THE CONSORTIUM OF TANZANIA UNIVERSITY AND RESEARCH LIBRARIES (COTUL)

PROCEEDINGS OF

THE 5TH COTUL SCIENTIFIC CONFERENCE

HELD ON 6TH – 10TH NOVEMBER 2023 AT JALNIMI TOURIST HOTEL, IN SINGIDA, TANZANIA

THEME

"LIBRARY AND INFORMATION SERVICES IN THE DIGITAL ERA"

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Edited by

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FOREWORD

The Consortium of Tanzania University and Research Libraries (COTUL) is a formally registered association of higher learning and research institutional libraries from both the public and private sectors. It was founded as a volunteer organisation in 2008 to collaborate on information provision. In particular, it supports the joint acquisition of electronic information resources and provides capacity-building to its members to improve the institution's core functions of teaching, learning and research in Tanzania. COTUL was formally registered in 2017 by the Ministry of Home Affairs with Reg. No. S.A. 21148 under the Societies Act, CAP. 337 R.E. 2002.

The 2013 COTUL Annual General Meeting (AGM) that was held at Ruaha Catholic University in the Iringa Region decided, among other issues, to begin conducting scientific conferences to share research knowledge and expertise among information professionals in the country and beyond. Since then, five (5) scientific conferences have been conducted. The last COTUL scientific conference was held in November 2023 at the Jalnimi Tourist Hotel in Singida region, where fifteen (15) papers were presented under the major conference theme: *Library and Information Services in the Digital Era*. Therefore, COTUL is pleased to publish seven (7) papers that were returned and met the publication merits in its 5th Conference Proceedings.

On behalf of the COTUL Executive Committee and the Conference Organising Committee, I would like to extend my sincere gratitude to all authors, conference participants, sponsors, employers and other individuals for their contributions that have made the AGM and the Scientific Conference successful.

Dr. Sydney E. Msonde
COTUL Chairperson

1 ASSESSMENT OF ACCESS TO AND USE OF THE MZUMBE UNIVERSITY INSTITUTIONAL REPOSITORY IN TANZANIA

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Abstract

This study evaluated the access to and utilization of institutional repository resources among postgraduate students at Mzumbe University in Tanzania. Specifically, the study aimed to determine the level of postgraduate students' awareness of the repository, examine their access to and utilization of the repository resources and identify their perceptions of the factors influencing access and utilization of the repository at Mzumbe University. The study was guided by the Unified Theory of Acceptance and Use of Technology and utilized a mixed research design integrating both quantitative and qualitative research approaches. A semi-structured questionnaire and interview guide were used to collect data from 83 conveniently selected postgraduate students and two key informants from the library directorate respectively. Statistical Product for Service Solution Version 26 and content analysis were used to analyse quantitative and qualitative data respectively. The findings indicate that the majority of postgraduate students are aware of the Mzumbe University institutional repository, but their interaction with the platform is significantly low. The study highlights several factors influencing access to and use of the institutional repository. These factors include the institution's management commitment to the repository's overall performance, frequent power cuts and the availability of information and communication technology facilities. The quality of the uploaded resources and Internet connectivity also play a role in determining access to and use of the repository. Based on the findings, the study recommends the possible measures that institutional repository stakeholders can take to address.

Keywords: *Institutional repository, academic community, researchers, academic libraries, digital preservation, scholarly works, Tanzania*

1 Introduction

Institutional Repository (IR) is an online platform for sharing, preserving and disseminating scholarly works produced by staff, researchers and students. These works are accessible to users worldwide (Mwalubanda, 2021; Nwachi & Idoki, 2021). Libraries all over the world have begun to accept Institutional Repositories (IRs) to add value to their services and fulfil the changing information needs of their users to support teaching, learning and consultancy (Eromosele et al., 2022). The

development and acceptance of IR enable users to have unlimited access to local content and remote access information resources on their electronic devices (Eromosele, 2019). Most academic libraries in developed countries have embraced Open Access Institutional Repositories (OAIRs) to effectively disseminate their institutions' scholarly outputs and by doing so, provide scholars with opportunities to increase the visibility of their publications (Kodua-Ntim & Fombad, 2020).

The IR is a digital collection of scholarly products created by the faculties, schools, research staff and postgraduate students of an academic institution. It is accessible to users both within and outside the institution (Ahmad, 2022). The quality of postgraduate students' degrees is often determined by the quality of their research work preserved in the IR (Ibrahim et al., 2020). Higher learning institutions in developing countries view IR as a means to increase institutional visibility, share research work and improve accessibility through the OAIR strategy (Dlamini & Snyman, 2017). To ensure the availability of quality scholarly works that contribute to economic and industrial development, it is important for higher learning institutions to provide high quality scholarly work deposited in the IR platform for easy access and visibility (Ahmad, 2022).

Many higher learning institution repositories in African countries are focusing on maximizing access to and use of their scholarly outputs. However, efforts to make this objective successful have always varied among different countries due to the tremendous emergence of technologies, infrastructural, institutional and environmental issues (Adam & Kaur, 2021; Mwalubanda, 2021). On one hand, Dlamini and Snyman (2017) assert that factors related to human capital, fiscal matters, institutional management support, commitment and varying degrees of open access awareness at the institutional level contribute to determining access to and use of IR resources. Despite the initiatives of a few African countries' higher learning institutions, including Nigeria, South Africa, Uganda, Kenya and Ghana, to ensure that such endeavors of OAIR proliferate, the extensive operation of the IRs has deliberately remained insignificant, with its performance reported below the institution's anticipation (Adam & Kaur, 2021).

In Tanzania, the Tanzania Commission for Universities (TCU) has recognized IR in higher learning academia as a powerful tool for storing, archiving, sharing and disseminating information. The TCU handbook for standards and guidelines for university education (2019) insists that research reports submitted by postgraduate

students should be uploaded and published in the institutional repository after they have been awarded their respective degrees. These reports must be approved for quality and made freely available for global access and use. Mzumbe University has been effectively operating with the OAIR since 2013 (MUIR Policy, 2013) and the procedure for uploading institutional scholarly works is guided by the Mzumbe University Institutional Repository (MUIR) Policy. Currently, the MU Repository has a total of 12 communities and a collection of 4433 items (MUIR, 2023). However, despite the number of items deposited, the usage of IR resources by the academic community remains questionable. The utilization of IR in any academic institution is dependent on the level of awareness and interaction with the platform for resources. Therefore, this study aims to assess the access to and use of institutional repository resources by postgraduate students at Mzumbe University. To address this issue, three specific objectives are outlined for the study:

a) To determine the level of awareness among postgraduate students of the institutional repository at Mzumbe University;
b) To examine the degree of access to and utilization of institutional repository resources at Mzumbe University;
c) To determine the perception of postgraduate students regarding the factors that influence access to and utilization of institutional repository resources at Mzumbe University.

2 Literature Review

2.1 Postgraduate Students' Awareness of the Institutional Repository

Awareness of any innovation or anything makes one to be knowledgeable on the existing phenomenon. Postgraduate students' awareness of the IR describes the state of being knowledgeable about the establishment of IR and its performance in their university. It entails the degree of students' knowledge on the availability of the platform and the extent to which they can access to and make use of it (Mustapha et al., 2023). Awareness is contributed by the efforts on marketing and advocacy of the phenomenon, the infrastructures and the environment which necessitates someone to get involved with the innovation or any development. Abba et al. (2022) insists that awareness to any deployed technology has to be associated with availability of connectivity, commitment of practitioners in conducting trainings, advocacy and marketing the new innovation. In this regard, librarians have to conduct digital literacy to postgraduate students in order to generate awareness that will increase access to and use of the IR.

In a study conducted by Alumona (2019) in Nigeria, postgraduate students at Nnamdi Azikiwe University Awka, Chukwuemeka Odumegwu Ojukwu University Uli and Madonna University Okija were well-informed about the IRs due to the significant role played by librarians in promoting the available research outputs. However, a study on the awareness of IR among postgraduate students at Ahmadu Bello University (ABU) in Nigeria reported a low level of awareness among students (Ahmad, 2017). On the other hand, the study by Nunda and Elia (2019) on the adoption and use of institutional repositories by postgraduate students at two institutions namely Muhimbili University of Health and Allied Sciences and Sokoine University of Agriculture in Tanzania asserted that majority of the academic community are aware of the IRs. Furthermore, in Eswatini, the academic community, including faculty members at the University of Eswatini (UNESWA) is well-informed and aware of the IR though postgraduate students were not aware of this (Saulus & Mutula, 2019).

Similarly, Ibrahim et al. (2020) conducted a study examining the perception of postgraduate students regarding the use of the institutional repositories. They found that postgraduate students at the University for Development Studies (UDS) in Tamale, Ghana were aware of the IR system but only occasionally utilized the platform and its resources.

Generally, lack of awareness regarding IRs among users is one of the threatening factors of the access to and use of OAIR, as identified in literature related to the implementation of IRs in African academic institutions (Dlamini & Snyman, 2017). Library staff and lecturers at academic institutions are regarded as pioneers that can promote awareness among postgraduate students and other stakeholders regarding the access to and use of IR resources.

2.2 Access to and Use of Institutional Repositories

Research on access to and use of open-access institutional repositories is being prominently conducted in both the northern and southern globes, with varying degrees of success depending on the strategies and operational environment of a particular institution. The IR platform allows for open-access to scholarly works produced by the institution. It includes features that permit users to access and use publications, allow use by license, distribute, read, transmit and copy in any digital device for offline usage (Kodua-Ntim & Fombad, 2020). These features motivate acceptance and use of IR resources by the global public, as long as the user is

connected online. This leads to increased usage of research outputs, as well as greater citation and visibility for scholars. Several universities in Ghana have developed IRs, leading to widespread acceptance and utilization in providing research outputs and increasing access to information resources (Korkuvi et al., 2022).

However, Nunda and Elia (2019) report that in Tanzania, there is low acceptance rate of IR resources among students. This lack of acceptance is influencing access to and use of the platform. Visibility and information sharing are important aspects which motivate students to use IR resources. Access to and use of IR is questionable to many academic institutions because some theses and dissertations are uploaded to the platform with unsatisfactory qualities which discourages some users from accessing it (Adam & Kaur, 2021).

In South Africa, higher learning institutions have embraced and promoted the use of Open Access Institutional Repositories (OAIRs) for knowledge sharing. As result, the quality of the resources to be uploaded is thoroughly screened to ensure that only high-quality scholarly works are deposited in the repositories. The academic community at these institutions has shown interest in accessing and utilizing the resources available on these platforms (Kodua-Ntim, 2023).

Similarly, the University of Jos in Nigeria had never used the IR in sharing information resources for a long time. The idea of establishing the repository was conceived in 2010, with the aim of ensuring that quality scholarly works are deposited to the platform. This initiative immediately increased access to and utilization of the scholarly works ultimately elevating the university to one of the highest ranks in Africa (Igboechesi et al., 2023).

Furthermore, a significant number of universities in Ghana are becoming popular for promoting high-quality scholarly works. These universities include the Kwame Nkrumah University of Science and Technology, University of Ghana, University of Cape Coast, University of Education, Winneba and University for Development Studies. The universities have functional repositories with quality outputs that have contributed in improving access to and utilization of the platform, thereby enhancing its visibility globally (Imoro & Saurombe, 2023).

2.3 Factors Influencing Access to and Utilization of IR Resources

There are several obstacles that hinder access to and use of IR resources in many academic institutions. This is due to different philosophy of access to all content submitted by their schools, faculties, academic staff and students, but not ensuring access to entire research work or journal articles. Issues like quality of content, sustainability of services and inadequate experts for the successful management of IR resources are attributed to stressing the accessibility and usability of such resources in academic institution (Bashir et al., 2022).

On one hand, Dlamini and Snyman (2017) identified factors that hinder users' access to and utilization of IR resources. They found that factors are not limited to insufficient financial support, poor support of top management, lack of awareness and shortage of experts for IR management. These observations corroborate the findings of Igboechesi et al. (2023) at the University of Jos in Nigeria who conducted a study on sustaining the relevance of IR in academic libraries in Nigeria.

Similarly, Abba et al. (2022) acknowledged that the most perceived obstacle among the academic community at Federal University of Technology Minna, in Niger State was inadequate skills for accessing to and using IR resources. Furthermore, Korkuvi et al. (2022) observed that factors such as unreliable power supply, inadequate funding, insufficient marketing, intellectual property rights, inadequate Information and Communication Technology (ICT) facilities, skilled ICT personnel and IR maintenance influenced the academic community access to and utilization of IR.

Additionally, Mwalubanda (2021) focused on the academic community's experience with accessing to and utilizing the institutional repository in Tanzania, Kenya and Uganda. The researcher found that this experience is influenced by a lack of awareness, which exacerbated by insufficient training, inadequate technological support and policies that guide access to and utilization of the repository.

On a different note, Kodua-Ntim and Fombad (2020) conducted a study on the strategies for the use of open access to institutional repositories in Ghanaian universities. They observed several factors influencing access to and use of repositories. These factors include, but not limited to, inadequate marketing, internet connectivity, inadequate ICT infrastructure, copyright issues, limited knowledge related to IR, insufficient technological skills, insufficient budget to manage the

institutional repositories, inadequate power supply, institutional culture and politics, lack of IR policy and lack of incentives/rewards for IR managers. Similar observations were identified in Nigeria and South African universities (Igboechesi et al., 2023; Kodua-Ntim, 2023).

The access to and use of IR resources demands technical skills and personnel investments to overcome the obstacles related to budget constraints, technological expertise and human investment. Moreover, Adam and Kaur (2021) are of the view that there are misconceptions that open-access institutional repository resources are not credible and copyrighted. They also suggest that the demand for IT experts is potential to push open-access services and thus calls attention to reconsideration for IR sustainability.

3 Theoretical Framework

This study focuses on technology, specifically examining three popular models used for acceptance and use in research. These models are the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), and the Technology Acceptance Model (TAM). The integration of these three models has resulted into a Functional Theory of the Unified Theory of Acceptance and Use of Technology (UTAUT) (Dwivedi et al., 2019; Ntim & Fombad, 2021).

In this regard, the UTAUT Model is generally acknowledged to guide technological-related studies and thus it guides this study by clearly defining the variables underpinning the study. It provides the fundamental relationship between variables such as performance and effort expectancy, social influence and facilitating conditions that affect the behavioral intention and actual technology use. These factors determine individuals' access to and use of the institutional repository. The control variables in this theory are age, gender, experience and volunteerism in relations to acceptance and use of the repository. It is believed that individuals' perception of access to and use of IR influences their behavior towards it. With this influence, traits of intentions, acceptance and use of the innovation are realized (Dwivedi et al., 2019). Likewise, performance expectancy, social influence, innovation and expectance efforts are associated with behavioral influence on the use of IR resources (Slade et al., 2015). Based on this interpretation, the theory describes IR within the context of practical experiences.

