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A seventeen-year Research Topic Dispersion and Methodological Choices among LIS Postgraduates in Tanzania

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Abstract

The study explored research topics dispersal and research strategies of Library and Information Science (LIS) postgraduate students in Tanzania from 2000-2017. Data were collected from the East Africana research repository section of the UDSM Library and the Information Studies Programme (ISP) offices from June to November 2017. A total of 269 LIS dissertations were assessed using content analysis to classify research topics. Findings revealed topics extensively researched were information dissemination, information access and information seeking behaviour. Least researched topics were information privacy and ethics, reading habits and encouragement, copyright and Information policy. History of information science and librarianship, quantitative and qualitative research, multimedia, webometrics, human–computer interaction, systems analysis, digital security, internet crime and information licensing and fair use were not researched. In addition, mixed research approach was mostly preferred by students but experimental and action research were least used. The study contributes in LIS education mapping in Tanzania and likely the first study to show topics selection based on globally accepted LIS classification schemes. The study gives an insight on research topics and research strategies used in higher learning organizations (HLIs) in Tanzania and arguably most developing countries. Findings may improve quality of research offered in LIS schools by supporting LIS postgraduate training and establishing library technology hubs and laboratories to match the world LIS research trend and order.

Keywords: LIS Research themes, research topics, LIS education, LIS classification schemes, topic dispersion, research strategies, Tanzania
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Introduction

Library and Information Science (LIS) discipline has been progressively transformed over the past three decades. The worldwide LIS discipline changes have had impact in the field particularly on research and methodological choices. LIS research provides a reflection of transformation undergone in the discipline development. Research conducted in LIS discipline are crucial in shaping existing knowledge and developing new knowledge by identifying knowledge gaps, provide new insights and establish research strategies to address solutions for existing societal challenges. Research knowledge and experience is fundamental in preparing professionals towards

addressing work-place challenges and provision of efficient and effective quality information services (Pickard, 2013).

Although LIS discipline has been changing globally, there are a number of factors which have been observed to influence and shape its growth and research pattern. These factors include methods and articulation of ideas, familiarity with research areas, comprehension of theories, structuring of education and research in institutions and scientific community organization (Rochester &Vakkari, 1998). Other attributing aspects shaping LIS research include funding, resource allocation, social structures, proximity of study areas and research skills (Ndenje-Sichalwe & Elia, 2021; Rochester & Vakkari, 1998). Although a number of factors have been highlighted, technology, information explosion and societal changes seem to be key attributes influencing global changes in LIS research and education. Notably, in recent years global technological progression have had tremendous impact in the LIS field by transforming library operations, curricula and research patterns. Resultantly, LIS education provision has changed its content and structure (Bawden & Robinson, 2012). Additionally, LIS education interdisciplinary and multidisciplinary nature (Keshavartz & Shekari, 2020; Ndenje-Sichalwe & Elia, 2021) have also contributed to notable changes in LIS discipline influencing research undertaken.

Though a number of ways exist which researchers can use to examine LIS field progression over years, exploring and evaluating topical dispersion is among the methods LIS scholars deploy in understanding changes in LIS education over years. Topic dispersal of research is important in advancing LIS knowledge, identifying new LIS themes, opportunities, put research into practice, growth of the professional and test the application of variety research methods (Pickard, 2013). Although, a number of scholars have researched on LIS topics globally (see Ma & Lund, 2021; Keshavartz & Shekari, 2020; Rochester & Vakkari, 1998; Song, Zhu & Shu, 2021), little research has been done in developing countries like Tanzania to assess thereof and concurrently identifying research methods researchers deploy. In fact, despite LIS education being offered for the past two decades in Tanzania higher learning institutions, little is known on research topics and research strategies used by LIS postgraduate students. Being the frontier in offering tertiary LIS education in Tanzania, the University of Dar es Salaam (UDSM) Information Studies Programme (ISP) was found to be an appropriate study area of LIS topic progression. The only recent Tanzanian research studied in similar context was by Ndenje-Sichalwe and Elia (2021). The scholars investigated research methodology practices among LIS Masters students. This study therefore sought to advance knowledge on research topics and research strategies LIS postgraduate students of the Information Studies Programme deployed for the past seventeen years.

