.70**	**1.081**
Use spreadsheet application software such as MS Excel for computing data	**3.36**	**0.562**
Use multimedia and publisher application software for preparing promotion materials and listening to or viewing information	**3.23**	**1.032**
Use data management software such as SPSS for computing data	**3.02**	**0.763**
Use database software and applications	**2.61**	**1.067**
Maintain user IDs and passwords in the information system	**2.56**	**1.054**
Install security software like firewalls and essential data encryption programmes to safeguard the organisation’s vital data	**2.55**	**1.492**
Software application evaluations	**2.46**	**1.038**
Use design software to prepare flow charts and diagrams, e.g., MS. Visio	**2.44**	**0.905**
Secure personal information against threats	**2.26**	**1.206**
Use project software to prepare project work plans	**2.08**	**0.862**
Verifying the security of third-party vendors to meet security requirements	**1.86**	**1.228**
Conduct internal and external system security audits	**1.84**	**1.301**

Digital technical skills	LISc Graduates N=382	
Ability to	**Mean**	**Std. D**
Note: Mean;1 to 1.8 = Very poor skills, 1.81 to 2.60 = Poor skills, 2.61 to 3.40 = Fair skills, 3.41 to 4.20 = Good skills, 4.21 to 5 = Excellent skills		

Source: Field Data (2023)

Based on findings depicted in Table 5.16, graduates have the most proficiency in using online collaboration tools such as Facebook, Google and YouTube for communication and social networking, as indicated by a mean score of (M=4.45). They also appear to have strong skills in using cloud applications to input, store and disseminate information, with a mean score of (M= 4.30). Graduates were relatively good at using word application software such as MS Word to prepare word documents and presentation software, as indicated by a mean score of (M= 4.25) and (M= 4.24), respectively.

The findings also reveal that graduates have weaker skills in using certain types of software, such as data management software like SPSS and database software like Oracle, where they scored (M= 3.02) and (M= 2.61), respectively. Similarly, they appear to have limited proficiency in maintaining user IDs and passwords in the information system and installing security software like firewalls and essential data encryption programmes, with mean scores of (M= 2.56) and (M= 2.55), respectively.

Finally, the results suggest that graduates have the least proficiency in verifying third-party vendors' security to meet security requirements and conducting internal and external system security audits, with mean scores of (M= 1.86) and (M= 1.84), respectively. These findings indicate room for improvement in the graduates' skills.

5.4.2.3 Advanced digital skills

LISc graduates were asked to provide their capabilities on advanced digital skills. These skills are beyond normal computer use; there are more technical and are mostly geared towards development, configuration and troubleshooting. This skill category had ten statements in which respondents were required to indicate their abilities through a

Likert scale question in the questionnaire, ranging from excellent skills to very poor skills/I do not know. **Table 5.17** provides the descriptive statistics.

Table 5.17: Advanced digital skills

Advanced digital skills	**LISc graduates N-382**	
Ability to	**Mean**	**Std. D**
Manage servers and technology tools	**2.75**	**1.206**
Perform data migration	**2.70**	**1.351**
Perform data backup – local and through the cloud	**2.65**	**1.290**
Manage to set up users' accounts and workstations	**2.51**	**1.144**
Develop library website	**2.46**	**0.771**
Perform troubleshooting issues	**2.26**	**0.943**
Maintain and upgrade existing systems as required	**2.07**	**0.944**
Design new computer systems and frameworks	**2.02**	**1.291**
Assist in system development and customisation	**1.96**	**0.636**
Write software codes	**1.85**	**0.749**
Note: M;1 to 1.8 = Very poor skills, 1.81 to 2.60 = Poor skills, 2.61 to 3.40 = Fair skills, 3.41 to 4.20 = Good skills, 4.21 to 5 = Excellent skills		

Source: Field Data (2023)

The findings, as presented in Table 5.17, suggest that the abilities of LISc graduates in advanced digital competencies are low. All skills tested on the LISc graduates ranged on a mean between (M= 1.85) and (M= 2.75), which implies that graduates were poor and very poor, respectively, on advanced digital competencies. These study findings suggest that LISc graduates need further training and development in these areas to perform effectively in their professional roles. The results highlight the need for LISc curricula to incorporate advanced digital competencies in their programme offerings to better prepare graduates for the demands of the digital age.

5.4.3 Comparison of Library and Information Service employers and Library and Information Science graduates' findings on digital skills competencies

The responses of LIS employers and graduates were combined to compare the digital skills that LIS employers expect versus the competencies that LIS graduates employed possess. A difference in proportion z-test was carried out to see if there was a

significant difference between the proportion of expected digital skills and the proportion of essential digital skills available to establish if the curricula on offer are competent to supplement the findings presented in section 5.3.5.

The hypothesis was as follows:

1. Null hypothesis/H 0: The two proportions are equal
2. Alternative hypothesis/H1: The two proportions are different from each other.

The z-tests results were interpreted as having either:

1. A significant difference, whereby the employer' expectations of graduates' abilities exceeded the students' perceived abilities.
2. A significant difference, whereby the students' perceived abilities exceeded the employer 'expectations of graduates' abilities.
3. No significant difference in proportion of the employer expected abilities and the students perceived abilities.

Based on the interpretation above, the first assumption suggests that a significant difference exists when employers anticipate higher levels of competence in graduates than what the students themselves believe they possess. This implies a potential gap between what employers require and what students perceive as their skills. The second assumption highlights a significant difference where students' self-assessment of their abilities surpasses what employers expect from them, indicating that students may have higher confidence in their skills than employer expectations. Finally, the third assumption implies that there is no statistically significant distinction between employer expectations and student self-perceptions, suggesting alignment between the perceived skills of students and the demands of the job market. These assumptions serve to shed light on the dynamic relationship between education, skills and the professional landscape, guiding potential adjustments in curriculum and readiness programs for LIS students. Therefore the statistical proportions of the z-tests were interpreted in this way, with the intention of determining the digital skills requirement of the job market in alignment with the preparedness of LIS students.

5.4.3.1 Z-Test for the efficacy in digital information management

Table 5:18 presented on page 137 below, shows the Z-test values for the data retrieved from the LIS employers in the LISc job market and LISc graduate comparison. In the first category of competencies, the null hypothesis was rejected for most skills due to a significant difference between LISc graduates' abilities compared to LIS employers' expectations.

Table 5.18: Z-Test for the efficacy in digital information management

Z-Test for the efficacy in digital information management					
Respondents' ability to	**N=39**	**N=382**	**S. Diff.**	**P-Value**	**Conclusion**
	I&VI	**G&E**			
Generate, organise, integrate and analyse digital content and knowledge	100%	27.7%	**72.2%**	**<0.05**	Reject null hypothesis
Decode, restructure and protect digital information	100%	30.1%	**69.8%**	**<0.05**	Reject null hypothesis
Process, organise and store digital information to facilitate retrieval and use	100%	68.0%	**31.9%**	**<0.05**	Reject null hypothesis
Select, search and retrieve digital information	100%	69.1%	**30.8%**	**<0.05**	Reject null hypothesis
Use the information in different digital formats	100%	78.0%	**21.9%**	**<0.05**	Reject null hypothesis
Evaluate digital information	100%	82.9%	**17.0%**	**<0.05**	Reject null hypothesis
Share digital information	100%	100%	**0%**	**>0.05**	Accept null hypothesis
Note; I&VI = Important and Very important, G&E = Good and Excellent, S. Diff – Statistical difference					

Source: Field Data (2023)

Based on the Z-test analysis as presented in Table 5.18, the results indicate a wider statistical difference which led to rejecting the null hypothesis between the respondents'

ratings on a majority of the skills tested, excluding the skills on the ability to share digital information, which showed a 0% statistical difference, implying employers valued the skills as important and graduates had good competencies in these skills. This finding led to the null hypothesis being accepted.

5.4.3.2 Z-Test for digital technical skills

Table 5.19 compares the data retrieved from the LIS employer in the LISc job market and LISc graduates. The findings established a significant difference between LIS graduates' abilities and employers' expectations; the null hypothesis was rejected in all the skills categories.

Table 5.19: Z-Test analysis for digital technical skills

Z-Test Analysis for digital technical skills					
Responses on the ability to	**N=39**	**N=382**	**S. Diff.**	**P-Value**	**Conclusion**
	I&VI	**G&E**			
Secure personal information against threats	100%	9.1%	**90.9%**	**<0.05**	Reject null hypothesis
Maintain user IDs and passwords in the information system	100%	20.9%	**79.1%**	**<0.05**	Reject null hypothesis
Use spreadsheet application software such as MS Excel for computing data	100%	34%	**66%**	**<0.05**	Reject null hypothesis
Conduct internal and external system security audits	74.3%	13.9%	**60.4%**	**<0.05**	Reject null hypothesis
Use library software for library data management and services provision	100%	45.3%	**54.7%**	**<0.05**	Reject null hypothesis
Use project software to prepare project work plans	51.3%	0.8%	**50.5%**	**<0.05**	Reject null hypothesis
Verifying the security of third-party vendors to meet security requirements	50%	4.2%	**45.8%**	**<0.05**	Reject null hypothesis
Use multimedia and publisher application software for preparing promotion materials and listening to or viewing	72%	34.6%	**37.4%**	**<0.05**	Reject null hypothesis

Z-Test Analysis for digital technical skills					
Responses on the ability to	**N=39**	**N=382**	**S. Diff.**	**P-Value**	**Conclusion**
	I&VI	**G&E**			
information					
Install security software like firewalls and essential data encryption programmes to safeguard the organisation's vital data	61.6%	26.1%	**35.5%**	**<0.05**	Reject null hypothesis
Use design drawing software	41%	16%	**25%**	**<0.05**	Reject null hypothesis
Manage access to the systems	82.1%	63.1%	**19%**	**<0.05**	Reject null hypothesis
Software application evaluations	38.4%	21.7%	**16.7%**	**<0.05**	Reject null hypothesis
Use operating systems such as Windows and Mac	100%	83.8%	**16.2%**	**<0.05**	Reject null hypothesis
Use database software and applications	28.2%	12.1%	**16.1%**	**<0.05**	Reject null hypothesis
Use online collaboration tools such as Facebook, Google and YouTube for communication and social networking	100%	86.6%	**13.4%**	**<0.05**	Reject null hypothesis
Use word application software such as MS Word to prepare word documents	100%	90.3%	**9.7%**	**<0.05**	Reject null hypothesis
Use design software to prepare flow charts and diagrams,	20.5%	11.8%	**8.7%**	**<0.05**	Reject null hypothesis
Use cloud applications to input, store and disseminate information	76.9%	82.2%	**-5.3%**	**<0.05**	Reject null hypothesis
Use presentation application software such as MS PowerPoint to present data	43.6%	78.6%	**-35%**	**<0.05**	Reject null hypothesis
Note; I&VI = Important and Very important, G&E = Good and Excellent, S. Diff – Statistical difference					

Source: Field Data (2023)

The findings presented in Table 5.19 indicate that the hypothesis tested had a significant difference in all skills related to technical digital competencies. The results of the hypothesis test show that the null hypothesis was rejected in all of the skills. The technical digital skills with the highest statistical difference included securing personal information against threats (90.9%), maintaining user IDs and passwords in the information system (79.1%), using spreadsheet application software for computing data (66%) and conducting internal and external system security audits (60.4%). On the other hand, the digital technical competencies found to have a negative statistical difference include using cloud computing applications (5.3%) and presentation application software (35%). The study findings imply that comprehensive training on digital technical skills is required to be implemented in HLI schools so that graduates can have the requisite skills in the end.

5.4.3.3 Z-Test for the advanced digital skills

Table 5:20 shows the Z-test values for the data retrieved from the LIS employers and LIS professionals in the LISc job market. The table below presents the findings.

Table 5.20: Z-Test analysis for advanced digital skills

Z-test for advanced digital skills					
Response on the ability to:	**N=39**	**N=382**	**S. diff.**	**P-value**	**Conclusion**
	I&VI	**G&E**			
Perform troubleshooting issues	100%	12.3%	**87.7%**	**<0.05**	Reject null hypothesis
Maintaining and upgrading existing systems as required	79.4%	11.2%	**68.2%**	**<0.05**	Reject null hypothesis
Develop library website	79.5%	13%	**66.5%**	**<0.05**	Reject null hypothesis
Perform data backup – local and through the cloud	87.2%	22%	**65.2%**	**<0.05**	Reject null hypothesis
Assist in system development and customisation	61.6%	2.9%	**58.7%**	**<0.05**	Reject null hypothesis
Perform data migration	74.4%	29.4%	**45%**	**<0.05**	Reject null hypothesis
Set up users' accounts and workstations	71.8%	29.1%	**42.7%**	**<0.05**	Reject null hypothesis
Design new computer systems and frameworks	33.3%	2.9%	**30.4%**	**<0.05**	Reject null hypothesis

Z-test for advanced digital skills					
Response on the ability to:	**N=39**	**N=382**	**S. diff.**	**P-value**	**Conclusion**
	I&VI	**G&E**			
Manage servers and technology tools	56.4%	34.8%	**21.6%**	**<0.05**	Reject null hypothesis
Write software codes	20.5%	4.7%	**15.8%**	**<0.05**	Reject null hypothesis
Note: I&VI – Important and Very important, G&E – Good and Excellent, S. diff - Statistical difference					

Source: Field Data (2023)

The findings, as depicted in Table 5.20, show a statistical difference in all the tasks performed by the employees. The null hypothesis has been rejected in each case. The level of statistical difference varies between tasks, with the highest level of difference in the ability to perform troubleshooting issues (87.7%). On the other hand, fewer LIS employers felt that writing software code is a necessary skill. This was the same feeling of the LISc graduates. These results suggest that LIS professionals are not adequately proficient in advanced digital skills.

Based on the Z-tests from all three categories of competencies, as presented in Tables 5.18, 5.19 and 5.20, there is a high mismatch in most of the skills that the LIS employers require graduates to be competent in. The findings suggested an existence of divergence between the skills and competencies produced by LISc education and the skills needed in the work environment. Therefore, the results imply a need for revision of all the LISc curricula reviewed.

5.5 Academic staff competencies and teaching methodology

The study's third objective aimed to investigate academic staff's competencies in teaching digital skills in Tanzania. The objective had two research questions. The primary goal of the objective was to assess whether departments have an adequate number of appropriately skilled academic staff who can teach and transfer digital competencies to LISc students using more than one teaching pedagogies. Four sections were used to answer this objective: LISc department academics capacity, academic staff

teaching digital skills, preference of teaching methodologies employed in digital skills integration and needed Competencies for LISc academic staff. The results of these investigations were used to gain a comprehensive understanding of the current state of academic staff competencies and methods of teaching ICT skills in Tanzania.

5.5.1 Library and Information Science department academic staff capacity

Academic staff are a crucial component of any academic programme. ADRs (N= 5) were asked about the strength of academic staff in their respective academic departments. The results revealed that all five departments had diverse academic staff, including tutorial assistants, academic staff and full professors. However, the number of academic staff members offering education in LISc differed across the departments. It was important for this study to investigate the staff capacity as the variation in the number of academic staff members is anticipated to impact the quality and scope of the education offered in that field in each department. **Table 5.21** presents the findings.

Table 5.21: Library and Information Science department capacity

LISc department capacity					
Qualification	**HLI-05**	**HLI-01**	**HLI-04**	**HLI-02**	**HLI-03**
Associate professors/ Professors	4	1	0	0	0
Lecturers/ Senior lecturers	6	11	3	3	7
Assistant lecturers	12	0	8	7	5
Tutorial assistants	0	9	5	3	0
Total	**22**	**21**	**16**	**13**	**12**

Source: Field Data (2023)

The findings from the document review, as presented in Table 5.21, reveal that HLI-05 had twenty-two academic staff and HLI-01 had twenty-one academic staff. This was the highest recording on the number of staff in the department compared to other LISc departments. HLI-03 had the least academic staff, twelve (12). The findings established that there were few professors in the field. The majority of the academic staff were lecturers/ senior lecturers. These findings suggest that qualified academic staff are very few in LISc departments and thus HLIs need to train more staff or recruit more qualified staff in the field.

5.5.2 Academic staff teaching digital skills

The Five ADRs were interviewed on the digital competencies of the academic staff in their respective departments. The findings revealed that four of the five ADRs interviewed indicated they lacked sufficient academic staff from their departments who could teach ICT courses. The findings of this study established that departments used competent staff members with several qualifications in computer science and information technology to teach digital skills courses, either by borrowing staff from other departments or by involving part-time academic staff from other HLIs. However, one department was found to have permanent staff members teaching digital skills competencies as the programme was hosted in the Faculty of Science and Technology. The following were the findings from each respondent.

Participant **ADR-05** articulated that:

> *The department faces a shortage of staff with ICT competencies; however, courses are taught by academic staff from the informatics department.*

Participant **ADR-02** pointed that:

> *We have a shortfall of competent academic staff with ICT background employed under the LISc department.*

Participant **ADR-01** articulated that:

> *We hire part-timers to teach ICT courses.*

Participant **ADR-04** pointed that

> *We have competent staff to teach ICT courses.*

Participant **ADR-03** articulated that:

> *The department holds LIS professionals and other academic staff employed part-time for teaching non-LISc courses.*

The interviewees indicated that the slow and tedious government process of hiring new academic staff in the HLIs is the primary factor that led to inadequate staffing. The following were the findings from each respondent.

Participant **ADR-02** said that:

> *The government takes a long time to provide slots for new hires to the university. As of now, we have not had any new hires for three years and the permit from the government for a new hire has not yet been released.*

Participant **ADR-01** pointed that:

> *Lack of academic staff is no doubt a big issue, which is associated with the government procedures of employing new staff through the Tanzania Secretariat of Employment being complex in nature. The current staff teaching digital skills to our students need further training so that they can be more competent in teaching.*

Participant **ADR-04** revealed that:

> *Many bureaucratic issues lead to unnecessary delays in hiring eligible and competent staff. The government secretariat takes a long time to announce vacant posts.*

Participant **ADR-03** articulated that:

> *The lack of proper recognition of the LISc department is a problem which results in the programme not having its own staff. Currently, the programme is hosted under department x, which teaches x as a primary objective and library studies is just a programme attached.*

The lack of digital competencies was a cause for concern for the interviewees, indicating the need to recruit and train skilled academic staff members in this area.

5.5.3 Preference of teaching methodologies

LISc academic staff were asked to indicate the teaching methodologies they use in imparting knowledge and skills of the digital skill courses available in LISc curricula. Respondents were given opportunities to select more than one preference regarding teaching methodology. **Table 5.22** presents the descriptive statistics.

Table 5.22: Academic staff preferred pedagogy approach

Academic Staff preferred pedagogy approach	**LISc academic Staff N=13**	
Teaching preference	**Frequency**	**Percentage**
Lectures/PowerPoint presentations	**12**	**92.3%**
Group working	**11**	**84.6%**
Project work	**7**	**53.8%**
Practical exercises	**7**	**53.8%**
Self-study	**5**	**38.5%**
Field visits to information and case studies	**4**	**30.8%**
Online	**2**	**15.4%**

Source: Field Data (2023)

As presented in Table 5.22, almost all types of teaching methodologies were found to be employed by LISc academic staff. However, some teaching methodologies were used by academic staff more than others. The findings indicate that 12 respondents (92.2%). preferred lectures / PowerPoint presentations as a teaching methodology, with the second most preferred teaching method being group work, with 11 (84.6%) preferences. The results also show that project work had 7 (53.8%) preferences, with online having the least at 2 (15.4%) preferences.

When the same question was posed to the students (N=135), the findings, as presented in Table 5.22, established the most preferred teaching methodology among the LISc third-year students is lectures/ power point presentations, with 124 (91.1%) respondents. The second most preferred teaching method is group work 119 (88.1%) preferences. Project work is the third most preferred method, with 112 (83.0%)

preferences. The least preferred teaching method is online, with only 27 (20%) preferences. **Table 5.23** provides the findings.

Table 5.23: Student's preference for pedagogy approach

Student's preference for pedagogy approach	**LISc students N=135**	
Students' preference	**Frequency**	**Percentage**
Lectures/PowerPoint presentations	**124**	**91.9%**
Group working	**119**	**88.1%**
Project work	**112**	**83.0%**
Practical exercises	**93**	**68.9%**
Self-study	**72**	**53.3%**
Online	**27**	**20.0%**

Source: Field Data (2023)

The Z-test analysis was applied to test the statistical difference between the teachers' preference for teaching methodology and students' preference for the training methodology of ICT courses. **Table 5.24** provides the Z-test analysis.

Table 5.24: Z-test analysis for preference of pedagogy approach

Z-test analysis for preference of pedagogy approach					
Responses	**LISc academic staff N=13**	**LISc students N=135**	**S. diff.**	**P-value**	**Conclusion**
Lectures	92.3%	91.9%	**0.4%**	**>0.05**	Accept null hypothesis
Group work	84.6%	88.1%	**-3.5%**	**>0.05**	Accept null hypothesis
Online	15.4%	20.0%	**-4.6%**	**>0.05**	Accept null hypothesis
Self-study	38.5%	53.3%	**-14.8%**	**<0.05**	Reject null hypothesis
Practical exercises	53,8%	68.9%	**-15.1%**	**<0.05**	Reject null hypothesis
Project work	53.8%	83.0%	**-29.2%**	**<0.05**	Reject null

Z-test analysis for preference of pedagogy approach					
Responses	**LISc academic staff N=13**	**LISc students N=135**	**S. diff.**	**P-value**	**Conclusion**
					hypothesis

Source: Field Data (2023)

As presented in Table 5.24, the null hypothesis was rejected for most of the questions in preference of teaching methodology due to a significant difference in the students' teaching methodology preference compared to the academic staff methodology choices of teaching. The hypothesis test results suggest a statistical difference in the preference for teaching methodologies among the academic staff and students. Only three approaches, as depicted in Table 5.24, accept the null hypothesis, including online, traditional lectures and group work approaches, which were found to be favoured the least by the academic staff and students; group work was found to be highly favoured by both academic staff and students. The other approaches, including self-study, project work, practical exercises, Power-Point presentations, one-to-one, blackboard/ whiteboard and field visits, rejected the null hypothesis, implying a statistical difference between the academic staff and students. The findings suggest that the online delivery method of education, despite being the most favoured in the technological world as the literature suggests, is not favoured by academic staff and students in the Tanzania environment.

5.5.4 Needed competencies for Library and Information Science academic staff

All (N=5) interviewees were asked to provide their insights into the competencies necessary for academic Staff members to thrive in the future. The participants shared diverse competencies required to be part and parcel of LISc academic staff, including; digital competencies skills, LISc subject knowledge and skills, generic skills and digital instructional skills and methods. Below are responses from each ADR.

Participant **ADR-01** said that:

> *LISc academic staff members should be experts in LISc core subjects, ICT courses related to LISc professionalism, good communication and class management skills.*

Participant **ADR-04** pointed that:

> *It is essential to have expertise in core LISc subjects, as it enables them to effectively teach and mentor students with aspects related to the field.*

Participant **ADR-03** said that:

> *LISc educator should have command and grip of the LISc programme in both theoretical and practical aspects. They should be competent in digital skills courses such as web design, database management, computer applications and other similar courses, as they are critical in preparing students for careers in the digital age as they provide the foundation for managing digital resources and platforms.*

Participant **ADR-05** said that:

> *Educators have soft skills in the digital age, such as communication and collaboration skills. LISc academic staff must be able to explain the content in both the academic and the real world.*

Participant **ADR-02** articulated that:

> *LIS educators should have knowledge of core LISc subjects.*

5.6 Concern on digital competencies integration in Library and Information Science curriculum.

The fourth objective of this study aimed to investigate the challenges that hinder the development of LISc curricula in Tanzania. The objective involved examining the

procedures involved in developing LISc curricula and identifying the challenges that affect the development of these curricula. The study relied on the insights of academic staff and ADRs who are knowledgeable about the procedures of curriculum development and the challenges encountered while developing a curriculum that equips LIS professionals with digital competencies. The research hoped to find out the ground situation of LISc curriculum development in LISc schools and reveal the challenges with the hope of revealing later solutions to the challenges identified by ADRs and academic staff. Two research questions were used to answer the objective. The research questions were structured into two sub-sections: Procedures for identifying desirable content for developing the LISc curriculum and Challenges affecting the development of LISc curricula in Tanzania.

5.6.1 Procedures for identifying desirable content for developing the Library and Information Science curriculum

This study requested input from ADRs with regard to procedures employed by respondents in identifying content in the development process of the LISc curriculum. The aim was to gain an understanding of the procedures and methods used in identifying content and developing a proper curriculum that reflects the digital competencies in departments teaching LISc programmes. The participants had varied opinions on the subject. They acknowledged that the procedures employed in curriculum development or redevelopment include conducting situational analysis. Situational analysis plays a critical role in identifying emerging digital trends and developing relevant content for the LISc curriculum. While situational analysis is a critical component of the process, the ADRs also pointed out other factors such as collaboration, consultation with LISc job market professionals, conducting research on international trends and aligning with international published LISc framework.

Participant **ADR-04** articulated that:

> *We incorporate emerging technologies into the LISc curriculum by regularly reviewing and updating course content to ensure that it is current and relevant through conducting research.*

ADR-04 also pointed that, as someone involved in LISc curriculum development for many years, I can say that reviewing international frameworks such as IFLA is essential in keeping our curriculum current and relevant, as they help us identify areas where our curriculum may be lacking and guide best practices and emerging trends in the field.

Participant **ADR-01** pointed that:

We engage with LISc job market professionals to understand the skills and knowledge that are in demand in the field of LISc, which helps us align the curriculum with the needs of the digital age and ensure that our graduates are equipped in relation to the market demands.

Participant **ADR-03** revealed that:

We encourage collaboration and teamwork in the LISc curriculum to develop skills essential for the digital age. We also review international LISc frameworks such as IFLA when developing our curricula.