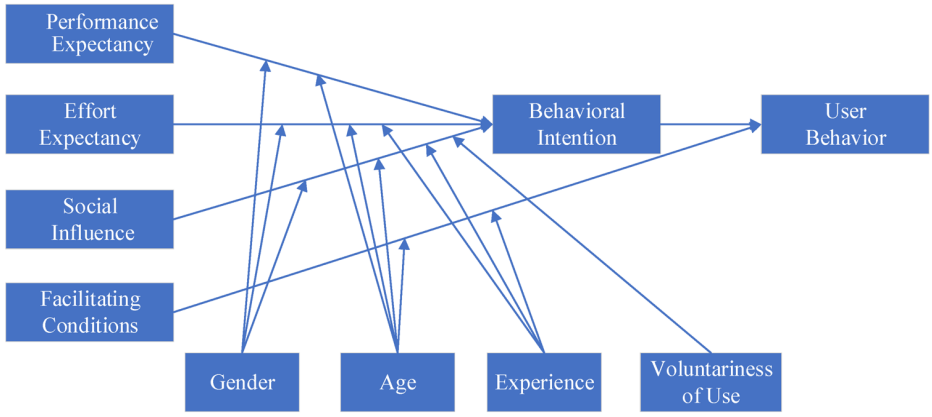

Figure 1: UTAUT Model (Venkatesh et al., 2003)

In this regard, the UTAUT Model benchmarks the independent variables of awareness, access, use, and influencing factors on access to and use of the platform, while the dependent variable focuses on IR resources. Dwivedi et al. (2019) argue that variables, such as attitude, awareness, efforts and performance expectancy are the main predictors of the academic community and researchers' behavioral intentions on access to and use of IR resources.

4 Study Design and Methods

This study employed a mixed research design that applied both quantitative and qualitative approaches to collect, process and analyze data. A mixed research design assisted in probing answers to questions regarding postgraduate students' access to and use of IR resources at Mzumbe University. The information collected from the respondents, provided answers on how much, how many and how often they access and use IR resources.

This study involved two key informants from the University library and 83 respondents who formed the sample size obtained from a population of 492 postgraduate students at Mzumbe University. The sample size determination formula by Yamane (1967) was used to compute the representative sample of postgraduate students' population. The formula used is: $n = \frac{N}{1+N(e)^2}$

Where *'n'* represents the sample size, *'N'* is the target population of 492, and 'e' represents the level of precision or confidence interval of 0.1. The total sample size is therefore 85 which includes 83 postgraduate students and 2 key informants who

are the IR Coordinator and ICT personnel. Table 1 presents the demographic information of the respondents.

The study employed both probability and non-probability sampling techniques to select respondents from the sampling frame. Through the probability sampling technique, the study used a convenience sampling technique to obtain 83 postgraduate students to fill out the questionnaire. Meanwhile, for the non-probability sampling technique, a purposive sampling approach was used to select the IR Coordinator of the Mzumbe University Library and ICT personnel. These informants were interviewed to gather important information based on their knowledge or experience concerning the study objectives.

Table 1: Socio-demographic Characteristics of Respondents (n=83)

Variable	Category	Frequency	Percent
Gender	Male	51	61.4
	Female	32	38.6
Age (years)	20-25	3	3.6
	26-30	32	38.6
	31-40	34	41.0
	41-45	11	13.3
	>45	3	3.6
Year of study	1st year	56	67.5
	2nd year	21	25.3
	3rd year	4	4.8
	4th year	1	1.2
	5th year	1	1.2
Faculty/School	SOB	23	27.7
	SOPAM	36	43.4
	FOL	6	7.2
	FST	7	8.4
	FSS	9	10.8
	IDS	2	2.4

Source: Field Data (2023)

Key: SOB School of Business
SOPAM School of Public Administrative Management
FOL Faculty of Law
FST Faculty of Science and Technology
FSS Faculty of Social Science
IDS Institute of Development Studies

In this study, both primary and secondary data were collected from the respondents and through documentary review respectively. The collected data were then

analyzed both quantitatively and qualitatively. Quantitative data were analyzed using Statistical Product and Service Solution (SPSS) software version 26 and Microsoft Excel 2010 to generate descriptive information. On the other hand, information from key informants and the reviewed literature was analyzed using a qualitative data content approach. The main points were summarized to meet the study objectives.

5 Presentation and Discussion of Findings

5.1 Awareness of the Mzumbe University Institutional Repository

Postgraduate students at Mzumbe University were asked to indicate their level of awareness of the repository that provides institutional scholarly works for their reference and critique. The level of awareness is important as it indicates how well individuals can navigate and utilize the environment to achieve their goals. It also measures individuals' acceptance and association with a given innovation or strategy as outlined in the UTAUT Model. Ultimately, these measurements of awareness help individuals feel more connected and confident in their beliefs and decisions regarding the matter (Klussman et al., 2022).

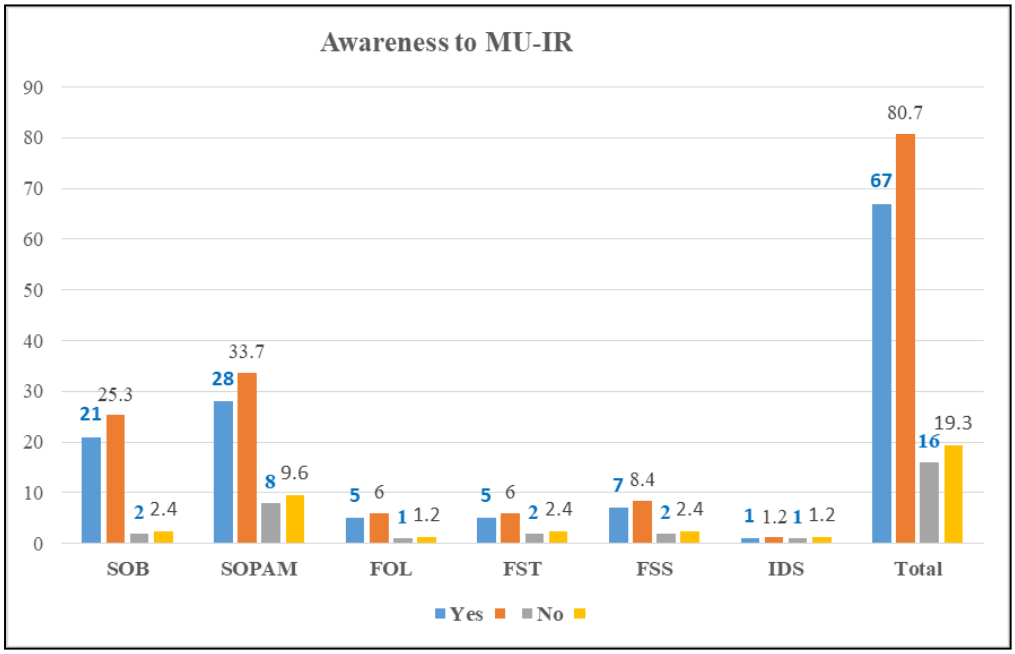

Figure 2: Awareness of MU-IR (Field Data, 2023)

Findings in Figure 1 show that 67(80.7%) respondents were aware of the Mzumbe University repository. In particular, the School of Public Administration and Management (SOPAM) and the School of Business (SOB) postgraduate students indicated being more informed about the repository. The awareness of IR from these two schools is contributed by the fact that their population is large compared to other faculties and institutes and thus, interaction and usage of the platform becomes more indicative. On the other hand, the general awareness of the platform is highly influenced by the initiatives the library staff put in place to ensure that the advocacy program and training are enhanced to realize the innovative efforts on IR are reflected. Similarly, it was reported as follows during an interview with one of the participants:

> *The level of awareness about the Mzumbe University repository has significantly improved because it can be freely accessed regardless of time and distance. The promotion programmes have also contributed to raising awareness among the Mzumbe University community* [Participant 1].

The findings on awareness of the IR among postgraduate students at Mzumbe University are confirmed by Nunda and Elia (2019), who explored the adoption and use of institutional repositories among postgraduates in two universities in Tanzania. They observed that 87.3% of the respondents were aware of the repositories. Similarly, in Ghana, Ibrahim et al. (2020) examined the perception of postgraduate students about the use of institutional repositories. The findings indicate that 67% of the respondents were aware of the University for Development Studies (UDS) Repository. In this light, awareness of IR among the academic communities is promising but what may be questionable at the instance is the utilization of the IRs.

Furthermore, some of the respondents (19.3%) were not aware of the IR due to varying reasons which include poor attendance to the training calls related to repositories, limited time to access and use institutional IR resources, reluctant to adopt changes and solely dependency on print-based resources. In this regard, Kodua-Ntim (2023) advocates and insists on improving training and supporting researchers to familiarize themselves with the importance of being aware of the repositories and how they can effectively use them. However, the provision of IR guidelines can assist in raising awareness and use of the platform.

The findings of the study on IR awareness among postgraduate students are contrary to the findings of Saulus and Mutula (2019) on faculties and postgraduate students' awareness and attitudes towards using IR. They reported that awareness of the IR at the University of Swaziland (UNISWA) is represented by only 69 (33.6%) postgraduate students and the majority of about 136 (66.2%) academic staff. The findings of Saulus and Mutula (2019) are in line with the findings of Kayungi et al. (2021) who in assessing the academic staff awareness of IRs in Tanzanian universities, established that 84.1% of the academic staff were highly aware not only of the repositories but also of the open-access practices. This phenomenon is not common among students, particularly postgraduate students whose research works should be benchmarked from the previous studies potentially archived in the IR.
In light of this view, postgraduate students must be encouraged to use the IR as they become potential researchers and they have to be aware of the platform. Awareness of the repository provides appealing benefits to the institution and the researcher in such a way that it increases the number of citations and downloads, builds a sense of community among scholars, enhances collaboration among researchers, provides for self-archiving, crucial for knowledge sharing among members of the institution, enhances visibility and recognition of the researcher within and beyond the institution (Kodua-Ntim, 2023).

5.2 Source of Knowledge and Awareness of the Mzumbe University Repository

Knowledge and awareness of available technology and services have the potential to guide customers towards accessing to and using of the appropriate information, leading to future development, sharing and dissemination. Awareness provides individuals with an understanding of new trends including innovations, emerging technologies, systems and services. Knowledge indicates familiarity or comprehension of these trends that build the ability of individuals to discover or learn from various sources and experiences (Alordiah et al., 2023). In this study, respondents were asked to indicate the sources of knowledge and awareness of the repository. The findings are presented in Table 2:

Table 2: Knowledge and Awareness of Mzumbe University Repository (n=83)

Faculty/School	SOB		SOPAM		FOL		FST		FSS		IDS		Total	
Sources of Awareness	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***
Digital literacy	7	8	10	12	0	0	1	1	4	5	1	1	23	27.7
Individual learning	5	6	10	12	2	2	0	0	2	2	0	0	19	22.9
Lecturers	8	10	8	10	2	2	2	2	0	0	0	0	20	24.1

Librarians	0	0	7	8	1	1	3	4	1	1	1	1	13	15.7
Seminars and workshops	1	1	0	0	0	0	1	1	2	2	0	0	4	4.8
Academic colleagues	1	1	1	1	0	0	0	0	0	0	0	0	2	2.4
Library website	1	1	0	0	1	1	0	0	0	0	0	0	2	2.4
Total	**23**	**28**	**36**	**43**	**6**	**7**	**7**	**8**	**9**	**11**	**2**	**2**	**83**	**100.0**

Source: Field Data (2023)

Table 2 indicates that the main sources of knowledge and awareness of the institutional repository are contributed by digital literacy (27.7%), lecturers (24.1%), individual learning (22.9%) and librarians (15.7%). The varying degrees of digital literacy and individual learning capabilities among postgraduate students promote enthusiasm and motivation to visit the institutional pages with learning resources, including the subscribed databases and the IR. The UTAUT Model affirms that awareness, efforts and performance expectancy are the main predictors among postgraduate students of the behavioral intentions and capability to access and use the IR resources (Dwivedi et al., 2019). The role of librarians and lecturers is usually focused on directing students to the right sources of information for their academic work. This can be done during lecture sessions, guidance on research writing stages, term papers and assignments. However, librarians are mostly involved in advocacy, conducting training and directing users during orientation sessions and daily routine services. This was mentioned during the interview:

> *The schools of SOB and SOPAM have a large number of postgraduate students and lecturers have been active in encouraging students to visit the institutional repository and the library website for digital resources. However, the calls for training from the librarians have always been unsuccessful as the majority of the students are reluctant to attend. At various levels, librarians provide advocacy and instructions to individual students who may be struggling with digital resources* [Participant 1].

The study findings on digital literacy as a source of knowledge for awareness of the IR corroborate with the findings by Abba et al. (2022) on the awareness and use of IR by postgraduates from Library and Information Technology at the Federal University of Technology, Minna in Niger State. Furthermore, the study findings suggested that library websites, academic colleagues, seminars and workshops played a limited role in creating awareness of the Mzumbe University repository.

Surprisingly, contrary to these findings, Kayungi et al. (2021) observed that institutional websites (62.1%), academic colleagues (45%) and seminars and workshops (32.7%) are potential sources of knowledge on the awareness of the selected four IRs in Tanzania. In Sudan, Abdelrahman (2017) conducted a study focusing on the use of the IR at the University of Khartoum by postgraduate students indicating that students become aware of the repository through colleagues (52.7%), Internet surfing (35.5%), seminars and workshops (7.5%) and librarians (1.8%). This implies that there are no standards or common approaches to raising awareness among users on new trends of technology, innovation, systems or services. However, consideration of the best approach that outperforms others should be reinforced to reflect the outcomes and justify the value of the invested resources.

In this context, it is important for librarians to play their pivotal role and be more innovative to ensure that the newly invented technologies are effectively communicated to users. The contribution of librarians in creating awareness of the repository to the users is often overlooked. There is a need to reconsider this as the core function in librarianship. Rafiq (2022) emphasizes that librarians have to play a proactive role in fostering cooperation and goodwill with users, developing a strategy that works as a key point of communication channel for repository awareness, access to and use. Nevertheless, extensive training is the main source of knowledge for awareness, access and use of the IRs. Many academic libraries recommend and apply this approach as a means to raise awareness among their users (Abdul-Jabbar et al., 2020).

5.3 Access to and Use of the Mzumbe University Institutional Repository

The awareness of the IR provides the user with access to opportunities and the ability to use the available resources for their information needs. The use of IR resources enables users to accomplish their intended scholarly objectives. Alordiah et al. (2023) suggest that access to and use of an item are motivated by awareness and knowledge of it, in which helps to improve competence and utilization. Respondents were asked to indicate the extent to which they access and use the IR for their academic work. Findings in this regard are presented in Table 3.

Table 3: Access to and Use of Mzumbe University Repository (n=83)

	Frequency of Use											
Category	**Most frequently**		**Frequently**		**Sometimes**		**Not frequently**		**Not at all**		**Total**	
Extent of Access	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***	***f***	***%***
To a very large extent	5	6	1	1	3	4	0	0	0	0	9	10.8
To a large extent	2	2	19	23	9	11	0	0	0	0	30	36.1
To some extent	1	1	7	8	20	24	3	4	2	2	33	39.8
Not to a large extent	0	0	0	0	0	0	2	2	3	4	5	6.0
Not at all	0	0	0	0	0	0	0	0	6	7	6	7.2
Total	**8**	**10**	**27**	**33**	**32**	**39**	**5**	**6**	**11**	**13**	**83**	**100**

Source: Field Data (2023)

Findings in Table 3 indicate that to some extent, 33 (39.8%) postgraduate students frequently accessed and used the IR. However, 30 (36.1%) respondents showed that to a large extent, they frequently accessed and used the repository. The findings signify those issues of information explosion and existence in various sources and awareness of the repository by postgraduate students at Mzumbe University are relatively lower in terms of frequency of access to and use of the platform resources. One of the participants narrated during the interview as follows:

> *Mzumbe University's institutional repository is freely accessed regardless of time and distance. Full-text documents are accessed, its access to and use is guided by the institutional policy. However, the frequency of access may be determined by various aspects including levels of awareness but also the fact that the advanced development in information technology has resulted in information explosion that exists in various sources and formats* [Participant 2].