Literature Review

The reviewed literature provides insight on topics researched by LIS scholars globally. The section further describes on methodology used by LIS students and gives a critical synthesis on the literature reviewed. A number of scholars have conducted studies on LIS research topics trends globally. For example, Ma and Lund (2021) examined the evolution and distribution of LIS research topics and data collection methods from 2006 to 2018. The findings indicated social media and data science are LIS topics recently gaining attention. Song, Zhu and Shu (2021) evaluated 1018 library and information science doctoral dissertations in China from 1994 to 2018. Knowledge management, informetrics and research evaluation were topics mostly researched. Hsiao and Chen (2020) conducted a study on the evolution of LIS research from, 2009 to 2013 and 2014 to 2018. Scholarly communication and scientometrics, information behaviour,

technology adoption, computer science techniques and library-related research were topics extensively chosen. Zong *et al*., (2013) conducted a study in China using postgraduate dissertations from 1994 to 2011 and found ontology, semantic web, electronic government, knowledge management and digital library were highly researched topics while research on cataloguing, digital library and knowledge organization were least researched.

Miyata *et al*., (2020) conducted a study to identify LIS topics from 2000–2002 and 2015–2017. The study shows the internet influenced changes in LIS research. Song *et al*., (2020) revealed a change from traditional to digital library and research focus on data science. Keshavatz and Shekari (2020) found LIS postgraduate students' topic selection was linked with research methods training. Hou *et al*., (2018) researched on emerging trends and new development in information science from 2009 to 2016. Findings revealed notable changes in the research topics where information retrieval, webometrics, and citation behaviour, scientometrics, citation analysis, scientific collaboration, and information behaviour were extensively researched.

In India, Maity and Hatua (2015) and Dora and Kumar's (2017) conducted a postgraduate study from 1950 to 2012 and 2004 to 2015 respectively. They found Information and Communication Technology (ICT) applications, scholarly communication, bibliometrics, scientometrics, information technology/digital libraries, information seeking, user studies and collection development were topics mostly researched. Singh and Babbar (2014) found bibliometrics, user studies, information seeking, electronic resources, network and consortia, library management software, institutional repository, webometrics and knowledge management were popular researched topics in India. Information Technology applications in libraries, library automation, human resource development, bibliometrics and user studies were topics widely researched among postgraduates in India from 1980-2007 (Shivalingaiah, Sheshadri &Manjunatha, 2009).

Rochester (2016) conducted a study in Australia between 1985 and 1994 and revealed information seeking, library history, information storage and retrieval and scientific and professional communication were mostly topics researched while methodology, information dissemination and cataloguing were not researched. Dora and Kumar (2020) observed information technology, information retrieval, bibliometrics, libraries, scientific communication to be widely researched. Prebor (2007) found topics highly researched were information industry economics and management, social aspects of information, information seeking and data organisation and retrieval.

In Africa, Alemna (2001) examined LIS research publication trends and found information technology, rural libraries, librarians' status and image, record management, academic libraries were mostly researched while bibliometrics and technical services which were least researched. Moreover, Moahi (2008) found popular topics researched in Botswana to be library education, management, planning, automation, library operations, information seeking and records and archives management. Information seeking behaviour, information literacy, communication and information technology were popular topics researched in Nigeria between 1979 and 2010 (Oyewusi, 2012). A LIS topic progression study by Onyancha (2018) revealed information systems and design, systems analysis, application development to be highly researched from 1971-1980. Onyanchas' study further found between 1991-2000 information technology, information systems, libraries and information retrieval were topics mostly researched. Notably, changes on topics were noted between 2011-2015 where knowledge management, social media, internet and bibliometrics were found to be mostly researched (Onyancha, 2018). Elia and Sife (2018) found

top 10 highly cited topics in LIS globally were on topics related to information retrieval, technology and scientometrics.

With regard to methodology in LIS, literature reviewed from South Africa and Nigeria indicates that the survey research methods dominated LIS research while use of qualitative and mixed methods research was limited (Ngulube & Ukwoma, 2019). A study by Ndenje-Sichalwe and Elia (2021) in Tanzania observed a mixed understanding of research methodology practices among postgraduate students in the LIS discipline. The authors observed postgraduate students lack of adequate knowledge on applying specific research approach based on problem at hand. Ullah and Amen (2018) observed that empirical, descriptive, quantitative research methodologies and survey were used by the majority of LIS researchers.

Literature reviewed indicates no clear pattern on LIS topics researched across the globe. However, information technology, information seeking, scientometrics and automation were common. The trend changes over time with retrospective research focusing more on libraries automation and library services. Current research on LIS topics is diversified and more inclined to information retrieval, scientometrics, social media and knowledge management. Based on the literature LIS postgraduate research methodology has been dominated by quantitative approach, specifically survey methods. Although quantitative approaches have been extensively used by LIS scholars, qualitative and mixed methods have been gaining popularity.