Participant **ADR-05** articulated that:

We offer professional development opportunities to our academic staff to help them stay up-to-date with developments in the field of LISc and the digital age, for which, through training, they can assist in developing a curriculum that aligns with the technological trend. We also involve stakeholders in the LISc job market.

Participant **ADR-02** said that:

We conduct a situational analysis to gather data from the stakeholders. We also review international LISc frameworks.

5.6.2 Challenges affecting the development of the Library and Information Science curricula in Tanzania

Thirteen academic staff members were asked to rate the challenges they encountered in aligning the LISc curricula with the needs of the digital age using a 5-point Likert scale.

The Likert scale responses were interpreted using mean scores. For instance, a mean score of 1 to 1.8 indicated that the respondents strongly disagreed with the statement, while a mean score of 4.21 to 5 implied that the respondents strongly agreed. **Table 5.25** presents the findings.

Table 5.25: Challenges affecting the development of Library and Information Science curricula

Institutional challenges	**LISc academic staff N=13**	
Responses on institutional challenges	**Mean**	**Std. D**
Lack of professional board involvement	**4.61**	**0.506**
Lack of learning resources	**4.23**	**0.832**
Lack of adequate academic staff	**4.15**	**0.688**
Lack of standard guidelines in developing LISc curricula	**3.61**	**0.960**
Lack of adequate ICT facilities	**3.53**	**1.126**
The gap between teaching and practising	**3.53**	**0.877**

Source: Field Data (2023)

Almost all types of challenges presented to the respondents were facing the HLIs selected for this study in Tanzania, though in varying degrees. The findings establish that the challenge with the highest mean score is the lack of professional board involvement, with a mean score of (M= 4.61), followed by the lack of learning resources, with a mean score of (M= 4.23). The third challenge was inadequate academic staff, with a mean score of (M= 4.15). This finding indicates that academic staff believe that their institution does not have enough academic staff to meet the needs of the students. The findings also established that the gap between teaching and practising and the lack of adequate ICT facilities are tied at fourth place, with a mean score of (M=3.53) for each. The challenge with the lowest mean score is other challenges, with a mean score of (M=3.46).

The ADRs from LISc schools were also asked to indicate which challenges they faced when developing curricula that align with the required digital competencies. They

identified challenges such as lack of proper consultation with the LIS professionals in the LISc job market, knowledge-based approach, top-down management approach, lack of academic staff, lack of ICT infrastructure, the gap between national education policies, bureaucratic procedures on curricula revisioning and development and absence of a clear model or framework. **Figure 5.3** presents the most content participants shared regarding challenges affecting LISc curricula development. The size variation reflects the frequency with which a word has been mentioned by participants. The words that appear in large size are those mentioned most often by participants, while those with small size were less mentioned by participant.

Figure 5.3: Challenges affecting Library and Information Science curricula development

Source: Field Data (2023)

Participant **ADR-01** pointed that:

> *There is a lack of proper consultation with the LIS professionals in the job market in the development of a LISc programme. Secondly, integrating hands-on digital competencies in LISc programmes can be difficult when the dominant approach to teaching is still knowledge-based. The top-down management approach is also a challenge in curriculum development.*

Participant **ADR-04** pointed that:

> *The lack of adequate competent academic staff affects in development of a LISc programme. This affects the quality of education for LISc students and limits*

their career opportunities. In addition, there is a lack of ICT infrastructure and a knowledge gap between the job market and LISc schools due to a lack of coordination in the job market.

Participant **ADR-05** articulated that:

There is a gap between national education policies and the need of the digital age. There is also an issue of accreditation agencies and institutions bureaucratic procedures on curricula revisioning and development. There is also, an absence of a clear model or framework for digital skills integration which makes it difficult for LISc schools to develop a comprehensive approach to digital skills training, which may impact the employability of graduates.

Participant **ADR-03** pointed that:

The lack of adequate ICT infrastructure is a challenge hunting LIS education. The second challenge is a top-down management approach which does not focus on the stakeholders but on the needs and objectives of the HLIs.

Participant **ADR-02** pointed that:

Bureaucratic procedures, indeed, are a challenge in the development and review Of LISc curricula. In many cases, the development and review of curricula are a Complex and bureaucratic process that requires multiple levels of approval which results in lengthy delays, especially when multiple stakeholders are involved, such as government agencies, accreditation bodies and the job market partners.

5.7 Digital skills framework for the Library and Information Science Bachelor's degree curriculum

The fifth objective of the study focused on proposing a model for a LISc Bachelor's degree curriculum that would suit Tanzania and consider the demands of the digital age. The recognition of a growing need for graduates with digital competencies in the LISc job market drove this objective. To achieve this objective, two research questions were

employed. The research questions were further discussed under four sub-headings: National and institutional policies governing digital skills integration in the LISc curriculum, Proposed digital skills contents, A review of published digital skills frameworks and Development and implementation studies. The sub-headings are presented below.

5.7.1 National and institutional policies governing digital skills integration in the Library and Information Science curriculum

Based on the interviewees, it was found out that the LISc programme, like other programmes offered in HLIs, is accredited by the Tanzania Commission for Universities (TCU), which provides minimum benchmarks for all programmes offered at HLIs. The study also found that universities have the autonomy to go beyond the minimum benchmarks established by TCU and develop their curriculum, which TCU must accredit before being put into use. However, the study also established a lack of institutional policies governing curricula development for digital skills competencies in the LISc programme.

Participant **ADR-02** indicated:

> *The Tanzania Commission for Universities (TCU), the parent university and the department are key stakeholders with a considerable influence on ensuring the quality of the offered LISc programme. Although no established model is used in the curriculum development process, the department has its guidelines and procedures aligned with the institution's objectives. These guidelines and procedures are strictly followed to ensure the LISc curriculum is high quality and effective.*

Participant **ADR-05** pointed that:

> *Our LISc programme has received recognition and accreditation from TCU, which allows it to be offered for five years, subject to periodic review. However, the department assesses and evaluates the programme every semester and both TCU and the university's associated departments collaborate to improve the programme's quality. Although this accreditation board is in place, there is still*

a need for a professional association to oversee and regulate the LISc profession, similar to those established in the Western world, such as ALA and IFLA. Developing a curriculum without a model or framework can lead to inconsistencies in curriculum development, particularly in digital skills competencies.

Participant **ADR-03** articulated that:

Our HLI operates independently and has implemented its own internal mechanisms for ensuring quality control and maintenance. Nevertheless, there still a need to establish a professional accreditation board for LISc in Tanzania to further improve the quality output of its graduates.

Participant **ADR-04** pointed that:

The TCU has a supervisory role in regulating HLIs and ensuring all programmes align with the demands of the digital age. However, it is crucial to establish a professional board that can define the specific qualities required for a given profession in order to enhance the quality of LISc education.

Participant **ADR-01** pointed that:

To develop or review the curricula, our HLI and department follow the guidelines established by TCU. Each organisation has its role and they depend on each other. However, the need for an accreditation body in the future is evident since the TCU guidelines have gaps that cannot quickly be addressed in every programme it accredits.

Based on the document review findings on the national policies, the Tanzania Commission for Universities (TCU, 2019:199) guidelines require all universities in Tanzania to have facilities, such as lecture halls, libraries and ICT resources, to ensure the quality of education. The policy also requires universities to train students to be digitally literate and incorporate ICT in teaching and learning. However, a further analysis established that there is no specific information regarding the Tanzania

Commission for Universities (TCU) guidelines for university education on the digital competencies that should be integrated into individual curricula.

The findings also established that the Education and Training Policy 2014 requires education providers to adhere to the legal framework in place for education and training. However, the framework in place does not directly link to the profession but rather provides the minimum requirement on the levels of education. The National Science and Information Technology Policy for Tanzania (1996:33) states that one of the sectorial objectives is to ensure the availability of adequate and appropriate science and technology teaching and learning equipment, along with competent instructors. However, it was established that this policy was not effectively carried out.

The findings of the document review further established that Tanzania's National ICT Policy 2016 does emphasise digital competencies integration in the curriculum. The policy states that the government is committed to integrating ICT into the education sector to improve education quality. The policy also highlights the need to develop digital competencies and the integration of these competencies into the school curriculum to prepare students for the digital age. Additionally, the policy calls for teacher training programmes to help teachers acquire the necessary digital competencies and integrate ICT into their teaching (ICT Policy, 2016).

Findings from the reviewed policy documents indicate that no specific policy document at the national level stipulates the design of the LISc curriculum. The use of ICT in learning is stated generally, but universities are not required to integrate digital skills into the LISc curriculum, which results in each HLI having its standards, as it is up to the universities to maximise from the national policies. To meet the demands of digital skills in the era of technology, national policies must be reviewed to establish a benchmarking criterion for all HLIs to adopt when developing a LISc curriculum.

5.7.2 Digital skills published frameworks

Based on the literature review presented in section 3.7, the findings established in the frameworks align with this study. The IFLA competency framework (2012) is an excellent resource for assessing and developing digital abilities among LISc workers and educators. However, it has certain shortcomings in facilitating the integration of

digital skills into LISc courses to fulfil the needs of the digital age. One flaw is that the framework is too broad and vague and lacks particular recommendations for teaching digital skills successfully. Furthermore, it may not focus on vital soft skills such as communication, critical thinking and problem-solving, all of which are required in the digital age. The ALA framework is better suited for Master's programme management, whereas CILIP focus less on developing technology. Similarly, the UGC model curriculum in India was discovered to be very old and not aligned with current job market needs, indicating the need for modification (Chartered Institute of Library and Information Professionals 2012; University Grants Commission 2001).

From the perspective of Africa, Sibiya's framework acknowledged the significance of digital capabilities, although it does not provide a clear and precise roadmap for attaining them in the LISc profession (Sibiya, 2022). This may make it difficult for practitioners to determine whether digital competencies are necessary and how to incorporate them into work practices. Raju's professional competency index focuses mostly on ICT competencies but does not thoroughly describe how they could be integrated into the LISc curriculum (Raju, 2017).

While these frameworks are essential for coordinating the LISc curriculum, they may not be sufficient to address Tanzania's specific demands. They were created and tested in many situations and may not be thorough enough for the specific skills and foundations required in Tanzania.

5.7.3 Digital competencies contents required

Almost all types of courses suggested in the question were preferred by all respondents to be included in the LISc curricula. However, as shown in Table 5.26, some courses were preferred over others. The findings of the digital skills courses preferred by LISc final-year students, academic staff, LIS employers and LISc graduates provide valuable insights into the digital competencies that should be incorporated into future LISc Bachelor's degree programmes. **Table 5.26** presented on page 157 provides the findings.

Table 5.26: Digital skills courses

Digital skills courses	N=569									
	LISc graduates N=382		LIS employers N=39		LISc academic staff N=13		LISc students N=135		Consolidated total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Computer applications	382	100%	39	39	13	100%	135	100%	**569**	**100%**
Computer maintenance	382	100%	39	39	13	100%	135	100%	**569**	**100%**
Digital library technologies	382	100%	39	39	13	100%	135	100%	**569**	**100%**
Information security	382	100%	39	39	13	100%	135	100%	**569**	**100%**
Web design	382	100%	39	39	13	100%	135	100%	**569**	**100%**
Internet applications	382	100%	39	39	13	100%	117	86.70%	**551**	**96.84%**
Multimedia	382	100%	30	30%	12	92.30%	117	86.70%	**541**	**95.08%**
Social and ethical issues in computing	382	100%	27	27%	11	84.60%	117	86.70%	**537**	**94.38%**
Operating systems	382	100%	32	32%	13	100%	128	94.80%	**555**	**97.54%**
Graphics design	382	100%	30	30%	12	92.00%	127	94.10%	**551**	**96.84%**
IT project management	382	100%	18	18%	13	100%	125	92.60%	**538**	**94.55%**
Computer security	382	100%	32	32%	13	100%	102	75.60%	**529**	**92.97%**
Network management and administration	382	100%	25	25%	13	100%	98	72.60%	**518**	**91.04%**
Mobile computing	312	74.10%	10	10%	11	84.60%	135	100%	**468**	**82.25%**
Systems analysis and design	312	74.10%	11	11%	12	92.30%	108	80%	**443**	**77.86%**
Open-source software	290	68.90%	29	29%	13	100%	124	91.90%	**456**	**80.14%**
Database systems	312	74.10%	11	11%	13	100%	98	72.60%	**434**	**76.27%**
Data mining	312	74.10%	26	26%	10	76.90%	100	74.10%	**448**	**78.73%**
Systems architecture	290	68.90%	14	14%	13	100%	82	60.70%	**399**	**70.12%**
Artificial intelligence	12	2.90%	10	10%	7	53.80%	117	86.70%	**146**	**25.66%**

Digital skills courses	N=569									
	LISc graduates N=382		LIS employers N=39		LISc academic staff N=13		LISc students N=135		Consolidated total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Principles of programming	11	2.60%	5	5%	8	61.50%	35	25.90%	**59**	**10.37%**
Data structure and algorithms	4	1.00%	5	5%	12	92.30%	0	0%	**21**	**3.69%**
Cryptology and coding theory	4	1.00%	0	0%	0	0%	0	0%	**4**	**0.70%**

Source: Field Data (2023)

Based on the findings in Table 5.26, computer applications, computer maintenance, digital library technologies, information security and web design are the top recommended courses for LISc students. These courses likely focus on fundamental ICT skills essential for LIS professionals in today's digital age.

Regarding more specialised ICT courses, mobile computing, systems analysis and design, open-source software deployment and database systems are recommended by LISc stakeholders. These courses likely focus on more advanced ICT skills that are needed for specific areas of the LISc job market. It is important to note that while some courses in artificial intelligence, principles of programming, data structure and algorithms and cryptology and coding theory are recommended, they are not as highly recommended as other courses. This may indicate that LISc graduates may not need a deep understanding of these areas, but a basic understanding of the concepts may be useful.

The findings of the digital skills courses preferred by LISc stakeholders suggest a valuable insight into the digital competencies that should be incorporated into future LISc Bachelor's degree programmes. It is interesting to note that some of the courses are currently offered and it was the anticipation of the researcher to see if they are still required. The findings established that courses, including Computer applications, Digital library technologies, Internet applications and Database systems, were still preferred.

5.7.4 Curriculum development and implementation strategies

The ADRs provided insightful suggestions on constructing and implementing a curriculum that would equip LISc graduates with the required knowledge and skills for success. **Figure 5.4** displays most content participants shared regarding curriculum development and implementation strategies. The size variation reflects the frequency with which a word has been mentioned by participants. The words that appear in large size are those mentioned most often by participants, while those with small size were less mentioned by participant.

Figure 5.4: Curriculum development and implementation strategies

Source: Field Data (2023)

Participant **ADR-04** pointed that:

> *The availability of qualified employees and IT infrastructure should be treated as a long-term investment rather than a short-term expense. Having competent human and ICT infrastructure on board, we can increase competent graduates; There is a need to upgrade the teaching methodology could be very beneficial.; continues, revising LISc Bachelor's degree curricula is essential for fostering a more inclusive and engaging learning environment; there is a need for establishing a standardised framework that guides the homogeneity of the LISc programme's HLIs competencies are also essential and LISc schools must proactively engage with the LISc job market and other stakeholders.*

ADR-04 also pointed that; *there is a need for establishing an advisory board as The advisory board can play a significant role in ensuring that the LISc the curriculum is up-to-date and reflects the current digital skills needs of the LISc job market; I also suggest developing a model or framework to guide curriculum developers on aligning digital competencies in LISc curricula is another way to overcome the challenges of LISc curriculum development faced by HLIs in developing countries.*

Participant **ADR-02** pointed that:

HLIs that provide the LISc Bachelor's degree programme should standardise the course curriculum; The should be adequate availability of trained employees and ICT infrastructure for the efficient implementation of the programme as Without these resources, students may be unable to fully engage in the programme and learn the necessary skills to thrive in the workforce; there is a need for a model or framework for curriculum development based on an in-depth analysis of the digital skills needs of the LISc job market and the latest digital trends and technologies; this will assist HLIs in developing a competent curriculum.

ADR-02 also pointed that; *there should be a continuing professional development (CPD) programme for LISc academic staff, which will support the integration of digital competencies into the curriculum and provide students with the necessary digital skills for the modern work environment is essential.*

Participant **ADR-03** pointed that:

The LISc programme needs to be regularly revised; I also believe that for our students to be competent as students in other programmes, there should be accreditation bodies such as the National Board of Accountants and Auditors for the accountants and auditors; the university should also consider issues such as the programme's size and the academic staff's areas of speciality; Students must have a comprehensive understanding of not only LISc but also computer science, data science and other related disciplines in order to better prepare them for a modern workplace environment and working facilities.

ADR-03 further pointed that; *A model or framework for digital skills integration in the curriculum is essential; a balanced approach to combining knowledge based education with hands-on digital competencies is also crucial and Investing in ICT facilities and providing continuing professional development programmes for LISc academic staff are other ways to overcome the challenges hindering LIS development and growth in relation to the current digital trends.*

Participant **ADR-05** pointed that:

I feel that the teaching approach is one of the most important variables determining a LISc programme's success or failure. Employing various teaching strategies and methods and being willing to change and develop over time is essential; the programme should include a multidisciplinary approach similar to the one now offered, but it should be considered that the interdisciplinary the approach should not detract from the programme's central theme and there should be adequate Human resources and ICT infrastructure.

Participant **ADR-01** pointed that:

It is essential to ensure the availability of qualified employees and appropriate IT infrastructure; I believe that there is potential for improvement in the current Curriculum; some of the coursework is overly theoretical and does not adequately prepare students for the difficulties of the new workplace. I want to see more possibilities for hands-on learning and a greater emphasis on the skills in demand in the current job market; Pedagogical practices should also be improved in a way that it should be a flexible and adaptable instructional strategy that may be customised to facilitate the integration of hands-on skills for students and additionally, reviewing national education policies can help to overcome the challenges of LISc curriculum development.

5.7.4.1 Assessment instruments

LISc academic staff, LISc graduates and LIS employers from the job market and LISc final-year student's respondents were asked to recommend the assessment approach that can be adopted to ensure theories and practices are well covered. Their responses are presented in **Table 5.27** on page 162 below.

Table 5.27: Assessment instruments

Responses on the preference of assessment approach	N=569									
	LISc graduates N=382		LIS employers N=39		LISc academic staff N=13		LISc students N=135		Cumulative total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Classroom work (50%), Laboratory work (30%), Student's, project/Case studies (10%), Field training (10%)	287	75.13%	39	100%	7	53.84%	74	54.8%	**407**	**71.5%**
Classroom work (60%), Laboratory work (20%), Student's project/Case studies (10%), Field training (10%)	49	12.82%	0	0.0%	2	15.38%	39	28.8%	**90**	**15.8%**
Classroom work (40%), Laboratory work (30%), Student's, project/Case studies (15%), Field training (15%)	37	9.68%	0	0.0%	3	23%	9	6.66%	**49**	**8.6%**
Classroom work (40%), Laboratory work (25%), Student's project/Case studies (20%), Field training (15%)	9	2.35%	0	0.0%	1	7.69%	13	9.62%	**23**	**4.04%**

Source: Field Data (2023)

Based on the study's findings, the preferred assessment method for digital skill courses in the curriculum for LISc graduate students, LISc academic staff and LISc final-year students are classroom work, accounting for 50% of the assessment. The second most preferred assessment method is laboratory work, accounting for 30% of the assessment,

followed by student's project/case studies, accounting for 10% of the assessment and field training, accounting for 10%. The least preferred method of assessment is class-room work accounting for 40% of the assessment, followed by laboratory work, accounting for 25% of the assessment; student's project/case studies accounting for 20% of the assessment; and field training, accounting for 15% of the assessment. The, 23 (4.04%) of the participants preferred this assessment method.

These findings suggest that most participants prefer a combination of classroom work and laboratory work for the assessment of digital skill courses in the curriculum. This finding could be due to the practical nature of digital skills and the need for hands-on experience in a controlled environment such as a computer laboratory. Including student project/case studies and field training in the assessment method is also valued, but to a lesser extent, indicating that practical experience and real-world application are essential in assessing digital skills.

5.7.4.2 Assessment of practical courses

LISc academic staff, employers, graduates and final year students were asked to recommend assessment of practical courses. **Table 5.28** presents the findings obtained through a questionnaire.

Table 5.28: Assessment approach

Responses on assessment preference in practical courses	N=569									
	LISc graduates N=382		LIS employers N=39		LISc academic staff N=13		LISc students N=135		Cumulative total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Theory and practical examination	382	100%	39	100%	6	46%	84	62.7%	**511**	**89.80%**
Practical semester examination	0	0.0%	0	0.0%	7	54%	51	37.8%	**58**	**10.19%**
Theory examination	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**0**	**0.0%**

Source: Field Data (2023)

Based on the findings of the study, it appears that the recommended method of assessment for practical courses among LISc graduate students, LISc academic staff and LISc final-year students is a combination of theory and practical examination, with 511 (89.80%) of participants preferring this approach. The second most preferred assessment method is a practical semester examination, with 58 (10.19%) participants choosing this approach. This suggests that a significant number of participants value the opportunity to demonstrate their practical skills in a formal examination setting. This indicates that most participants value integrating theoretical and practical knowledge in their assessments rather than focusing solely on theoretical knowledge.

5.7.4.3 Education delivery approach

LIS professionals were required to indicate the best approach for delivering LISc education. Based on the findings in Table 5.29, it appears that the preferred method of learning for LISc graduate students, final-year students and academic staff is face-to-face learning, with 365 (64%) participants preferring this approach. The second most preferred method is blended learning, with 186 (32.68%) participants choosing this approach. The least preferred method was distance learning, with only 18 (3.16%) participants choosing this approach. These findings suggest that traditional learning (in class) is still the preferred method for many in the LISc job market, but blended and distance learning are also valued by some participants. It is important to consider learners' needs and preferences when determining the best approach to education in the LISc job market. **Table 5.29** depicts the results.

Table 5.29: Education delivery approach

Education delivery approach	N=569									
	LISc graduates N=382		LIS employers N=39		LISc academic staff N=13		LISc students N=135		Cumulative total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Traditional learning (in class)	224	58.63%	20	51.28%	10	76.92%	111	82.22%	**365**	**64.14%**
Blended learning	151	39.52%	11	28.20%	3	23%	21	15.55%	**186**	**32.68%**

Education delivery approach	N=569									
	LISc graduates N=382		LIS employers N=39		LISc academic staff N=13		LISc students N=135		Cumulative total	
	Fq.	%	Fq.	%	Fq.	%	Fq.	%	Fq.	%
Distance learning	7	1.83%	8	20.51%	0	0.0%	3	2.22%	**18**	**3.16%**

Source: Field Data (2023)

5.8 Summary of chapter five

The study found that the current LISc Bachelor's degree programmes in Tanzania are outdated and not producing competent graduates. Employers highly recommend digital competencies, but academic staff capacity is low, especially for those teaching digital skills competencies. It was found that there are procedures involved in curriculum development but no established institutional policies governing curriculum development specifically for digital competencies in the LISc programme. Lack of professional involvement, learning resources and academic staff are the main challenges faced by HLIs in Tanzania when developing the LISc curriculum. ADRs recommend strategies such as engaging with the LISc job market, collaborating with policymakers and investing in modern ICT to solve the challenges. The study recommends re-evaluating and standardising the LISc curriculum, developing a framework, ensuring enhancement of teaching methodology and investing in ICT infrastructure and manpower for effective development and implementation of LISc curricula that align with the needs of the digital age.

Chapter Six provides the interpretations and discussions of the findings presented in this chapter, aligning with literature and conceptual underpinning to support or reject the findings.

CHAPTER SIX

INTERPRETATIONS AND DISCUSSIONS OF THE RESEARCH FINDINGS

6.1 Introduction

Chapter Five presented and analysed the research findings consistent with the study's objectives outlined in Chapter One, section 1.4.1. This chapter further discusses the results to provide a comprehensive understanding of the LISc education in Tanzania and related competencies and skills required for the digital age. The researcher's reflection is also proffered in this chapter due to pluralism, an ontological perspective of mixed methods research rooted in multiple realities and interpretations. Integrating multiple research approaches into a single investigation results in a well-focused study and enhances robust findings. Creswell and Creswell (2018:324) and Perry (2012:30) opine that the discussion and interpretation of results complete the jigsaw puzzle to address the research problem at hand, enabling readers to grasp research findings and comprehend them in the light of the broader disciplinary and related context. The discussion of the findings was organised in line with the five research objectives of the study.

This chapter is organised into sections and sub-sections derived from the objectives and research questions. **Table 6.1** presents the layout of the sections and sub-sections with the headings and sub-headings under which the study findings are discussed. In the course of the discussion of the findings for this study, confidentiality and anonymity was maintained through using the assigned code numbers and pseudonyms to participants, curriculum reviewed and HLIs involved in this study.