The study findings corroborate the observation by Abdelrahman (2017) regarding postgraduate students' use from the University of Khartoum institutional repository. Approximately 24.3% of postgraduate students access the repository twice or more in a month while 48.4% do not access or use the repository. Similarly, in Ghana, Ibrahim et al. (2020) suggest that, despite the awareness among graduate students at the University of Development Studies (UDS) about the presence of the repository, access and use of the platform remains occasional. In a study on institutional repository adoption and use in selected Tanzanian higher learning institutions, again Dwivedi et al. (2019) found that 15 (27.3%) postgraduate students occasionally used

the repository and particularly once a month. Additionally, Nunda and Elia (2019) discovered that 14 (25.5%) postgraduate students visited the platform at least once a week, 11 (20%) visited daily and 6 (10.9%) used the platform rarely. Furthermore, Abdul-Jabbar et al. (2020) conducted a study about accessibility and use of institutional repositories among research scholars at COMSATS Institute of Information Technology, Lahore in Pakistan. They identified that 121 (42%) research scholars accessed and used the repository on a weekly basis, 86 (30%) interacted with the repository daily, 41 (14%) used it once a month and 42 (14%) scholars used it either two or three times a week.

This implies that the aspect of access to and use of the IR depends on the efforts librarians put in to ensure users are aware of the platform and thus its performance. The UTAUT Model suggests that the expectancy of efforts from library staff, the academic community and researchers can influence the awareness of both staff and users and thus affect the behavioral intention towards access to and use of the IR resources. Nevertheless, quality, availability of subject-based resources and connectivity contribute to the frequency of users' access to and use of the platform. The ease with which the IR resources are accessed develops interest and motivates users to frequently visit the platform for scholarly works (Mir, 2022). The access to and use of IR have had a significant role in improving the research work of postgraduate students. Alordiah et al. (2023) are of the view that the provision of equitable access and frequent use of digital online resources and infrastructures within higher learning institutions contribute to fostering the quality of research outputs and thus its dissemination and visibility of the institution and researchers as well.

5.4 The Intention of Using the Mzumbe University Institutional Repository

Respondents were asked about their intention to use Mzumbe University's institutional repository. Postgraduate students are among the categorical research groups that may need broad interaction of research-based platforms for the establishment of the areas for the study, identification of the literature gaps and research problems. Findings on the intention of postgraduate students to use the repository are summarized in Figure 3:

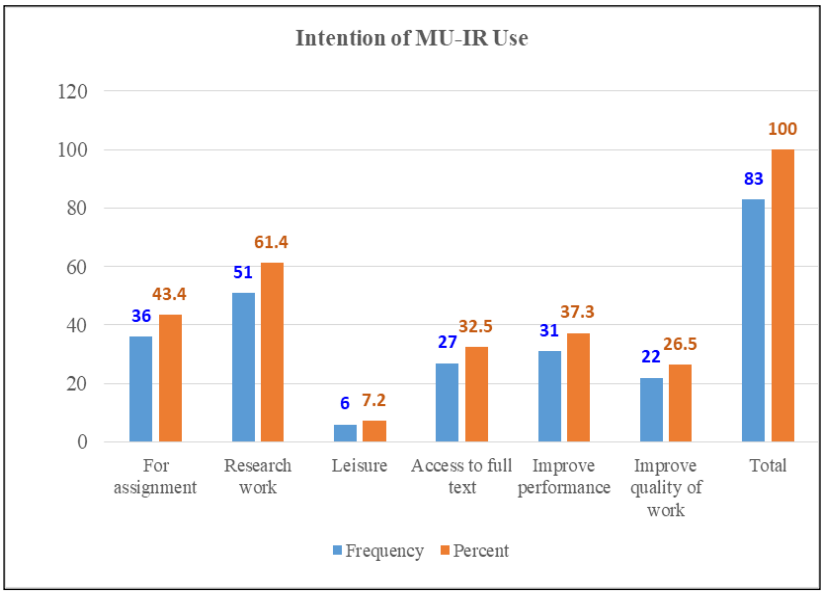

Figure 3: Intention of MU-IR Use (Field Data, 2023)

According to the descriptive statistics, findings in Figure 3 indicate that the intentions of using Mzumbe University Institutional Repository (MU-IR) in research work were significantly high as reported by 51 (61.4%) respondents followed by 36 (43.4%) who intended to use in assignment and 31 (37.3%) respondents who intended to use MU-IR resources to improve their academic performance. In this regard, it is obvious that postgraduate students had access to and utilized the IR for scholarly works and raising their performance in research. These findings have been supported by the information generated from the qualitative data gathered through interviews with one of the key informants who narrated as follows:

> *Mzumbe University's institutional repository is an important tool for postgraduate students since it is one of the sources of current information as it assists the academic community in understanding the most researched areas of the study and in so doing this may help them to come up with their point of departure to avoid the duplication of efforts. In this view, users can be able to improve their research works and maintain originality* [Participant 1].

The findings of the study corroborate the results of Ibrahim et al. (2020) who studied the perception of graduate students on the use of the institutional repository of the University for Development Studies in Tamale, Ghana and observed that the majority (75%) of graduate students use the institutional repository for research

works. Again, in Sudan, Abdelrahman (2017) in the study about the use of the University of Khartoum institutional repository by graduate students found that among other intentional uses of the institutional repository, access to and use of research works, hardly electronic theses and dissertations reported at a large proportion of about 33 (35.5%) respondents.

In supporting the study findings, Kodua-Ntim and Fombad (2020) acknowledge that several universities are setting up institutional repositories to house the scholarly outputs stemming from their schools and faculties permitting their users access to and use of scholarly output to support academic performance. They allow their users to view and download materials in the IRs. With the IR, users can have access to and use the repository resources to fulfil their assignment needs and improve their research works (Abdul-Jabbar et al., 2020).

The intention to use IR for accessing full text, improving the quality of work and for leisure was significantly low. This trend may be attributed to various factors and mostly related to the reading culture of postgraduate students, awareness of the repository and benefits emanating from the platform as well as the available content based on user needs which may explain the user intention to use the platform and subsequently the usage behavior as demonstrated by the UTAUT Model. In this regard, the user's intention to use the IR provides for the sustainability of the platform and increases the usage of scientific information, author citations and visibility. Given its importance, Nunda and Elia (2019) encourage universities and research centers to ensure relevant, quality and current repository contents are submitted to the platform, particularly in every field of the study.

5.5 Attributes Contributing to Users' Interest in Accessing and Using the Repository

The interest in any technological system, despite the aspect of awareness, is attributed to various factors that may include IR set-up, technological factors, infrastructures and human behavior, just to mention a few. In this study, postgraduate students were asked to indicate their perception of the attributes contributing to their interest in accessing and using the repository. Findings on this aspect are presented in Table 4:

Table 4: Attributes Contributing to Users' Interest in Accessing and Using MU-IR (n=83)

Attributes Contributing to Users' Interest in Accessing and Using the Repository	**Agree**		**Undecided**		**Disagree**	
Attributes	***F***	***%***	***f***	***%***	***f***	***%***
Easy to access and use the platform	56	67.5	22	26.5	5	6
The link is available throughout and over 24/7	52	62.7	25	30.1	6	7.2
Ability to search and free download of full text	51	61.4	19	22.9	13	15.7
Prompt technical support from library staff	51	61.4	24	28.9	8	9.6
The link is user friendly	47	56.2	23	27.7	13	15.7
Quality resources available	49	59	27	32.5	7	8.4
Currency of repository content	48	57.8	25	30.1	10	12
The link is easy to learn and share	54	65	24	28.9	5	6
Meets user needs	51	61.4	25	30.5	6	7.3

Source: Field Data (2023)

Table 4 presents the attributes that contributed to users' interest in using the IR. The study findings reveal that 56 (67.5%) respondents were interested in accessing and using the platform because of its easy access and use, while 54 (65%) respondents reported the platform to be easy to learn and share resources. Similarly, 52 (62.7%) respondents indicated that the platform is available globally and accessible 24/7, whereas 51 (61.4%) reported on the ability of the platform to meet users' needs, prompt technical support from library staff as well as the opportunity to search and download full text. These findings were revealed during an interview with one of the key informants who confirmed as follows:

> *Honestly, the Mzumbe University institutional repository is freely accessible regardless of time and distance. In addition, full-text documents are accessible, and their access and use are guided by the policy. If access is limited, often it may be due to various other reasons including the platform operating under very old DSpace Software – Version 3, which can cause the platform to misbehave* [Participant 2].

The findings signify that the repository has remarkable potential in providing scholarly works and has become a panacea for open-access endeavors to the academic community and researchers. On one hand, during interview, it was insisted by one of the key informants as follows:

> *Mzumbe University institutional repository is easy to use because the link is available on the library webpage, also the user can easily navigate and be able to download full text with quality and current information related to the specific field of study* [Participant 1].

The study findings are affirmed by Nunda and Elia (2019) who observed that 33 (60%) and 27 (49%) respondents from two surveyed university institution repositories in Tanzania showed that the quality and sharing of information resources respectively contributed to establishing interest of users interacting with the platform. In addition, Mwinyimbegu (2019) also found out that 40 (77%) respondents indicated free access and full-text downloadable content, 39 (75%) respondents reported easy access and use of the platform whereas 35 (67%) graduate students opined on availability of current repository content were the contributing attributes toward respondents' interest to access to and use the platform at Muhimbili University of Health and Allied Sciences (MUHAS) and the University of Dar es Salaam (UDSM) in Tanzania.

These results call attention for universities to engage in uploading information resources of high quality to develop the interest of users toward interacting with the platforms. On this, the institution, indeed can realize the potential benefits emanating from this endeavor which among others could be increasing the institution's visibility and usability of the repository resources to a broader perspective. In light of this lens, Buragohain and Kumar (2021) are of the view that every educational and research-based institution must have a repository that has a philosophy of sharing research output with easy and free or open-access, providing current and timely information resources with high quality to its users and in respect to the area of the study.

5.6 Factors Influencing Access to and Use of the Repository

The study also sought to establish postgraduate students' perceptions of the factors influencing access to and use of the IR. Respondents were asked about the extent to which they agreed or disagreed on the provided list of factors influencing access to and use of the platform. The factors included technological aspects, institutional issues, resources, guiding tools and intellectual property rights. Table 5 presents finding on the factors influencing access to and use of the repository:

Table 5: Perception on the Factors Influencing Access to and Use of MU-IR (n=83)

Factors Influencing Access to and Use of the Repository	**Agree**		**Undecided**		**Disagree**	
Factors	***f***	***%***	***f***	***%***	***f***	***%***
Availability of internet connectivity	43	51.8	26	31.3	14	16.9
ICT facilities	45	54.2	22	26.5	16	19.3
Quality of content available	47	56.6	28	33.7	8	9.6
Awareness about IR concept	42	50.6	29	34.9	12	14.5
Expert librarians	47	56.6	28	33.7	8	9.6
Availability and accessibility of research output	48	57.8	29	34.9	6	7.2
User friendly interface	43	52.5	34	41.5	5	6.1
IR policy that sets emphasis on advocacy	40	48.2	33	39.8	10	12
Copyright issues knowledge	43	51.8	32	38.6	8	9.6
Availability of funds	41	49.4	31	37.3	11	13.3
Power supply	50	60.2	26	31.3	7	8.4
Commitment of management	54	65	22	26.5	7	8.4

Source: Field Data (2023)

In response to the perceptions of the respondents regarding the factors influencing access to and use of the institutional repository, 54 (65%) respondents revealed that the management's commitment to the general performance and management of the repository is significantly insufficient. Similarly, 50 (60.2%) respondents indicated that frequent power cuts have been affecting their interaction with the repository while 45 (54.2%) mentioned the availability of ICT facilities on campus for accessing and using the repository resources.

The quality of the uploaded content was reported by 47 (56.6%) respondents while internet connectivity was pointed by 43 (51.8%) respondents. These factors are crucial in influencing access to and use of the repository and are financially dependent, in such a way that nothing can be done by the management or decision makers when there is insufficient budget to sustain the operations of the repository. This consequently deters effective utilization of the repository by the academic community and other researchers.

The study confirms various research findings reported in different regions of developing nations. For example, Aghoghovwia and Ekereuche (2023) observed

that financial constraints in higher learning institutions in Nigeria resulted in inadequate ICT facilities. This was reported by 17out of 20 (85%) respondents which affected their effective access to and use of the institutional repositories. Similarly, in Ghana, Ibrahim et al. (2020) stated that 52 out of 85 (61%) respondents agreed that a lack of awareness about IR influenced graduate students' access to and use of the platform.

The findings further indicated that 49 (58%) graduate students opined that frequent power cuts were contributing factor towards access to and use of the IR. Imoro and Saurombe (2023) reported that unreliable internet connectivity in Ghana influenced access to and use of the IR, as revealed by 444 (57.9%) respondents. Other factors were identified by Mwinyimbegu (2019) who found that about 36 (69%) respondents indicated that the lack of an IR policy among universities in Tanzania influenced self-archiving, access to and use of IR resources. Additionally, 35 (67%) respondents stated that internet connectivity influences access to and use of IR resources. Most universities in developing countries have common factors that influence access to and use of the IR. However, on a different note, Ezeani and Ezema (2011) as cited by Aghoghovwia and Ekereuche (2023) narrated the following:

> *Many universities in African countries are facing serious problems including low internet connectivity, software and hardware challenges, a lack of highly skilled personnel, inadequate power supply, low bandwidth, legal copyright laws, poor funding, lack of organizational infrastructure and policies, project sustainability, and many others.*

Given the various factors that influence access to and use of the IR, it is important to take related measures to ensure the sustainability of the platform. These measures include ensuring a strong technological infrastructure, skilled human capital, a strong financial standing, an institutional repository policy that guides the best practices for using and self-archiving onto the platform, a dedicated academic community and researchers with digital literacy skills (Henok & Yule, 2019; Mwinyimbegu, 2019; Aghoghovwia & Ekereuche, 2023).

6 Conclusion and Recommendations

6.1 Conclusion

The establishment of an IR and its access to resources is imperative not only to the researchers who contribute to it but to the entire academic community. For the IR to be successful and sustainable in providing scholarly works, the institution must understand and overcome the prevailing issues influencing access to and use of the platform. The findings of the study indicate that the majority of postgraduate students are aware of the Mzumbe University IR, but their interaction with the platform is significantly low.

The findings further highlighted some of the factors influencing access to and use of the IR which include the institution's management commitment to the general performance and management of the repository, frequent power cuts and the availability of Information and Communication Technology (ICT) facilities on campus. Nevertheless, the quality of the uploaded resources and internet connectivity were similarly influential on access to and use of the IR resources at Mzumbe University. Moreover, the aforementioned factors need to be addressed to ensure that the repository is effectively utilized by the academic community and other researchers. Further research is recommended to explore the impact of the Mzumbe University IR on sharing and disseminating scholarly works.