Methodology

This study assessed research topics of LIS postgraduate students in Tanzania using University of Dar es Salaam ISP as a case study. Data for the study were collected from the East Africana research repository section of the UDSM Library and the ISP offices from June to November 2017. Using a list of all LIS dissertations retrieved between 2000-2017, researchers searched on Online Public Access Catalogue (OPAC) for respective dissertations using class mark number. The identified dissertations were carefully read/perused and analysed to classify a scheme and topic. Dissertations were evaluated by scrutinizing titles, keywords, abstracts and content to ascertain and assign respective classification scheme. Content analysis was a strategy used to ascertain and classify research theme/topic embarked by postgraduate students. In LIS, similar studies to examine trends of research based on content analysis were conducted by (Armann-Keown & Patterson, 2020; Miyata *et al*., 2020).

A collection of all LIS dissertations (269) was assigned into different categories of the classification scheme. The Baruchson-Arbib classification scheme of information science (Zins, 2007) was used for assigning different subject categories. The classification scheme consists of ten categories, including foundation of information science, methodology, information and learning society, information technology, data organization and retrieval, information industry, economic and management, information ethic and law, user studies, diffusion studies and social information science. The categories are further divided into subcategories. This classification scheme was selected over other schemes outlined by Zins as it appears to be more extensive and comprehensive in representing LIS topics. Prebor (2007) also adopted the Baruchson-Arbib classification scheme. Data collected and analysed were then presented in tabular form.

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Research Findings

This section provides analyses of research done by LIS postgraduate students between 2000-2017. Results also show nature of topics researched and an overview of research strategies applied.

Research Topics and Classification Schemes, 2000-2017

The study analysed and classified research topics with respect to classification schemes used. Results showed information access (30); information dissemination (30); information seeking behaviour (21), communication and computer networks/internet use (19), archival science (19) and information centres and libraries management (16) were topics extensively research by postgraduate students in Tanzania. See Table 1:

Table 1: Topic distribution from main classes in thesis/dissertations, 2000-2017

Classification scheme	**Topics**	**Year**					
		2000 - 2002	**2003 - 2005**	**2006-2008**	**2009-2011**	**2012-2014**	**2015-2017**
Foundations of IS	Archival science	3	2	1	4	4	5
	History of information science and librarianship	-	-	-	-	-	-
	History of knowledge formats (manu-scripts, print and digital),	-	-	-	-	-	-
	Library and information science as a profession.	1	-	-	-	2	1
Methodology	Quantitative and qualitative research	-	-	-	-	-	-
	Bibliometrics	-	-	3	1	-	-
	Informatics	-	-	-	-	-	-
	Webometrics						
Information/Learning Society	Social and cultural aspects of the information society	-	-	-	-	1	-

	Sociology of knowledge	-	-	-	-	-	-
	Social communication	-	-	-	-	1	-
	Electronic learn-ing	-	-	-	2	1	2
	Information literacy	-	-	1	1	4	1
	Information science education,	-	-	1	-	-	-
	Lifelong learning	1	-	1	1	-	3
	Reading habits and encouragement	-	1	1	-	-	1
	The application of technology in teaching and learning	1	2	3	1	1	5
Information Technology	Communication and computer networks/internet use	4	3	2	5	4	1
	Document delivery systems	-	-	-	-	-	-
	Structure of computerized systems	-	1	1	1	1	-
	Programming languages	-	-	-	-	-	-
	Multimedia	-	-	-	-	-	-
	Information retrieval systems	-	-	2	1	2	2
	Systems analysis	-	-	-	-	-	-
	Human–computer interaction,	-	-	-	-	-	-
	Information architecture	-	-	-	-	-	-
	Digital security systems	-	1	-	-	-	-
	Website construction	-	-	-	-	-	-
	Networks technologies	-	-	-	-	-	-