Table 6.1: Layout of the discussion of findings

The layout of the discussion of the findings	
Main section	**Sub-sections**
6.2: Library and Information Science curriculum	6.2.1 Profile of Library and Information Science Bachelor's degree programmes 6.2.2 Quality control of Library and Information Science education 6.2.3 Coverage of the Library and Information

The layout of the discussion of the findings	
Main section	**Sub-sections**
	Science Bachelor's degree curriculum 6.2.4 Digital competencies covered in Library and Information Science Bachelor's degree curriculum 6.2.5 Relevance of Library and Information Science curriculum content 6.2.6 Information Communication Technology facilities available at High Learning Institutions under study
6.3: Changing Competencies and Skills in Managing Libraries in the Digital Age	6.3.1 Digital competencies required in the Library and Information Services job market 6.3.2 Digital skills preparedness of Library and Information Science graduates
6.4: Academic staff competencies and teaching methodologies	6.4.1 Library and Information Science department academic staff capacity 6.4.2 Preference of teaching methodologies employed in digital skills integration 6.4.3 Requisite competencies for Library and Information Science academic staff
6.5: Concerns on digital competencies integrations in Library and Information Science curriculum	6.5.1 Procedures for identifying desirable content for developing Library and Information Science curriculum 6.5.2 Challenges affecting the development of Library and Information Science curricula in Tanzania
6.6: Digital skills framework for Library and Information Science Bachelor's degree curriculum	6.6.1 National and institutional frameworks governing digital skills integration in the Library and Information Science curriculum 6.6.2 Digital skills published frameworks 6.6.3 Digital competencies contents to be incorporated into the Library and Information Science curriculum 6.6.4 Curriculum development and implementation strategies

Source: Researcher (2023)

6.2 The Library and Information Science curriculum

This study's first objective was to audit the LISc education programme leading to a Bachelor's degree provided by the selected HLIs in Tanzania. This objective was addressed through two research questions, as presented in Chapter One, sections 1.4.2, the first and second research questions were broken down into six sub-sections to

answer the first objective, including; the profile of the LISc Bachelor's degree programme, quality control of LISc education, coverage of the LISc Bachelor's degree curriculum, digital competencies encapsulated in the LISc Bachelor's degree curriculum, the relevance of LISc curricula content and ICT infrastructure to facilitate LISc education.

The rationale of the objective aimed to bring an understanding of the current situation and pattern of the programme since there is a dearth of literature in the context of Tanzania LISc education, but also literature revealed that LISc schools in similarly developing countries are still struggling to ensure that they correspond to the emerging trends of LISc that are associated with the outcome of digital innovations (Raju 2017b:237; Mahlatse, Pienaar & Van Deventer 2018:24). It was then essential to find out if the situation observed in other developing countries is similar or not to the case of Tanzania. The detailed discussion is presented in the following sub-headings.

6.2.1 Profile of Library and Information Science Bachelor's degree programmes

This sub-section discusses the LISc Bachelor's degree programme currently offered at the HLIs under study. The findings of this study, as presented in Chapter Five, section 5.3.1, revealed that the profile of LISc education in Tanzania had similarities and differences among the five selected HLIs that were found to offer Bachelor's degree programmes at the time the study was conducted. The findings established that the first programme in Tanzania was established in 2003, followed by rapid growth a decade later due to increased demand for LIS professionals from schools, HLIs, research organisations and private and public offices within the country. The findings also established that the programmes were similar in duration, which was three years and the majority of the programmes were housed under the Faculty of Social Science, with one found to be under the Faculty of Science and Technology. In addition, most programmes had a similar name incorporating the traditional library and information studies/ management theme.

The study's findings suggest that LISc education in Tanzania is yet to fully customise its programme with the global trends of LISc in the digital age. According to Onyancha and Minishi-Majanja (2017), the evolving nomenclature of LISc programmes has been influenced by world trends and job market demands. Onyancha and Minishi-Majanja

(2017) narrated that the programme was first named librarianship in the early 1930s. However, over time, the nomenclature of programmes has changed to reflect the broader focus of the field, including Library Science/Studies, Library Information Science and Information Science. This trend towards a broader and more inclusive nomenclature reflects the increasing role of LIS professionals in modern society and the recognition that libraries and other information institutions have transformed from traditional libraries to libraries that depend on technology to operate effectively. Nadozie and Igwe (2017:29) recommend using a more modern nomenclature, such as information science, to emphasise the multidisciplinary nature of the information profession and give more visibility to its subsidiaries, such as multimedia technology, library and information management, archives and records management and knowledge management.

However, the study also established that most programmes are housed under social science faculties, which does not corroborate with the study results by Um and Feather (2007:266), which observed decades ago that LISc programmes in the United Kingdom were increasingly housed within technology and computing faculties or schools. The rationale for this trend is related to the growth of technology integration in information management and dissemination. This approach guarantees the availability of competent academic staff, equips students with a comprehensive understanding of the field and prepares them for a wide range of careers in the information sector. Therefore, the findings of this study suggest that although the current LISc education programmes in HLIs are still confined to traditional perceptions, there is a need to break the barrier to align the programme with the trends of the digital age.

6.2.2 Quality control of Library and Information Science education

This sub-section discusses the quality control of the LISc education programme offered at HLIs under study. According to Ocholla, Dorner and Britz (2013), three dominant quality assurance methods are used in the HLIs. These methods include a combination of professional associations and government regulating authorities, a combination of government and universities and only professional organisations (Ocholla, Dorner & Britz 2013:135).

The findings of the current study, as presented in Chapter Five, section 5.3.2, corroborate the opinion of Ocholla, Dorner and Britz (2013) that most respondents indicated that the TCU, the university and the respective department manage the quality of LISc academic programmes. This finding implies a clear understanding of the stakeholders involved in managing the quality of academic programmes, which is essential for ensuring that the programmes meet the required standards. Most respondents indicated that establishing the Tanzania Commission for Universities (TCU) has positively impacted the overall quality of higher education institutions in the country. The TCU has been instrumental in providing guidelines and regulations for universities to follow, which has improved the quality of academic programmes offered in the country.

In addition, the findings established that the LISc profession has an association (Tanzania Library Association); however, the association has not been effective in determining quality standards and the future directions of education in the profession. This study's findings are consistent with those of Ocholla, Dorner and Britz (2013:136), who discovered that most developing-world professional associations are feeble, inefficient and exert little to no control over educational programming. Kaur (2015:11) further argues that accreditation agencies are essential in education because they increase trust from potential employers, boost credibility and foster a culture of quality throughout an education programme in HLI.

According to the study findings, there is a need for Tanzania to strengthen its LISc professional board. There is also a need to put quality control measures that create uniformity in the individual LISc Bachelor's degree programmes offered by the HLIs in Tanzania. The results were comparable to Minishi-Majanja (2009) findings that there is a lack of consistency in the LISc educational programmes in South Africa, as each HLI is responsible for creating its programme, albeit with endorsement from the South African Qualifications Authority. Such weakness observed in the TCU framework highlights the necessity for a professional accreditation body that would aid in establishing standards and frameworks for consistency and coordination within the LISc education system.

6.2.3 Coverage of the Library and Information Science Bachelor's degree curriculum

This sub-section establishes the comprehensiveness of the LISc Bachelor's degree offered at the selected HLIs under study. The findings, presented in section 5.3.3 sub-section 5.3.3.1 to 5.3.3.4 of Chapter Five, indicate that the LISc curricula address a broad range of competencies, including the LISc core competencies, technological competencies, generic competencies and practical skills competencies. Despite a comprehensive coverage of competencies, the examination of the course objectives showed that the curriculum was still confined to the traditional perspectives and practical training components needed to be improved.

Similar findings were observed in a study conducted by Raju (2017), Katuli-Munyoro (2014:167) and Okeji and Mayowa- Adebara (2020), who discovered that LISc curricula encompass a wide range of competencies and skills. The study findings suggested that LISc education has taken a more general approach to the education of LIS professionals, as suggested by Signh and Vorbach (2017:94), who opined that the field of LISc education is currently undergoing an extended period of transformation driven by the swift pace of technological advancements. This finding lends credence to the observations made in the KALIPER Report (2000), which states that LISc education caters to many competencies. These study findings imply that LISc education programmes have moved from the education model specific to a discipline toward a more multidisciplinary education model. The findings agree with the observations made by Raju (2018) that contemporary LISc education has expanded beyond the confines of discipline-specific knowledge. This study's findings also corroborate with Kaur (2015:12), who opines that in this transitional phase of the digital age, successful programmes are those that have and will increase their focus on the broader information landscape while at the same time retaining their traditional library-focused programmes, as a blending of traditional and modern skills is still required especially in developing countries.

A lack of practical elements in digital competencies-related courses was also mentioned as a limitation. This study's findings corroborate with Scanlon (2017), who indicated

that LISc schools needed more practical aspects and computer laboratories to teach digital competencies. Muthu, Sivaraman and Singh's (2015:55) findings suggest that the occurrence of a lack of practical aspects could be associated with a lack of competencies and knowledge capacity among the academic staff teaching those courses, which also confirms the study findings as discussed in section 6.5.2, that lack of adequate and competent LISc academic staff is among the challenges facing HLIs offering LISc programmes in Tanzania.

The findings suggest the need for successful LISc programmes to focus on the broader information landscape while retaining their traditional library-focused programmes, especially in developing countries. Overall, the findings suggest that LISc education programmes must continue evolving and adapting to meet the demands of the digital age.

6.2.4 Digital competencies covered in Library and Information Science Bachelor's degree curriculum

Libraries have evolved from the perspective of traditional management of physical resources and services to an integrated technological management that supports access to resources instantly regardless of time and distance (cheampong & Agyemang 2021). As presented in Chapter Five, section 5.3.4, the study findings discovered that digital skills contents were evident in all the LISc schools' curricula. It was indicated that these contents were moderately incorporated from the basic to some advanced skills; however, each LISc Bachelor's degree curriculum had different levels of digital competencies integration, some with a broader context while others covering only a small portion of digital skills content. Further findings on the content of the digital skills courses reveal that the courses needed to be better structured and much focus should shift from knowledge-based to competencies-based for students to gain more hands-on skills than theoretical skills. Digital competencies found in most of the LISc programmes include; ICT and its applications, Website designing, Database management systems, Automation, Management information systems, Networking and Digital libraries, among other things. The document reviews of the curricula revealed that each curriculum was unique in that the proportion of ICT classes varied from one to the next.

The findings of this study establish that parts of the digital content covered in the LISc curricula matched other findings previously identified by other authors, such as Raju (2017:9), on her established competency index, Ocholla and Bothma (2007:65) and Minishi-Majanja (2007:6), who indicated that ICT was found to be included in LISc programmes and sometimes offered as a specialisation in Moi University, University of Botswana and the University of Pretoria. According to Minishi-Majanja (2007), courses such as Operating systems, Applications software, Hardware and software selection, LANs and intranets, Internet facilities and Internet tools are typically considered essential for LIS practice. Tu and Xu (2018) also identify networking and troubleshooting, ICT, digital library development, data librarian training, data visualisation and digital curatorship as the critical focus of digital competencies in the LISc curriculum to meet the growing needs of the LISc job market. The study's results are also consistent with the findings of Bishop, Cadle and Grubesic (2015:68) as well as Detmering and Sproles (2012:553), who identified emerging areas of knowledge and skills, such as geographic information systems, mobile technologies, electronic data management, data curation, embedded librarianship and library publishing, among others.

The study's findings also established that the integration of digital skills was moderate, with some LISc programmes offering such competencies as elective courses. This suggests that not much has been done, as similar findings were reported by Manda (2006:5), who observed that the integration of ICT into paraprofessional training in Tanzania is limited in both courses and course content, with the majority of ICT courses being offered only as an optional course. A similar observation was made by Kacunguzi and Samuel (2017:716) while assessing Nigerian and Ugandan LISc programmes in meeting the demands of the digital age, where it was established that the LISc programmes offered in the HLIs under study had fewer core ICT courses as compared to elective courses.

Given that most of the HLIs offering LISc bachelor degree programmes were discovered to have included moderate digital skills content and that some of these schools were found to have plans to revise their curricula, Sinclair (2014) suggested that LISc schools should update their programmes to meet the demands of the digital world.

An analysis of advertised LISc jobs by Ocholla and Shongwe (2013:39) found a need for LISc schools to emphasise teaching digital skills, as they found that the jobs advertised between 2009–2012 reflect a need for ICT skills as more library services have become oriented to electronic services. The implication was that digital content in the curriculum should be driven by market and digital age requirements to better prepare students for employment opportunities.

6.2.5 Relevance of Library and Information Science curriculum content

The study sought to establish the relevance of LISc curricula content. As presented in section 5.3.5 in Chapter Five, most ADRs indicated that their curricula were outdated or partially outdated. The findings were consistent with the findings of LISc graduates, LISc final-year students, LISc academic staff, as well as LIS employers.

The study's findings are consistent with a similar study by Lukwale et al. (2013) in Tanzania, who established that the LISc programmes were outdated and needed revision to keep pace with the new emerging needs in the LISc sector. In their study, Ismail and Khan (2021:9) noted that the current LISc curriculum is not effective in meeting job market needs due to a lack of suitable ICT-related content in the curricula. This study's results also corroborate the findings of Raju (2013:254), who found that fifty per cent of LISc schools offer irrelevant courses. Malik and Ameen (2017:307) also discovered that Pakistan provides LISc education with an outdated curriculum emphasising management issues more than ICT-related competencies.

The findings of this study are in accordance with Raju (2017:743) and Sinclair (2014), who suggested that LISc schools should update their programmes to meet the ever-changing demands of the digital world for graduates to be able to fill the new upcoming posts in the LISc job market. These new posts in the LISc work environment show the influence of ICT on emerging knowledge and skills required in the LISc sector (Ocholla & Shongwe 2013:41). This calls for the need for active involvement of all the stakeholders in the LISc sector to create education that meets these new needs. Wolf (2007) confirms that an effective curriculum would result from the effective participation of stakeholders, such as heads of departments, academic staff, employed graduates and employers of graduates. Ensuring that the LISc curriculum includes

courses that enhance the skills and competencies of LISc graduates will increase their efficacy in the LISc workplace. The LISc curriculum must be evaluated for its relevance to enhancing employment competitiveness in the current environment, emphasising developing a workforce that meets the needs of the contemporary LISc work environment.

The study findings suggest that there is a need for the HLIs to update their curricula to align with the current trends in the job market, particularly in terms of incorporating digital competencies. The study highlights the importance of balancing theoretical and practical training to ensure graduates are well-equipped to meet the job market demands. These findings are consistent with the current literature on incorporating digital competencies into LISc curricula and the need to update curricula to align with the current job market trends, including Raju (2015:28) and Craft (2018), who further suggest that LISc schools must infuse digital skills content into their curriculum that can create a graduate who has abilities to create and provide access to digital documents and data. The implication is that digital content should be valued in future LISc curricula as digital competencies have become the backbone for managing and performing library services.

6.2.6 Information Communication Technology facilities available at high learning institutions under study

The study sought to establish the current availability of ICT facilities in the selected HLIs. Section 5.3.6 of Chapter Five highlights that most respondents did not respond positively regarding available facilities. Inadequate resources, such as internet connectivity, computer and library software, printers and scanners, present a significant challenge for HLIs that offer LISc education. This ICT resource shortage negatively impacted students' ability to develop the practical skills and competencies necessary to keep up with the evolving job market.

The findings are consistent with those of Kaur (2015:14) and Abubakar (2021:63), who stated that almost all LISc schools had incorporated the teaching of computer applications into their curricula, but the majority of these schools lack even the most basic facilities, let alone state-of-the-art computer laboratories with sufficient resources

for each student to facilitate practical learning. Similar findings were also revealed by Minishi-Majanja (2004), who pointed out a lack of ICT resources, inadequate power supply, inappropriate software, outdated computer hardware and inadequate internet. The study's findings suggest that a lack of ICT infrastructure can significantly impact students' ability to develop the necessary skills and competencies to meet the changing job market demands. Addressing these challenges will require significant investments in ICT infrastructure and a concerted effort to ensure students can access the necessary resources.

The discussion of objective one focused on the findings of objective one, which aims to examine the LISc Bachelor's degree programmes in terms of scope and content, particularly in incorporating ICT courses. The findings suggest that there has been a significant expansion in the scope and content of LISc programmes, which reflects the global trend in HLIs to realign educational programmes with changes in society and ICT developments. However, a deeper analysis of the course content suggests that LISc programmes have not deviated from the traditional perspective of librarianship, with most programmes still confined to traditional core LISc areas. Therefore, there is a need to redevelop the deep structure of LISc Bachelor's degree programmes to incorporate the trends that are crucial competencies for LISc graduates to survive in the digital age.

The findings suggest that careful planning should be put in place when redeveloping and rethinking LISc programmes for the future, as suggested by Gersick (1991:20) that the outcomes of revolutions cannot be predicated as they may or may not leave a system better off and therefore careful planning can increase the likelihood of success. HLIs should consider incorporating the digital age trends into their LISc Bachelor's degree programmes to broaden their scope and content and align them with international trends. Doing so will ensure that LISc graduates are well-equipped to navigate the challenges of the digital age and contribute to the advancement of the field.

6.3 Changing competencies and skills in managing libraries in the digital age

Raju (2013:163) stated that the advancement of technology had changed the traditional thinking of library services and management beyond recognition, which has significantly impacted the skills, competencies and knowledge of LIS professionals to

perform effectively in the digital age environment. To understand the digital age LISc sector requirements in Tanzania, the study's second objective aimed to determine employers' perception and need for the digital skills that LISc graduates must possess to compete in the LISc job market. Rivikumar and Aro-Gordon (2020:1480) argue that the perspectives and opinions of employers are crucial factors in evaluating the effectiveness of a curriculum. By gathering feedback from employers, academic staff responsible for curriculum development can identify the strengths and weaknesses of the curriculum and develop strategies to address any shortcomings. According to Rivikumar and Aro-Gordon (2020:1480), employers can provide valuable insights into the specific skills and knowledge necessary for students to succeed in the workforce. Minishi-Majanja (2007:10) also affirmed the significance of obtaining input from employers by stating that employers are responsible for anticipating the requirements of LISc graduates and collaborating with LISc educators to modify the curriculum. This objective was addressed under two sub-headings: employer expectations regarding digital competencies and LISc graduates' competencies in the LISc job market. Consultations were conducted with Tanzanian academic, public, special and school library employers and LISc graduates. LISc graduates were used in making a comparison with what they had been taught in class against the demands of employers. The findings were expected to assist in bringing out the current picture of what needed to be done in the LISc Bachelor's degree programmes offered by the selected HLIs under study.

6.3.1 Digital competencies required in the Library and Information Services job market

Raju (2017:739) and Rorissa, Albright and Kawooya (n.d:68) argue that the LIS profession is now technologically driven in the digital age and that using ICT is crucial for the success of any venture. They suggest that any endeavour's success, whether in the private or public sector, is directly tied to the extent to which it can leverage and take advantage of the dynamic changes and developments in ICT. According to Rorissa, Albright and Kawooya (n.d:68) the ability to effectively use ICT can improve efficiency and increase productivity, which is a significant competitive advantage in today's globalised economy. The findings presented in section 5.4.1 sub-sections 5.4.1.1 to 5.4.1.3 of Chapter Five, showed that LIS employers expect graduates to be able to

manage digital information, have the ability in technical skills and advanced digital skills to manage this information effectively, LIS professionals must possess diverse skills to organise, process, evaluate and protect digital information.

When the findings of this study were compared to other studies on the wish list for digital competencies, it was clear that the competencies required by LIS employers in Tanzania were cited in other studies as competencies that are highly necessary for a graduate to be competent in the digital age. This study's findings support those of Khan and Bhatti (2017:573), who discovered that digital competencies for developing and managing digital libraries are divided into two categories: digital competencies for creating and managing digital libraries and digital competencies to protect digital content. The findings of this study also support the findings of Tella, Akande and Bamidele (2018:9), Usman, Agber and Tyoakosu (2016) and Raju (2017:753), who believe that LISc graduates should be competent in basic skills such as the ability to use word processing and spreadsheet software, as these are the most commonly used applications that have replaced paperwork entry in the traditional library management system. The findings of this study also support Makori and Osebe (2016:20) and Raju's (2017:745) argument that LISc graduates should be abreast of development in library systems as the systems provide a secure and efficient platform for managing and supporting information and library services. Their argument implies that knowledge of library systems is essential for the new working environment, as digital devices have enabled libraries to shift services from a traditional perspective to electronic and digital forms. The findings of this study also support the arguments of Biju et al. (2019:4850) regarding the ability to manage and maintain security issues in the digital environment, where he insisted on the importance of employing a variety of preventative approaches, such as transmitting sensitive data, using a firewall, anti-virus software and encryption, among other valuable techniques in preventing cyber-attacks.

The findings of this study also confirm the findings of Boumarafi (2015) and Raju (2017:751), who emphasise those 21st-century LIS professionals are expected to be able to use advanced technology such as digital and metadata and web design technology with fluency in web languages, server setup and computer maintenance and related skills to develop or integrate library services via the web. Similarly, Ayonmike and

Okeke (2016) also support the findings by indicating that it is a must for LIS professionals to be fluent in website design skills, computer security skills, database skills, network management, database creation and management, library automation, systems troubleshooting and maintenance and security issues, among other things.

This study's findings also revealed that, compared to other competencies, most LIS employers did not place a higher value on the ability to use databases and writing software. This finding supports those of Pan et al. (2018:490), who determined that database software proficiency is a specialised skill and that it is unreasonable to expect a graduate to have achieved expert-level proficiency in such a skill upon graduation. However, Raju (2017:751) further stated that LIS professionals need to understand database systems used in library services platforms as new library setups highly depend on the database systems, but also should have programming skills such as mark-up language, extensible style sheet language transformations and mark-up language scheme, Such skills are needed to configure and maintain a variety of services in the library. Graduates of LISc programmes must have database skills. These opinions were also supported by Burke and Maceli (2020:36), who state that LIS professionals should be proficient in programming skills.

The findings of this study confirmed the majority of the digital skills competencies identified in other literature; the implication was that LISc schools in Tanzania were expected to include these digital competencies in the LISc curriculum in accordance with the LIS employers' expectations. The plethora of skills suggested by LIS employers and those found in the literature indicate a paradigm shift in the competencies and skills required of the LIS profession. Because libraries are becoming more digital and the need to develop systems and software applications may arise from time to time, a few weeks devoted to programming skills should be covered in their LISc curriculum because having such skills is valuable not only to the LISc sector that the students will eventually be a part of but also to the student's ability to have broader options of employability.

6.3.2 Digital skills preparedness of Library and Information Science graduates

LIS employers and LISc graduates working in the employment field were requested to indicate the changing competencies required in the digital age. Regarding the findings presented in Chapter Five, section 5.4.2 subsections 5.4.2.1 to 5.4.2.3, LISc graduates who were found to be working in libraries and related centres of information possess a moderate level of digital proficiency. It was discovered that graduates were only proficient in sharing and using digital information, evaluating, processing, organising and storing digital information to facilitate retrieval and use and selecting, searching and retrieving digital information. The study also revealed that LISc graduates could use online collaboration and social networking, cloud computing applications, Microsoft applications such as word processing and presentation software, operating systems, library management software and manage system access.

The study identified several skills that were lacking in proficiency among LISc graduates. These skills include evaluating software applications to assess system performance, preparing flow charts and diagrams using design software such as MS Visio, securing personal information against threats, using project management software such as MS Project to develop work plans, verifying the security of third-party vendors to ensure compliance with security requirements and conducting system security audits. The study also found that many LISc graduates had fair or poor skills in advanced digital skills, such as performing data backups locally and through the cloud, developing library websites, troubleshooting issues, maintaining and upgrading existing systems, designing new computer systems and frameworks, assisting in system development and customisation and writing software code, among others.

The findings of this study concur with those of Ayoku and Okafor (2015:507), who discovered that university librarians are adept at e-mail and word-processing tasks. This research also confirms the findings of a recent survey conducted by Baro et al. (2018:156), which found that academic librarians are aware of search gates to which they can upload and share content. The result is also consistent with the findings of Semode et al. (2017:11), who discovered that librarians rated their skills, such as

interacting with friends and family, searching and navigating social networking sites, as high.

With regard to the lack of advanced digital skills among LISc graduates observed in this study, the findings concur with the findings of Mapulanga (2013:645), who reported that library projects were being implemented slowly due lack of digital competencies of LISc graduates in technical expertise to implement and maintain the projects. Mapulanga (2013:645) further noted that most librarians rated their website development skills as moderate to low. This study's findings concur with those of Ayoku and Okafor (2015:513), who discovered that university librarians need more expertise in database management, web design and web design application knowledge. The findings are also consistent with those of Mansour (2017:86), who discovered that LIS professionals were uncertain about specific competencies, particularly software development and that more than half of the respondents indicated they needed more competencies related to designing and developing a library website.

According to the discussion in the second objective of this study, there is a perceived gap between the skills and competencies required by LISc employing agencies and what LISc education in Tanzania provides. This is comparable to the findings of Kadhila, Shalyefu and Shivoro (2018:229), who asserted a mismatch between the skills employers require and the skills educational institutions provide, causing graduates to be less competitive in the global labour market. The high mismatch between the employer's and the LISc graduates' requirements confirms that the current LISc curricula need more improvement to enhance the desired competencies required in the digital age. Ayinde and Kirkwood (2020) argue that LISc schools are not teaching courses that are relevant to digital competencies, which, in turn, may lead to other ICT-related competitors taking the role of LIS professionals. This could result in losing opportunities for LIS professionals in the job market.

The discussion of the findings on objective two of this study relates to the PET as it highlights the changes in the competencies required for LIS professionals that are yet to be incorporated into the LISc education programme in the respective HLIs. The PET suggests that change occurs rapidly in response to external pressures, followed by

stability until the subsequent external pressure arises (Tushman & Romanelli 1985). The findings of the study indicate that LIS employers in Tanzania and other literature sources are emphasising the need for digital competencies in areas such as creating and managing digital libraries, protecting digital content, using word processing and spreadsheet software, understanding library systems, addressing security issues, using advanced technology such as digital and metadata and web design technology and database skills, among others. These competencies reflect the external pressures created by the shift towards digital libraries and the need to manage digital content and provide electronic and digital forms of library services. The study's recommendation to include programming skills in the LISc curriculum also reflects the need for professionals in the LISc field to adapt to the changing digital landscape. The discussion suggests that the LISc field is shifting towards a greater emphasis on digital competencies, reflecting PET's idea of rapid change in response to external pressures.

Therefore, this suggests that to meet the demands of the current and future library systems, HLIs offering LISc programmes must revise their deeper structure, which includes the core values and beliefs of the programme, as suggested by Tushman and Romanelli (1985:176). The revision will require careful planning and consideration to ensure that the new programme structure adequately prepares graduates to meet the demands of the evolving library landscape.