6.2 Recommendations

Based on the findings of the study, the following recommendations are made for consideration by various stakeholders of the Mzumbe University IR:

a) To improve and promote awareness, access to and use of the repository by shifting from conservative awareness practices to digital approaches. Digital literacy programmes and various tools including social media, open-access avenues, websites and e-learning platforms should be used to establish and improve relationships between the academic community and other researchers to interact with the repository.

b) To establish a mechanism through which the repository is systematically and periodically reviewed to ensure that the quality of uploaded resources is comprehensive and aligned with the policy. Nevertheless, as the repository continues to grow, it is equally important that the growth is in line with the field of study or communities to help researchers identify new study opportunities.

c) Limited financial resources to run institutional repositories has been a common problem among many developing countries. The fiscal resources are needed for the procurement of new ICT facilities and equipment's as well as covering the costs of recurrent expenditure for the repository management. Therefore, stakeholders, institutional repository managers, and administrators must seek external funding sources or apply for funding for research projects to ensure the smooth operation and management of the platform.

d) The university, through the government, may negotiate with telecommunication companies to ensure that the internet package is improved and perhaps the cost of internet data for accessing and using web-based platforms is minimized. In the digital era, where everything is dynamically changing due to modern interactions and lifestyles, this has become even more necessary as most universities are increasingly embracing online educational models. However, the old networking and ICT infrastructures have to be replaced with more improved versions to support the advanced wireless technology existing to date.

e) The university lacks IR experts rather than system administrators or librarians who only monitor the system. Thus, they lack the technical aspects required for the development and management of the IR. In light of this view, there is a need for continuous professional development programmes; otherwise, courses on library and information management technology or library and information studies curricula have to be revised to reflect emerging technological trends and incorporate the technical aspects of IRs.

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2 DEPLOYMENT OF MY LIBRARY ON FINGER TIPS APPLICATION AT MZUMBE UNIVERSITY: CHALLENGES AND PROSPECTS

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Abstract
This study aims to explore the deployment of My Library On Finger Tips (MyLOFT) at Mzumbe University (MU). Specifically, it investigates users' awareness and perception of MyLOFT, its promotion, challenges, and strategies to maximise usage of the MyLOFT application. The study employed a blended methodology, combining qualitative and quantitative methods, to analyse 67 academic staff members' experiences with the MyLOFT application at the selected University. Sample size determination utilised PPS and purposive sampling methods. Quantitative data were analysed using SPSS version 20 and presented in graphs and tables, while qualitative data underwent content analysis and were presented in quoted statements. The study reveals that e-resource usage at MU was low before MyLOFT deployment, but increased after deployment. Word of mouth and email were effective in creating awareness and MyLOFT Student Ambassadors promoted the application. Users found features like Multiple Access and Save Content Off and Online as the most appealing. Challenges identified include technical issues, navigation difficulties, unclear instructions, mobile compatibility, and security. To maximise the MyLOFT utilisation, the application should include personalised content, resolving technical issues, utilising student ambassadors for promotion, incentivising usage, and improving the interface. The University should add relevant databases. Effective communication, user feedback, and impact measurement are essential for continual optimisation. This study therefore explores e-resources remote access applications in Tanzanian academic libraries, filling a research gap and providing valuable insights for future developments.

Keywords: *Off-campus access, remote access to e-resources, MyLOFT, electronic resources, remote authentication, Single Sign On, information discovery tools*

1 Introduction

Accessing electronic resources remotely has gained significant importance, particularly within academic and research environments, facilitating individuals to retrieve extensive information and scholarly materials from any location globally. Remote access to library electronic resources has its origins dating back to 1980 (De

Sakar, 2015). Initially, remote access relied on technologies such as proxy servers, VPN, Athens authentication and Shibboleth authentication (Bracke, 2001). In 1997, the University of Arizona pioneered the creation of EZproxy to cater to the needs of the off-campus students (Bunton, 2017). The significance of these tools was further emphasised during the COVID-19 pandemic, which led to universities' closures in early 2020, prompting libraries to seek solutions to support remote users (Zhou, 2022). The pandemic played a vital role in accelerating the adoption of remote access tools for electronic resources. As highlighted by Raghavaiah and Srikanth (2022), libraries transitioned to online access platforms to provide resources to their members, with subscribed resources being made available through virtual private network (VPN) systems. In response, libraries turned to proxy technologies like Online Computer Library Center (OCLC), and EzProxy to connect with their users, as noted by Babbar et al. (2022). A recent study by Duragappa and Chandrashekara (2022) identified various software solutions created for remote access, including EZproxy, remote CC Proxy, Squid Proxy, RHN proxy, Kinimbus, Remotelog, Open Athens and the newly introduced MyLOFT.

The utilisation of remote access applications in accessing e-resources holds substantial significance in enhancing the accessibility of library e-resources for off-campus students and faculty members alike. The e-resource remote access applications effectively eliminate previous access constraints, encompassing methods such as Internet Protocol (IP) address-based entry, password and username requisites, URL tokens, and Organisation Access Numbers (OANs).

The implementation of MyLOFT at Mzumbe University (MU) commenced with a trial period of 20 days for the library staff, followed by positive feedback leading to a subscription. The off-campus access was introduced in August 2022, with 2240 registered users and a 26% adoption rate. To raise awareness of the application, monthly training sessions and usage guides were provided.

The decision to adopt MyLOFT at MU was influenced by the low usage of subscribed e-resources, an increase in the number of off-campus students and the relocation of the Faculty of Law to areas without library services. These factors prompted the University to enhance e-resource accessibility, aligning with recommendations from the MU Internal Audit report. This paper explores the

deployment of the MyLOFT application at MU, exploring the challenges and prospects associated with this endeavour.

2 Statement of the Problem

In the contemporary university setting, the reliance on e-resources by both students and lecturers has become paramount. A challenge arises because many university members, including students, researchers and lecturers, are not physically on campus, where access to resources is usually based on IP addresses (Nagi & Parmar, 2021). This separation restricts access to e-resources, primarily due to subscription limitations tied to the institution's IP address (Punchihewa et al., 2014). Several scholars have identified reasons for the deployment of remote access tools, including Awoyemi & Awoyemi (2021) who noted that such applications allow users to access e-resources from anywhere by eliminating the need for physical visits to libraries. Nyakweba (2016) noted that the remote access tool facilitates quicker and more efficient searching and retrieval of information, saving users valuable time in their research processes. Mufungulwa (2022) suggests that remote access tools for e-resources have become increasingly essential due to the rising popularity of remote learning and research, particularly in response to global events like the COVID-19 pandemic. Chandrashekara (2022) highlights the cost-effectiveness of remote access, which diminishes the financial burden of procuring and upkeeping physical books and journals. Chidambaram (2021) noted that e-resources remote tools allow users to customise their search preferences, save searches, and set up alerts for new publications. This application provides a unified interface, granting users access to all library-subscribed e-resources, whether on- or off-campus.

So far MU has adopted the MyLOFT application for one year, offering convenient access to a wide array of library e-resources, including databases, e-journals, and e-Books. The full deployment took place in August 2022, and in August 2023, the University initiated an assessment of the deployment process with a focus on achieving Value for Money (VFM) and Return on Investment (ROI). The significance of this study lies in its examination of the MyLOFT application deployment, the identification of associated challenges, and the proposal of a strategic way forward. Ultimately, the study aims to demonstrate that effective management of MyLOFT can profoundly impact the day-to-day academic activities of both students and academic staff.

3 Study Objectives

The general objective of this study is to assess the effectiveness of MyLOFT at MU, encompassing the identification of challenges and the proposal of potential solutions. The specific objectives are:

RO1: To establish users' awareness of the MyLOFT application at MU.

RO2: To ascertain users' perceptions of the MyLOFT application at MU/To determine mechanisms used by the library in promoting the MyLOFT application.

RO3: To establish challenges in the use of the MyLOFT application at MU.

RO4: To recommend strategies to be used in maximising the usage of MyLOFT at the MU Library.

4 Literature Review

4.1 Deployment of E-resources Remote Access Tools

Typically, in most libraries, access to subscribed electronic resources is provided within specific IP ranges or an intranet environment, limiting access to individuals within the campus premises (Dixit, 2018). MyLOFT access simplifies the process for users by providing convenient access to multiple resources that the library has subscribed to. It functions as an intermediary server, bridging the gap between users and the library's e-resources databases. When users connect to MyLOFT, it subsequently establishes connections on their behalf to the library's licensed databases, retrieving web pages and delivering them back to the users. This system also performs a verification check when users click on links to online library resources, determining whether the user's computer is located on- or off-campus.

To enable remote access to e-resources, libraries must first install the necessary application on their servers (Naik & Machado, 2023). Concurrently, library users are required to install this application on their respective devices for remote access to e-resources (Shikongo, 2021). Subsequently, the remote access application's URL should be made available on the institution's website and library portal. Users will then receive the URL for the e-resources remote access application, along with a unique login ID and password, enabling them to access electronic resources remotely. To ensure user identity verification, libraries can employ various authentication methods such as federated authentication, email domain-based access and registration ID-based access. Additionally, libraries can activate their remote

access through protocols like CAS (Central Authentication Service), Shibboleth and other similar mechanisms (Breeding, 2021).

A study by Namdeo, et al. (2021) identified three primary motivations for libraries to implement remote access to e-resources. Firstly, it was emphasised that offering remote access aligns with the contemporary goals of educational institutions and libraries, serving as an effective means to optimise the utilisation of library e-resources; this is also seconded by Namdeo, et al. (2021) as quoted in (Kattimani, 2022). Secondly, the study highlighted the critical role of remote access during the COVID-19 pandemic, when governments worldwide enforced lockdowns as a precautionary measure against the spread of the coronavirus. Lastly, the study underscored that remote access to e-resources becomes especially valuable in situations characterised by geographical and temporal barriers, contributing to bridging knowledge disparities.

Baikady and Jessy (2014) noted that the increase in university enrollments has led to a shortage of on-campus accommodation facilities. Consequently, a significant proportion of students now live off-campus. To ensure that these off-campus students have access to essential library resources, the implementation of remote access tools has become imperative. Their study also identified another compelling rationale for libraries to adopt remote access tools. Universities have increasingly initiated online programmes, necessitating libraries to subscribe to such applications to fulfil the evolving information requirements of their students and faculty populations. This shift in educational delivery methods underscores the growing importance of remote access solutions in modern academic settings.

4.2 MyLOFT Services and Features

Scholarly research conducted by various authors has identified key characteristics of the library remote access platforms. According to Dixit (2018), these platforms feature a branded and customised interface tailored to meet the specific needs of the institution. Borteye et al., (2022) further emphasise that the platforms offer a user-friendly web portal and mobile application to facilitate seamless access to electronic resources.

Dhananjay (2022) observed that library remote access platforms provide a unified search interface that covers all resource types, including databases, e-books, journals,

and repositories. They also integrate a Web OPAC with an A-Z listing of all digital collections and offer customised off-campus access. According to Singh and Kumar (2022), a remote access platform is available around the clock, allowing users to access e-resources from anywhere and on any device. Nalumaga et al., (2022) note that these platforms support open architecture for seamless integration with online education tools and feature robust security controls to prevent unauthorized access.

D'silva and Balasubramanian (2022) further highlighted that these remote access applications centralise user management and usage monitoring, streamlining these tasks from a single location. They also generate customised reports to cater to the specific needs of the library department. Additionally, Borteye et al. (2023) pointed out the intriguing capability of saving content and accessing it offline.

Yohannan and Balasubramanian (2021) revealed that users can directly access databases, e-books the latest journal articles subscribed by the library. They also receive daily news feeds and updates from their favourite blogs, news sites and websites. Furthermore, Nalumaga et al. (2022) described how users can tag content for easy searching, and offline reading, and organise content into folders for reference. They can also employ a text highlighter to mark, summarise, and share important notes from articles and content.

4.3 MyLOFT, Single–Sign–On a Remote Login Solution to E-resources

MyLOFT platform functions as a centralised remote access gateway, enabling users to connect seamlessly to a wide array of subscribed electronic resources provided by the library. MyLOFT simplifies the access process for off-campus and external users by requiring them to input their institution-provided usernames and passwords.

The implementation of MyLOFT Single-Sign-On as a remote login solution for accessing MU e-resources has introduced a streamlined and efficient approach for users. With this application, users only need to authenticate once, granting them access to various e-resources without the need to repeatedly enter login credentials for each service. This solution aims to enhance user convenience, reduce authentication complexities, and optimise response times, ultimately enhancing the overall experience of accessing MU's valuable e-resources.

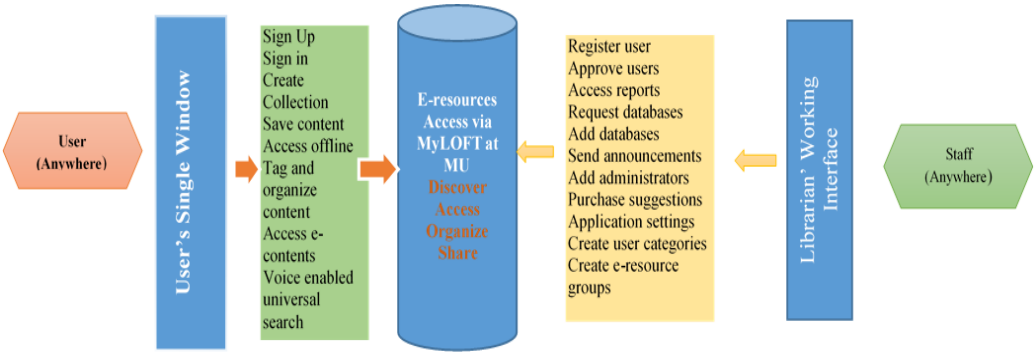

Figure 1: MyLOFT Platform: Scope and Features
Source: Researcher's Construct 2023

4.4 Users Interface

The MyLOFT user interface prioritises user workflow, enhancing their ability to discover library-subscribed resources. This streamlined interface ensures seamless access whether users are conducting searches through Google or Discovery services. Within MyLOFT, users can effortlessly register, log in, tag, organise, create collections, access content both online and offline, share resources, and synchronise data between their mobile devices and the web-based application (MyLOFT & RemoteXs, 2021). Moreover, MyLOFT offers voice-enabled universal search and provides access to user guides, Frequent Asked Questions (FAQs) and customer support for user assistance. MyLOFT is purposefully designed for smartphone usage, available on Google Play and Apple platforms, offering an intuitive design that simplifies access to all content within a single, user-friendly interface (Gulati, 2021)

4.5 Librarians' MyLOFT User Interface

On the side of the library staff or MyLOFT administrators, numerous features are available, as illustrated in Figure 1. They can register and approve users, handle requests to add new databases and disseminate announcements to users. Additional functionalities encompass creating user categories and e-resource groups as revealed in Figure 1.

4.6 Exploring Selected Remote Access Tools in Library Resources

In the realm of library resources, various commercial, open-access and remote-access software/tools have emerged. This study selected four among the widely recognised ones: Ezyproxy, Knimbus, Lib Hub Kiox and RemoteXs.

4.6.1 Ezyproxy

Ezyproxy was conceptualised by Chris Zagar in 1999, standing out as a commercial discovery tool. It operates on proxy technology, facilitating access to library electronic resources (Bhat, 2019). Often branded as a "referral server," Ezyproxy operates on a subscription-based model. Its usage entails validation for remote users per browser session, demanding proficient IT management (Rosenfeld & Enoch, 2019). Ezyproxy serves the purpose of centralising webpages accessible to both on-site and off-site users, providing seamless access to library e-resources. Despite its intricacy, Ezyproxy ensures secure delivery of e-resources to users, ensuring accessibility regardless of their location or time.