	Knowledge representation	-	-	-	-	-	-
	Search tools	-	1	-	-	-	-
Data organization & Retrieval	Classification schemes	-	-	-	-	-	-
	Metadata	-	-	-	-	-	-
	Indexing	-	-	-	-	-	-
	Abstracting	-	-	-	-	-	-
	Knowledge organization	-	-	2	-	-	-
	Taxonomies	-	-	-	-	-	-
	Thesauri	-	-	-	-	-	-
	Ontology	-	-	-	-	-	-
	Vocabulary control	-	-	-	-	-	-
	Online searching techniques	1	-	-	-	-	-
	Reference work	1	-	-	1	-	2
	The semantic web	-	-	-	-	-	-
Information Industry Economics and Management	Databases	1	-	-	-	-	-
	Digital libraries	-	-	-	-	-	-
	Information industry market	-	1	-	-	-	-
	Information management	1	5	1	-	2	-
	Knowledge management	-	-	-	3	1	2
	Information centres and libraries management	-	-	3	2	7	4
	Collection management	1	-	-	3	2	1
	Electronic commerce	-	-	-	-	-	-
	Marketing through ICT	-	-	-	-	-	-
	Marketing	-	-	1	-	2	2
Information Ethic & Law	Copyright	-	-	-	-	-	1
	Digital security	-	-	-	-	-	-

	Digital divide	-	-	-	-	-	-
	Internet crime	-	-	-	-	-	-
	Free access to information	-	-	-	-	-	-
	Information policies	-	-	1	-	-	-
	Information licensing and fair use	-	-	-	-	-	-
	Information privacy and ethics	-	-	1	-	-	2
User studies	Human information behaviour	-	-	-	-	-	-
	Information-seeking behaviour	1	1	4	5	5	5
	Information access	-	6	2	6	4	12
	Information needs	1	2	1	3	1	1
	Reference interview	-	-	-	-	-	-
	User-information	2	-	1	3	-	1
	Scientist-interaction	-	-	-	-	-	-
	Usability of web information	-	-	-	-	-	-
Diffusion studies	Information dissemination	2	3	5	6	10	4
	Communication theory	-	-	-	-	-	-
	Information centres and libraries	-	1	1	1	-	-
	Electronic dissemination	-	-	-	-	1	2
Social information science	Information needs of different cultures	-	-	1	-	-	-
	Information education, power and ethics,	-	-	1	-	-	-
	Social information banks	-	-	-	-	-	-

	Social information sections in school and public libraries	-	-	-	-	-	-
	Printed and electronic self-help sources	-	-	-	-	-	-
	The social information scientist	-	-	-	-	1	-
	Community information	2	-	2	3	2	1
	Information diffusion in multicultural societies	-	-	-	-	-	-
	Health information centres	-	-	-	-	-	-
	Social networks	-	-	-	-	-	-
Total		**23**	**30**	**43**	**53**	**59**	**61**

Although findings from Table 1 revealed that information dissemination, information access, information-seeking behaviour, communication and computer networks/internet use, archival science, information centres and libraries management and the application of technology in teaching and learning were mostly researched, the topic distribution does not show a clear pattern of increase or decrease. Least researched topics were, marketing (5), reference work (4), bibliometrics (4), Library and information science as a profession (4), information privacy and ethics (3), reading habits and encouragement (3), electronic dissemination (3), information centers and libraries (3), knowledge organization (2), information education, power and ethics, (1) information policy (1), copyright (1), online search techniques (1), information needs of different cultures (1), information science education (1) and social and cultural aspects of the information society (1).

Pattern of LIS Topics among Postgraduate Students

The study examined LIS topics postgraduate students selected. Findings of the study did not clearly show variations in topics chosen by masters and doctorate students. See Table 2:

Table 2: Topics distribution among Masters and PhD's students: 2000-2017

Classification scheme	Topics	Year											
		2000-2002		2003-2005		2006-2008		2009-2011		2012-2014		2015-2017	
		MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD	MA	PhD
Foundations of IS	Archival science	3	-	2	-	1	-	4	-	3	1	4	1
	History of information science and librarianship	-	-	-	-	-	-	-	-	-	-	-	-
	History of knowledge formats (manu-scripts, print and digital),	-	-	-	-	-	-	-	-	-	-	-	-
	Library and information science as a profession	1	-	-	-	-	-	-	-	2	-	1	-
Methodology	Quantitative and qualitative research	-	-	-	-	-	-	-	-	-	-	-	-
	Bibliometrics	-	-	-	-	3	-	1	-	-	-	-	-
	Informatics	-	-	-	-	-	-	-	-	-	-	-	-
	Webometrics	-	-	-	-	-	-	-	-	-	-	-	-
Information/Learning Society	Social and cultural aspects of the information society	-	-	-	-	-	-	-	-	1	-	-	-