6.4 Academic staff competencies and teaching methodologies

Xue et al. (2019:28) opine that the quality of LISc education and other education provided in the education systems is determined by the quality of LISc educators. Thus, the third objective of the study aimed to investigate the quality of LISc educators in terms of digital competencies and teaching methodologies of academic staff in Tanzania. To achieve this objective, the study was divided into three sub-headings: LISc department academics capacity, Preference of teaching methodologies employed in digital skills integration and needed competencies for LISc academic staff.

6.4.1 Library and Information Science department academic staff capacity

Bonney, et. al. (2015) stated that a programme's success depends on the academic staff's quality, with the academic staff being carefully selected with suitable professional qualifications and experience. As presented in Chapter Five, sections 5.5.1 and 5.5.2, the findings revealed that the departments need more academic staff with combined LISc and digital skills, as only one HLI was found to have permanent academic staff with the required digital skills because the programme was hosted under the informatics department. However, other HLIs were found to have limited academic staff with digital skills in their respective departments and most of their academic staff were outsourced from other departments. They also involved part-timers to fill in the gaps of the required competencies in the digital skills-related specialisation.

The finding of this study also corroborates with a local study conducted in Tanzania by Citizen (2021) that indicated several universities in Tanzania were suffering from a lack of academic staff, with some experiencing a severe shortage of up to 65%. The findings of this study were also consistent with those of Baro et al. (2019:190), who reported a need for qualified library staff and educators in ICT. Xue et al. (2019:39) also noted that the quality of LISc education is determined by the quality of LISc educators and argued that incompetent academic staff could compromise even if the HLI has a good curriculum.

6.4.2 Preference of teaching methodologies employed in digital skills integration

The preference for teaching methodologies employed in integrating digital skills varies depending on factors such as the type of digital skills being taught, the level of expertise of the target audience and the available resources and budget. Respondents were asked to indicate their preferences for teaching methodologies. The findings of this study, as presented in Chapter Five, section 5.5.3, found that academic staff preferred formal lectures, group work, private study, student presentations, practical tutorials and field visitation/internship attachment. The findings of the LISc academic staff were further corroborated to a large extent with the findings of students who preferred lectures/PowerPoint presentations, group working, field visits, information and case studies, practical exercises and self-study, among other teaching methodologies.

This study's findings confirm the arguments by Rajagopalan (2019), who opine that formal lectures are the best methodology as they provide a structured and organised way for instructors to present information to students. Lectures can cover much material in a relatively short period, allowing instructors to share their expertise and knowledge with a large number of students at once. In addition to providing a way to deliver information, formal lectures can also effectively engage students in critical thinking and analysis. Along the same line, Hew and Lo (2018:11) also corroborate this study's findings that students preferred formal lectures more than any other method of instruction. The findings of this study also established that group work was rated high among academic staff and students. Group work allows integration and discussion between students and academic staff, which is more participatory and supports effective learning. The findings suggest that the group approach allows new ideas and allows everyone to participate actively, making it easy for students to understand and thus enhance learning.

The fact that formal lectures are a highly used approach and recommended by both academic staff and students, the ability to build up hands-on competencies for students becomes narrowed down as the approach does not create opportunities for building competencies rather than just knowledge due to the fact that it does not directly engage students in an active learning experience. The findings suggest a need for academic staff to integrate more than one learning approach with much emphasis on the practical aspect to enhance the digital hands-on competencies of LISc graduates.

This study findings also corroborates with Lihitkar, Naidu and Lihitkar (2013:12) and Xue et al. (2019:54), who discovered that while many LISc programmes in the United States and China have adopted e-learning, some students and academic staff have found it challenging to engage optimally in this online and even blended environment. Distance learning has a negative impact on students, including a sense of isolation, the potential language barriers that can impede effective communication and learning. Moreover, it raises concerns about the high costs associated with internet connectivity, which can be a barrier for students from economically disadvantaged backgrounds.

Due to a lack of proper and adequate infrastructure, academic staff and students in Tanzania did not prefer the online method of delivering education, despite its popularity in the technological world and some parts of developing countries (Sadeghi 2019; Urokova 2020). However, Minishi-Majanja (2012:23) emphasises that academic staff should be encouraged to use eLearning educational platforms and resources/systems, such as Skype, Twitter, Moodle, YouTube, and Google Docs, concurrently with the old delivery methods to enhance learning. Raju (2015:24) and Minishi-Majanja (2020), also asserts that the adoption of eLearning methods if properly managed is beneficial for enhancing the quality of teaching within the field of LISc, due to its flexibility, accessibility and interactive online resources in enriching the learning experience for students and preparing them for the digital demands of modern LIS roles.

6.4.3 Requisite competencies for Library and Information Science academic staff

Notably, much of the revealed literature has focused on students, not educators, thus seemingly underplaying the perspective of the teachers and the teaching. A gap in the literature was also identified, particularly in Tanzania, where the researcher found few studies on the required LISc academic staff skills. Compared to other HLIs, which provide education for trainers, there is no education for trainers meant to educate LISc educators. As presented in section 5.5.4 in Chapter Five, the findings revealed several competencies required for LISc educators, including digital competencies, subject knowledge and skills, generic skills and digital instructional skills and methods. To a large extent, the competencies identified by respondents match the competencies recommended by Smith, Hallam and Ghosh (2012) and Breen (2018).

The findings also revealed that each of the five HLIs had a training plan for staff skill enhancement, including internal or external workshops, conferences, seminars, professional courses, industrial attachments and long-term training programmes that lead to a degree. Nonetheless, ADR findings reveal that implementing such training heavily depends on the availability of funds. The study's findings also corroborate those of Minishi-Majanja (2020:323) and King (2018), who found that workshops and seminars are predictably the most prevalent and preferred means of keeping up to date with e-teaching, followed by custom-directed CPD programmes and personal efforts/research.

The discussion on the third objective of this study highlights a need for qualified LIS professionals and educators in ICT. Thus, the study suggested that the quality of LISc educators determines the quality of LISc education and highlights the importance of competent academic staff to ensure the success of a programme, despite having a good curriculum. This opinion was also emphasised in the Wolf 2007 curriculum development model that the importance of the quality of academic staff is directly related to a programme's success (Wolf, 2007). The study's findings also confirm the theory of Punctuated Equilibrium Theory, which aligns with the suggestions that the traditional, old delivery teaching methods should not be discarded but instead punctuated by new and innovative learning approaches, such as the use of digital platforms and resources. This abrupt shift is necessary to enhance the digital hands-on competencies of LISc graduates and improve the quality of education provided. Additionally, the theory emphasises that the abrupt shift should be followed by periods of stability, allowing for the new learning approaches to be integrated effectively into the curriculum (Tushman & Romanelli 1985).

6.5 Concern on digital competencies integrations in Library and Information Science curriculum

The fourth objective of the study was to identify challenges that affect the development of LISc curricula in Tanzania. It was important for this study to discuss the difficulties that academics faced when incorporating digital competencies into the LISc curriculum in order to identify strategies to overcome these challenges. In most cases, the challenges arising from the curriculum usually negatively impact the digital output of the graduates. This objective was addressed through two sub-headings: Procedures involved in developing LISc curricula and Challenges hindering curriculum development in Tanzania.

6.5.1 Procedures for identifying desirable content for developing Library and Information Science curriculum

Raju (2015) suggests that LISc schools must infuse content on digital competencies into their curriculum to meet the needs of the digital environment, as it was discovered that these contents needed to be improved in most LISc schools. In the case of Tanzania, it

was essential to investigate which procedures LISc educators employ in aligning their curriculum during the development process. The findings, as presented in section 5.6.1, Chapter Five, revealed that participants had varied opinions on the procedures they employed in identifying desirable content for the LISc curriculum that aligns with the trends of the digital age. They acknowledged that the procedures used in curriculum development include conducting research or performing situational analysis, which most respondents said is critical in identifying emerging digital trends and developing relevant content for the LISc curriculum. While research is a critical component of the process, as stated by all respondents, most ADRs also pointed out other factors such as collaboration, consultation with LISc job market professionals and research on international trends.

This study's findings corroborated Zagerman, (2022) who claim that research is a foundation for developing a sound curriculum. The findings also corroborated with the ALA standards for Master's degree programme accreditation (2008) and the IFLA guidelines for educational programmes (2012), emphasising academic staff interaction with other disciplines and close liaison within the field during the development process to fine-tuned curricula. Wolf (2007) also confirms the study's findings by identifying HoDs, academic staff, employed graduates and graduate employers as critical stakeholders to include in the curriculum development process. Wolf (2007) supported the current study's findings by stating that articulating these stakeholders was essential in curriculum development. Collaboration among scholars ensures that the appropriate stakeholders address global perspectives and challenges on time. Furthermore, it was stressed that collaboration could aid in benchmarking with LISc schools already with sustainable and relevant digital competencies content (Wolski & Richardson 2014).

Although the procedures involved are relevant and recommended by other scholars and professional boards of LISc, the findings, as discussed in objectives one and two, show that there is still a mismatch between users' demands and what is found and taught in the current curricula. Furthermore, those procedures involved are not helping the HLIs to move forward with the trends of the digital age. Muthu, Sivaraman and Singh (2015:59) and Mbagwu, Okoye and Anyanwu (2018) suggest that LISc schools should consider that their curricula should align with the digital age, as the LISc graduates are

required to be conversant, knowledgeable and skilled in the digital age. This study confirmed these findings as it was discovered that LISc programmes offered in Tanzania must be revised to align with the job market's needs.

6.5.2 Challenges affecting the development of Library and Information Science curricula in Tanzania

The findings of the study, as presented in section 5.6.2 in Chapter Five, revealed a number of challenges that face LISc education development in Tanzania, including lack of professional board involvement, inadequate academic staff, lack of standard guidelines in developing LISc curricula, lack of proper consultation with the LIS professionals in the field, learning approach, top-down management approach, the gap between national education policies, bureaucratic procedures on curricula revisioning and development and absence of an explicit model or framework as well as ICT facilities.

The study's findings corroborate with those of Atiku and Boateng (2020:11), who opine that the effective involvement of stakeholders in the respective discipline in the curriculum review process would go a long in bridging the gap between the LISc job market and HLIs. Atiku and Boateng (2020) further opine that stakeholders' consultation views will assist HLIs in aligning curricula that match the requirement and reality in the present job market. Atiku and Boateng (2020) further emphasise that academic staff members, as the main pillar toward delivering education, should also be involved in all stages of developing and refining the curriculum. Barman and Das (2020:1919) further concur by indicating that stakeholders and HLIs coming together in curriculum development and alignment can result in competitive curricula that meet the market needs.

Baro et al. (2019:190) and Mulauzi and Njobvu (2018:225) further confirm the study's findings by arguing that the shortage of skilled ICT educators is one of the challenges librarians encounter in acquiring digital literacy skills. Baylor and Ritchie (2002:398) also support this by stating that no matter how much technology is available or how advanced it is, it will only be used if the academic staff are well-skilled and trained. The arguments suggest that for an innovation to be successfully implemented by prospective students, the essential need to build competencies for facilitators must first be made

available. Their views further indicate that the efficiency and value of LISc education programmes primarily depend on the level of knowledge and accessibility of those LISc academic staff. The lack of available skills and the inadequate number of available skills hurt the LISc education system's quality, quantity, community engagement and research output. Fung (2017) has further advocated that HLIs must focus more on advancing the academic staff and curricula to improve students' occupational attributes.

Abubakar and Abbas (2014) argue that effective learning can only occur with adequate facilities and an enabling environment. It is paramount to note that the traditional teaching mode in our library schools today cannot withstand modern trends as computers and other ICT facilities are needed to train prospective LISc graduates. Regrettably, the number of computers in the ICT laboratories in Tanzania's HLIs needs to cater for the teeming population of students. As corroboratively opined in the study by Baro et al. (2019:190), more ICT facilities are needed to acquire digital literacy skills. A lack of conducive information and communication technology infrastructure hinders the effective implementation of courses that require students to experience more practical learning than theoretical lectures because students need to be able to independently perform activities as part of practical learning on a computer device to grasp the concepts underlying ICT.

The study's findings also corroborated the report by Citizen (2022), which pointed out a need to revise the education system from a knowledge-based approach to a competency-based approach. Ismail and Khan (2021:11) also state that balancing the theory and practice of LISc curricula is essential. The findings suggest that HLI education can be revised to be an outcome-based or competency-based approach that will provide more hands-on skills to graduates, which are the most needed. Findings also established a need for a policy or framework that guides HLIs in integrating digital competencies into the curricula and the rigorous bureaucratic process involved in curriculum reviews or reforms. Stukalo and Simakhova (2020) emphasise that policy or frameworks are guides that direct how the education system functions; provide the ability to control changes and what can and cannot be done within the education system. A relatively minor finding was the issue of the availability of funds and time for developing and reviewing curricula. The results confirm Muthu, Sivaraman and Singh (2015:59), who indicated

that the financial resources available in HLIs are insufficient to support teaching, learning, research, infrastructure investments, human capital development and efficient operations. The availability of sufficient financial resources is necessary to deliver the LISc curriculum. Minishi-Majanja (2004) also pointed out that the rapidly changing nature of information and communication technology necessitates consistent funding.

6.6 Digital skills framework for Library and Information Science Bachelor's degree curriculum

The fifth objective of the study focused on proposing a curriculum model for a Bachelor's degree in LISc that is responsive to the needs of the digital age in Tanzania. The objective was addressed through three sub-sections, each of which played a critical role in achieving the overarching goal. The first sub-section addressed the national and institutional policies governing Tanzania's curriculum development. The second sub-section focused on published digital literacy competencies and the third and final sub-section involved proposing digital competencies contents to be incorporated into the LISc curriculum. It was important for this study to discuss the national and international policies in place and the published digital skills framework in the LISc job market to identify gaps and strategies that can support developing and implementing the LISc curriculum for the future.

6.6.1 National and institutional frameworks governing digital skills integration in the Library and Information Science curriculum

ADRs were tasked to indicate the institutional frameworks governing digital skills integration in the LISc curriculum, but also national policies were analysed to assess if they provide guidelines in developing curricula to the needs of the digital age. As presented in Chapter Five, section 5.7.1, the findings established that HLIs needed a specific model or framework at the institutional level to align LISc programmes with digital competencies content. This study's findings suggested that there needed to be a structured approach in place to ensure that the content taught in LISc programmes was in line with the digital competencies requirements of the job market.

The study's findings underscore the need for HLIs to establish a more structured approach to aligning LISc programmes with digital competencies content, as Wolf (2007) suggested. Wolf (2007) emphasises the importance of using a model or framework for curriculum development as it provides a structured approach. A framework or model can support LISc academic staff in guiding through the steps involved in developing a curriculum, including identifying the needs of the learners, determining the learning outcomes, selecting appropriate teaching and learning strategies and evaluating the effectiveness of the curriculum, but also ensures that the curriculum is systematic, coherent and meets the needs of the learners and the job market. Tammaro (2015:171) further added that having a control organ for a profession acts as a quality control tool, ensuring the legitimacy and recognition of LISc qualifications and encouraging excellence by employing external assessors to ensure programme quality and relevance. Raju (2017) said that standardised operating frameworks make qualification permeability and student mobility across different programmes more accessible. As a country, it is critical to have a standard procedure and framework to define and distinguish the LISc profession from other information-related disciplines and define core knowledge and skills. The findings indicate the need for a framework to support graduate standards and quality control.

Based on the LISc curricula document review, all were accredited by the TCU. These findings were consistent with the interview findings, which established that the LISc programme, like other programmes offered in HLIs, was certified by the TCU, which provides minimum benchmarks for all programmes offered at HLIs. The study also found that universities have the autonomy to go beyond the minimum benchmarks established by TCU and develop their curriculum, which TCU must accredit before being put into use. The findings also established that curricula must be aligned with the Tanzania education and training policy established in 2014.

Learning digital skills in schools for a society to be digitally literate has been generally stated in national policies such as the Tanzania National ICT Policy 2016, Standards and Guidelines for University Education in Tanzania, Education and Training Policy 2014 and National Science and Information Technology Policy 1996, as well as Tanzania National Qualification Framework. National policies put pressure on digital

skills integration for the digital age requirements. However, adopting such policies highly depends on how HLIs adopt and integrate the goals into their curricula. The findings obtained from the review of national policies pertaining to the development of LISc curricula in the universities of Tanzania revealed a gap. Most of the policies were outdated, but also there needed to be a specific national policy that provided guidelines for aligning digital skills integration in HLI programmes, particularly programmes that demand high digital skills, such as LISc. This result of the gaps in the national policies was evident in the LISc curricula reviewed as they were inconsistent because each HLI transcribed the national policies based on their objective and capacity.

The findings indicate that there may be a perceived need for a revision of national policies to assist in establishing standards for the quality of digital competencies that LISc education programmes should impact. According to Tammaro (2015:171), having a control organ for a profession will serve as a quality control tool that ensures the legitimacy and recognition of LISc qualifications. Additionally, having a control organ for a profession will encourage excellence by employing external assessors to ensure that LISc programmes are high quality and relevant.

6.6.2 Digital skills published frameworks

The findings, as presented in Chapter Five, section 5.7.2, revealed a series of digital skills and competencies models that are being promoted (University Grants Commission 2001; Smith, Hallam & Ghosh 2012; Chartered Institute of Library and Information Professionals 2012; American Library Association 2015; Sibiya 2022). Most of the published frameworks were found to have incorporated content on digital skills; however, the level of integration could not be found among the frameworks. The review of digital literacy models provides valuable insights into the skills and competencies being promoted in the field. However, it also highlights the need to broaden the perspective and consider a more balanced approach that prioritises all necessary skills and competencies as the frameworks are mainly based on basics and orientation on technical and advanced digital skills was minimum. The frameworks almost exclusively favoured conceptual and non-task-specific aspects, but also, all frameworks were developed in a different context (the majority being developed countries) other than Tanzania. These findings suggest the need for a digital skills framework in Tanzania

that LISc HLIs can apply to develop LIS professionals' competencies to the digital age requirement. This framework could guide the integration of digital skills in the LISc Bachelor's degree programmes and ensure that LIS professionals are adequately equipped with the necessary digital skills to meet the demands of the digital age.

6.6.3 Digital competencies contents to be incorporated into the Library and Information Science curriculum

The library landscape is transforming alongside the digital age trends, leading to new activities that necessitate a fresh set of digital competencies for LIS professionals to stay competitive and up-to-date. This study discovered that the future LISc curriculum should incorporate digital content outlined in Chapter Five, section 5.7.3, including courses on computer applications, digital library technologies, web design, multimedia, information security, artificial intelligence, and others. These findings align with the results from the objective of determining the required digital skills in the LISc marketplace. However, most of the recommended digital skills courses were absent from the current LISc curricula examined and even the few covered were typically optional.

The study's findings are consistent with Raju (2020:351) as cited in Raju's (2017b:9) competency index, which outlines the critical skills similar to the proposed courses to be included in future LISc curricula. Therefore, the study's findings and the literature call for revising the LISc curriculum to meet the needs of the digital age LISc job market. LISc schools should integrate digital competencies into their core courses to equip LIS professionals with the skills required for the changing workplace. This revision would ensure that LIS professionals remain relevant and competitive in the rapidly changing digital landscape.

The discussion on the study relates to PET. The PET suggests that change occurs rapidly in response to external pressures, followed by stability until the subsequent external pressure arises (Tushman & Romanelli 1985). Based on the theory, the external pressure is the changes in technology which result in a need for newer competencies as established in this study, as well as literature including but limited to;—creating and managing digital libraries, protecting digital content, using word processing and spreadsheet software, understanding library systems, addressing security issues, using

advanced technology such as digital and metadata and web design technology and database skills, among others. These competencies reflect the external pressures created by the shift towards digital libraries and the need to manage digital content and provide electronic and digital forms of library services. The study's recommendation to include programming skills in the LISc curriculum also reflects the need for professionals in the LISc field to adapt to the changing digital landscape. Overall, the discussion suggests that the LISc field is undergoing a paradigm shift towards greater emphasis on digital competencies, reflecting the Punctuated Equilibrium Theory's idea of change occurring rapidly in response to external pressures.

Thus, to meet the demands of the current and future library systems, LISc schools must revise their deeper structure, which includes the core values and beliefs of the programme, as suggested by Tushman and Romanelli (1985:176). The revision will require careful planning and consideration to ensure that the new programme structure adequately prepares graduates to meet the demands of the evolving library landscape. In summary, the study emphasises the need for LISc programmes to keep up with the latest trends and equip graduates with the necessary skills to succeed in the digital age.

6.6.4 Curriculum development and implementation strategies

As presented in Chapter Five, section 5.7.4, the findings revealed that a significant proportion of respondents acknowledged the necessity to re-evaluate the current Bachelor's degree programmes in Tanzania's HLIs. On the other hand, most respondents also supported standardising all courses so that all HLIs had a uniform LISc curriculum and ensuring that the LISc curriculum encompasses diverse competency areas. Participants underlined the necessity for a curriculum that balances theories and practical parts of LISc, digital skills and generic skills. Respondents also stressed the significance of guaranteeing the availability of qualified personnel and ICT infrastructure and advocated for improving teaching methodology. Similarly, interview findings established a number of strategies, including proactivity in engaging with the LISc job market, collaboration with policymakers and organisations, setting an advisory board, developing a model or framework, investing in modern ICT, reviewing national education policies, providing continuing professional development programmes

for LISc academic staff to prioritise research in the field, and ongoing curriculum review, among others.

The present study's results are in agreement with this prior research in the field. Minishi-Majanja (2007:6) noted that LISc programmes should enhance their practical training components. In addition, Minishi-Majanja and Ocholla (2004:195) contend that incorporating both practical and theoretical instruction in the curriculum is an effective method for facilitating the integration of ICT. Craft (2018) and Mulauzi and Njobvu (2018:225) argue that employing qualified instructors and purchasing updated infrastructure to support LISc digital competencies education is necessary. Moreover, Minishi-Majanja (2007:11) proposed the utilisation of distance education and/or online learning as a solution to address the challenge of inadequate or insufficient teaching staff, given the accessibility of ICT resources.

The present study emphasised the importance of involving stakeholders and ensuring their opinions are gathered in developing LISc digital competencies curricula. Additionally, Wolski and Richardson (2014) assert that collaboration between LIS professionals and related fields is crucial for knowledge and skills transfer. Wolf (2007) recommends that LISc academic collaboration with practitioners when developing the curriculum is important as practitioners better understand what content should be included in the curriculum. Thus, the present study's findings support Wolf's (2007) suggestion that LISc academics should consult with practitioners on digital competencies integration to ensure graduates possess the relevant skills and knowledge necessary for a digital environment. The study's findings are closely related to Wolf's (2007) CDM, which emphasises the importance of collaboration between LISc academics and practitioners in developing curricula. The study's results suggest that a curriculum that balances theories and practical parts of LISc, digital skills and generic skills is necessary.

Raju (2015) and Mulauzi and Njobvu (2018:225) also corroborate the strategies proposed by a majority of ADRs that a need for curriculum review is important to be done frequently. In this way, frequent integration of digital competencies in the curricula will result in closing the gap of competencies required in the market. The study also established a necessity to establish an advisory board. According to Refae et

al. (2016) and Taylor and Calitz (2019), there are numerous benefits of advisory boards, including offering guidance on academic matters, serving as a valuable resource for curriculum development, monitoring graduate performance and curriculum effectiveness, keeping HLIs informed of LISc job market trends and requirements and helping academic departments to meet accreditation standards. The study findings also align with Wolf's model and PET, which suggest that the curriculum development process is ongoing and iterative, with feedback and input from stakeholders being crucial (Tushman & Romanelli 1985; Wolf 2007).

The study's results lend credence to the argument that the LIS field needs an official accrediting body. Accreditation is a widely used strategy for ensuring the high quality of educational programmes and services and standardising the field. According to Kaur (2015), accreditation is crucial in gaining the trust of potential employers, strengthening an organisation's reputation and fostering a culture of quality throughout the company. A professional accreditation agency like ALA is needed because the TCU's system for approving schools has some problems. TCU grants institutional accreditation; however, some examples were presented in which a university claimed to meet all TCU requirements but did not in practice. Such problems have arisen because Tanzania does not have a national accreditation agency for LISc degree programmes. This is becoming increasingly obvious as new departments are created despite lacking permanent academic staff, adequate facilities and a functioning information technology infrastructure. Establishing professional accreditation boards will aid in guaranteeing high-quality education, developing appropriate standards and directing teachers in the right direction.

The findings also suggest a need for a framework. These findings corroborate those of Refae et al. (2016:42) and Taylor and Calitz (2019), who opined that developing a framework would improve digital skills and ensure institutions and countries adhere to a standard of set competencies. Frameworks are known to provide a number of benefits, some of which include: diverse perspectives and guidance for academic staff members on academic issues; an invaluable source of advice to strengthen and shape curriculum; the ability to monitor graduate performance and the effectiveness of the curriculum; the ability to keep higher education institutions up to date on trends and requirements in the

LISc job market; and, most importantly, the ability to assist academic disciplines in developing their unique contributions to society (Refae et al. 2016; Taylor & Calitz 2019). Having a framework will thus place a significant emphasis on adapting the curriculum that meets the LISc sector's needs in the digital age.

6.7 Summary of chapter six

Chapter Six of this study serves as an interpretation and discussion of the findings presented in Chapter Five. The study uncovered similarities and differences among HLIs regarding LISc program establishment, duration and faculty composition. It emphasised the urgency of aligning the LISc program with global trends and the digital age. While the TCU and HLIs demonstrated efforts to manage program quality, there is a clear need to strengthen the LISc professional board and establish effective quality control measures. The curricula addressed a wide range of competencies but were predominantly rooted in traditional perspectives, underscoring the importance of evolving and adapting the curriculum to meet the demands of the digital age. Although digital skills content was incorporated to varying extents, better structuring and a shift towards competency-based learning are necessary.