4.6.2 Knimbus

Knimbus was conceived as a "knowledge cloud" by Rahul Agarwalla, serving as both a collaborative space and a discovery tool for researchers and scholars (Gulati, 2021). Founded in November 2010, Knimbus has experienced significant growth, currently being utilised by over 1,200 institutions across 34 countries worldwide (Naik & Machado, 2024). This platform offers a unified search interface, seamlessly connecting users to both library-subscribed and freely available e-resources, utilising real-time searching and analysis methods (Sharma et al., 2021). Knimbus boasts features like high-speed real-time search, instant project sharing to prevent duplication and advanced filtering options. Moreover, it prioritises community engagement by enabling users to establish research groups and collaborate with team members on shared projects (Naik & Machado, 2024). In addition to content discovery and sharing capabilities, Knimbus facilitates access to e-resources, articles, tagging and peer discussion forums, with the overarching goal of democratising knowledge across diverse domains (Kaushik & Kumar, 2013; Borah & Borah, 2014).

4.6.3 Lib Hub Kiox

Lib Hub Kiox, also known as Semper Tool, serves as a unified library gateway for discovering and accessing e-resources (Mtega & Benard, 2014; Jabir, & Katabalwa,

2016).). It caters to both on- and off-campus users, providing 24/7 access to e-resources and sending email alerts for newly uploaded articles (Mtega & Benard, 2014). With features like customisable collections, user-friendly interfaces, and offline/online access via username and password, Lib Hub Kiox ensures seamless exploration and enjoyment of digital content for its users (Jabir & Anajoyce, 2018).

4.6.4 RemoteXs

RemoteXs stands as a cloud-based software solution designed for digital libraries, offering a centralised platform for accessing a wide array of electronic content (Cheng et al., 2019). By consolidating subscribed resources into a single portal, RemoteXs streamlines the process of accessing diverse e-content (Naik & Machado, 2024). Through a single login, this application provides remote access authentication, enabling users to seamlessly access all content (Vyas & Trivedi, 2020). Furthermore, RemoteXs offers institutions an option to allocate fixed IP addresses and provides comprehensive usage statistics for all e-resources. Compatible with various devices, including tablets and smartphones, RemoteXs aims to facilitate the discovery and utilisation of licensed e-resources by libraries or library consortia. Particularly beneficial for smaller institutions lacking IT personnel, RemoteXs serves as a user-friendly solution for enhancing access to digital library resources.

5 Awareness of the E-resources Remote Access Applications

Chitumbo and Chewe (2017) revealed that the majority of students were not using remote access applications because they were not aware of their existence, had poor information search skills and poor internet connectivity in the area of location which affected the downloading of pages. Bhat (2019) noted that libraries should conduct user awareness or user education programmes from time to time in which newly inducted users are made aware of the availability of new technologies such as remote access and discovery tools. Rafiq et al., (2019) found that the library's efforts to raise awareness, combined with effective communication channels on campus, helped users become familiar with discovery tools and remote access resources. Masese et al., (2016) observed that awareness of methods of accessing e-resources using remote tools would be enhanced by regular user training, current awareness, marketing of e-resources, and the access tool.

6 Library Patrons' Perceptions of the Remote E-resource Access Applications

Chelulei (2020) emphasised the critical role of library patrons' perspectives on remote e-resource access applications, crucial for both students and lecturers in achieving academic success and conducting research. Highlighting the significance of these tools, Chitumbo and Chewe (2017) demonstrated that students enrolled in Zambia's distance learning programmes recognise their value and user-friendliness in accessing institutional e-resources. Similarly, Rao and Bhat (2018) advocated for remote access applications as essential best practices for libraries. They emphasised how these tools facilitate round-the-clock access to information, optimising the utilisation of e-resources and providing convenient access to various library materials from any location. Additionally, Singh (2021) acknowledged the importance of remote access applications, particularly in crises like the COVID-19 pandemic, as they enable libraries to maintain effective service delivery.

Gumede (2021) conducted a study highlighting the significance of remote access to library resources, particularly for off-campus students, offering them services equivalent to those available to on-campus users. Decker (2021) further accentuated the bridging function of remote access in improving customer service, observing that modern library patrons demand unrestricted access to information from any location and at any time of the day. Chandrashekara (2022) underscored the negative consequences on patrons' e-resource access when libraries lack remote access platforms.

In Tanzania, Jabil and Katabalwa (2016) emphasised the efficacy of remote access tools in facilitating e-resource access, enabling users to retrieve information from multiple databases simultaneously and assisting in resource management through usage statistics. Furthermore, Tawfeeq (2015).) advocated for the implementation of Single-Sign-On (SSO) systems in academic libraries to simplify user authentication and enhance satisfaction, considering the proliferation of online services and resource types. This user-friendly approach is essential to accommodate a growing user base and promote efficient resource utilisation.

7 Promoting Access and Use of E-resources Remote Access Tools

Various studies have proposed diverse strategies for academic libraries to enhance the utilisation of e-resources remote access tools. Rao and Bhat (2018) suggested strategies such as utilising library and university websites, conducting training

sessions and employing various promotional materials. These recommendations aim to maximise the effectiveness of these tools. Moyer, Hayes, and Mittrach (2021) mention libraries' adoption of marketing tactics to increase the visibility of remote access tools. These tactics include creating instructional protocols, providing online tutorials and engaging users in both virtual and in-person training sessions. Furthermore, electronic newsletters were utilised to disseminate information within scholarly circles (Moyer, Hayes, and Mittrach, ibid).

Understanding the demographics and needs of library patrons is crucial for promoting e-resource remote tools, as emphasised by Zibani (2017). Target audiences may include students, faculty, researchers and community members. Haugh (2021) suggests utilising library website announcements, social media, posters and email newsletters for effective promotion. Saunders and Wong (2020) recommend offering training sessions or workshops to educate patrons on using remote access tools, including in-person sessions, webinars, or online tutorials. Libraries should also communicate the benefits of these tools, such as 24/7 access to resources and the ability to search multiple databases simultaneously (Gubbi et al., 2013).

Customising marketing materials to match the specific needs and interests of different patron groups is essential, according to Cassell and Hiremath (2023). They emphasise highlighting convenience for students accessing resources from home and time-saving benefits for busy researchers. Incorporating eye-catching visuals, such as graphics or videos, can further illustrate how remote access tools work (ibid.). Continuous feedback gathering from patrons helps libraries understand their experiences and areas for improvement (Zibani, 2017).

Providing ongoing support to patrons encountering difficulties with remote access tools is crucial, as noted by Saunders and Wong (2020). This support may include offering a help desk or online chat service. Finally, Yi (2016) recommends regularly monitoring usage statistics and evaluating marketing efforts to refine strategies and ensure effective promotion to patrons.

8 Challenges in the Use of the Remote E-resource Access Application

Several studies have investigated the challenges surrounding the deployment of e-resources remote access tools. Rao and Bhat (2018) highlighted network issues and difficulties in downloading full texts as significant obstacles. Similarly, Jabil and

Katabalwa (2016) identified various challenges encountered during the implementation of remote e-resources tools in Tanzania. These challenges include staff and students' reluctance to undergo training, limited computer availability, unreliable internet connections and insufficient funds for promotional activities.

Nyakweba (2016) observed that setting up, configuring and effectively managing these tools often requires specialised IT expertise, skills that many librarians lack. Kasella (2020) and Rahaman et al. (2023) pointed out challenges related to user authentication and access control in both discovery and remote access tools. Botta et al. (2016) noted the complexity and time-consuming nature of integrating remote access applications, especially in environments with diverse library systems and protocols.

Ali (2020) stressed the importance of adequately training researchers, students and faculty to utilise e-resources remote and discovery tools effectively, a component often overlooked in many libraries. Furthermore, Jalal and Sutradhar (2020) highlighted financial challenges associated with subscription costs or licensing fees for e-resources and discovery tools as significant setbacks. Overall, the deployment of these tools presents challenges ranging from implementation complexity and user authentication to integration with existing systems, metadata management, user training and support, as well as financial considerations.

9 Research Methodology

This investigation is a singular case study survey rooted in the positivist paradigm, described as a research tradition that occupies the space between positivism and constructivism (Samy, & Robertson, 2017). Employing both qualitative and quantitative approaches ensured a comprehensive understanding of the research topic by allowing researchers to triangulate data from multiple perspectives (Yin, 2009; Creswell & Plano Clark, 2018). While quantitative methods provided numerical data and statistical analysis, qualitative methods offered in-depth insights into the context, motivations and meanings underlying phenomena. By integrating both approaches, researchers enhanced the validity and reliability of their findings, captured complex phenomena, and provided a better understanding of the research subject (Creswell & Plano Clark, 2018).

The study focused on a targeted group of sixty-seven (67) academic staff members who utilised the MyLOFT application at MU. A total of six (06) respondents were

purposively selected from the total of 67 to be involved in the interview session. The sample size was determined using the Probability Proportional to Size (PPS) method, which, as advocated by Alam et al. (2015), facilitates the selection of a sample that accurately represents the entire population. Additionally, purposive sampling was applied to identify interview participants who could provide relevant insights. This method was chosen for its capability to select respondents with specific characteristics aligned with the research objectives (Rai & Thapa, 2015).

9.1 Sample Size

$\text{Sample Size (n)} = \frac{\text{No.of Users in Category (n)}}{\text{Total Population}}$ x Desired Total Sample. The rounded sample size for each user category was calculated using the following given data: the total population was 281, and the desired sample size was 67. This involved dividing the number of users in a specific category by the total population and then multiplying the result by the desired total sample size (67). For example, IDS: $^{n}IDS = \frac{10}{281}\ x\ 67$.

$^{n}IDS \approx 2.39$. This process was repeated for each user category to establish the rounded sample sizes for all categories.

Table 1: Study Sample Size

S/N	User Category	No. of Users (n)	Rounded Sample Size (n)
1	IDS	10	3
2	SOPAM	65	15
3	SOB	60	14
4	FSS	42	10
5	LSD (Librarians)	11	3
6	FoL	39	9
7	FST	52	12
8	MU-ICTU	2	1
Total		**281**	**67**

Source: MyLOFT MU Platform (2023)

Data collection comprised structured and unstructured questionnaire items, administered to academic staff members using the MyLOFT application to access subscribed e-resources. Additionally, some targeted respondents were interviewed due to their consistent use of the application. The collected data were subjected to analysis using the SPSS version 20 for classification. Basic statistical measures like frequencies, pie charts and percentages were used to illustrate the gathered

information, complemented by various graphs for enhanced clarity. Furthermore, the analysis of interview data followed a content analysis approach, with findings presented in quoted form to maintain fidelity to participants' perspectives.

10 Findings

10.1 Demographic Profile of the Respondents

The study encompassed participants who were lecturers from seven (07) distinct academic units within MU. Researchers opted for this approach to ensure a diverse range of responses from respondents affiliated with different MU Units, thereby enhancing the breadth and depth of the study's findings.

Table 2: Distribution of the Respondents

S/N	University Units	F	%
1	SOPAM	14	20.9
2	SoB	13	19.4
3	FSS	10	14.9
4	FoL	11	16.4
5	FST	9	13.4
6	IDS	4	6
7	MU -ICTU	0	0
8	LSD	6	9
Total		**67**	**100**

Source: Field Survey Data (2023)

Key: SOPAM = School of Public Administration and Management, SoB = School of Business, FSS Faculty of Social Sciences, FoL = Faculty of Law, FST = Faculty of Science and Technology, IDS = Institute of Development Studies, and LSD = Library Services Directorate

SOPAM represents the highest percentage of respondents at 20.9%, indicating a significant level of engagement or interest from this academic unit. SoB, with 19.4%, closely follows SOPAM, suggesting substantial participation and relevance in the context of the research. FSS contributes 14.9% of the respondents, indicating a notable presence and interest from the social science perspective. FoL accounts for 16.4% of the respondents, showcasing a considerable engagement from the legal studies domain. FST represents 13.4% of the respondents, signifying a noteworthy involvement from the science and technology faculty. IDS, while with a lower percentage (6%), still provides valuable insights. MU-ICTU reports no respondents, indicating either non-participation or minimal relevance to the research focus. LSD

contributes to 9% of the respondents, underscoring the importance of library services in the deployment of the specified application.

The distribution of respondents across various units a MU highlights a diverse representation, ensuring a comprehensive understanding of the challenges and prospects associated with deploying the My Library On Finger Tips Application at MU. Further exploration of the unique perspectives from each unit is essential for a holistic assessment and informed decision-making.

10.2 E-resource Usage Statistics: MyLOFT Platform Pre- and Post-Deployment at Mzumbe

Access to e-resources at MU was facilitated through four distinct methods. Initially, users were required to be physically present on campus and utilise MU IP addresses to gain access, constituting the first method. The second method involved the use of individual usernames and passwords. The third method employed an Organisation Access Number (OAN), while the fourth method utilised URL tokens. However, it is worth noting that the last method had its limitations, applying only to SAGE Journals. Despite the availability of multiple access methods, the utilisation statistics of e-resources remained consistently low.

Below are two tables containing usage statistics for the three most popular databases: EBSCOhost, Emerald and JSTOR. These statistics cover the period from January to July 2022, which is before the deployment of MyLOFT and January to July 2023, which is seven (07) months after the deployment of the application. The metrics used for comparison are the Total Item Requests, which refer to the total number of times the full text of a content item was downloaded or viewed from the three databases (Tusa, 2020).

Table 3: Pre-Deployment Electronic Resources Usage Statistics for MyLOFT Application (January– July 2022)

Platform	Metric Type	Total	Jan-2022	Feb-2022	Mar-2022	Apr-2022	May-2022	Jun-2022	Jul-2022
EBSCOhost	Total Item Requests	976	347	77	118	101	156	108	69
Emerald	Total Item Requests	3815	259	115	309	833	1348	569	382
JSTOR	Total Item Requests	4577	685	240	1331	787	203	782	549

Sources: COUNTER Reports from Databases (2023)

Table 4: Post-Implementation E-resources Usage Statistics for MyLOFT Application (January – July 2023)

Platform	Metric Type	Total	Jan-2023	Feb-2023	Mar-2023	Apr-2023	May-2023	Jun-2023	Jul-2023
EBSCOhost	Total Item Requests	3169	867	592	599	220	412	324	155
Emerald	Total Item Requests	6625	944	526	837	897	1446	1231	744
JSTOR	Total Item Requests	23088	4685	2682	2491	3387	4203	3816	1824

Sources: COUNTER Reports from Databases (2023)

The statistics presented in Tables 3 and 4 highlight significant changes in e-resource usage at MU before and after the deployment of MyLOFT. Across all platforms, including EBSCOhost, Emerald, and JSTOR, there was a notable increase in usage post-implementation. EBSCOhost experienced a substantial rise in usage, with pre-deployment requests totalling 976, compared to post-implementation requests reaching 3169. Similarly, Emerald saw a considerable increase in usage, with pre-deployment requests at 3815, escalating to 6625 post-implementations. This growth was consistent throughout each month.

However, the most remarkable surge was witnessed in JSTOR, where pre-deployment requests stood at 4577 and skyrocketed to 23088 post-implementations. This significant increase in usage was evident across all months. Overall, the deployment of MyLOFT had a profound impact on e-resource usage at MU, with substantial increases observed across all platforms. Notably, JSTOR experienced the most significant growth, highlighting the effectiveness of the implementation in enhancing access and utilisation of electronic resources.

Respondents' Sources of Awareness about the MyLOFT Platform at MU

Respondents were presented with a questionnaire containing various options to select the sources through which they became aware of the MyLOFT platform at MU. The summarised results of their responses are presented in Table 5.