	Sociology of knowledge	-	-	-	-	-	-	-	-	-	-	-	-
	Social communication	-	-	-	-	-	-	-	-	1	-	-	-
	Electronic learning	-	-	-	-	-	-	2	-	1	-	2	-
	Information literacy	-	-	-	-	1	-	1	-	4	-	1	-
	Information science education,	-	-	-	-	1	-	-	-	-	-	-	-
	Lifelong learning	1	-	-	-	1	-	1	-	-	-	2	1
	Reading habits and encouragement	-	-	1	-	-	1	-	-	-	-	1	-
	The application of technology in teaching and learning	1	-	2	-	3	-	1	-	-	1	3	2
Information Technology	Communication and computer networks/internet use	4	-	3	-	2	-	5	-	3	1	-	1
	Document delivery systems	-	-	-	-	-	-	-	-	-	-	-	-
	Structure of computerized systems	-	-	1	-	1	-	1	-	1	-	-	-
	Programming languages	-	-	-	-	-	-	-	-	-	-	-	-
	Multimedia	-	-	-	-	-	-	-	-	-	-	-	-

	Information retrieval systems	-	-	-	-	2	-	-	1	-	2	2	0
	Systems analysis	-	-	-	-	-	-	-	-	-	-	-	-
	Human–computer interaction,	-	-	-	-	-	-	-	-	-	-	-	-
	Information architecture												
	Digital security systems	-	-	1	-	-	-	-	-	-	-	-	-
	Website construction	-	-	-	-	-	-	-	-	-	-	-	-
	Networks technolo-gies	-	-	-	-	-	-	-	-	-	-	-	-
	Knowledge representation	-	-	-	-	-	-	-	-	-	-	-	-
	Search tools	-	-	1	-	-	-	-	-	-	-	-	-
Data organization& Retrieval	Classification schemes	-	-	-	-	-	-	-	-	-	-	-	-
	Metadata	-	-	-	-	-	-	-	-	-	-	-	-
	Indexing	-	-	-	-	-	-	-	-	-	-	-	-
	Abstract-ing	-	-	-	-	-	-	-	-	-	-	-	-
	Knowledge organization	-	-	-	-	1	1	-	-	-	-	-	-
	Taxonomies	-	-	-	-	-	-	-	-	-	-	-	-
	Thesauri	-	-	-	-	-	-	-	-	-	-	-	-

	Ontology	-	-	-	-	-	-	-	-	-	-	-	-
	Vocabulary control	-	-	-	-	-	-	-	-	-	-	-	-
	Online searching techniques	1	-	-	-	-	-	-	-	-	-	-	-
	Reference work	1	-	-	-	-	-	1	-	-	-	2	-
	The semantic web	-	-	-	-	-	-	-	-	-	-	-	-
Information Industry Economics and Management	Databases	1	-	-	-	-	-	-	-	-	-	-	-
	Digital libraries	-	-	-	-	-	-	-	-	-	-	-	-
	Information industry market	-	-	1	-	-	-	-	-	-	-	-	-
	Information management	1	-	5	-	1	-	-	-	1	1	-	-
	Knowledge management	-	-	-	-	-	-	3	-	1	-	-	2
	Information centres and libraries management	-	-	-	-	3	-	2	-	7	-	4	-
	Collection management	1	-	-	-	-	-	3	-	2	-	1	-
	Electronic commerce	-	-	-	-	-	-	-	-	-	-	-	-

	Marketing through ICT	-	-	-	-	-	-	-	-	-	-	-	-
	Marketing	-	-	-	-	1	-	-	-	2	-	2	-
Information Ethic & Law	Copyright	-	-	-	-	-	-	-	-	-	-	1	-
	Digital security	-	-	-	-	-	-	-	-	-	-	-	-
	Digital divide	-	-	-	-	-	-	-	-	-	-	-	-
	Internet crime	-	-	-	-	-	-	-	-	-	-	-	-
	Free access to information	-	-	-	-	-	-	-	-	-	-	-	-
	Information policies	-	-	-	-	1	-	-	-	-	-	-	-
	Information licensing and fair use	-	-	-	-	-	-	-	-	-	-	-	-
	Information privacy and ethics	-	-	-	-	1	-	-	-	-	-	1	1
User studies	Human information behavior	-	-	-	-	-	-	-	-	-	-	-	-
	Information-seeking behaviour	1	-	1	-	4	-	5	-	3	2	5	-
	Information access	-	-	6	-	1	1	6	-	4	-	10	2
	Information needs	1	-	2	-	1	-	3	-	1	-	1	-
	Reference interview	-	-	-	-	-	-	-	-	-	-	-	-
	User-information	2	-	-	-	1	-	3	-	-	-	1	-
	Scientist-interaction	-	-	-	-	-	-	-	-	-	-	-	-