The study exposed a significant gap between the digital skills employers expect from LIS graduates and the skills currently provided by LIS education. To bridge this gap, improvements in the LIS curriculum are essential to better align with the digital competencies demanded in the job market. Furthermore, the lack of academic staff possessing combined LISc and digital skills highlights the need to integrate various learning approaches and emphasise practical aspects within LISc departments. Insufficient infrastructure and limited resources impede the adoption of online education in Tanzania. Digital competencies, subject knowledge and skills, generic skills and digital instructional skills and methods are the key competencies required for LISc academic staff.

LISc schools employ various procedures such as research, collaboration, consultation and analysis to align their curriculum with the digital age. However, several challenges hinder progress, including the lack of involvement from the professional board, inadequate academic staff, absence of guidelines, limited consultation with LIS

professionals, top-down management approach, gaps between national education policies, bureaucratic procedures, absence of a model or framework and insufficient ICT facilities. Bridging the digital skills gap necessitates stakeholder involvement, continuous curriculum updates and collaboration between academia and practitioners. Additionally, securing adequate funding and time for curriculum development and review is crucial.

The study also revealed gaps in national policies, emphasising the need for a specific policy guiding the integration of digital skills into LISc programmes. A Tanzanian-specific digital skills framework tailored to LISc programmes is essential for effective integration. The study recommends incorporating courses covering various digital competencies into the LISc curriculum to meet the digital age job market demands. A structured approach, including using a curriculum model or framework, must align LISc programmes with digital competencies content. Lastly, the study underscores the importance of establishing a control organ for the LISc profession and presents a proposed curriculum development framework for integrating digital skills.

The next chapter presents the summary of findings, conclusions and recommendations

CHAPTER SEVEN

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

The previous chapter interpreted and discussed the findings of this study based on the research objectives. This chapter presents a synthesised synopsis of the study, reaffirming the research problem and providing answers to the primary research objectives and questions that guided the investigation. The chapter brings together the findings and the conclusions in light of the study. Furthermore, it proffers recommendations and proposes a digital skills curriculum framework for the LISc Bachelor's degree curriculum that addresses the digital skills needs in Tanzania's new LISc work environment. In addition, this chapter shows the study's implications for academic policy and practices and suggests some proposals for further research surrounding LISc education in Tanzania. These suggestions aim to increase graduates' digital skills to meet the LISc field's current and future employment needs.

As discussed in Chapter Four, the study was underpinned by a pragmatism paradigm using mixed methods where both quantitative and qualitative approaches were used for an in-depth study of the problem. This study was also underpinned by the Punctuated Equilibrium Theory of 1985 by Tushman and Romanelli and Wolf's Curriculum Development Model of 2007. The study sampled five HLIs offering LISc education at the Bachelor's degree level. For confidentiality, the names of the HLIs, curriculum and academic department representatives were coded throughout this chapter as they were used in Chapters Five and Six. The respondents for the study were LISc final-year students, LISc academic staff teaching digital skills competencies, academic department representatives, LIS employers and LISc graduates employed in the job market. Data was also collected from the LISc Bachelor's degree curriculum offered at the HLIs under study. The data was collected through questionnaires, interviews and document reviews. Questionnaires (see Appendix XI: Questionnaire for students, Appendix VIII: Questionnaire for academic staff, Appendix X: Questionnaire for LISc graduates and Appendix IX: Questionnaire for LIS employers) were used to collect data from students, academic staff, employers and LISc graduates. An interview guide and document

analysis guide (see Appendix XII: Interview schedule for academic department representatives, Appendix XII: Document analysis guide) were used to collect data from academic department representatives. Quantitative data were analysed using SPSS statistical analysis software to generate tables and charts, while qualitative data were analysed thematically and Word art software was further used to provide a visual of the findings.

The study's response rate, as detailed in Chapter Five, section 5.2, was 574 (71.83%). This response rate signifies the percentage of respondents who actively participated in the research by providing their input to this study. The respondents were categorised as follows; Three hundred and eighty-two (382) LISc graduates; Thirty-nine (39) LIS employers; One hundred and thirty-five (135)LISc final-year students; Thirteen (13) LISc academic staff and Five (5) academic department representatives. In addition, the study retrieved and analysed five LISc Bachelor's degree curriculum documents out of the five targeted. The response rate was found to be satisfactory for the provision of reliable data.

7.2 Summary of the study findings

As mentioned in section 7.1, this section presents the summary of the findings of this study based on the objectives delineated in Chapter One. The findings were presented, interpreted and discussed in Chapters Five and Six of the study. The study's primary purpose was to investigate the LISc education programme leading to a Bachelor's degree programme currently offered by the five HLIs chosen in Tanzania, aiming to propose a model to guide the development or redevelopment of the LISc curriculum in light of the current needs of the digital age. This purpose required that the study first determines the extent to which digital competencies are covered in the LISc Bachelor's degree programmes available at the selected HLIs in Tanzania, establish the needs for the digital age and then develop a model that would provide benchmarking for future coverage. This section and sections 7.3 and 7.4 focus on the first portion of the purpose, while the second portion involving proposing a model has been provided in section 7.5.

7.2.1 Library and Information Science Bachelor's degree curriculum in Tanzania

This section bears the main theme of objective one, "To audit the LISc bachelor degree curricula alignment with the digital age". Research questions 1 and 2, as presented in chapter one, were used to answer the research objective.

As presented in section 5.3.1 and discussed in section 6.2.1, the study established that all LISc Bachelor's degree programmes offered in Tanzania have three years minimum to accomplish and most were housed primarily within social sciences departments. Despite the prevalence of technological advancements within the LISc field, only one programme was housed within the Faculty of Science and Technology. The required fundamental and optional courses varied from one HLI to the other, with one HLI programme having more courses compared to other reviewed LISc Bachelor's degree programmes. The findings also established that the evaluation process for most programmes was conducted on a semester basis, except one that evaluated students participating in distance learning on an annual basis.

In addition, the findings established that four programmes had the same name, i.e. Library and Information Studies/Management, which can be said to be contrary to the new trends of LISc where the naming of the programme has progressed to Information Science and the word library is being dropped from the programme naming to allow the programme to have a broader perspective. Nonetheless, one HLI was found to have adopted a different name, Information and Records Management, whose content, when reviewed, was found to cover a broader context of information and records management. The findings also confirmed that the TCU acknowledged and granted accreditation for each and every programme. The study determined that one of the HLIs had a practical attachment that lasted for four months, while the others only provided between four and six weeks of practical attachment.

Regarding quality management control which governs how the programmes are developed, implemented and evaluated to enhance the quality of education in alignment with the digital age, the study findings presented in section 5.3.2 revealed that the quality of the LISc programme was managed similarly to other programmes offered in the HLIs in Tanzania due to the absence of a LISc professional board. TCU was found

to be the primary regulator of all programmes in LISc. However, the findings also established that HLI and the department hosting the LISc programme also had the mandate to ensure the programme's quality.

As far as the comprehensiveness of the competencies covered, as presented in sections 5.3.3 and 5.3.4 and discussed in sections 6.2.3 and 6.2.4, this study found that LISc curricula offered many competencies, including core LISc competencies, technological competencies, generic competencies and practical skills. All curricula required cataloguing, classification, collection development courses, retrieval and dissemination and information storage. Digital skills courses were also included, but the extent varied from one HLI to another. Digital skills courses that were evident in the curriculum reviewed included web design and administration; introduction to computers; information retrieval systems; automation; information systems management, database design and management, application of information technology tools; collaborative web technologies; geographic information systems; open source software, networking; hardware and software; troubleshooting among others. Despite a comprehensive coverage of competencies, the examination of the course objectives showed that the curricula were still confined to traditional and theoretical perspectives and practical training components needed improvement. In addition, most of the digital competencies courses were found to be elective.

The study found that all LISc curricula had general courses. These courses encompassed management, marketing, customer care, budgeting, supervisory skills, strategic planning, human resources management; project management, entrepreneurship; comparative and international librarianship; communication; information science libraries and society; information and communication theory; research methods, statistical analysis; mathematics as well as the legal framework and related courses. In addition, only one LISc programme was found to offer an entire semester for practical attachment, while other programmes had six to eight weeks of practical attachment.

The study's findings, as depicted in section 5.3.5 and discussed in section 6.2.6, further revealed that the technological infrastructure supporting the teaching of digital content in LISc was insufficient compared to the growing number of students enrolled in the HLIs. None of the HLIs had laboratory or ICT facilities solely designated for the LISc

programme. Instead, the facilities were shared among all enrolled students, which resulted in their capacity being constrained compared to the number of enrolled students. According to the respondents, a lack of adequate ICT resources at the HLIs, including connectivity to the internet, computers, library software, printers and scanners, negatively impacted the students' abilities to develop the practical skills necessary for the job market. The findings also showed that some of the computers in the laboratory were either in need of maintenance or were too old to operate correctly.

Sections 5.3.5 and 6.2.5 of the study sought to determine whether LISc programmes were relevant to the need and changes of the digital age demands. The findings established that most respondents indicated that the curricula were outdated and some HLIs planned to review the curriculum. The study findings also highlighted the importance of balancing theoretical and practical training to ensure graduates are well-equipped to meet the job market demands, as it was established that practical components needed to be improved in the curricula reviewed.

7.2.2 Changing competencies in managing libraries in the digital age

The purpose of the study's second objective was to gather the perceptions of employers with regard to what digital skills competencies are deemed essential and that should be integrated into the future LISc curricula to enhance the competencies of the LISc graduates. As presented in Chapter One, question 3 and 4, were used in responding to the second research objective. The following paragraphs summarise the findings.

According to the findings, employers in the LISc sector require graduates to have skills in the ability to manage digital information, digital technical skills in using software and computer applications and advanced digital skills associated with managing computers and information systems. These three broad competencies had thirty competencies valued as important and very important, as was depicted in Tables **5**.12, 5.13 and 5.14 and further discussed in section 6.3.1. These competencies include: Share digital information; Select, search and retrieve digital information; Use information in more than one digital formats; Process, organise and store digital information to facilitate retrieval and use; generate, organise, integrate and analyse digital content and knowledge; Evaluate digital information; decode, restructure and protect digital

information; use collaboration tools for communication and social networking; Use library management software; use presentation application software; use word application software; use operating systems; secure personal information against threats; manage access to the systems; use cloud computing applications to store, retrieve and work online; Use spreadsheet application software; use data management software; evaluate software applications to determine the effectiveness of the system performance; maintain user ID and passwords in the information system; Install security software; use multimedia and publisher application software; use design software; perform troubleshooting issues; maintain and upgrade existing systems as required; perform data backup locally and through the cloud; perform data migration; develop library websites; manage servers and technology tools; manage to set up users' accounts and workstations; and assist in system development and customisation.

The findings also established that employers rated low competencies such as using project management software; using database software; verifying third-party vendors' security to meet security requirements; conducting internal and external system security audits; designing new computer systems and frameworks; and writing software codes.

The findings as presented in Tables 5.15, 5.16 and 5.17 and discussed in section 6.3.2, further established that LISc graduates were found to have great confidence in the ability to: share digital information; use the information in different digital formats; evaluate digital information; process, organise and store digital information to facilitate retrieval and use; select, search and retrieve digital information; generate, organise, integrate and analyse digital content and knowledge; use online collaboration tools communication and social networking; use cloud computing applications to store, retrieve and work online; use word application software to prepare word documents; use presentation application software for presenting data; use operating systems; use library management software for library data management and services provision; manage access to the systems; use spreadsheet application software for computing data; use multimedia and publisher application software; and use data management software.

However, they were found to have poor competencies in decode, restructuring and protecting digital information; using database software; Maintaining user IDs and passwords in the information system; install security software like firewalls and essential data encryption programmes to safeguard the organisation's vital data; evaluate software applications to determine the effectiveness of the system performance; use design software to prepare flow charts and diagrams; Secure personal information against threats; use project management software to prepare project work plans; manage servers and technology tools; perform data migration; perform data backup locally and through the cloud; manage to set up users' accounts and workstations; develop library websites; perform troubleshooting issues; maintain and upgrade existing systems as required; and design new computer systems and frameworks. The finding also established that graduates have very poor skills in verifying the security of third-party vendors to meet security requirements; conducting internal and external system security audits; assisting in system development and customisation; and Writing software codes.

The study also sought to find a comparison of the data set obtained from LIS employers and LISc graduates. The z-test analysis, as presented in Tables 5.18, 5.19 and 5.20 and discussed in the part section 6.3.2, revealed a high mismatch in the majority of the digital skills that the LISc sector requires graduates to possess compared to what the LISc graduates have. Therefore, the results imply a need to revise all the LISc curricula for better alignment with the needs of the LISc sector in the digital age.

7.2.3 Teaching digital competencies in Library and Information Science schools

The third objective of the study focused on assessing the staff capacity and teaching methodology preferred in imparting skills and competencies in LISc education at the selected HLIs. As presented in Chapter One, this objective was answered through research questions 5 and 6. The following paragraph summarises the findings.

As depicted in sections 5.5.1 and 5.5.2 and discussed in section 6.4.1, the findings established that out of eighty-four (84) academic staff from the five departments offering LISc education in the selected HLIs, only nineteen were engaged in teaching digital competencies. The findings also established that there were few professors in the

field, with the majority found to be in the qualification category of lecturers/senior lecturers at the time this data was collected.

The findings established that departments used competent staff members with computer science and information technology qualifications to teach digital skills courses by borrowing staff from other departments or involving part-time academic staff from other HLIs. The findings further showed that only one department was found to indicate that they have enough academic staff to cover the courses found in their department. The findings further established that the slow and tedious government process of hiring new academic staff in the HLIs is the main challenge affecting staff capacity growth in the HLIs under study.

The findings, as presented in Tables 5.22 and 5.23 and discussed in section 6.4.2, established that lectures/PowerPoint presentations, group work and project work were the most preferred teaching methodology by academic staff, followed by other teaching methodologies, including practical exercises, self-study and field visits to information and case studies. Online teaching was the least preferred method by respondents. The findings established that students identified lectures/PowerPoint presentations, group work and project work as their most preferred teaching methodology, followed by practical exercises and self-study, with just a few preferences found for online teaching.

As presented in section 5.5.4 and discussed in section 6.4.3, the findings established that academic staff teaching digital skills must be continuously upgraded. Based on the findings, respondents suggested that academic staff should have diverse competencies, including; digital competencies skills, LISc subject knowledge and skills, generic skills and digital instructional skills and methods for effectively delivering quality education that aligns with the trend of the digital age.

7.2.4 Concern on digital competencies integrations in Library and Information Science curriculum

The fourth objective of the study aimed to assess the procedures involved in developing and redeveloping the curriculum and the challenges associated with developing a curriculum that aligns with the needs of the digital age. This objective was answered through research questions 7 and 8.

The findings, as presented in section 5.6.1 and discussed in section 6.5.1, established that the procedures involved in the development process included situational analysis, collaboration and consultation with LISc job market professionals, conducting research on international trends and aligning with international published LISc frameworks. The findings did not establish if standard guidelines or frameworks are employed, especially in integrating digital competencies in LISc education.

Findings, as presented in section 5.6.2 and discussed in section 6.5.2, established a number of challenges faced in the curriculum development process, including lack of professional board involvement; lack of learning resources; lack of adequate academic staff; lack of standard guidelines in developing LISc curricula; lack of adequate ICT facilities; the gap between teaching and practising; lack of proper consultation with the LIS professionals in the LISc job market; knowledge-based approach; top-down management approach; lack of academic staff; lack of ICT infrastructure; the gap between national education policies, bureaucratic procedures on curricula revisioning and development; and absence of an explicit model or framework.

7.2.5 Digital skills framework for Library and Information Science Bachelor's degree curriculum

The fifth and last objective of the study was to propose a digital competencies model for the LISc Bachelor's degree curriculum that would suit Tanzania and consider the demands of the digital age. The objective was answered through research questions 9 and 10. The following paragraphs summarise the findings.

As presented in section 5.7.1 and discussed in section 6.6.1, the findings established no HLI policies or frameworks governing the integration of digital content in the LISc programme and other higher learning programmes offered in HLIs. Similarly, the findings showed that no specific policy document at the national level stipulates the design of the LISc curriculum to align with the needs and trends of the digital age. The findings established that ICT use in learning is generally stated, but there is no requirement for HLIs to integrate digital skills into the LISc curriculum, which results in each HLI having its standards, as it is up to the universities to maximise the national policies.

At the international level, as presented in section 5.7.2 and discussed in section 6.6.2, the findings from the reviewed published digital skills framework established a gap in relation to the study. The findings revealed that the reviewed framework provides a comprehensive approach; however, their focus is more on the HLI level and does not provide enough guidance for developing specific digital skills and competencies that students need to acquire. Similarly, other frameworks detailed the specific digital skills and competencies needed for the different job roles other than LISc. In contrast, a few provided a good overview of the general digital skills dimensions. Still, it lacks a precise mapping of these skills to specific job roles or industries, which may make it challenging to apply in practice. The findings also established no published framework or design for the context of Tanzania.

Section 5.7.3 and the discussion presented in section 6.6.3 of this study established that future LISc courses needed to be integrated with digital skills content that reflects the needs of the LISc job market. Respondents of the study highly recommend that the future LISc should incorporate courses such as Computer applications, Computer maintenance, Digital library technologies, Information security, Web design, Internet applications, Multimedia, Social and ethical issues in computing, Operating systems, Graphics design; IT project management, Computer security and Network management and administration. The majority recommended these courses, above 91.01% of the respondents. The findings further established that respondents indicated courses such as Mobile computing systems analysis and design, Open source, Software deployment, Database systems, Data mining and Systems architecture. Some of the courses that were least rated included Artificial intelligence, Principles of programming, Data structure and algorithms, Cryptology and coding theory.

The findings, as presented in section 5.7.4 and discussed in section 6.6.4, established that for effective development and implementation of the LISc curricula that align with the needs of the digital age, there is a need to ensure the availability of competent staff, ICT infrastructure, curriculum framework, review of national policies, standardisation, enhance teaching methodology, collaborate with stakeholders, establish governing boards and professional accreditation boards, develop a continuous development programme for academic staff to improve their skills, ensure time to time curriculum

review with the changing technology, integrate diverse competencies in the curriculum and enhance focus on practical competencies to develop graduates hands-on skills.

On teaching digital content, the findings established that respondents highly preferred a high weight of the credits to be covered in classroom work, followed by practical laboratory work and student project/Case studies. This finding could be due to the practical nature of digital skills and the need for hands-on experience in a controlled environment such as a laboratory. The findings established that most respondents recommend the assessment method for practical courses to combine theory and practical examination. This indicates that most participants value integrating theoretical and practical knowledge in their assessments rather than focusing solely on theoretical knowledge. In addition, the findings established that most respondents considered traditional learning (in class) method, followed by blended learning, with the least preferred method being distance learning.

The findings from the above five objectives were deemed adequate to allow the study to accomplish its goals. The following section provides the significant conclusions derived from the above findings.

7.3 Conclusions of the study

This section serves a dual purpose in providing the reader with the significant overall conclusions of the study. The study aimed to propose a Bachelor's degree curriculum model for LISc education in Tanzania that meets the skills and competencies required for the digital age. The study assumes that such a framework will help HLIs offering LISc programmes to create a curriculum that includes digital competencies required in the present job market. The proposed Bachelor's degree curriculum framework for LISc education in Tanzania is presented and discussed in section 7.5 of this chapter. The following sections present conclusions drawn from each research objective.

7.3.1 Conclusions regarding the current Library and Information Science Bachelor's degree curriculum in Tanzania

Based on the discussion in section 6.2 and the summary of findings in section 7.2.1, the study concludes the following:

7.3.1.1 There is a minimal presence of digital courses in LISc curricula, and there is inconsistency from one curriculum to another which implies a lack of uniformity of the LISc curricula preparation from national level. The inconsistence of competencies found from one curriculum to the other in LISc curricula is associated with a lack of a controlling national professional board which regulate and maintain the standard of the programme with the country.

7.3.1.2 The ICT resources at the HLIs under investigation are inadequate for fostering the development of digital competencies among LISc students. Resource inadequacies in LISc education and training programmes signify that LIS graduates were not being adequately prepared for their future work roles. This might be a contributory factor to the reproach from employers that LISc graduates were not adequately prepared for the jobs they apply for.

7.3.2 Conclusions on the changing competencies and skills in managing libraries in the digital age

Based on the discussion in section 6.3 and the summary of findings in section 7.2.2, the study concludes the following:

Information and Communication Technology advancements in LIS have created new perspectives on LIS professionalism by creating high demands on a comprehensive skill set of ICT proficiency in order to successfully and competitively work in the digital age LIS workplace. These changes trigger a need for LISc programmes to redefine their learning outcomes and expand the scope of the discipline, as today's roles of LIS professionals require sufficient knowledge of digital competencies.

7.3.3 Teaching digital competencies in Library and Information Science programmes

Based on the discussion in section 6.4 and the summary of findings in section 7.2.3, the study concludes the following:

7.3.3.1 The LISc education in Tanzania is still characterized by a shortage of staff proficient in digital competencies which results in a prevalent practice of

borrowing staff from other departments and reliance on part-time academic staff due to notably, the slow and cumbersome hiring process in the HLIs particularly owned by the government.

7.3.3.2 The traditional methods, notably lectures with PowerPoint presentations, group work, and project work, are strongly favoured by both academic staff and students in teaching digital competencies, which reflect a collective preference for structured and instructor-led learning experiences.

7.3.3.3 The academic staff teaching digital skills within LISc education need to possess a diverse skill set; including proficiency in digital competencies, in-depth LIS subject knowledge, generic skills, and expertise in digital instructional methods, that can continuously be acquired through ongoing professional development initiatives.

7.3.4 Concern on digital competencies integrations in Library and Information Science curriculum

Based on the discussion in section 6.5 and the summary of findings in section 7.2.4, the study concludes the following:

7.3.4.1 There is a notable absence of established institutional frameworks or policies utilized by HLIs offering LISc programme in developing and implementation of LISc curriculum. Therefore, there is a compelling need for further exploration and development of standardized guidelines and frameworks in LISc curriculum design, with a particular focus on the integration of digital competencies.

7.3.4.2 The LISc education and training in Tanzania is faced by internal and external challenges which affect LISc curriculum development and implementation. This suggests a need for comprehensive reforms addressing these multifaceted challenges to ensure the creation of relevant, dynamic, and effective LISc curricula which will in turn enhance the quality and relevance of LISc education in the face of evolving industry needs and technological advancements.

7.3.5 Digital skills framework for Library and Information Science Bachelor's degree curriculum

Based on the discussion in section 6.6 and the summary of findings in section 7.2.5, the study concludes the following:

7.3.5.1 There are no clearly defined standardised guidelines for LISc education and training in Tanzania at the national level to guide curriculum development, which hinders the consistency and effectiveness of LISc education from curriculum development to its implementation.

7.3.5.2 Drivers towards successful development and implementation of LISc curricula should be in place including ensuring the availability of competent staff, robust ICT infrastructure, curriculum frameworks, periodic policy reviews, standardization, enhanced teaching methodologies, collaboration with stakeholders, governing boards, professional accreditation, continuous development programs for academic staff, and a focus on practical competencies to nurture graduates' hands-on skills.

7.4. Recommendations

The recommendations provided by the study were based on a thorough analysis of the findings and conclusions derived from the research objectives outlined in Chapter One. This study provides vital information that will assist HLIs teaching LISc education in aligning LISc education with the needs of the digital age. Although the recommendations are aimed principally at HLIs in Tanzania, which served as the primary focus of investigation for this study, it should be noted that the recommendations can apply to comparable situations and contexts. The following sections present recommendations drawn from each research objective.

7.4.1 The current Library and Information Science Bachelor's degree curricula in Tanzania

Based on the conclusions outlined in section 7.3.1, this study recommends the following:

7.4.1.1 Higher learning institutions in Tanzania should prioritise in renaming their LISc programmes to reflect the profession's changing landscape in the digital age. By doing so, the LISc education system in Tanzania can keep up with global trends and adapt to the evolving needs of the profession. Additionally, this change in programme names would broaden the scope of learning in the LISc field, requiring incorporating additional competencies into the curriculum that merge with the trends of the digital age.

7.4.1.2 There is a need to establish a professional board to oversee the quality of LISc programmes in Tanzania. This board should be in charge of establishing and enforcing consistent quality standards across all HLIs that offer LISc programmes. To ensure that the programmes are developed, implemented and evaluated in accordance with the established guidelines, the board should collaborate with the Tanzania Commission for Universities, universities and respective departments. The board should also ensure that the facilities and human resources are available to support the programmes' quality delivery. Establishing a professional board would improve graduate quality and ensure consistency in the LISc programmes offered by Tanzania's HLIs.

7.4.1.3 Higher learning institutions should systematically develop or revise curricula to ensure digital skills courses are integrated at appropriate levels, treated as core courses and provide relevant opportunities for practical learning to be well covered.

7.4.1.4 Higher learning institutions should set aside funds to procure adequate ICT facilities in HLIs offering LISc programmes to enhance practical learning and competencies. This investment will help bridge the digital divide and prepare LISc graduates for the evolving job market. Investment in ICT in HLIs will benefit not only LISc students or programmes but also other programmes in HLIs that require graduates to be digitally literate.

7.4.2 The changing competencies and skills in managing libraries in the digital age

Based on the conclusions outlined in section 7.3.2, this study recommends that:

7.4.1.1 Stakeholders in the LISc sector should be actively involved in evaluating, updating or developing the LISc curricula. Such involvement will assist in aligning LISc programmes with the digital age trends and meet the emerging needs in the LISc sector. This participation can involve regular consultations and collaborations between HLIs offering LISc programmes, job market practitioners, alumni and professional associations to ensure the updated curricula are relevant, current and practical. Additionally, such collaboration with stakeholders can help ensure that these HLIs' curricula align with the current market demands.