Table 5: Sources of Awareness about the MyLOFT Application

Sample Size N =67	Awareness of the MyLOFT App	Yes		No	
		F	%	F	%
	Library Webpage	9	13.4	58	86.6
	Posters and Flyers	6	9	61	91
	Email	30	44.8	37	55.2
	Word of Mouth	44	65.7	23	34.3

Sources: Field Survey Data (2023)

The findings summarised in Table 5 show the number of respondents who are aware of the MyLOFT application and those who are not. Through, the Library Webpage/Social Media, nine (9) respondents (13.4%) became aware of MyLOFT, while 58 (86.6%) did not. Through Posters and Flyers, 6 (9%) were aware of MyLOFT, while 61 respondents (91%) were not. Moreover, 30 respondents (44.8%) found out about MyLOFT through Email and Newsletters, whereas 37 (55.2%) did not. In addition, 44 respondents (65.7%) learned about MyLOFT through the Word of Mouth, while 23 (34.3%) did not.

The most common source of awareness about the MyLOFT application at MU was Word of Mouth, with 65.7% of respondents having learned about it through this method. Email and Newsletter are the second most significant sources, with 44.8% of respondents becoming aware of MyLOFT through the channel. Library Webpages seem to be less effective in creating awareness, with only 9 (13.4%) of respondents, respectively, using these sources. A higher percentage of respondents (65.7%) became aware of MyLOFT through the Word of Mouth which suggests that personal recommendations and informal communication play a significant role in spreading awareness about the platform. This may indicate a strong sense of trust among peers or colleagues. Email is also a notable source of awareness (44.8%), suggesting that official university communication channels are effective in reaching a substantial portion of the target audience. The Library Webpage and Posters and Flyers have limited effect in raising awareness about MyLOFT. This could indicate a need for improvement in the visibility and accessibility of information on these platforms or a need for more engaging promotional materials. The data suggests that institutions should consider leveraging word-of-mouth marketing strategies, as they seem to be highly effective in creating awareness about educational platforms like MyLOFT. Encouraging satisfied users to recommend the platform to their peers could be beneficial.

Respondents were also provided with an option of stating other sources of awareness apart from those which were provided.

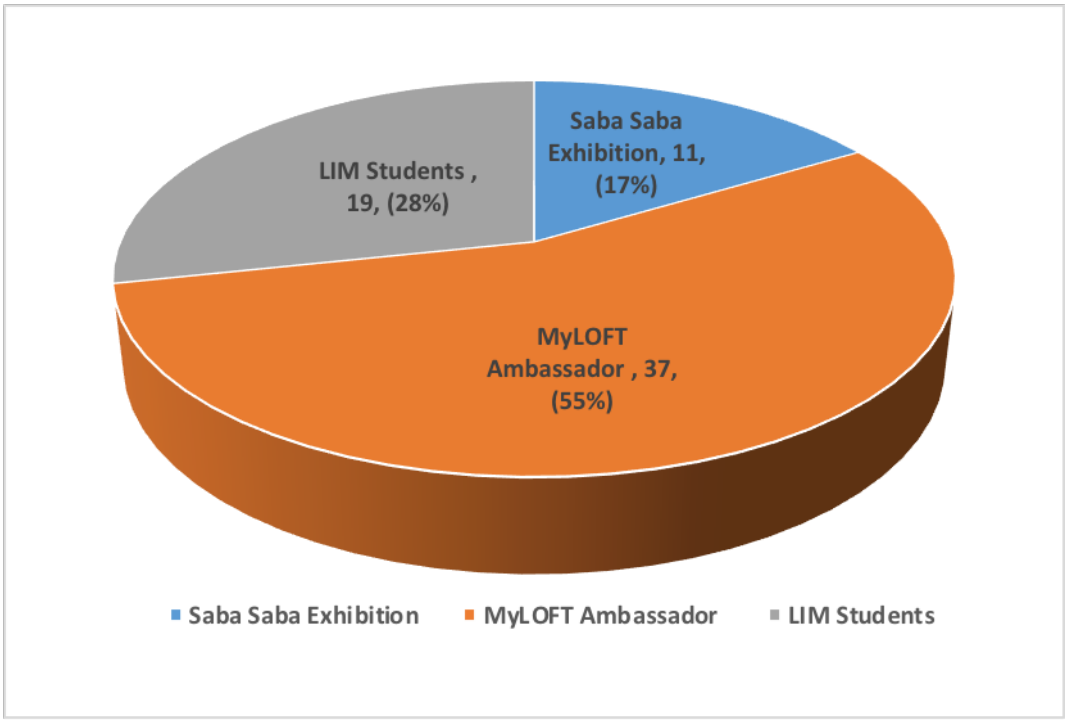

Figure 2: Sources of Awareness on the MyLOFT Platform
Source Field Survey Data (2023)

The findings presented in Figure 2 indicate that the most prominent source of awareness about the MyLOFT platform is MyLOFT Student Ambassador, with 37 (55.2%) of respondents having learned about it through this method. LIM Students is the second most significant source, with 19 (28.4%). Saba Saba Exhibition contributed to awareness but was less significant in comparison to other methods, with 11 (16.4%) of the respondents using this source.

During an in-depth interview with a senior lecturer, the discussion centred on identifying effective methods for promoting awareness about the MyLOFT platform. The senior lecturer made the following remarks:

> *It has become evident that students possess the potential to excel in promoting newly deployed learning platforms, particularly in raising awareness among their peers. Their ability to effectively communicate with fellow students surpasses that of librarians. Therefore, I recommend the utilisation of Library Student Ambassadors as a means of enhancing awareness and dissemination of information about MyLOFT.*

10.3 Perceptions of Users Regarding the MyLOFT Application

The researchers sought to gather insights into respondents' interactions with the MyLOFT platform. The respondents were presented with various options to express their perceptions of the platform. The perception of each MyLOFT feature was assessed by calculating the percentage of respondents who answered "Yes" or "No" to whether they found the feature interesting. By analysing these percentages, researchers gauged the overall perception of each feature among the respondents and identified which features were more favoured or disfavoured by the user community. The summarised findings are presented in Table 6.

Table 6: The Respondents' Perception of MyLOFT Features

Sample Size = 67	**Interesting Feature of the MyLOFT App**	**Yes**		**No**	
		F	**%**	**F**	**%**
	Multiple Access	44	65.7	23	34.3
	Multiple Logins	32	47.8	35	52.2
	Voice Enabled Search	16	23.6	51	76.1
	Tag & Organise	28	41.8	39	58.2
	Save Content Off and Online	45	67.2	21	31.3
	No Password	22	32.8	45	67.2
	Not Affiliated with Institutions IP Addresses	22	32.8	45	67.2

Source: Field Survey Data (2023)

The findings suggest that Multiple Access and Save Content Off and Online are perceived as attractive features by a significant number of the majority of the respondents, with approximately 65.7% and 67.2% finding them interesting, respectively. On the contrary, the Voice Enabled Search appears to be less appealing, with only 23.6% of respondents finding it interesting. This could indicate that the voice search feature might need improvement or better promotion to gain user interest. Multiple Logins and Tag & Organise features received mixed perceptions, with roughly equal proportions of respondents finding them interesting and not interesting. The No Password and Not Affiliated with Institutions IP Addresses features also seem to generate mixed responses, but a slight majority of the respondents did not find them interesting.

An academic librarian who participated in the in-depth interview concerning the findings mentioned the following concerns:

> *Developers and marketers of the MyLOFT application should focus on highlighting and enhancing features like Multiple Access and Save Content Off and Online to cater to the preferences of a substantial portion of the*

users. The Voice-Enabled Search feature may require further investigation to understand why it is not resonating with users and whether improvements can be made.

For features with mixed perceptions, user feedback and additional research could help determine areas of improvement or adjustments. The MyLOFT team needs to consider these insights when prioritising feature development and marketing efforts to align with user preferences and needs.

10.4 The Respondents' Levels of Satisfaction with the MyLOFT Platform

The findings in Figure 3 provide a summary and explanation of the satisfaction levels of respondents concerning MyLOFT offerings and interactivity. The respondents were given Likert scales to indicate their chosen level of satisfaction.

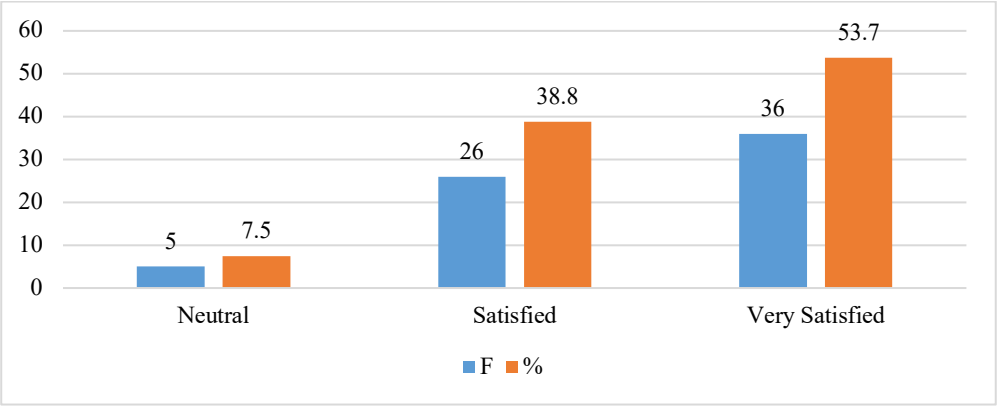

Figure 3: The Respondents' Level of Satisfaction with the MyLOFT Platform
Source: Field Survey Data (2023)

The findings represent respondents' perceptions of MyLOFT, categorised into three satisfaction levels: Neutral, Satisfied, and Very Satisfied. A small proportion of the respondents (7.5%) reported feeling neutral about MyLOFT. This suggests that a minority of the users neither strongly like nor dislike the platform. A significant portion of the respondents (38.8%) expressed satisfaction with MyLOFT. This indicates that a substantial number of users were satisfied with the platform. The majority of the respondents (53.7%) reported being very satisfied with MyLOFT. This suggests that the platform has garnered a high level of approval and positive feedback among users.

The findings reveal that the combined percentage of respondents who are satisfied or very satisfied with MyLOFT is approximately 92.5%. This indicates a strong overall positive sentiment among users. The fact that more than half of the respondents fall into the "Very Satisfied" category suggests that MyLOFT has successfully met or exceeded the expectations of a significant portion of its user base. While there is a small percentage of the respondents who feel neutral, this group might benefit from additional features or improvements to enhance their experience. Overall, the data reflects a positive perception of MyLOFT among the surveyed users, which can be seen as a testament to the platform's effectiveness and user satisfaction.

MyLOFT should continue to prioritise and build upon the features and aspects that have garnered high levels of satisfaction among users to maintain and potentially increase user engagement and satisfaction. For users in the "Neutral" category, it would be beneficial to gather further feedback through surveys or interviews to understand their specific concerns or areas where the platform can be improved.

The platform can use the positive sentiment among its users as a valuable marketing tool and a source of credibility to attract new users or retain existing ones. Continual monitoring and assessment of user satisfaction should be an ongoing practice to ensure that MyLOFT remains aligned with user-evolving expectations and needs.

In a comprehensive interview with a senior lecturer, on their satisfaction with the MyLOFT application. The interview revealed a compelling justification for their positive assessment:

> *Before the deployment of the MyLOFT application, I encountered numerous challenges in accessing MU-subscribed e-resources. At one point, I almost lost hope of ever being able to access and utilise these valuable resources. However, with the introduction of MyLOFT, I can now conveniently access these resources from the comfort of my home and virtually anywhere, 24/7. It's safe to say that the advent of MyLOFT as a remote access solution will undoubtedly enhance my teaching, learning, research, and publications. (Senior Lecturer-MU)*

10.5 The Respondents' Perceptions of the MyLOFT Interface and Design

The findings regarding the perceptions of the MyLOFT interface and its design are summarised and presented in Figure 4. The majority of the survey participants, comprising 39 individuals (58.2%) of the total respondents, expressed a very positive

assessment of the MyLOFT interface and its design. Additionally, 16 respondents (23.9%) rated it as good, while 10 individuals (14.9%) found the platform's interface and design acceptable. Only one (1) respondent (1.5%) ranked it as poor, and there were no responses from a similar proportion of respondents.

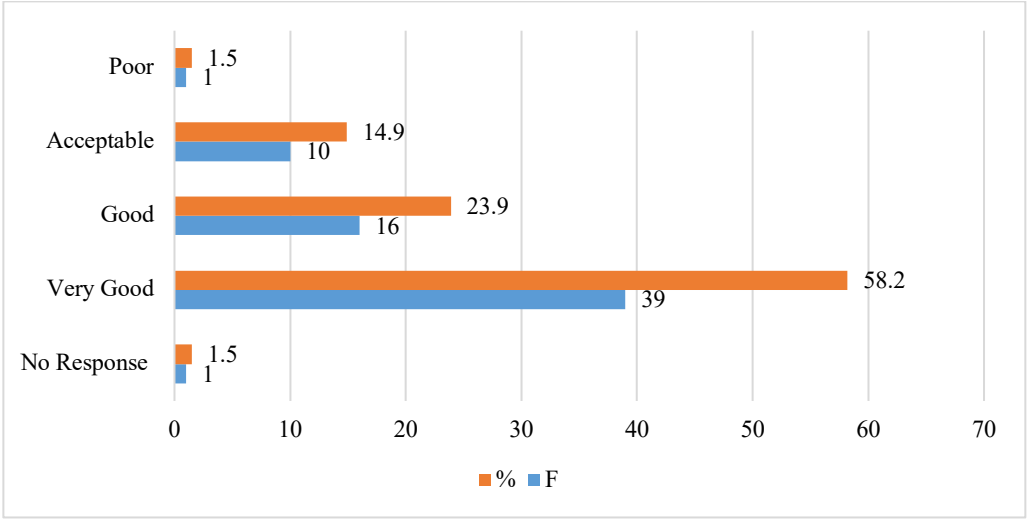

Figure 4: Respondents' Perceptions on the MyLOFT Interface and Design
Source: Field Survey Data (2023)

The findings show that the majority of the respondents, 58.2%, had a very good perception of the MyLOFT interface and design, indicating a high level of satisfaction. Additionally, 23.9% rated it as good, signifying overall satisfaction. A smaller group, 14.9%, found it acceptable, meeting their minimum requirements, while only 1.5% ranked it as poor, suggesting areas for improvement. The "No Responses" category highlights the need for improved feedback collection methods to capture a more comprehensive range of user insights.

The results highlight that the majority of the users have a positive view of the MyLOFT interface and design, validating the development team's efforts and indicating alignment with the user expectations. However, it is crucial not to overlook the 1.5% of the respondents who rated it poor; their feedback should be thoroughly examined to pinpoint areas for enhancement, possibly through usability testing or targeted surveys. For the 14.9% who found it merely acceptable, there is an opportunity to identify improvements that could elevate their perception. Additionally, addressing the issue of "No Responses" indicates the need for refining

survey methods to ensure comprehensive feedback collection. In essence, while the MyLOFT interface enjoys overall positive feedback, there is room for improvement to further enhance user satisfaction and cater to the concerns of a minority who expressed dissatisfaction.

During an in-depth interview, a respondent who rated the MyLOFT interface design poor made the following remarks:

> *MyLOFT interface poses several challenges, particularly in the aspect of content saving within user-created collections. Some saved content inexplicably ends up in the general collection instead of the intended specific collection, necessitating users to manually transfer the content to the correct collection.*

10.6 Mechanisms Used by the Library in Promoting the MyLOFT Platform

The respondents were presented with various choices to identify the predominant strategies for promoting the MyLOFT application at MU. The outcome of their research is succinctly presented in Table 7.