	Usability of web information	-	-	-	-	-	-	-	-	-	-	-	-
Diffusion studies	Information dissemination	2	-	3	-	5	-	6	-	10	-	4	-
	Communication theory	-	-	-	-	-	-	-	-	-	-	-	-
	Information centres and libraries	-	-	1	-	1	-	1	-	-	-	-	-
	Electronic dissemination	-	-	-	-	-	-	-	-	1	-	1	1
Social information science	Information needs of different cultures	-	-	-	-	1	-	-	-	-	-	-	-
	Information education, power and ethics,	-	-	-	-	1	-	-	-	-	-	-	-
	Social information banks	-	-	-	-	-	-	-	-	-	-	-	-
	Social information sections in school and public libraries	-	-	-	-	-	-	-	-	-	-	-	-
	Printed and electronic self-help sources	-	-	-	-	-	-	-	-	-	-	-	-
	The social information scientist	-	-	-	-	-	-	-	-	1	-	-	-

	Community information	2	-	-	-	2	-	2	1	1	1	1	-
	Information diffusion in multicultural societies	-	-	-	-	-	-	-	-	-	-	-	-
	Health information centres	-	-	-	-	-	-	-	-	-	-	-	-
	Social networks	-	-	-	-	-	-	-	-	-	-	-	-
Total		**23**	**0**	**30**	**0**	**40**	**3**	**51**	**2**	**50**	**9**	**50**	**11**

Findings from Table 2 show no clear pattern of topic choices across levels of education, communication and computer networks/internet use, information retrieval systems, archival science, the application of technology in teaching and learning, knowledge management, information ethics and access and use of information were preferred by doctorate students. Despite a wider recognition globally, digital libraries, multimedia, webometrics and semantic web topics have not been researched by neither Masters nor doctorate IS students. In addition, there was no study that was conducted on classification schemes. Additionally, results show information seeking behaviour research was preferred by Masters students than PhD candidates. Findings further show that bibliometrics was not preferred by doctorate candidates when compared to Masters students.

Research strategies Used by LIS Postgraduate Students

This section presents research strategies used by LIS masters and doctoral students in the period of 2000-2017.

Table 3: Research strategies in thesis/dissertations in 2000-2017

Research strategy	Year					
	2000-2002	**2003-2005**	**2006-2008**	**2009-2011**	**2012-2014**	**2015-2017**
Qualitative	-	-	2	4	2	-
Quantitative	-	-	1	1	-	1
Mixed approach	1	1	13	15	29	36
Bibliometric	-	-	2	2	-	-
Literature review	-	-	1	-	-	-
Experimental	-	-	-	-	-	-

Action research	-	-	-	-	-	-
Survey	19	25	23	24	27	23
Case study	-	3	1	5	-	1
Not indicated	3	1		2	1	-
Total	**23**	**30**	**43**	**53**	**59**	**61**

Findings from Table 3 show mixed research approach and survey were dominant research strategies applied by among postgraduates. Students least researched on either qualitative, quantitative or literature review research strategies. In addition, postgraduate students have not used experimental and action research. It was found out that seven (7) dissertations did not indicate the research strategy used.

Discussion

Findings revealed LIS postgraduate students in Tanzania researched more on user studies research topics. For instance, sixty-seven (67) highly researched topics were related to user studies research, within the categories of information access and information seeking behaviour. In addition, results revealed LIS postgraduates highly researched on communication and computer networks/internet use, archival science and information centres and libraries management. Students also preferred information needs, information management, user information, collection management, information retrieval systems, information literacy and knowledge management topics. These findings corroborate with those of Singh and Babbar (2014), Shivalingaiah, Sheshadri and Manjunatha (2009) and Onyancha (2018) which showed these topics were widely researched by LIS professionals.