7.4.1.2 There should be regular review and updating of LISc curricula to ensure that they remain relevant and meet the emerging needs of the LISc sector. The timeline for review, as established in the study, was five years, which is rather long considering the rapid changes occurring in the profession. There is, therefore, a need for TCU to review its guidelines on the duration of curricula review so that it can be more realistic. For example, the National Council for Technical and Vocational Education and Training, which is the second regulator of education in Tanzania, reviews the curriculum for technical education in HLIs every three years. A three-year term is very responsive for a curriculum to immediately adopt the current demands and thus enhance the competencies of the graduates.

7.4.1.3 Educating digital competencies should not only be left to the HLIs; therefore, a mechanism for enforcing digital competencies should start at the intermediary levels in secondary schools. Implementing these competencies from the secondary education level will support students by giving them a foundation of digital skills competencies. This will benefit LISc education programmes or other programmes in HLIs and provide an advantage for students who will not make it to higher learning institutions.

7.4.3 The teaching of digital competencies in Higher Learning Institutions offering Library and Information Science programmes

Based on the conclusions outlined in section 7.3.3, this study recommends that:

7.4.3.1 Higher learning institutions should take prompt action to address the shortage of qualified academic staff working in the field to ensure that students receive sufficient education. One way to accomplish this goal is to prioritise the education or recruitment of qualified personnel working in the field of LISc. HLIs may also continue to form partnerships with other departments, organisations or HLIs to share their pools of qualified academic personnel.

7.4.3.2 The study recommends simplifying recruitment procedures to reduce the delays that impede the expansion of HLIs' staffing capacities. The Tanzanian government's procedures and scheme for promotion should be reviewed to make it flexible enough to allow academic staff to integrate multiple disciplines and be promoted. Currently, if one moves to a degree other than their specialisation, they may not see the benefit of the acquired skills in terms of their career development. Loosening this string will open doors, especially for the current LISc academic staff, to expand their qualification in ICT and similar fields. Such a movement will reduce the gap in staff demands in the respective HLIs.

7.4.3.3 Higher learning institutions should implement continuous professional development learning programmes for LISc academic staff to advance their skills. A training plan will help them continually be current with the innovation in the field, thus becoming active in teaching relevant knowledge and being proactive in curriculum revisioning.

7.4.4 Concern on digital competencies integrations in Library and Information Science curriculum

Based on the conclusions outlined in section 7.3.4, this study recommends that:

Higher learning institutions should adopt a formal approach to curriculum development, as Wolf's 2007 Curriculum Model proposed. Following a formal process will guide in understanding and following up proper procedures that will provide competent content to build the required competencies for graduates needed for the job market. The study also recommends that HLIs offering LISc programmes should continue to research to identify the job requirements and ensure that content on digital competencies is evident in the LISc curriculum to achieve the required demand.

7.4.5 Digital skills framework for Library and Information Science Bachelor's degree curriculum

Based on the conclusions outlined in section 7.3.5, this study recommends that:

A framework should be created that can efficiently address the gaps in digital skills training within Tanzanian LISc education. The study further recommends that the framework should be flexible enough to meet the demands of the LISc market in the digital era, be informed by current best practices and emerging trends in digital technologies and offer a clear roadmap for the creation and delivery of digital skills training in LISc education, with special emphasis placed on the integration of digital content across all levels of the curriculum. Such a framework is anticipated to help close the digital skills gap and give LIS professionals the know-how and abilities they need to succeed in the digital era. Thus, innovation and creativity in the LISc field will be encouraged and LIS professionals in Tanzania's society will become more digitally literate.

7.5 Proposed framework for digital competencies incorporation in Library and Information Science Bachelor's degree curriculum in Tanzania

The main aim of this study was to explore the LISc Bachelor's degree programme in meeting the needs of the digital age in Tanzania. One of the study's key findings was that no established framework or model was used in developing the LISc curriculum in alignment with the needs of the digital age. Given the growing importance of digital technologies in the field of LISc, the study sought to develop a framework that could be used to embed digital competencies content into the LISc Bachelor's degree curriculum. The proposed framework aims to provide a structured approach for incorporating digital competencies into the curriculum, ensuring that future LISc graduates are adequately prepared to navigate and utilise digital technologies in their professional practice.

The researcher conducted a comprehensive review of existing literature on digital competencies in the LISc field to develop the framework, as presented in Chapter Three. The researcher also reviewed relevant digital skills frameworks, as presented in Chapter Three, section 3.8 and Chapter Five, section 5.7.2, to gain insights into the

types of digital competencies considered essential in the digital age. Data was collected from stakeholders in the field, including LISc ADRs, academic staff, LISc final-year students, LISc graduates and LIS employers, to gain insights into the specific digital competencies required in the field. These findings helped to inform the development of the proposed framework for embedding digital competencies into the LISc curriculum.

Therefore, this study has developed and presented a digital competencies framework for the LISc Bachelor's degree, divided into three primary constructs: digital information management, digital technical skills and advanced digital skills. These constructs are further broken down into six areas of skills: digital information management, software applications, communication and collaboration, computer and data security, computer system troubleshooting and system development skills. The framework, therefore, proposes thirty-two digital skills abilities derived from the six competencies areas that, if adequately integrated into the curriculum, can equip graduates with the necessary digital competencies for the LISc job market... A visual representation of the framework is presented in **Figure 7.1,** on page 217 below**.**

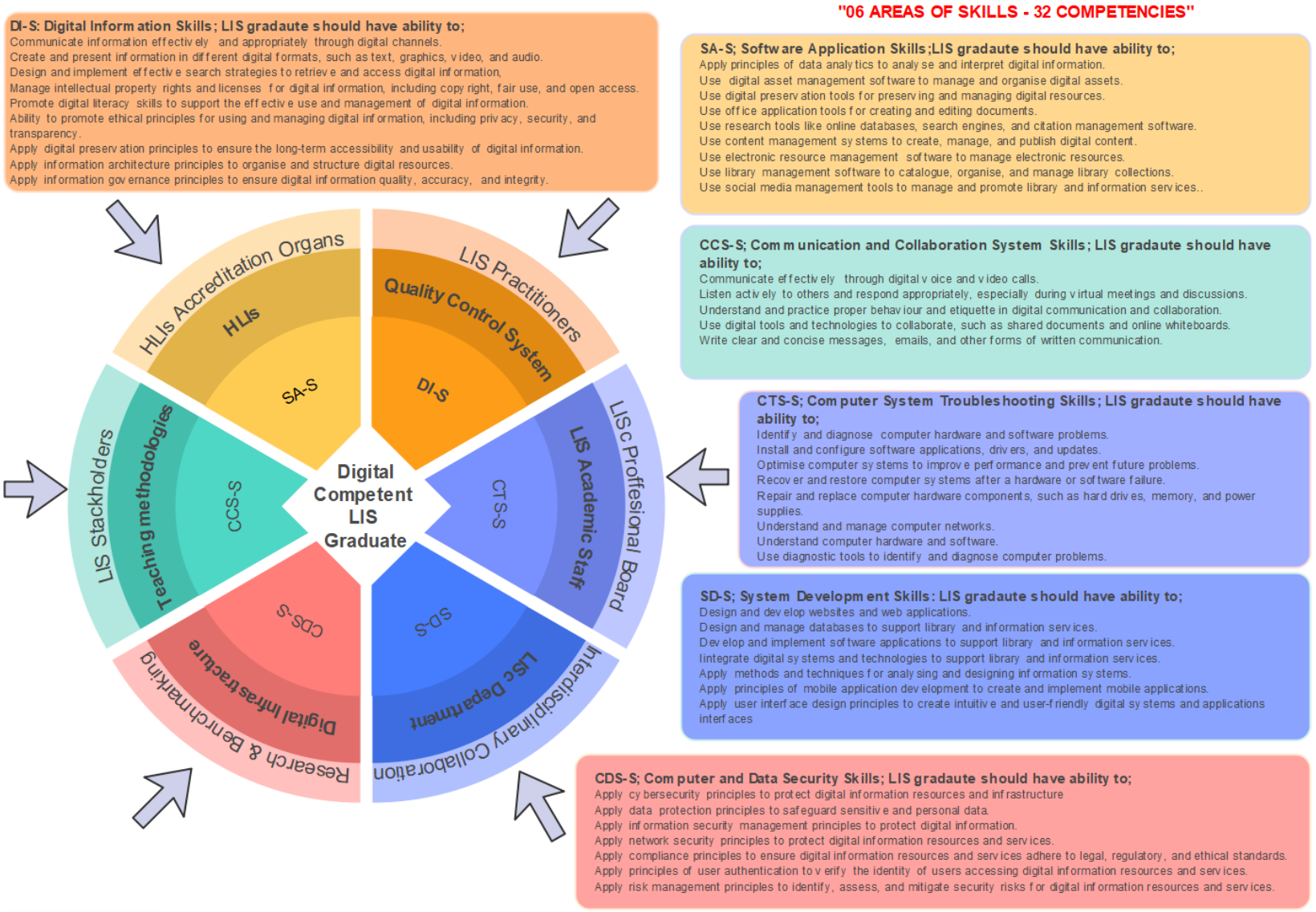

Figure 7.1: Digital competencies framework for Library and Information Science Bachelor's degree curriculum

Source: Field Data (2023)

The digital competencies curriculum framework for the Bachelor's degree in LISc, illustrated in Figure 7.1, is crucial for incorporating digital skills into the LISc programme. The model provide a comprehensive framework for curriculum development and enhancement. The constructs highlighted in the model include six digital competencies areas derived from the study findings, HoD/ LIS department, academic staff, pedagogy, digital infrastructure resources, quality assurance, stakeholder engagement, accreditation and interdisciplinary collaboration. These forms the bases of internal and external environment which support the curriculum to effectively developed and delivery graduates according to the required standards by the market demands.

7.5.1 Internal environment of the proposed framework

As depicted in figure 7.1 above, the HoDs and associated LIS department play a central role as internal stakeholders in crafting the educational journey for LIS students. Their responsibility lies in providing strategic direction to ensure that the curriculum aligns with its objectives, meets market demands and delivers a comprehensive educational experience. Moreover, they are entrusted with the allocation of academic staff time and financial resources to enhance the development and delivery of technologically advanced courses, thereby fostering innovation in digital education. Additionally, the department is an instrumental in nurturing academic staff development by coordinating workshops, training sessions and promoting participation in conferences. This collective effort creates an environment where educators continually enhance their digital proficiency and remain attuned to current market needs and evolving teaching methodologies, ensuring the effective integration of digital skills.

The model view academic staff as content experts responsible for infusing relevant research on digital competencies into the curriculum. To meet this responsibility, the framework insist academic staff members to continuously engage in professional development and stay updated on emerging trends in digital scholarship. This involves not only ensuring that existing academic staff possesses the requisite qualifications for teaching digital competencies but ensure CPD is provided in order to up skill their competences. Framework emphasis a simultaneously, efforts should be made to recruit

new academic staff with the appropriate expertise and capabilities to teach digital competencies efficiently.

The framework also insists that effective teaching methodologies constitute a critical construct in ensuring output of competent digital graduates. Teaching methods lay the foundation for how knowledge and skills are imparted to students, fostering engagement, critical thinking and the practical application of concepts. By employing innovative and pedagogically sound teaching methods, academic staff can create an environment in which students actively participate, collaborate and gain hands-on experience with digital competencies.

In recognising the importance of technology in digital competency education, the framework highlight a need for HLIs and associated department offering LIS programmes to invest in ICT resources. This investment should facilitate the teaching of digital competencies by providing students with the necessary technological infrastructure to apply theoretical knowledge to practical situations. The framework advocates for the procurement of resources that enable students to have skills and competences to manage digital information effectively, work with digital tools and technologies and develop expertise in infrastructure and data management within LISc profession settings, including the vital skill of troubleshooting computer systems.

The framework further underscores the importance of quality assurance and control systems in guiding the LISc curriculum. Existing quality control mechanisms, such as educational policies and frameworks, may require adaptation to effectively address the incorporation of digital skills and ensure if the training is taking place effectively to ensure competent output. Quality control checks are vital in ensuring that the programme remains aligned with industry standards and evolving best practices in digital scholarship.

7.5.2 External environment of the proposed framework

The collaborative approach to curriculum development is a fundamental aspect of ensuring that educational programmes remain relevant, responsive and effective in preparing graduates for the evolving demands of the digital age extends beyond the confines of academic institutions and encompasses external stakeholders as well.

The framework emphases the engagement of stakeholder and practitioner. This construct encourages HLIs and respective department to proactively consult with diverse stakeholders and seasoned practitioners to gain insights into market demands. Collaboration with external voices ensures that the curriculum remains relevant, responsive and effective in preparing students for the digital age.

Accreditation boards, such as the TCU and the NACTEVET as for the case of Tanzania, assume a pivotal role in accrediting and endorsing the curriculum developed. The frameworks recommends that HLIs should submit their curricula to these boards for accreditation, approval and endorsement.

Moreover, the framework highlights the potential establishment of a professional board for LISc programmes to further enhance programme quality and align it with industry standards. This board would play a multifaceted role, including accrediting LISc programmes to ensure adherence to quality standards and alignment with the curriculum framework's guidelines, thereby bolstering programme credibility. Additionally, the board would offer curriculum oversight, fostering industry-academic partnerships, facilitating professional development for academic staff and staff, promoting research and innovation in LIS education and setting ethical guidelines for LISc professionals, emphasising responsible digital information management practices. By establishing such a professional board, the curriculum framework seeks to elevate the quality, relevance and industry compatibility of LISc programmes, reaffirming the commitment to producing graduates proficient in digital competencies, poised for success in the dynamic digital age and ensuring the adaptability of LISc programmes to the evolving information landscape

The framework also suggests a need for Interdisciplinary Collaboration through partnering with related fields such as Information Technology, Information Systems, Computer Science and Software Engineering. This collaborative approach enriches the curriculum by infusing diverse expertise and ensuring that graduates are well-prepared to navigate the complex digital information and technology landscape.

The curriculum framework places significant emphasis on research as a cornerstone of curriculum development in LIS programmes. This research-driven approach serves a

dual purpose: first, it involves benchmarking against international LIS frameworks to ensure the curriculum's global competitiveness and alignment with recognised industry standards. This comprehensive benchmarking entails a meticulous examination of established LIS curricula, competency models and best practices from leading institutions and professional organisations worldwide. By integrating insights from these international benchmarks, the curriculum gains credibility and relevance on a global scale, positioning graduates as adaptable and globally-aware professionals who can thrive in diverse settings. Furthermore, this research-driven benchmarking process keeps the curriculum abreast of emerging trends and technologies in the dynamic field of LIS.

Equally important within this research-driven approach is the evaluation of other LIS programmes offered by a range of Higher Learning Institutions (HLIs), both locally and internationally. This evaluation entails a thorough comparative analysis of various aspects, including programme content, structure, pedagogical methodologies and outcomes. By conducting such evaluations, curriculum developers can identify areas of excellence and innovation in other programmes, enabling them to adapt or incorporate relevant elements into their own curriculum. Moreover, these evaluations serve as a mechanism to identify any gaps or deficiencies in existing LIS programmes, ensuring that the curriculum provides a comprehensive education that aligns with the evolving needs of the industry. Additionally, this comparative analysis informs strategic decisions about elective courses, specialisation options, or unique programme features that distinguish the curriculum and make it more appealing to prospective students and employers alike.

By adhering to this framework, HLIs offering LISc programmes can produce graduates who possess the necessary knowledge, skills and competencies to engage in digital competencies activities effectively. Graduates will be well-prepared to meet the demands of the job market and contribute to developing the digital economy. The involvement of HLIs in implementing this framework is crucial for its success and the overall development of the digital competencies landscape.

7.6 Implications of the study in practice and academic policies

The results of this study are anticipated to significantly impact educational practices and policies regarding the inclusion of digital competencies in the HLIs curriculum, especially in the LISc field.

According to the study findings, there is a significant policy gap regarding which digital competencies should be incorporated into the LISc curriculum. The framework suggested by the study can be used to improve educational policies relating to integrating digital competencies in the LISc curriculum by drawing attention to this gap. The framework proposed by the study can assist in revising educational policies on what competencies the policies need to insist on to be part of the curriculum, especially in the LISc field. Such revision of policies can assist HLIs in following a new benchmarking which will assist in the uniformity of the digital competencies in the LISc curricula developed in Tanzania. This revision will ensure that graduates from the LISc programmes have the uniform skills and knowledge required for performing digital activities. This framework can therefore raise the standard of LISc education and increase graduates' employability.

This study's proposed framework is expected to significantly affect the development and revision of the LISc curriculum in HLIs. Given the changing digital landscape, LISc graduates must have the digital competencies required in the digital age. As the study found that HLIs lack a framework to address the levels of digital competencies in the LISc curriculum, the framework suggested by the study can help close this gap by offering HLIs a roadmap for incorporating digital competencies into their curricula. Using such a framework will guarantee that graduates are ready to compete in the job market and meet the demands of the contemporary LISc of the digital age.

The framework has implications for LIS employers because employers of LISc graduates looking to hire professionals with digital competencies can benefit significantly by using the proposed framework as a reference for required skills. Employers may use the framework to identify the digital competencies and skills needed in the LISc profession in the digital age. The framework can also further assist employers in locating the necessary CPD training plans for LISc graduates already in employment to advance their skills.

The framework has monetary implications for HLs that offer LISc education as well. For effective implementation, HLIs are expected to invest in ICT infrastructure to ensure that facilities for teaching or training digital competencies are adequate to support the integration of practical learning to enhance hands-on competencies and knowledge needed in the digital age.

7.7 Suggestions for further research

The present research was restricted to only final-year students, academic staff instructing digital skills and academic department representatives from five universities in Tanzania. To compare the study findings, future investigations could be expanded to encompass all students regardless of their level of education, academic staff, irrespective of whether they teach digital skills or not, as well as LISc graduates who have graduated not only within the five HLIs covered in this study but also other HLIs outside the country.

The study used a mixed methods approach grounded in the pragmatism paradigm and allowed for collecting, presenting and discussing qualitative and quantitative data. To compare the study findings alternative paradigms and research methodologies could be used in future studies to compare the findings with those from the current study. Alternative paradigms and research methodologies could offer viewpoints and insights into Tanzania's lack of digital skills.

The study employed the Punctuated Equilibrium Theory (1985) and Wolf's Curriculum Development Model (2007). According to the Punctuated Equilibrium Theory, change happens abruptly rather than gradually and external shocks or events are what cause these changes. The digital skills gap in the context of the current study can be viewed as a punctuated equilibrium, where external events like technological developments or shifts in the labor market cause abrupt changes in the demand for digital skills. On the other hand, the Wolf Curriculum Development Model offers a systematic approach to curriculum design and development. This model strongly emphasises the significance of determining the stakeholders' needs and matching the curriculum to those needs. Future studies may examine whether HLIs offering LISc programmes incorporated the framework into developing new or revised LISc curricula. The effectiveness of the

suggested framework could be assessed by looking at how well LISc programmes have incorporated digital content. This study could be conducted by reviewing the updated or new LISc Bachelor's degree curricula and surveying graduates to determine whether they feel adequately prepared to meet the job market demands, particularly regarding digital skills. If carried out, these studies could offer information about the viability and effects of incorporating digital competencies into LISc Bachelor's degree programmes, information that could then be used to guide policy decisions and educational practices in Tanzanian LISc schools.

7.8 Summary of chapter seven

Chapter Seven serves as a comprehensive synthesis of the study's outcomes, conclusions and recommendations, framed around the five key themes derived from its main objectives. Moreover, the chapter introduced a proposed framework for the seamless incorporation of digital competencies into the LISc Bachelor's Degree programme in Tanzania. This framework delineates thirty-two distinct competences categorised into three essential digital skills domains, namely Efficacy in information management skills, Digital information management skills and advanced digital skills. These competences are further organised into basic, intermediate and advanced levels, facilitating a structured progression from fundamental proficiencies to intricate technical expertise. Furthermore, the chapter sheds light on the practical implications of the study's findings in the realms of academic policies and educational practices, underlining their potential impact. The chapter lastly concludes by offering valuable suggestions for further research, pinpointing unexplored avenues that warrant in-depth investigation in the realm of Library and Information Science education.

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APPENDICES

Appendix I: Permission letter University of Dar es salaam

Joseph Solomon Daudi
P.O.Box 1440-Arusha
+255-659 777 773
20th March 2022.

Vice Chancellor,
UNIVERSITY OF DAR ES SALAAM
Dar es Salaam - Tanzania

Re: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR INSTITUTION

I am requesting permission to conduct research in your Institution/ University. I am a PhD student at the University of South Africa and work at the Institute of Accountancy Arusha (IAA). My research title is "Library and Information Science Education: Proposing a curriculum model for the digital age".

I intend to obtain information from final year Library and Information Science (LIS) students, LIS department/faculty academic staff and academic heads of the LIS programmes through the use of questionnaires and in depth-interview. Participation is voluntary and informed consent will be received from the participants. A comprehensive written information form regarding the research will be given to participants. In order to ensure that the participant is protected, anonymity will be ensured. The name of the university and the participant will not be written during the reporting of the results phase.

Furthermore, responses and records from the participants will be kept strictly confidential. The researcher hopes that the outcomes of this research will help me to meet the requirements of a Doctor of Philosophy in information science qualification while shedding light on the possible improvements to the LIS curriculum and informing practices and policy formulation. Upon completion of this study, all involved parties will be informed of the study's outcomes. Should there be any queries or misunderstandings regarding the study, kindly contact the supervisor, Prof Mabel Minishi-Majanja: based at UNISA, college of Graduate studies.

The research proposal and the ethical clearance documents of the study were submitted to the Higher Degree Committee at UNISA for approval. The Committee approved the research proposal, and the ethical clearance certificate was issued.

Attached with the letter is the UNISA ethical clearance certificate. Your approval to conduct this research will be highly appreciated.

Joseph Solomon Daudi [10349154@mylife.unisa.ac.za | 2josephdavid@gmail.com]

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

Appendix II: Permission letter Mzumbe University

Joseph Solomon Daudi
P.O.Box 1440-Arusha
+255-659 777 773
20th March 2022.

Vice Chancellor,
MZUMBE UNIVERSITY
Morogoro - Tanzania

Re: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR INSTITUTION

I am requesting permission to conduct research in your Institution/ University. I am a PhD student at the University of South Africa and work at the Institute of Accountancy Arusha (IAA). My research title is "Library and Information Science Education: Proposing a curriculum model for the digital age".

I intend to obtain information from final year Library and Information Science (LIS) students, LIS department/faculty academic staff and academic heads of the LIS programmes through the use of questionnaires and in depth-interview. Participation is voluntary and informed consent will be received from the participants. A comprehensive written information form regarding the research will be given to participants. In order to ensure that the participant is protected, anonymity will be ensured. The name of the university and the participant will not be written during the reporting of the results phase.

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Appendix III: Permission letter Sokoine University of Agriculture

Joseph Solomon Daudi
P.O.Box 1440-Arusha
+255-659 777 773
20th March 2022.

Vice Chancellor,
SOKOINE UNIVERSITY OF AGRICULTURE
Morogoro - Tanzania

Re: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR INSTITUTION

I am requesting permission to conduct research in your Institution/ University. I am a PhD student at the University of South Africa and work at the Institute of Accountancy Arusha (IAA). My research title is "Library and Information Science Education: Proposing a curriculum model for the digital age".

I intend to obtain information from final year Library and Information Science (LIS) students, LIS department/faculty academic staff and academic heads of the LIS programmes through the use of questionnaires and in depth-interview. Participation is voluntary and informed consent will be received from the participants. A comprehensive written information form regarding the research will be given to participants. In order to ensure that the participant is protected, anonymity will be ensured. The name of the university and the participant will not be written during the reporting of the results phase.

Furthermore, responses and records from the participants will be kept strictly confidential. The researcher hopes that the outcomes of this research will help me to meet the requirements of a Doctor of Philosophy in information science qualification while shedding light on the possible improvements to the LIS curriculum and informing practices and policy formulation. Upon completion of this study, all involved parties will be informed of the study's outcomes. Should there be any queries or misunderstandings regarding the study, kindly contact the supervisor, Prof Mabel Minishi-Majanja: based at UNISA, college of Graduate studies.

The research proposal and the ethical clearance documents of the study were submitted to the Higher Degree Committee at UNISA for approval. The Committee approved the research proposal, and the ethical clearance certificate was issued.

Attached with the letter is the UNISA ethical clearance certificate. Your approval to conduct this research will be highly appreciated.

Joseph Solomon Daudi [10349154@mylife.unisa.ac.za | 2josephdavid@gmail.com]

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Appendix IV: Permission letter Tumaini University Dar es salaam College

Joseph Solomon Daudi
P.O.Box 1440-Arusha
+255-659 777 773
20th March 2022.

Vice Chancellor,
TUMAINI UNIVERSITY DAR ES SALAAM COLLEGE
Dar es Salaam - Tanzania

Re: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR INSTITUTION

I am requesting permission to conduct research in your Institution/ University. I am a PhD student at the University of South Africa and work at the Institute of Accountancy Arusha (IAA). My research title is "Library and Information Science Education: Proposing a curriculum model for the digital age".

I intend to obtain information from final year Library and Information Science (LIS) students, LIS department/faculty academic staff and academic heads of the LIS programmes through the use of questionnaires and in depth-interview. Participation is voluntary and informed consent will be received from the participants. A comprehensive written information form regarding the research will be given to participants. In order to ensure that the participant is protected, anonymity will be ensured. The name of the university and the participant will not be written during the reporting of the results phase.

Furthermore, responses and records from the participants will be kept strictly confidential. The researcher hopes that the outcomes of this research will help me to meet the requirements of a Doctor of Philosophy in information science qualification while shedding light on the possible improvements to the LIS curriculum and informing practices and policy formulation. Upon completion of this study, all involved parties will be informed of the study's outcomes. Should there be any queries or misunderstandings regarding the study, kindly contact the supervisor, Prof Mabel Minishi-Majanja: based at UNISA, college of Graduate studies.