Table 7: Mechanisms Used by the Library in Promoting MyLOFT Platform

Sample Size = 67	MyLOFT Training & Promotion	Yes		No	
		F	%	F	%
	Training on MyLOFT	59	88.1	8	11.9
	MyLOFT Promotion	38	56.7	29	43.3

Source: Field Survey Data (2023)

The findings reveal that a significant majority of respondents, 88.1%, have benefited from training on the MyLOFT platform, showcasing the library's proactive commitment to user education. This is a positive sign as it enhances user engagement and satisfaction with MyLOFT. However, there is room for improvement in the MyLOFT promotion efforts, with only 56.7% of respondents being aware of these promotions, leaving 43.3% unaware. This suggests an opportunity to enhance awareness and utilisation of the platform.

To address this, the library should consider reinforcing promotional activities through email campaigns, posters, workshops, or social media outreach to inform users about MyLOFT features and benefits. Additionally, given the success of training initiatives, the library can continue providing training sessions while tailoring them to address specific user needs, ensuring that users maximise the platform's capabilities. Gathering feedback from both trained and untrained users

can further refine these strategies and improve the overall user experience with MyLOFT. While the library has excelled in providing MyLOFT training, there is a need for more comprehensive promotional efforts to fully harness the platform's potential within the library community.

10.7 Library's Success in Promoting the MyLOFT Application

One of the specific objectives of this study was to gain insight into the library's efforts to promote the utilisation of MyLOFT within the MU community. The respondents were presented with Likert scale items to express their sentiments and the findings are presented in Figure 5.

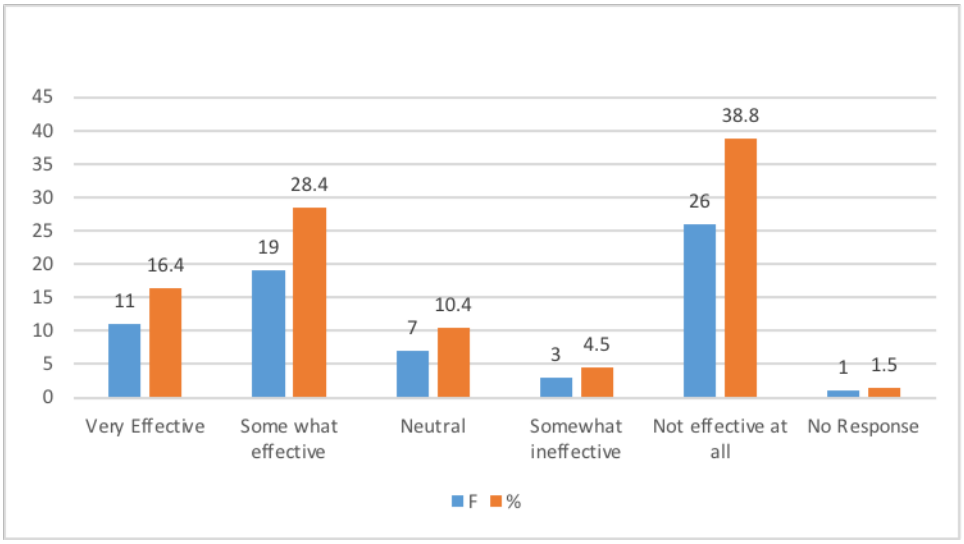

Figure 5: Library's Success in Promoting the MyLOFT Application
Source: Field Survey Data (2023)

The summarised survey in Figure 5 shows a range of perceptions among respondents regarding the library's effectiveness in promoting the MyLOFT application. Some users, comprising 16.4%, highly appreciate the library's efforts, finding them very effective. A larger segment, 28.4%, views the library's promotional initiatives as somewhat effective. Additionally, 10.4% remain neutral in their assessment, indicating an opportunity for the library to sway opinions positively with targeted improvements. Lastly, better communication and education can help to address the lack of response from a small fraction of users, ensuring a more informed and engaged user base. These findings underscore the importance of data-

driven improvements in the library's promotional strategies to better serve its user base effectively.

10.8 Influence of Promotional Effectiveness on MyLOFT Application Usage

The researchers sought to ascertain whether effective promotion and marketing of the MyLOFT platform would lead to increased usage. Respondents were presented with alternative Likert scale items for selection, as depicted and summarised in Figure 6.

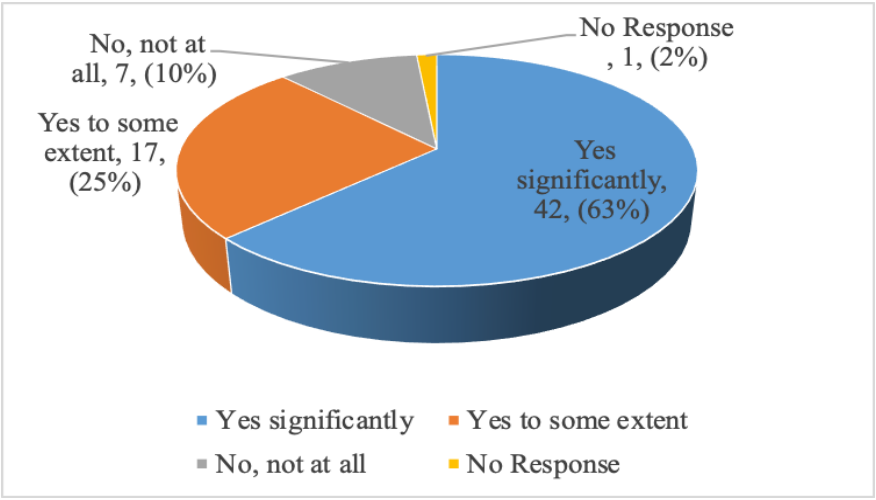

Figure 6: The Impact of Promotional Effectiveness on MyLOFT Application
Source: Field Survey Data (2023)

The provided data in Figure 6 pertains to a survey evaluating the influence of marketing and promotion efforts on the usage of MyLOFT as a product or service. The responses were categorised into different levels of impact: yes significantly, yes to some extent, no, not at all. The findings indicate that the majority of the respondents, comprising 60.1%, believe that marketing and promotion would positively affect MyLOFT usage. This suggests the potential for increased adoption if effective marketing strategies are deployed. Conversely, 10.5% of respondents hold a belief that marketing efforts would not impact MyLOFT usage at all, indicating a small negative perception. Additionally, 1.5% did not respond, possibly indicating uncertainty or lack of awareness about the product's marketing potential.

In light of these findings, it is encouraging to observe a predominantly positive outlook towards marketing and promotion potential to boost MyLOFT usage. This

underscores the importance of investing in marketing strategies to harness this perceived positive impact. However, it is essential to address the concerns of the small proportion of the respondents with negative perceptions. Understanding their reasons and potentially dispelling any misconceptions should be considered. Furthermore, engaging with the uncertain respondents to gather their insights can help refine marketing approaches. Overall, the data support a favourable outlook regarding marketing's role in increasing MyLOFT usage, suggesting opportunities for further research and targeted marketing efforts to maximise product adoption.

10.9 Challenges and Barriers to the Use of the MyLOFT Platform at MU

The fourth specific objective of this investigation was to delineate and analyse the challenges and barriers experienced by respondents when utilising the MyLOFT platform for accessing electronic resources. The resultant responses have been collated and are presented in Table 8 for reference and analysis.

Table 8: Challenges to Using MyLOFT

Sample Size N =67	Challenges of Using MyLOFT	Yes		No	
		F	**%**	**F**	**%**
	Technical Issues	38	56.7	29	43.3
	Difficulty in Navigating the Application Features	22	32.8	45	67.2
	MyLOFT Unclear Instructions	20	29.5	47	70.1
	Slow App Performance	16	23.9	51	76.1
	MyLOFT Compatibility with Mobile Phone	30	44.8	37	55.2
	Private/Security Issues	16	23.9	51	76.1

Source: Field Survey Data (2023)

The findings in Table 8 above shed light on several key challenges faced by MyLOFT users. Firstly, a significant majority of the respondents, accounting for 56.7%, reported encountering technical issues during their interactions with MyLOFT. Secondly, approximately one-third of the respondents, constituting 32.8%, expressed difficulty in navigating the features of the application. These findings suggest the need for improvements in the user interface and an enhanced provision of user guidance within the platform, as such challenges can impede users' ability to effectively utilise MyLOFT. Another substantial concern emerged from the data, with 29.5% of respondents reporting unclear instructions within the MyLOFT platform. This emphasises the critical importance of providing comprehensive and user-friendly guidance to ensure user satisfaction and successful adoption of the platform. Furthermore, roughly one-fourth of the respondents,

23.9%, reported experiencing slow application performance. This issue may be linked to technical optimisations that are required to enhance the speed and efficiency of the MyLOFT application. Regarding mobile phone usage, 44.8% of respondents indicated compatibility issues between MyLOFT and mobile phones. This finding suggests the necessity for improvements in mobile user experience to cater to a broader user base effectively.

Lastly, a substantial number, 76.1%, of the respondents expressed concerns about private and security-related issues associated with MyLOFT. This high level of apprehension underscores the urgent need to implement robust security measures and prioritise privacy protection within the MyLOFT platform to instil and maintain user trust.

The identified challenges within the MyLOFT platform, encompassing technical issues, navigation difficulties, unclear instructions, slow app performance, compatibility issues with mobile devices and security concerns, collectively underscore the imperative for addressing these issues promptly. By doing so, MyLOFT can enhance its usability and overall effectiveness, ultimately delivering greater value to users accessing electronic resources.

The researchers conducted in-depth interviews with respondents who reported encountering technical issues while using the MyLOFT application. The subsequent section highlights the following complaints voiced by these respondents:

> *This application exclusively operates with Microsoft Edge and Chrome browsers. Furthermore, users are required to install numerous extensions for the application to function optimally. On the mobile front, users may need to modify their devices to enable application usage. For instance, users may be prompted to change their Defense Service Network (DSN) settings. Additionally, some older phones may not be compatible with the application.*

10.10 Strategies to Maximise the Usage of MyLOFT at the MU Library

The last objective of this study pertained to the identification of strategies aimed at enhancing the utilisation of the MyLOFT platform within the context of MU. To obtain insights into these strategies, the respondents were presented with a selection of alternative options, utilising a Likert scale format for their choices. The resultant findings are succinctly presented in Table 9.

Table 9: Strategies to Maximise Usage of MyLOFT at MU Library

S/n	Categories of Responses	SA		A		N		D		SD	
		F	%	F	%	F	%	F	%	F	%
i	MyLOFT Should Offer Personalised Content	41	61.2	22	32.8	2	3	2	3	0	0
ii	Regular Improvement of the MyLOFT App	38	56.7	25	37.3	4	6	0	0	0	0
iii	Engaging Students in Promoting MyLOFT - (Knowledge Ambassadors (KA's)	44	65.7	17	25.4	6	9	0	0	0	0
iv	Provide Incentives to Regular Users	39	58.3	16	23.9	8	11.9	3	4.5	1	1.5
v	Improving MyLOFT Interface	42	62.7	16	23.9	7	10.4	1	1.5	1	1.5
vi	Adding/Subscribing to More Databases	47	70.1	18	26.9	2	3	0	0	0	0
v	MyLOFT Promotion Increases Usage	44	65.7	22	32.8	1	1.5	0	0	0	0
vi	If the Suggested Recommendations Are Implemented, Usage Will Rise	43	64.2	19	28.4	4	6	1	1.5	0	0
vii	Provide More Training to Users	47	70.1	18	26.9	2	3	0	0	0	0

Source: Field Survey Data (2023)

Key: SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, and SD = Strongly Disagree.

Table 9 presents data on strategies to optimise the MyLOFT usage at the MU Library, categorised by different approaches and assessed using the Likert scale. Notably, respondents strongly supported key strategies such as offering personalised content (61.2%) and enhancing the MyLOFT interface (62.7%). These findings underscore the importance of tailoring content to individual preferences and maintaining user-friendly design to boost platform engagement. Additionally, engaging students in promoting MyLOFT (65.7%) and providing more user training (70.1%) are viewed as favourable approaches, indicating the potential for leveraging student advocacy and educational initiatives to empower users.

Furthermore, the data reflect a consensus (64.2%) on the positive impact of implementing suggested recommendations in increasing the MyLOFT usage. The overwhelming support for expanding the MU Library database offerings (70.1%) highlights the significance of diversifying resources to attract and retain users.

Effective promotion efforts (65.7%) are considered vital for increasing platform adoption. In summary, prioritising these strategies, aligned with user preferences, holds the potential to enhance engagement and satisfaction among MyLOFT users at the MU Library.

The findings demonstrate that aligning strategies with user preferences and needs is essential for enhancing engagement and satisfaction among MyLOFT users at the MU Library. Prioritising personalised content, interface improvements, student involvement, training, expanding resources and effective promotion can collectively contribute to a more vibrant and user-centric library experience. These findings provide valuable guidance for the MU Library's efforts to optimise MyLOFT usage and meet the evolving needs of its users.

11 Conclusion

This study provided valuable insights into the usage, awareness, perceptions and challenges related to the MyLOFT application at MU. Before the implementation of MyLOFT, the University relied on various methods to access electronic resources, with some limitations in terms of accessibility. The study indicates relatively low download figures considering the University population, highlighting the need for improvement. The study suggests that while MyLOFT has been generally well-received, there are areas for improvement in promotion, user training, technical aspects and interface design to further enhance its usability and impact at MU.

12 Recommendations

These recommendations offer a strategic roadmap for enhancing the effectiveness and user experience of MyLOFT, a digital platform aimed at providing academic resources to users. Key suggestions include personalising content to cater to individual user preferences, addressing technical issues through regular updates and improvements, and leveraging student ambassadors for promotion within the university community. Additionally, incentivising regular usage, improving the platform interface and expanding the range of available databases are highlighted as essential steps to attract and retain users with diverse research needs. Furthermore, the importance of effective communication, user feedback mechanisms and measuring the impact of implemented strategies are emphasised to ensure continual enhancement and optimisation of the platform.

The recommendations underscore the significance of a multifaceted approach that combines user-centric strategies, technical enhancements, promotional efforts and ongoing assessment to maximise the utility and user engagement of MyLOFT. By incorporating these suggestions, the MyLOFT vendor and the MU Library can effectively address user needs, improve platform functionality and foster a supportive as well as engaging academic environment within the University community.

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3 UNVEILING DETERMINANTS OF E-RESOURCES AND RESEARCH SUPPORT SERVICE UTILIZATION AMONG POSTGRADUATE MEDICAL STUDENTS AT MUHAS, TANZANIA

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Abstract
The rapid development of information and communications technology (ICT) has changed the nature of conducting research in most higher learning institutions across the world. This transformation has enabled libraries to harness the potential of technologies in providing research support services to researchers and postgraduates to improve the quality of research output. Despite the library's efforts to provide research support services, most postgraduate medical students find research writing difficult, particularly when it comes to locating relevant literature from scholarly databases. The purpose of this research was to investigate predictive factors for the usage of e-resources and research support services among postgraduate medical students in Tanzania. The study employed a cross-sectional research design. A total of 317 postgraduate medical students were conveniently sampled from a purposefully selected health university. Using questionnaires and interviews, the research utilized the Statistical Package for Social Sciences (SPSS) to generate descriptive statistics and a coding strategy using ATLAS.ti software to analyze qualitative data. Moreover, regression analysis was used to determine the predictive factors influencing postgraduate medical students' usage of e-resources and research support services offered at MUHAS library. Findings demonstrate that Information Literacy (IL) competency, research writing stage, e-resources accessibility, nature of research support services offered, ICT skills and individual experience were factors that contributed to effective e-resources utilization. Therefore, integrating IL skills, scientific writing and research communications into postgraduate curricula may enhance the effective use of e-resources. It is also important to improve library research support services to enable researchers and postgraduate students to produce high-quality research output.