The present findings show students mostly preferred research topics related to information which include information dissemination, access and seeking. These topics seem to be highly researched as they represent key attributes of the information science discipline (Bawden & Robinson, 2012, Ndenje-Sichalwe & Elia, 2021). One reason which may explain these findings is linked with students preferring to research on information seeking in electronic environment. In developing countries including Tanzania, the period from 2000s to date observed proliferation and adoption of computers, automation and internet in libraries. These transformations promoted computer usage and revolutionized services offered to library users. Indicatively, computer and internet adoption and usage seem to be key influential factors which heightened research on the access and use of information. Researching on these topics were relevant towards creating awareness, monitoring resource usage and identifying challenges libraries face in the new electronic environment. Supporting, topics on information needs, information centres and libraries management and information management reflects the dire need observed in transforming libraries towards provision of timely, effective and efficiency services to users. Obviously, technological changes observed in the past two decades paved ways for information professionals to find what users prefer and managing collections with both print and electronic formats. Technology subjects LIS professionals in new trends of informing users on ways to market and use information resources from electronic databases subscribed. Changes in technology have rapidly influenced research and work roles of information professionals (Bawden & Robinson 2012; Pickard, 2013).

The findings also indicated records and archives science to be among topics researched by LIS postgraduate students. There are several reasons for the trends on researching the topic. The major reason that may have attributed to postgraduate students researching on the topic is advent

and application of technology in managing records. Advancement in technology respectively attributed to the migration of libraries from print to electronic setting. These changes influenced public and private institutions working environment shifting towards electronic records management. Preference to records and archives related topics by students could be attributed by multidisciplinary nature of LIS discipline which has a wide spectrum of information professionals who not only manage information, but also deal with records and archives from variety of institutions. In addition, research in records and archival science hinges on the fact that for more than a decade and a half since the establishment of LIS postgraduate training in Tanzania, there was no higher learning institution which offered postgraduate training thereof. For the period understudy, institutions which provided professional postgraduate training in Tanzania on the subject were the Tanzania Public Services College and School of Library, Archives and Documentation Studies. However, these institutions only produce certificate and diploma levels. The situation explains the ISP was the only avenue in Tanzania where records and archives management professionals could be trained.

Furthermore, the present findings showing knowledge management was moderately studied differs from a recent study by Onyancha, (2018). Onyancha found globally from 2011-2015, knowledge management was a topic highly researched. Similarly, Song, Zhu and Shu (2021) revealed knowledge management and informetrics were popular topics research topics in China. The difference between the two studies and the present may be explained by two main reasons. One is Tanzania like many developing countries has insufficient resources set for managing knowledge unlike developed countries (Mohsin & Syed, 2018). For instance, applying knowledge management initiatives, processes and practices requires organization sufficiency in resources including experts and equipment. Such meagre resources and little investment on knowledge-based research in developing countries affect knowledge management processes and practices which in turn contribute to scanty research on the topic. The other factor which also hinges on scarce resources and lack of knowledge management initiatives in many organizations in developing countries is slow transformation from information to knowledge-based societies. Arguably, weaknesses of the Tanzania ICT policy of 2003 may have contributed to little research on knowledge management. The ICT policy thereof envisioned more on transforming institutional barriers on adoption of ICT and little emphasis on knowledge acquisition and creation. Resultantly, research done by postgraduate students seems to conceptualize more on information than knowledge. Moreover, based on researchers' experience in most developing countries like Tanzania, there is little employers' cognizance of the role of knowledge in business process. This may contribute to scanty research on the topic. Institutional framework, scientific community organization, funding and support were explained by Rochester and Vakkari (1998) as factors influencing type of research conducted, in this case being research on knowledge management.

Based on the findings, postgraduate students' research in Tanzania seems to be skewed to similar topics while an extensive number of topics are either least or not researched at all. For instance, topics that were found not to be researched by LIS postgraduate students include history of information science and librarianship, quantitative and qualitative research, informatics and webometrics, document delivery systems and programming languages. They also include, multimedia, systems analysis, human–computer interaction, classification schemes, knowledge organization, ontology, semantic web, digital libraries, marketing through ICT, digital security, internet crime, information licensing and fair use and health information centres.

Findings on topics which were not researched by LIS postgraduate students were surprising, confusing and alarming. Results are surprising in the sense that, although ISP offers postgraduate teaching on master's courses related to classification, knowledge organization, information and communication technologies, systems analysis, students did not research on these topics. Confusion of results emanates from the observation that these research topics related to information retrieval seem to lately receive attention worldwide (Elia & Sife, 2018). Additionally, Zong, et. al, (2013), Song, Zhu and Shu (2021) and Maity & Hatua (2015) found ontology, semantic web, electronic government, knowledge management, digital library and bibliometrics, informetrics, ICT applications and scholarly communication which arguably are not well-researched in most developing countries were widely researched in China and India respectively. The present findings are alarming as highly topical research themes researched in LIS globally such as human–computer interaction, informetrics and scientometrics, internet crime, information licensing and fair use receive little attention among LIS scholars in developing countries.