The research proposal and the ethical clearance documents of the study were submitted to the Higher Degree Committee at UNISA for approval. The Committee approved the research proposal, and the ethical clearance certificate was issued.

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Appendix V: Permission letter Open University of Tanzania

Joseph Solomon Daudi
P.O.Box 1440-Arusha
+255-659 777 773
20th March 2022.

Vice Chancellor,
OPEN UNIVERSITY OF TANZANIA
Dar es Salaam - Tanzania

Re: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR INSTITUTION

I am requesting permission to conduct research in your Institution/ University. I am a PhD student at the University of South Africa and work at the Institute of Accountancy Arusha (IAA). My research title is "Library and Information Science Education: Proposing a curriculum model for the digital age".

I intend to obtain information from final year Library and Information Science (LIS) students, LIS department/faculty academic staff and academic heads of the LIS programmes through the use of questionnaires and in depth-interview. Participation is voluntary and informed consent will be received from the participants. A comprehensive written information form regarding the research will be given to participants. In order to ensure that the participant is protected, anonymity will be ensured. The name of the university and the participant will not be written during the reporting of the results phase.

Furthermore, responses and records from the participants will be kept strictly confidential. The researcher hopes that the outcomes of this research will help me to meet the requirements of a Doctor of Philosophy in information science qualification while shedding light on the possible improvements to the LIS curriculum and informing practices and policy formulation. Upon completion of this study, all involved parties will be informed of the study's outcomes. Should there be any queries or misunderstandings regarding the study, kindly contact the supervisor, Prof Mabel Minishi-Majanja: based at UNISA, college of Graduate studies.

The research proposal and the ethical clearance documents of the study were submitted to the Higher Degree Committee at UNISA for approval. The Committee approved the research proposal, and the ethical clearance certificate was issued.

Attached with the letter is the UNISA ethical clearance certificate. Your approval to conduct this research will be highly appreciated.

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Appendix VI: Permission letter Organisation

Joseph Solomon Daudi
P.O.Box 1440-Arusha
+255-659 777 773
20th March 2022.

Dear Sir/ Madam

Re: REQUEST FOR PERMISSION TO CONDUCT RESEARCH IN YOUR INSTITUTION

I am requesting permission to conduct research in your Institution/ University. I am a PhD student at the University of South Africa and work at the Institute of Accountancy Arusha (IAA). My research title is "Library and Information Science Education: Proposing a curriculum model for the digital age".

I intend to obtain information from final year Library and Information Science (LIS) students, LIS department/faculty academic staff and academic heads of the LIS programmes through the use of questionnaires and in depth-interview. Participation is voluntary and informed consent will be received from the participants. A comprehensive written information form regarding the research will be given to participants. In order to ensure that the participant is protected, anonymity will be ensured. The name of the university and the participant will not be written during the reporting of the results phase.

Furthermore, responses and records from the participants will be kept strictly confidential. The researcher hopes that the outcomes of this research will help me to meet the requirements of a Doctor of Philosophy in information science qualification while shedding light on the possible improvements to the LIS curriculum and informing practices and policy formulation. Upon completion of this study, all involved parties will be informed of the study's outcomes. Should there be any queries or misunderstandings regarding the study, kindly contact the supervisor, Prof Mabel Minishi-Majanja: based at UNISA, college of Graduate studies.

The research proposal and the ethical clearance documents of the study were submitted to the Higher Degree Committee at UNISA for approval. The Committee approved the research proposal, and the ethical clearance certificate was issued.

Attached with the letter is the UNISA ethical clearance certificate. Your approval to conduct this research will be highly appreciated.

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Appendix VI: Ethical clearance certificate

UNISA university of south africa

COLLEGE OF HUMAN SCIENCES RESEARCH ETHICS REVIEW COMMITTEE

29 November 2021

NHREC Registration # :
Rec-240816-052
CREC Reference # :
10349154_CREC_CHS_2021

Dear Mr. Joseph Solomon Daudi

Decision:
Ethics Approval from 29 November 2021 to 29 November 2026

Researcher(s): Name: Mr Joseph Solomon Daudi
Contact details: 10349154@mylife.unisa.ac.za
Supervisor(s): Name: Prof MK Minishi-Majanja
Contact details: 012 4296532 / +27725144951

Title: Library and information science education and training in Tanzania: Developing a curriculum model for the digital age

Degree Purpose: PhD

Thank you for the application for research ethics clearance by the Unisa College of Human Science Ethics Committee. Ethics approval is granted for five years.

The ***low risk application*** *was reviewed by* College of Human Sciences Research Ethics Committee, in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the

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confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.

5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No fieldwork activities may continue after the expiry date **(29 November 2026).** Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

*The reference number **10349154_CREC_CHS_2021** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature: pp

Prof. KB Khan
CHS Research Ethics Committee Chairperson
Email: khankb@unisa.ac.za
Tel: (012) 429 8210

Signature: PP

Prof K. Masemola
Executive Dean: CHS
E-mail: masemk@unisa.ac.za
Tel: (012) 429 2298

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Appendix VIII: Questionnaire for academic staff

UNISA university of south africa

PARTICIPANT INFORMATION SHEET

Date:_____

Title: Library and information science education in Tanzania: proposing a curriculum model for the digital age

Dear Prospective Participant

My name is JOSEPH SOLOMON DAUDI and I am doing research with Mabel K Minishi-Majanja, a Professor, in the Department of Information Science towards a PhD in Information Science at the University of South Africa. We are inviting you to participate in a study entitled Library and information science education and training in Tanzania: proposing a curriculum model for the digital age. I am conducting this research to propose a Bachelor degree curriculum model for LIS education and training in Tanzania that will meet the skills and competencies required for the digital age. This study chooses LISc heads of academic department and academic staff, LISc students; LISc employers and LISc employed staff. You have been selected to participate in this study because you have insights, expertise, authority, experience, and interest in the problem under investigation. Your contact details have been obtained from the admission office and human resource office of the HEI where you are currently working/ studying after seeking the permission to conduct this study.

The study involves questionnaires, semi-structured interviews and content analysis as a means of collecting data. The study will be guided by the following objectives:-

a) To Audit the LIS Bachelor degree curricula alignment with the Digital Age.
b) Establish digital competencies that Tanzanian LIS bachelor degree graduates must acquire for the Digital Age.
c) Explore digital competence and teaching methodologies of academic staff teaching LIS Bachelor degree programme in Tanzania.
d) Identify challenges that Tanzanian HLIs face, which prohibit the development and alignment of curriculum with the needs of Digital Age.

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e) Propose a curriculum framework for the re-/development of the LIS bachelor degree programme that responds to the needs of the Digital Age in Tanzania.

The survey takes an average of twenty minutes to complete. Time allocate to conduct interview is fifty minutes. Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. It will not be possible to withdraw once you have submitted the questionnaire. Any information that you are going to provide will be used in the development of the LIS Bachelor degree curriculum model that will respond to the needs of the digital age in Tanzania. There are no risks to the participants who are going to participate in this study. You do not need to mention your name in this survey. All answers that you are going to provide will be kept private and no one will be able to connect the answers you have provided in the survey. The information will be collected and stored confidentially for future references and later on be destroyed. Apart from the researcher and identified members of the research team, no person will know about your involvement in this research. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. The researcher will be available only to people working on the study and no person will have the access to the records without researcher's permission and the approval from the Research Ethics Review Committee. Data that are going to be collected from you may be used for other purposes, such as a research report, journal articles and/or conference proceedings. A report of the study may be submitted for publication, but you will not be identified to prevent your privacy.

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at home for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Hard copies will be shredded. Participation in this study does not involve any form of payment. This study has received written approval from the Research Ethics Review Committee of the College of Human Sciences-Department of Information, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

The findings are accessible for five years. Should you require any further information or want to contact the researcher about any aspect of this study, please contact +255 659 777 773

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Should you have concerns about the way in which the research has been conducted, you may contact majanmk@unisa.ac.za (+012 4296532) in case of student project. Alternatively, contact the research ethics chairperson of the Department of Information Science Ethics Committees, Dr Isabel Schellnack-Kelly 0124296071 or via email at schelis@unisa.ac.za

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

Joseph Solomon Daudi

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CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the <insert specific data collection method>.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname…… (please print)

Participant Signature……..Date……

Researcher's Name & Surname……(please print)

Researcher's signature……..Date……

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1. Demographic Data

1.1 Gender of the respondents? Please tick as applicable.

1.1.1 Female [ ]

1.1.2 Male [ ]

1.2 Age Group? Please tick as applicable. Please tick as applicable

1.2.1 1960 – 1980 (Generation X) [ ]

1.2.2 1981- 2000 (Millennial) [ ]

1.2.3 2000- present (Generation Z) [ ]

1.3 Please tick as applicable, on the Educational Qualifications. Please tick as applicable.

1.3.1 PhD [ ]

1.3.2 Master's degree [ ]

1.3.3 Postgraduate Diploma [ ]

1.3.4 Bachelor Degree [ ]

1.4 Indicate the name of the university where you are currently affiliated to? Please tick as applicable.

1.4.1 University Of Dar Es Salaam [ ]

1.4.2 Tumaini University, Dar Es Salaam College [ ]

1.4.3 Mzumbe University [ ]

1.4.4 Sokoine University Of Agriculture [ ]

1.4.5 Open University Of Tanzania [ ]

2. Questions Based on the Research Objectives

2.1 Reflecting on your own training, education and your preparedness for the various roles and positions in your career, do you think that the current LIS education provided in the HLIs, is relevant to the needs of the digital age?

2.1.1 Curriculum is up to date [ ]

2.1.2 Curriculum is partially up to date [ ]

2.1.3 Curriculum is outdated [ ]

2.2 Does your HLI have adequate ICT infrastructure to support digital skills learning? Please tick as applicable.

Sn	ICT Facilities available at HLIs Under Study	(Tick)
1	LCD projectors	
2	Computers	
3	Internet/Wi-Fi	
4	Printer	
5	Library Software	
6	Scanners	
7	Laptops	

2.3 Which of the following teaching methods do you find effective for ICT Related courses? Please tick as applicable. [SA = Strongly Agree, A = Agree, U = Uncertain, D = Disagree, SD = Strongly Disagree]

Sn	Teaching Methods	SA	A	U	D	SD
1	Field visits to information and case studies					
1	Group working					
2	Lectures /Power point presentations					

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Sn	Teaching Methods	SA	A	U	D	SD
3	Online					
4	Practical exercises					
5	Project work					
6	Self-study					

2.4 Are there any challenges faced by your HLI that impedes the alignment of the LIS curriculum to the needs of the digital age? Please tick as appropriate.

sn	Institutional Challenges	(Tick)
1	Gap between teaching and practicing	
2	Lack of adequate academic staff	
3	Lack of adequate ICT facilities	
4	Lack of learning resources	
5	Lack of professional board involvement	
6	Lack of standard guidelines in developing LIS curricula	

2.4.1 Others (please specify)

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2.5 Based on the changing environment of libraries and information services, which of the following modules are required to be integrated in Library and information science/ studies curriculum? Please tick as applicable.

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Note

[HR = Highly required, MD= Moderately required, BR = Basically required, NR = Not Required]

Sn	Competences required	HR	MD	BR	NR
1	Artificial Intelligence				
2	Computer Applications				
3	Computer Maintenance				
4	Computer Security				
5	Cryptology and Coding Theory				
6	Data Mining				
7	Data Structure and Algorithms				
8	Database Systems				
9	Digital Library technologies				
10	Graphics Design				
11	Information Security				
12	Internet Applications				
13	IT Project Management				
14	Mobile Computing				
15	Multimedia				
16	Network Management and Administration				

Sn	Competences required	H R	MD	BR	NR
17	Open-Source Software Deployment				
18	Operating Systems				
19	Principles of Programming				
20	Social and Ethical Issues in Computing				
21	Systems Analysis and Design				
22	Systems Architecture				
23	Web Design				

2.6 others, please specify below;

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2.7 Recommend the assessment approach that can be adopted to ensure theories and practices are well covered (Please tick once as applicable)

Sn	Responses on Preference of assessment approach	(Tick)
1	Classroom Work (50%), Laboratory Work (30%), Student's, Project/Case Studies (10%), Field Training (10%)	

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Sn	Responses on Preference of assessment approach	(Tick)
2	Classroom Work (60%), Laboratory Work (20%), Student's Project/Case Studies (10%), Field Training (10%)	
3	Classroom Work (40%), Laboratory Work (30%), Student's, Project/Case Studies (15%), Field Training (15%)	
4	Classroom Work (40%), Laboratory Work (25%), Student's Project/Case Studies (20%), Field Training (15%)	

2.8 Recommend on the assessment of practical courses. (Please tick once as applicable)

Sn	Responses on assessment preference on practical courses	(Tick)
1	Theory and practical examination	
2	Practical semester examination	
3	Theory examination	

2.9 Recommend on the educational delivery approach (Please tick once as applicable)

Sn	Delivery Approach	(Tick)
1	Conventional learning	
2	Blended learning	
3	Distance learning	

2.10 Do you have any additional comments you feel would be helpful for this study?

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Appendix IX: Questionnaire for employers

UNISA university of south africa

PARTICIPANT INFORMATION SHEET

Date:_____

Title: Library and information science education in Tanzania: proposing a curriculum model for the digital age

Dear Prospective Participant

My name is JOSEPH SOLOMON DAUDI and I am doing research with Mabel K Minishi-Majanja, a Professor, in the Department of Information Science towards a PhD in Information Science at the University of South Africa. We are inviting you to participate in a study entitled Library and information science education and training in Tanzania: proposing a curriculum model for the digital age. I am conducting this research to propose a Bachelor degree curriculum model for LIS education and training in Tanzania that will meet the skills and competencies required for the digital age. This study chooses LISc heads of academic department and academic staff, LISc students; LISc employers and LISc employed staff. You have been selected to participate in this study because you have insights, expertise, authority, experience, and interest in the problem under investigation. Your contact details have been obtained from the admission office and human resource office of the HEI where you are currently working/ studying after seeking the permission to conduct this study.

The study involves questionnaires, semi-structured interviews and content analysis as a means of collecting data. The study will be guided by the following objectives:-

a) To Audit the LIS Bachelor degree curricula alignment with the Digital Age.
b) Establish digital competencies that Tanzanian LIS bachelor degree graduates must acquire for the Digital Age.
c) Explore digital competence and teaching methodologies of academic staff teaching LIS Bachelor degree programme in Tanzania.
d) Identify challenges that Tanzanian HLIs face, which prohibit the development and alignment of curriculum with the needs of Digital Age.

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e) Propose a curriculum framework for the re-/development of the LIS bachelor degree programme that responds to the needs of the Digital Age in Tanzania.

The survey takes an average of twenty minutes to complete. Time allocate to conduct interview is fifty minutes. Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. It will not be possible to withdraw once you have submitted the questionnaire. Any information that you are going to provide will be used in the development of the LIS Bachelor degree curriculum model that will respond to the needs of the digital age in Tanzania. There are no risks to the participants who are going to participate in this study. You do not need to mention your name in this survey. All answers that you are going to provide will be kept private and no one will be able to connect the answers you have provided in the survey. The information will be collected and stored confidentially for future references and later on be destroyed. Apart from the researcher and identified members of the research team, no person will know about your involvement in this research. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. The researcher will be available only to people working on the study and no person will have the access to the records without researcher's permission and the approval from the Research Ethics Review Committee. Data that are going to be collected from you may be used for other purposes, such as a research report, journal articles and/or conference proceedings. A report of the study may be submitted for publication, but you will not be identified to prevent your privacy.

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at home for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Hard copies will be shredded. Participation in this study does not involve any form of payment. This study has received written approval from the Research Ethics Review Committee of the College of Human Sciences-Department of Information, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

The findings are accessible for five years. Should you require any further information or want to contact the researcher about any aspect of this study, please contact +255 659 777 773

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Should you have concerns about the way in which the research has been conducted, you may contact majanmk@unisa.ac.za (+012 4296532) in case of student project. Alternatively, contact the research ethics chairperson of the Department of Information Science Ethics Committees, Dr Isabel Schellnack-Kelly 0124296071 or via email at schelis@unisa.ac.za

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

Joseph Solomon Daudi

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CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the <insert specific data collection method>.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname…… (please print)

Participant Signature……..Date……

Researcher's Name & Surname……(please print)

Researcher's signature……..Date……

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1. Demographic Data

1.1 Gender of the respondents? Please tick as applicable.

1.1.1 Female [ ]

1.1.2 Male [ ]

1.2 Age Group? Please tick as applicable. Please tick as applicable

1.2.1 1960 – 1980 (Generation X) [ ]

1.2.2 1981- 2000 (Millennial) [ ]

1.2.3 2000- present (Generation Z) [ ]

1.3 Please tick as applicable, on the Educational Qualifications. Please tick as applicable.

1.3.1 PhD [ ]

1.3.2 Master's degree [ ]

1.3.3 Postgraduate Diploma [ ]

1.3.4 Bachelor Degree [ ]

1.4 Indicate the name of the university where you are currently affiliated to? Please tick as applicable.

1.4.1 University Of Dar Es Salaam [ ]

1.4.2 Tumaini University, Dar Es Salaam College [ ]

1.4.3 Mzumbe University [ ]

1.4.4 Sokoine University Of Agriculture [ ]

1.4.5 Open University Of Tanzania [ ]

2. Questions Based on the Research Objectives

2.1 Reflecting on your own training, education and your preparedness for the various roles and positions in your career, do you think that the current LIS education provided in the HLIs, is relevant to the needs of the digital age?

2.1.1 Curriculum is up to date [ ]

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2.1.2 Curriculum is partially up to date [ ]

2.1.3 Curriculum is outdated [ ]

2.2 Based on your experience working in library environment, which of the following ICT skills and knowledge are required to LISC professionals in order to operate libraries effectively in the digital age? Please tick as applicable.

Note:
NI= Not Important skill, SI= Slightly Important skill, MI = moderately Important skill, IS = Important skill, VI = Very Important skills, ADS= Advanced digital skills, DTS= Digital technical skills, DIMS= Digital information management skills]

2.2.1 Advanced digital skills

Sn	Competences	NI	SI	MI	I	VI
1	Assist in system development and customization					
2	Designing new computer systems and frameworks					
3	Develop library website					
4	Maintaining and upgrading existing systems as required					
5	Manage servers and technology tools					
6	Mange to Set up users' accounts and workstations					
7	Perform data backup local and through the cloud					
8	perform data migration					
9	Perform Troubleshooting issues					
10	Verifying the security of third-party vendors to meet security requirements					

Sn	Competences	NI	SI	MI	I	VI
11	Write software codes					

2.2.2 Digital Information Management skills

Note:

NI= Not Important skill, SI= Slightly Important skill, MI = moderately Important skill, IS = Important skill, VI = Very Important skills, ADS= Advanced digital skills, DTS= Digital technical skills, DIMS= Digital information management skills]

Sn	Competencies	NI	SI	MI	I	VI
1	Decode, restructure and protect digital information					
2	Evaluate digital information					
3	Generate, organise, integrate, analyses digital content and knowledge					
4	Process, organise and store digital information to facilitate retrieval and use					
5	Select, search and retrieve digital information					
	Share digital information					
	Use information in various digital formats					

2.2.3 Digital technical skills

Note:

NI= Not Important skill, SI= Slightly Important skill, MI = moderately Important skill, IS = Important skill, VI = Very Important skills, ADS=

Advanced digital skills, DTS= Digital technical skills, DIMS= Digital information management skills]

Sn	Digital Technical skills	NI	SI	MI	I	VI
1	Conduct internal and external system security audits					
2	Evaluate software applications to determine the effectiveness of the system performance					
3	Install security software like firewalls and essential data encryption programme to safeguard the organisation's vital data.					
4	Maintain user id and passwords in the information system					
5	Manage access to the systems					
6	Secure personal information against threats					
7	Use cloud computing applications to store, retrieve and work online, such as google docs					
8	Use data management software such as SPSS for computing data.					
9	Use database software, e.g. Oracle					
10	Use design software to prepare flow charts and diagrams, e.g., Ms. Visio					
11	Use Library management software, e.g. Koha, for library data management and services provision					
12	Use multimedia and publisher application software, for preparing promotion materials and listening to or viewing information.					
13	Use operating systems, such as Windows and Mac.					
14	Use presentation application software such as MS. PowerPoint for presenting data.					

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Sn	Digital Technical skills	NI	SI	MI	I	VI
15	Use project management software to prepare project work plans such as MS. project.					
16	Use spreadsheet application software such as MS. Excel for computing data					
17	Use web 2.0 collaboration tools such as Facebook, Google, and YouTube for communication, and social networking.					
18	Use word application software such as Ms. word to prepare word documents.					

2.2.4 Others (please specify)

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2.3 Based on the changing environment of libraries and information services, which of the following modules are required to be integrated in Library and information science/ studies curriculum? Please tick as applicable.

Note

[HR = Highly required, MD= Moderately required, BR = Basically required, NR = Not Required]

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Sn	Competences required	HR	MD	BR	NR
1	Artificial Intelligence				
2	Computer Applications				
3	Computer Maintenance				
4	Computer Security				
5	Cryptology and Coding Theory				
6	Data Mining				
7	Data Structure and Algorithms				
8	Database Systems				
9	Digital Library technologies				
10	Graphics Design				
11	Information Security				
12	Internet Applications				
13	IT Project Management				
14	Mobile Computing				
15	Multimedia				
16	Network Management and Administration				
17	Open-Source Software Deployment				
18	Operating Systems				
19	Principles of Programming				
20	Social and Ethical Issues in				

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Sn	Competences required	HR	MD	BR	NR
	Computing				
21	Systems Analysis and Design				
22	Systems Architecture				
23	Web Design				

2.4 others, please specify below;

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2.5 Recommend the assessment approach that can be adopted to ensure theories and practices are well covered (Please tick once as applicable)

Sn	Responses on Preference of assessment approach	(Tick)
1	Classroom Work (50%), Laboratory Work (30%), Student's, Project/Case Studies (10%), Field Training (10%)	
2	Classroom Work (60%), Laboratory Work (20%), Student's Project/Case Studies (10%), Field Training (10%)	
3	Classroom Work (40%), Laboratory Work (30%), Student's, Project/Case Studies (15%), Field Training (15%)	

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Sn	Responses on Preference of assessment approach	(Tick)
4	Classroom Work (40%), Laboratory Work (25%), Student's Project/Case Studies (20%), Field Training (15%)	

2.6 Recommend on the assessment of practical courses. (Please tick once as applicable)

Sn	Responses on assessment preference on practical courses	(Tick)
1	Theory and practical examination	
2	Practical semester examination	
3	Theory examination	

2.7 Recommend on the educational delivery approach (Please tick once as applicable)

Sn	Delivery Approach	(Tick)
1	Conventional learning	
2	Blended learning	
3	Distance learning	

2.8 Do you have any additional comments you feel would be helpful for this study?

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Appendix X: Questionnaire for Library and information science graduates

UNISA university of south africa

PARTICIPANT INFORMATION SHEET

Date: _____

Title: Library and information science education in Tanzania: proposing a curriculum model for the digital age

Dear Prospective Participant

My name is JOSEPH SOLOMON DAUDI and I am doing research with Mabel K Minishi-Majanja, a Professor, in the Department of Information Science towards a PhD in Information Science at the University of South Africa. We are inviting you to participate in a study entitled Library and information science education and training in Tanzania: proposing a curriculum model for the digital age. I am conducting this research to propose a Bachelor degree curriculum model for LIS education and training in Tanzania that will meet the skills and competencies required for the digital age. This study chooses LISc heads of academic department and academic staff, LISc students; LISc employers and LISc employed staff. You have been selected to participate in this study because you have insights, expertise, authority, experience, and interest in the problem under investigation. Your contact details have been obtained from the admission office and human resource office of the HEI where you are currently working/ studying after seeking the permission to conduct this study.

The study involves questionnaires, semi-structured interviews and content analysis as a means of collecting data. The study will be guided by the following objectives:-

a) To Audit the LIS Bachelor degree curricula alignment with the Digital Age.
b) Establish digital competencies that Tanzanian LIS bachelor degree graduates must acquire for the Digital Age.
c) Explore digital competence and teaching methodologies of academic staff teaching LIS Bachelor degree programme in Tanzania.
d) Identify challenges that Tanzanian HLIs face, which prohibit the development and alignment of curriculum with the needs of Digital Age.

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e) Propose a curriculum framework for the re-/development of the LIS bachelor degree programme that responds to the needs of the Digital Age in Tanzania.

The survey takes an average of twenty minutes to complete. Time allocate to conduct interview is fifty minutes. Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. It will not be possible to withdraw once you have submitted the questionnaire. Any information that you are going to provide will be used in the development of the LIS Bachelor degree curriculum model that will respond to the needs of the digital age in Tanzania. There are no risks to the participants who are going to participate in this study. You do not need to mention your name in this survey. All answers that you are going to provide will be kept private and no one will be able to connect the answers you have provided in the survey. The information will be collected and stored confidentially for future references and later on be destroyed. Apart from the researcher and identified members of the research team, no person will know about your involvement in this research. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. The researcher will be available only to people working on the study and no person will have the access to the records without researcher's permission and the approval from the Research Ethics Review Committee. Data that are going to be collected from you may be used for other purposes, such as a research report, journal articles and/or conference proceedings. A report of the study may be submitted for publication, but you will not be identified to prevent your privacy.