The present study further revealed that there was no clear pattern in students' selecting research topics over the years with respect to their education level. No noticeable patterns were observed in choice of topics between doctorate and masters LIS postgraduates in Tanzania. However, it appears that research on communication and computer networks/internet use, information retrieval systems, archival science, the application of technology in teaching and learning, knowledge management, information ethics and access and use of information were preferred by doctorate students. The findings of this study showed discrepancy of the choice of research topics related to key LIS subjects. The topics were not extensively researched, despite their association with the LIS discipline. Such topics include referencing, digital libraries, searching tools, information licensing and fair use, networks technologies, information architecture, multimedia and document delivery systems. Based on these findings, libraries in most developing countries have therefore remained consumers of new technology which might not reflect the needs of users or positively promoting efficiency in services offered.

Although there are a number of factors which influence students to choose a subject to research such as funding, supervisors' knowledge on the subject, student's preference, weak research skills (Ndenje-Sichalwe & Elia, 2021, Dora & Kumar, 2020, Mutula, 2011), researchers' supervision experience, majority of postgraduate students who have permanent employment are largely influenced by the employment status, nature of work, working environment and workstation. On the other hand, non-employed, fresh from school graduates from lower levels who joins postgraduate LIS education prefer choosing topic of their interest with assistance from supervisors. Such factors may negatively contribute to weak selection of LIS topics which have little impact in theory development and new knowledge. These attributes may explain why some topics were not researched or least researched. Furthermore, similar attributes could have contributed to students shunning experimental and action research. These research strategies require sufficient funding and projects which most students and their institutions lack. The fact that mostly cited LIS topics and scholars came from developed countries (Elia & Sife, 2018) explain partly the crux of the problem.

Another possible reason for some topics receiving little interest in Tanzania could be related to curriculum. For a number of years, the curriculum of most LIS education programmes from lower to higher levels in developing countries particularly in Tanzania have had little accommodated changes to reflect global LIS development and research trends. Msuya's (2005) major suggestion from a critical assessment of the ISP Masters curricula showed the essence of establishing demand-driven courses with ICT being integral. Supporting, Lariviere, Sugimoto and

Cronin (2012) and Elia and Sife (2018) found most researched and highly cited LIS topics are interlinked with technology. However, matching global demand-driven topics such as technology application, information systems, scientific communication, bibliometrics and LIS productivity, courses and programmes related to research methods in LIS may need to accommodate new methodological aspects (Keshavartz & Shekari, 2020).

Despite methodology being key in shaping theory generation in LIS, most postgraduate students in Tanzania have insufficient research knowledge (Ndenje-Sichalwe & Elia, 2021). Supporting, findings on research strategy indicated survey and mixed approach to be dominant. These findings could be associated with factors such as supervisors' methodological orientation, skills, curriculum, research methods training (Ndenje-Sichalwe & Elia, 2021; Keshavatz & Shekari, 2020) and nature of topics. Lack of awareness of new global trends and inadequate skills among LIS teaching staff on the application of new research methods tend to affect research methodology competencies and topic selection of postgraduate students (Daniel, Kumar & Omar, 2017; Keshavatz &Shekari, 2020).

Conclusion and Recommendations

Despite the erratic pattern in research, the study concludes that information access, information seeking behaviour and information dissemination were topics postgraduate students preferred. Databases, knowledge management, technology application, information ethics and copyright were least being researched by LIS postgraduate students in Tanzania. Classification, scientometrics, webometrics, digital libraries, human-computer interaction and systems analysis were topics not researched. Conclusively, LIS students seem to abandon core LIS topics related to foundations of information science and arguably research more on social aspects of information. Furthermore, practical oriented research such as experimental and action research which constitutes quality human-computer interaction research is insufficient. It is recommended that the higher learning institutions in developing countries allocate sufficient funds for postgraduate students to conduct quality LIS research which meets high standards on topics related to computers and information seeking. In addition, postgraduate students should make necessary effort to select topics which are unique reflecting global LIS education changes. There is an urgent need of LIS schools in developing countries to review their curricula to have demand-driven programmes which can address drastic dynamic global changes and address societal needs. The researchers suggest another study be done in Tanzania to explore factors which influence postgraduate students' selection of LIS topics.

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