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at home for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Hard copies will be shredded. Participation in this study does not involve any form of payment. This study has received written approval from the Research Ethics Review Committee of the College of Human Sciences-Department of Information, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

The findings are accessible for five years. Should you require any further information or want to contact the researcher about any aspect of this study, please contact +255 659 777 773

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Should you have concerns about the way in which the research has been conducted, you may contact majanmk@unisa.ac.za (+012 4296532) in case of student project. Alternatively, contact the research ethics chairperson of the Department of Information Science Ethics Committees, Dr Isabel Schellnack-Kelly 0124296071 or via email at schelis@unisa.ac.za

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

Joseph Solomon Daudi

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CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the <insert specific data collection method>.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname…… (please print)

Participant Signature……..Date……

Researcher's Name & Surname……(please print)

Researcher's signature……..Date……

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1. Demographic Data

1.1 Gender of the respondents? Please tick as applicable.

1.1.1 Female [ ]

1.1.2 Male [ ]

1.2 Age Group? Please tick as applicable. Please tick as applicable

1.2.1 1960 – 1980 (Generation X) [ ]

1.2.2 1981- 2000 (Millennial) [ ]

1.2.3 2000- present (Generation Z) [ ]

1.3 Please tick as applicable, on the Educational Qualifications. Please tick as applicable.

1.3.1 PhD [ ]

1.3.2 Master's degree [ ]

1.3.3 Postgraduate Diploma [ ]

1.3.4 Bachelor Degree [ ]

1.4 Indicate the name of the university where you are currently affiliated to? Please tick as applicable.

1.4.1 University Of Dar Es Salaam [ ]

1.4.2 Tumaini University, Dar Es Salaam College [ ]

1.4.3 Mzumbe University [ ]

1.4.4 Sokoine University Of Agriculture [ ]

1.4.5 Open University Of Tanzania [ ]

2. Questions Based on the Research Objectives

2.1 Reflecting on your own training, education and your preparedness for the various roles and positions in your career, do you think that the current LIS education provided in the HLIs, is relevant to the needs of the digital age?

2.1.1 Curriculum is up to date [ ]

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2.1.2 Curriculum is partially up to date [ ]

2.1.3 Curriculum is outdated [ ]

2.2 Please rate your abilities on the use of the digital skills. Please tick as applicable.

Note:

VP= Very Poor skills, P = Poor Skills , F = Fair skill, G= Good skills, E= Excellent

2.2.1 Advanced digital skills

Sn	Competences	NI	SI	MI	I	VI
1	Assist in system development and customization					
2	Designing new computer systems and frameworks					
3	Develop library website					
4	Maintaining and upgrading existing systems as required					
5	Manage servers and technology tools					
6	Mange to Set up users' accounts and workstations					
7	Perform data backup local and through the cloud					
8	perform data migration					
9	Perform Troubleshooting issues					
10	Verifying the security of third-party vendors to meet security requirements					
11	Write software codes					

2.2.2 Digital Information Management skills

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Note:

VP= Very Poor skills, P = Poor Skills , F = Fair skill, G= Good skills, E= Excellent

Sn	Competencies	NI	SI	MI	I	VI
1	Decode, restructure and protect digital information					
2	Evaluate digital information					
3	Generate, organise, integrate, analyses digital content and knowledge					
4	Process, organise and store digital information to facilitate retrieval and use					
5	Select, search and retrieve digital information					
6	Share digital information					
7	Use information in various digital formats					

2.2.3 Digital technical skills

Note:

VP= Very Poor skills, P = Poor Skills , F = Fair skill, G= Good skills, E= Excellent

Sn	Digital Technical skills	NI	SI	MI	I	VI
1	Conduct internal and external system security audits					

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Sn	Digital Technical skills	NI	SI	MI	I	VI
2	Evaluate software applications to determine the effectiveness of the system performance					
3	Install security software like firewalls and essential data encryption programme to safeguard the organisation's vital data.					
4	Maintain user id and passwords in the information system					
5	Manage access to the systems					
6	Secure personal information against threats					
7	Use cloud computing applications to store, retrieve and work online, such as google docs					
8	Use data management software such as SPSS for computing data.					
9	Use database software, e.g. Oracle					
10	Use design software to prepare flow charts and diagrams, e.g., Ms. Visio					
11	Use Library management software, e.g. Koha, for library data management and services provision					
12	Use multimedia and publisher application software, for preparing promotion materials and listening to or viewing information.					
13	Use operating systems, such as Windows and Mac.					
14	Use presentation application software such as MS. PowerPoint for presenting data.					
15	Use project management software to prepare project work plans such as MS. project.					
16	Use spreadsheet application software such as MS. Excel for computing data					

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Sn	Digital Technical skills	NI	SI	MI	I	VI
17	Use web 2.0 collaboration tools such as Facebook, Google, and YouTube for communication, and social networking.					
18	Use word application software such as Ms. word to prepare word documents.					

2.2.4 Others (please specify)

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2.3 Based on the changing environment of libraries and information services, which of the following modules are required to be integrated in Library and information science/ studies curriculum? Please tick as applicable.

Note

[HR = Highly required, MD= Moderately required, BR = Basically required, NR = Not Required]

Sn	Competences required	HR	MD	BR	NR
1	Artificial Intelligence				
2	Computer Applications				

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Sn	Competences required	HR	MD	BR	NR
3	Computer Maintenance				
4	Computer Security				
5	Cryptology and Coding Theory				
6	Data Mining				
7	Data Structure and Algorithms				
8	Database Systems				
9	Digital Library technologies				
10	Graphics Design				
11	Information Security				
12	Internet Applications				
13	IT Project Management				
14	Mobile Computing				
15	Multimedia				
16	Network Management and Administration				
17	Open-Source Software Deployment				
18	Operating Systems				
19	Principles of Programming				
20	Social and Ethical Issues in Computing				
21	Systems Analysis and Design				

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Sn	Competences required	HR	MD	BR	NR
22	Systems Architecture				
23	Web Design				

2.3.1 others, please specify below;

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2.4 Recommend the assessment approach that can be adopted to ensure theories and practices are well covered (Please tick once as applicable)

Sn	Responses on Preference of assessment approach	(Tick)
1	Classroom Work (50%), Laboratory Work (30%), Student's, Project/Case Studies (10%), Field Training (10%)	
2	Classroom Work (60%), Laboratory Work (20%), Student's Project/Case Studies (10%), Field Training (10%)	
3	Classroom Work (40%), Laboratory Work (30%), Student's, Project/Case Studies (15%), Field Training (15%)	
4	Classroom Work (40%), Laboratory Work (25%), Student's Project/Case Studies (20%), Field Training (15%)	

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2.5 Recommend on the assessment of practical courses. (Please tick once as applicable)

Sn	Responses on assessment preference on practical courses	(Tick)
1	Theory and practical examination	
2	Practical semester examination	
3	Theory examination	

2.6 Recommend on the educational delivery approach (Please tick once as applicable)

Sn	Delivery Approach	(Tick)
1	Conventional learning	
2	Blended learning	
3	Distance learning	

2.7 Do you have any additional comments you feel would be helpful for this study?

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Appendix XI: Questionnaire Students

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PARTICIPANT INFORMATION SHEET

Date:_____

Title: Library and information science education in Tanzania: proposing a curriculum model for the digital age

Dear Prospective Participant

My name is JOSEPH SOLOMON DAUDI and I am doing research with Mabel K Minishi-Majanja, a Professor, in the Department of Information Science towards a PhD in Information Science at the University of South Africa. We are inviting you to participate in a study entitled Library and information science education and training in Tanzania: proposing a curriculum model for the digital age. I am conducting this research to propose a Bachelor degree curriculum model for LIS education and training in Tanzania that will meet the skills and competencies required for the digital age. This study chooses LISc heads of academic department and academic staff, LISc students; LISc employers and LISc employed staff. You have been selected to participate in this study because you have insights, expertise, authority, experience, and interest in the problem under investigation. Your contact details have been obtained from the admission office and human resource office of the HEI where you are currently working/ studying after seeking the permission to conduct this study.

The study involves questionnaires, semi-structured interviews and content analysis as a means of collecting data. The study will be guided by the following objectives:-

a) To Audit the LIS Bachelor degree curricula alignment with the Digital Age.
b) Establish digital competencies that Tanzanian LIS bachelor degree graduates must acquire for the Digital Age.
c) Explore digital competence and teaching methodologies of academic staff teaching LIS Bachelor degree programme in Tanzania.
d) Identify challenges that Tanzanian HLIs face, which prohibit the development and alignment of curriculum with the needs of Digital Age.

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e) Propose a curriculum framework for the re-/development of the LIS bachelor degree programme that responds to the needs of the Digital Age in Tanzania.

The survey takes an average of twenty minutes to complete. Time allocate to conduct interview is fifty minutes. Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. It will not be possible to withdraw once you have submitted the questionnaire. Any information that you are going to provide will be used in the development of the LIS Bachelor degree curriculum model that will respond to the needs of the digital age in Tanzania. There are no risks to the participants who are going to participate in this study. You do not need to mention your name in this survey. All answers that you are going to provide will be kept private and no one will be able to connect the answers you have provided in the survey. The information will be collected and stored confidentially for future references and later on be destroyed. Apart from the researcher and identified members of the research team, no person will know about your involvement in this research. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. The researcher will be available only to people working on the study and no person will have the access to the records without researcher's permission and the approval from the Research Ethics Review Committee. Data that are going to be collected from you may be used for other purposes, such as a research report, journal articles and/or conference proceedings. A report of the study may be submitted for publication, but you will not be identified to prevent your privacy.

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at home for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Hard copies will be shredded. Participation in this study does not involve any form of payment. This study has received written approval from the Research Ethics Review Committee of the College of Human Sciences-Department of Information, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

The findings are accessible for five years. Should you require any further information or want to contact the researcher about any aspect of this study, please contact +255 659 777 773

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Should you have concerns about the way in which the research has been conducted, you may contact majanmk@unisa.ac.za (+012 4296532) in case of student project. Alternatively, contact the research ethics chairperson of the Department of Information Science Ethics Committees, Dr Isabel Schellnack-Kelly 0124296071 or via email at schelis@unisa.ac.za

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

Joseph Solomon Daudi

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CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the <insert specific data collection method>.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname…… (please print)

Participant Signature……..Date……

Researcher's Name & Surname……(please print)

Researcher's signature……..Date……

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1. Demographic Data

1.1 Gender of the respondents? Please tick as applicable.

1.1.1 Female [ ]

1.1.2 Male [ ]

1.2 Age Group? Please tick as applicable. Please tick as applicable

1.2.1 1960 – 1980 (Generation X) [ ]

1.2.2 1981- 2000 (Millennial) [ ]

1.2.3 2000- present (Generation Z) [ ]

1.3 Please tick as applicable, on the Educational Qualifications. Please tick as applicable.

1.3.1 PhD [ ]

1.3.2 Master's degree [ ]

1.3.3 Postgraduate Diploma [ ]

1.3.4 Bachelor Degree [ ]

1.4 Indicate the name of the university where you are currently affiliated to? Please tick as applicable.

1.4.1 University Of Dar Es Salaam [ ]

1.4.2 Tumaini University, Dar Es Salaam College [ ]

1.4.3 Mzumbe University [ ]

1.4.4 Sokoine University Of Agriculture [ ]

1.4.5 Open University Of Tanzania [ ]

2. Questions Based on the Research Objectives

2.1 Reflecting on your own training, education and your preparedness for the various roles and positions in your career, do you think that the current LIS education provided in the HLIs, is relevant to the needs of the digital age?

2.1.1 Curriculum is up to date [ ]

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2.1.2 Curriculum is partially up to date [ ]

2.1.3 Curriculum is outdated [ ]

2.2 Does your HLI have adequate ICT infrastructure to support digital skills learning? Please tick as applicable.

Sn	ICT Facilities available at HLIs Under Study	(Tick)
1	LCD projectors	
2	Computers	
3	Internet/Wi-Fi	
4	Printer	
5	Library Software	
6	Scanners	
7	Laptops	

2.3 Which of the following teaching methods do you find effective for ICT Related courses? Please tick as applicable. [SA = Strongly Agree, A = Agree, U = Uncertain, D = Disagree, SD = Strongly Disagree]

Sn	Teaching Methods	SA	A	U	D	SD
1	Field visits to information and case studies					
1	Group working					
2	Lectures /Power point presentations					

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Sn	Teaching Methods	SA	A	U	D	SD
4	Online					
5	Practical exercises					
6	Project work					
7	Self-study					

2.4 Based on the changing environment of libraries and information services, which of the following modules are required to be integrated in Library and information science/ studies curriculum? Please tick as applicable.

Note
[HR = Highly required, MD= Moderately required, BR = Basically required, NR = Not Required]

Sn	Competences required	HR	MD	BR	NR
1	Artificial Intelligence				
2	Computer Applications				
3	Computer Maintenance				
4	Computer Security				
5	Cryptology and Coding Theory				
6	Data Mining				
7	Data Structure and Algorithms				
8	Database Systems				

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Sn	Competences required	HR	MD	BR	NR
9	Digital Library technologies				
10	Graphics Design				
11	Information Security				
12	Internet Applications				
13	IT Project Management				
14	Mobile Computing				
15	Multimedia				
16	Network Management and Administration				
17	Open-Source Software Deployment				
18	Operating Systems				
19	Principles of Programming				
20	Social and Ethical Issues in Computing				
21	Systems Analysis and Design				
22	Systems Architecture				
23	Web Design				

2.5 others, please specify below;

.....

.....

.....

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.....

.....

.....

2.6 Recommend the assessment approach that can be adopted to ensure theories and practices are well covered (Please tick once as applicable)

Sn	Responses on Preference of assessment approach	(Tick)
1	Classroom Work (50%), Laboratory Work (30%), Student's, Project/Case Studies (10%), Field Training (10%)	
2	Classroom Work (60%), Laboratory Work (20%), Student's Project/Case Studies (10%), Field Training (10%)	
3	Classroom Work (40%), Laboratory Work (30%), Student's, Project/Case Studies (15%), Field Training (15%)	
4	Classroom Work (40%), Laboratory Work (25%), Student's Project/Case Studies (20%), Field Training (15%)	

2.7 Recommend on the assessment of practical courses. (Please tick once as applicable)

Sn	Responses on assessment preference on practical courses	(Tick)
1	Theory and practical examination	
2	Practical semester examination	
3	Theory examination	

2.8 Recommend on the educational delivery approach (Please tick once as

applicable)

Sn	Delivery Approach	(Tick)
1	Conventional learning	
2	Blended learning	
3	Distance learning	

2.9 Do you have any additional comments you feel would be helpful for this study?

.....

.....

.....

.....

.....

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Appendix XII: Interview guide for academic department representatives

UNISA university of south africa

PARTICIPANT INFORMATION SHEET

Date:_____

Title: Library and information science education in Tanzania: proposing a curriculum model for the digital age

Dear Prospective Participant

My name is JOSEPH SOLOMON DAUDI and I am doing research with Mabel K Minishi-Majanja, a Professor, in the Department of Information Science towards a PhD in Information Science at the University of South Africa. We are inviting you to participate in a study entitled Library and information science education and training in Tanzania: proposing a curriculum model for the digital age. I am conducting this research to propose a Bachelor degree curriculum model for LIS education and training in Tanzania that will meet the skills and competencies required for the digital age. This study chooses LISc heads of academic department and academic staff, LISc students; LISc employers and LISc employed staff. You have been selected to participate in this study because you have insights, expertise, authority, experience, and interest in the problem under investigation. Your contact details have been obtained from the admission office and human resource office of the HEI where you are currently working/ studying after seeking the permission to conduct this study.

The study involves questionnaires, semi-structured interviews and content analysis as a means of collecting data. The study will be guided by the following objectives:-

a) To Audit the LIS Bachelor degree curricula alignment with the Digital Age.
b) Establish digital competencies that Tanzanian LIS bachelor degree graduates must acquire for the Digital Age.
c) Explore digital competence and teaching methodologies of academic staff teaching LIS Bachelor degree programme in Tanzania.
d) Identify challenges that Tanzanian HLIs face, which prohibit the development and alignment of curriculum with the needs of Digital Age.

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e) Propose a curriculum framework for the re-/development of the LIS bachelor degree programme that responds to the needs of the Digital Age in Tanzania.

The survey takes an average of twenty minutes to complete. Time allocate to conduct interview is fifty minutes. Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. It will not be possible to withdraw once you have submitted the questionnaire. Any information that you are going to provide will be used in the development of the LIS Bachelor degree curriculum model that will respond to the needs of the digital age in Tanzania. There are no risks to the participants who are going to participate in this study. You do not need to mention your name in this survey. All answers that you are going to provide will be kept private and no one will be able to connect the answers you have provided in the survey. The information will be collected and stored confidentially for future references and later on be destroyed. Apart from the researcher and identified members of the research team, no person will know about your involvement in this research. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. The researcher will be available only to people working on the study and no person will have the access to the records without researcher's permission and the approval from the Research Ethics Review Committee. Data that are going to be collected from you may be used for other purposes, such as a research report, journal articles and/or conference proceedings. A report of the study may be submitted for publication, but you will not be identified to prevent your privacy.

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet at home for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. Hard copies will be shredded. Participation in this study does not involve any form of payment. This study has received written approval from the Research Ethics Review Committee of the College of Human Sciences-Department of Information, Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

The findings are accessible for five years. Should you require any further information or want to contact the researcher about any aspect of this study, please contact +255 659 777 773

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Should you have concerns about the way in which the research has been conducted, you may contact majanmk@unisa.ac.za (+012 4296532) in case of student project. Alternatively, contact the research ethics chairperson of the Department of Information Science Ethics Committees, Dr Isabel Schellnack-Kelly 0124296071 or via email at schelis@unisa.ac.za

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

Joseph Solomon Daudi

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CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the <insert specific data collection method>.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname…… (please print)

Participant Signature……..Date……

Researcher's Name & Surname……(please print)

Researcher's signature……..Date……

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INTERVIEW GUIDE

1. **Demographic Data**

   1.1 Gender

   .....

   1.2 Age Group [1960 – 1980 (Generation X); 1981- 2000 (Millennial); 2000-present (Generation Z)

   .....

   1.3 Educational Qualifications.

   .....

2. **Interview Questions**

   2.1 Do you believe that it important to align the LIS curriculum to reflect the current trends of the digital innovation taking place in the LIS field of work?

   If Yes, to Question 2.1

   2.1.1 Research scholar have established that, LISC graduates are not well suited or prepared for the market demands in the digital age do you think that the current LIS education provided in the HLIs, is relevant (up to date) to the needs of the digital age?

   .....

   2.1.2 Does your department have adequate academic staff to teach Competencies related to digital skills in the LIS programme?

   .....

   2.1.3 In relation to continuity professional development programme, What do you think are the needed competencies to be embedded to the LIS

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academic staff to competent In the digital age?

.....

2.1.4 Which control system are in place that manage LIS education programme?

.....

2.1.5 In curriculum development or revisioning, What procedures does your HLI employ in in identify the content of the curriculum in the intention of aligning the LIS curriculum with the needs of the job market?

.....

2.1.6 What policies does your HLI/ department employ in in the intention of aligning the LIS curriculum with the needs of the job market?

.....

2.1.7 Are there any challenges faced by your HLI that impedes the alignment of the LIS curriculum to the needs of the digital age?

.....

2.1.8 Provide your valuable suggestions the challenges identified in question 2.1.8 that can support development and implementation of LIS curriculum that meet the manpower needs of the digital age.

.....

2.1.9 Do you have any additional comments aligning with question 2.1.1 to 2.1.9 you feel would be helpful for this study?

.....

If No, to Question 2.1

2.1.10 Provide reasons why you think, it is not necessary to align the Current LIS curriculum offered in your department with the needs of the digital age.

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2.1.11 Do you have any additional comments aligning with question 2.1.11?

.....

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Appendix XIII: Document analysis guide

UNISA university of south africa

APPENDIX 6: Document Review Checklist

1. Review Profile of LIS education
    1.1 Registration
    1.2 Programme Name
    1.3 Faculty/ Department
    1.4 Duration
    1.5 Accreditation system
    1.6 Education evaluation system
    1.7 Curriculum review period
    1.8 Number of courses
    1.9 Review standards/ guidelines adopted in developing the curricula
2. Review competences captured in LISc curricula
3. Review the extent of digital content integration in the LISC curricula
4. Review International frameworks in LIS education
    4.1 Review publish framework that relates to the LIS education, Competencies of LIS proffesional
5. Review national frameworks in digital skills awareness

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Appendix XIV: Acceptance letter University of Dar es salaam

UNIVERSITY OF DAR ES SALAAM

DIRECTORATE OF RESEARCH

P.O. Box 35091 ■ DAR ES SALAAM ■ TANZANIA

General Line: 2410500-8 Ext. 2084
Direct Line: 2410727
Website: www.udsm.ac.tz

Fax: 255 022 2410743
255 022 2410023
E-mail: research@udsm.ac.tz

Our Ref: [redacted]

25th May 2022

Director
University Library
University of Dar es Salaam

RE: RESEARCH CLEARANCE

This is to introduce **Mr. Joseph Solomon Daudi** who is a students at the University of South Africa (UNISA). Mr Joseph is at the moment conducting data collection as part of his PhD STUDIES. the title of his research is " **Library and nifromation science education in tanzania; proposing a curriculum model for the digital age".**

This is to request you to grant the above mentioned students anly help that may enable her to achieve her objectives. The period for which this permision has been granted is from **1st June to September 30th 2022.**

[redacted]

[redacted]

DIRECTOR OF RESEARCH

cc: Vice Chancellor
cc: DVC - Academic
cc: DVC - Administration
cc: DVC - Research

Appendix XV: Acceptance letter Mzumbe University

MZUMBE UNIVERSITY
(CHUO KIKUU MZUMBE)

E-mail: mu@mzumbe.ac.tz
Tel: +255 023 2604380/1/3/4
Fax: +255 023 2604382
Cell: +255 0754 694029
Website: www.mzumbe.ac.tz

P.O.BOX1,
MZUMBE
MOROGORO, TANZANIA

REF. NO. MU/OF/R.[redacted] DATE: 24th June, 2022

JOSEPH SOLOMON DAUDI,
P.O.Box 1440,
ARUSHA.

Re: PERMISSION TO COLLECT DATA AT MZUMBE UNIVERSITY

We acknowledge receipt of your letter of 10th February 2022 with the above subject.

This serves to inform you that permission is granted to you to collect data at our university in order to complete your PhD studies.

On reporting date, let you meet the Director of Human resources and administration who will then direct you to the right place.

Your cooperation is highly appreciated.

[redacted]

[redacted]

For: VICE CHANCELLOR

MZUMBE UNIVERSITY
P. O. Box 1, MZUMBE
TANZANIA

Appendix XVI: Acceptance letter Sokoine University of Africulture

SOKOINE UNIVERSITY OF AGRICULTURE

OFFICE OF THE DEPUTY VICE CHANCELLOR
(ADMINISTRATION AND FINANCE)
P.O. BOX 3000, CHUO KIKUU, MOROGORO, TANZANIA
[illegible] +255 023 260 [illegible], [illegible] +255 023 260 [illegible]
FAX: +255 023 260 [illegible]
E-mail: dvcadminfin@suanet.ac.tz

Ref. No. SUA/ ADM[redacted] Date: 20th May, 2022

TO WHOM IT MAY CONCERN
SOKOINE UNIVERSITY OF AGRICULUTURE

RE: UNIVERSITY STAFF, STUDENTS AND RESECHERS CLEARANCE

The science university of Agriculture was established by universities act No.7 of 2005 and SUA charter of 2007 which became operational on 1st January 2007 repealing Act No.6 of 1984. One of the mission objectives of the University is to generate and apply knowledge through research. For this reason, the staff, student and researchers undertake research activities from time to time

To facilitate the research function, the vice chancellor of the sokoine university of agriculture (SUA) is empowered under the provision of SUA charter to issue research clearance to staff, students and researchers of SUA.

The purpose of this letter is to introduce to you Mr. **Joseph Solomon Daudi** a Bonafede staff of IAA and occasion students No.10349154 Registered for a **PhD** in the University of South Africa (UNISA). By this letter **Mr Joseph Daudi** has been granted clearance to enable him achieve his research objectives. Specifically, we request your permission for him to meet and talk to leaders and other relevant stakeholder in your faculty. Department in connection with his research. The title of the research in question is "**Library and information science education in Tanzania; proposing a curriculum model for the digital age**".

The period for which this permission has been granted is from **1st May, 2020 to 1st of August 2020** and the research will cover **Sokoine University of Agriculture**.

Should some of these areas/ officers be restricted, you are requested to kindly advice the researcher on alternative areas/ office which could be visited. In case you may require further information on the research please contact me.

We than you in advance for your cooperation and facilitation of this research activity.

Yours sincerely

[redacted]

[redacted]

DEPUTY VICE CHANCELLOR
(ADMINISTRATION AND FINANCE)

Copy to Students – **Mr Joseph Solomon Daudi**

Appendix XVII: Acceptance letter Tumaini University Dar es salaam College

TUMAINI UNIVERSITY
DAR ES SALAAM COLLEGE
(A Constituent College of Tumaini University Makumira)
CocaCola Road, Plot No.10,Mikocheni Light Industrial Area
P.O. Box 77588, Dar es Salaam, Tanzania
Telephone: +255 222 702 025; +255 222 702 026
Email: provost@tuda.co.ac.tz; Website: www.tudarco.ac.tz

TU/DARCo/RC/Vol. III/014 08/07/2022

Joseph Solomon Daudi
P. O. Box 392 UNISA 0003
South Africa

Dear Sir,

RE: PERMISSION TO CONDUCT RESEARCH

Reference is made to your letter dated 11th June, 2022 regarding the above subject.

Please be informed that permission for your request to conduct research has been granted and be informed to:

i. Provide list of respondents to be interviewed
ii. Dates you planned to visit TUDARCo and
iii. Report to the Director Postgraduate Research, Innovation and Entrpreneurship when you are ready to collect data.

Sincerely,
P. O. Box 77588
Prof. Akim J. Mturi
For: Deputy Provost for Academic Affairs

"Where Morals, Positive Mindset and Attitudes are Inculcated"