Keywords: *E-resources, research support services, postgraduate medical students, determinant factors, Tanzania.*

1 Introduction

The rapid development of information and communications technology (ICT), including digital technologies has changed the nature of conducting research in

higher learning institutions across the world. These digital technologies (e.g., artificial Intelligence, video technologies and clouding computing, etc.) have enabled the library to harness the potential of new technologies in providing research support services to researchers and postgraduate students to increase the quality of research output. The new technologies enable researchers, including postgraduates, to access and use e-resources while undertaking their research. Despite the library's efforts to provide research support services which include offering training on e-resources access and usage, most postgraduate medical students find research writing difficult, particularly when it comes to locating relevant literature from scholarly e-resources databases.

Slow internet bandwidth, poor searching competence, lack of awareness and ICT illiteracy were among the challenges reported in a Tanzania country-wide survey conducted in 2016 that undermined effective access to and use of e-resources (Msuya, 2016). Similar findings were reported by Mwantimwa et al. (2021) in their recent research conducted in 10 academic institutions on academic staff and researchers' use of electronic resources in Tanzania. Many of the previous studies conducted in the country (Mtega et al., 2013; Ruzegea & Msonde, 2021; Samzugi, 2019) focused on the use of electronic resources in higher learning institutions. However, studies that explore the determinant factors and the way research support services promote effective usage of e-resources by postgraduate students in Tanzania are limited (Katabalwa, 2016; Ruzegea & Msonde, 2021). Similarly, few empirical studies have investigated the use of e-resources by postgraduate students in a health science university in Tanzania, especially during the research writing process.

The literature demonstrates a high level of information literacy skills and awareness of online resources in Tanzania (Rukamata, 2022; Wema, 2021; Lwehabura, 2018). However, the extent to which these skills are used and how different academic institutions and individuals use them varies greatly. On the other hand, a citation analysis study conducted by Chande-Mallya & Sife (2015) revealed that e-resources were underutilized by postgraduates while conducting research at MUHAS. Similarly, a survey at the University of Dar es Salaam found that 69.2% of postgraduate students used electronic journal resources to complete their assignments rather than for research purposes (Katabalwa, 2016). These results imply that postgraduate students in Tanzania use e-resources more for other learning activities that are not related to research and scholarships. Therefore, it is

important to establish how often and how effectively postgraduate medical students use electronic resources for their research projects. It is also important to know which electronic resources they prefer to use when doing their research. These variables make it feasible to carry out a thorough investigation of how postgraduate medical students use electronic resources for their research projects.

2 Reviewed Literature

2.1 Overview of Research Support Services

The MUHAS library introduced the research support services desk in 2015, upgrading the then reference services section. The aim was to accommodate the cross-cutting information needs of many postgraduate students who lacked targeted research support services when they were undertaking their research projects. This desk is housed within the ICT section though all library staff within the Directorate of Library Services are responsible for delivering research support services in their respective sections. Among the services offered within the desk include guidance on effective literature searching, reference management and citations, proposal writing skills, coordinating training on information literacy skills and guidance on journal selection for publications etc.

2.2 The Use of e-Resources among Postgraduate Medical Students

The proliferation of electronic resources in this digital era has significantly changed how academic libraries offer their services. Many academic libraries have evolved into hybrid libraries building virtual collections beyond their physical walls. Some have established their digital repositories and provide discovery tools to their subscribed and open e-resources databases. In the digital age, scholars, researchers and information seekers in different fields have access to a wide range of e-resources from libraries to accomplish their academic purposes. The perennial question and challenge revolve around the underutilization of these e-resources in most developing countries, particularly in Tanzania. This is supported by Ruzegea and Msonde (2021), who affirmed that the failure of some postgraduate medical students to access and use e-resources is still a significant challenge to be addressed in most universities in developing countries. This situation varies from one university to another, making it important to investigate determinant factors in using e-resources and library research support services among postgraduate medical students in Tanzania.

2.3 Academic Library Services that Support the Use of e-Resources for Research

Libraries need to extend both direct and indirect services and support to enable users to address their need for scholarly information, particularly when embarking on research activities. The efficacy of any university library depends on how it has enabled its users to gain access to and utilise its information resources and services (Joseph Jeyaraj et al., 2022). In light of this, many libraries have designed library research support services sections aimed at assisting faculty, postgraduates, as well as undergraduate students, in gaining skills and competence in using e-resources to accomplish their research works. To achieve this, academic libraries are encouraged to design information literacy (IL) skills education programmes and develop persistent promotional and marketing strategies critical to ensure maximum and efficient use of e-resources (Chande-Mallya & Sife, 2015; Mardiana et al., 2019; Ruzegea & Msonde, 2021).

In postgraduate studies, there is a high demand for scholarly and research information to support academic and research activities. However, postgraduate students seem to face difficulties in accessing and retrieving scholarly content from e-resource databases subscribed to by their respective institutional libraries. Some of the hindering factors include lack of the required searching skills (Akpojotor, 2016). As such, Anhwere and Paulina (2018) argued that university libraries need to continuously design and provide information literacy (IL) skills courses to enable postgraduates to effectively use e-resources. E-resources are essential in supporting postgraduates' academic and research works.

Academic libraries have evolved significantly over the past decades, especially with the evolution of e-research and digital learning environments. The post highlights that research ethics is an area that has benefited from the new library services that have been created to enhance research activity (Katopol, 2017). Together with established services that support research more generally, services have been extended to provide strong support for compliance with, and capabilities to deal with, research ethics matters. Therefore, a modern and well-equipped academic library provides a better environment for research development and ultimately extends a significant benefit to the entire academic community of the institution.

2.4 Determinant Factors of Using e-Resources

The application of information communication technology in libraries has brought about many changes by transforming library resources from printed form to electronic forms such as e-books, e-journals, e-magazines, and e-newspapers allowing information to be disseminated globally. This shift has led academic libraries to acquire sufficient electronic resources as the best way to meet the information needs of their library users. Jogan (2015) recognizes that awareness of electronic resources contributes to their use because e-resources provide access to a wide range of information, quick information retrieval, ensure resource availability 24hrs a day, facilitate easy citation and offer downloading options, hyperlinks and multiple search options compared to printed resources. Ruzegea and Msonde (2021) note that awareness of electronic resources has become a major concern in the academic community. This indicates that the level of awareness of available resources and possessing adequate skills among postgraduate students, academic staff and library staff help to maximise the use of available electronic resources to meet their information needs.

A study titled "*University Students' e-Resource Usage: Predictors, Problems and Perceptions*" identified demographic factors such as gender, age, level of education, information literacy competency and individual experience as some of the factors that influence the use of e-resources in higher learning institutions (Ruzegea & Msonde, 2021). Another study on "*Access, awareness and use of electronic resources by postgraduate students at the University of Delhi*" found that 40% of respondents faced problems in accessing e-resources due to non-connectivity, 36% were unable to use computers, and 32% said there were too few computers with internet facilities (Anhwere & Paulina, 2018).

3 Study Objectives

The overall objective of this research was to investigate predicting factors of e-resource usage and library research support services among postgraduate medical students in Tanzania. The specific objectives of this study were twofold:

1. To assess the extent to which postgraduate students use e-resources and research support services in learning and research activities.
2. To predict factors that influence postgraduate students' usage of e-resources and research support services during their research journey.

4 Design and Data

A cross-sectional descriptive research design was employed to conduct this research which explored the determinant factors and research support services among postgraduate students in health universities in Tanzania. The design allowed researchers to gather authentic information from a group of individuals to gain a broader understanding of the current state of existing knowledge about e-resource usage. The population of this study, from which the sample was drawn, included postgraduate students available at MUHAS.

The question of how big the sample arises whenever one conducts any research. Based on Fowler (2009), the sample may range from 1% to 10% of a population with similar characteristics. However, the larger the sample size, the better the population representation (Muneja et al., 2023). At the time of conducting this research, there were five schools at MUHAS, from which three of them (School of Medicine, Public Health and Pharmacy) were randomly selected for this study. The selected schools had a total of 384 postgraduate students. A convenience sampling technique was employed to draw a sample for the present study. The willingness of postgraduate students was an important factor for them to participate in this research.

Data were collected using the survey method which enabled researchers to gather extensive data for statistical analysis. The researchers developed the questionnaire as there were no existing ones that addressed the intended variables in this research. Before administering the questionnaire, it was evaluated by two experienced researchers in this area (Allahyari et al., 2011) who found that some questions required modifications to meet the intended research objectives. After modifications, the questionnaire was pilot-tested on 15 postgraduates from the School of Dentistry who were not part of this study (Fraser et al., 2018). The final version of the questionnaire, which comprised both open and closed-ended questions, was administered to all 384 postgraduates. The closed-ended questions were measured using a nominal scale (e.g., 1 = Yes and 2 = No) and Likert scale (e.g., 1 = Strongly Disagree, 2 = Disagree, 3 = Not Sure, 4 = Agree, and 5 = Strongly Agree). A total of 317 questionnaires, equivalent to 83% response rate, were returned duly filled to allow statistical analysis.

Regarding data analysis, the study employed SPSS version 21 software to perform descriptive statistics on the resulting data. The descriptive statistical analysis generated frequency and percentage distributions for the determinant factors for using e-resources and research support services among postgraduate students. Moreover, a coding strategy using ATLAS.ti software was employed to analyse the qualitative resulting data. The first author coded all of the qualitative data. A number of recurring codes were clustered into major themes. To ensure the trustworthiness of the coding scheme, the codes and their associated descriptions were given to the second author for member checking. The researchers agreed on 18 of the 25 sub-codes. Statistical analysis of the ratings resulted in an inter-coder agreement of 0.72 (Cohen's kappa). The researchers resolved their discrepancies through negotiation. Then the third author re-coded all of the data using the revised coding scheme. Additionally, regression analysis was used to determine the factors that influence postgraduates' use of e-resources and research support services during the course of conducting their research works. Furthermore, data from open-ended responses were analysed quantitatively and used to contextualize survey responses (Muneja et al., 2023).

5 Results and Discussion

5.1 Demographic Characteristics

The mean age of the respondents was 34 years old. The majority of respondents were male (62%), while females accounted for 38%. Additionally, most respondents were in the third year (52%) followed by the second year (45%), with a small percentage in the first year (3%). The majority of respondents were enrolled in MMED programmes (radiology, obstetrics and gynecology, anesthesia, pediatrics, urology, surgery), while a few were pursuing Master's in Public Health, Master of Science in Nursing Critical Care and Trauma (MScN CCT), and M.Sc. in Tropical Diseases Control (TDC).

Understanding the socio-demographic information (eg. gender, age group and year of study) of the responding postgraduate students was important. Results in Table 1 indicate that over half of the responding postgraduates were males 187 (59%) while 130 (30%) were females. The majority of the responding postgraduates 184 (58%) were in the age range of 31-40 years, whereas 75 (24%) were in the age range of 41-50 years. Additionally, 58 (18%) and 4 (1%) were in the age range of 20-30 and over 51 years, respectively. Respondents were also asked to indicate their year

of study. From the results, a large proportion of the responding postgraduates 174 (55%) were in their 2nd year. A segment of responding postgraduates, 88 (28%) were in their third year, while 55 (24%) were in their 1st year.

Table 1: Demographic Characteristics

School	No. of Students	Gender		Age Group				Year of Study		
		Male	Female	20-30	31-40	41-50	>50	1st Year	2nd Year	3rd Year
Public Health	87	54	33	17	53	17	0	18	46	23
Medicine	155	81	74	29	89	37	4	31	89	35
Pharmacy	75	52	23	12	42	21	0	6	39	30
Total	**317**	**187**	**130**	**58**	**184**	**75**	**4**	**55**	**174**	**88**

Source: Field Data (2023)

5.2 Sources of Scholarly Literature by Postgraduate Students

Researchers mostly search for relevant scholarly literature from different sources to support their research endeavors. In this study, respondents were asked through a survey to indicate the ways they used to access scholarly literature to meet their learning and research needs. Data in Figure 1 demonstrate that the majority (78%) of the respondents used search engines to access relevant scholarly literature while over one-third of the respondents used academic e-resources databases as their source for scholarly literature. A segment of the respondents, 29% and 24%, used institutional repositories and university libraries, respectively.

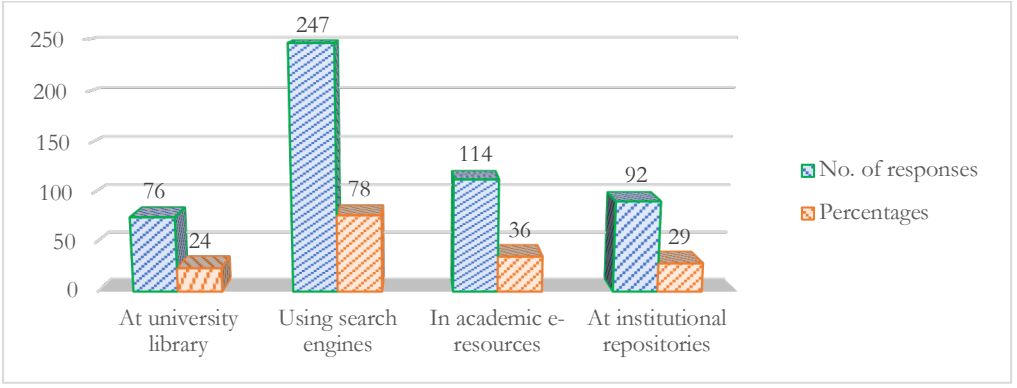

Figure 1: Sources of Scholarly Literature

5.3 Awareness of e-Resources Databases

The researchers were interested in knowing the level of postgraduates' e-resources awareness. Respondents were asked a multiple-response question to indicate their awareness of e-resources databases that can help them promote their learning and research. Data in Table 2 show that respondents showed awareness of four major databases including PubMed, Google Scholar, UpToDate and HINARI. The majority of them had a limited level of awareness of other potential databases such as Scopus, Embase, Global Health and PubMed Central that are related to their field of study. Of more concern is the lack of awareness about EBSCOhost, Emerald and DOAJ databases for students at this level.

Table 2: Postgraduates' Awareness of e-Resources Databases

S/N	Scholarly Databases	Frequency	Percentages
1.	PubMed	255	81
2.	SCOPUS	16	5
3.	Google Scholar	241	76
4.	HINARI	171	54
5.	UpToDate	216	68
6.	Global Health	22	7
7.	Embase	70	22
8.	DOAJ	48	15
9.	Cochrane	54	17
10.	Emerald	8	2.4
11.	DOAR	8	2.4
12.	AJOL	38	12
13.	EBSCOHOST	0	0
14.	PubMed Central	86	27

Source: Field Data (2023)

5.4 Challenges Encountered when Using e-Resources

The respondents were asked to indicate difficulties encountered during searching and using e-resources for research. Data depicted in Figure 2 indicate that the majority of the respondents (78%) had difficulties in getting access to full-text publications. Similarly, over one-third of the respondents (49%) reported lack of effective searching skills, while 29% and 27% reported getting too much information and slow internet connectivity, respectively, as challenges that hindered them from accessing relevant e-resources for their research. About 38 (12%) respondents reported on difficulties in getting genuine (factual) information and

10% reported that e-resources are too complicated to use. Other challenges reported which were below 10% related to always getting irrelevant information, subscription fees, missing information and getting information which are not related to one's field of study.

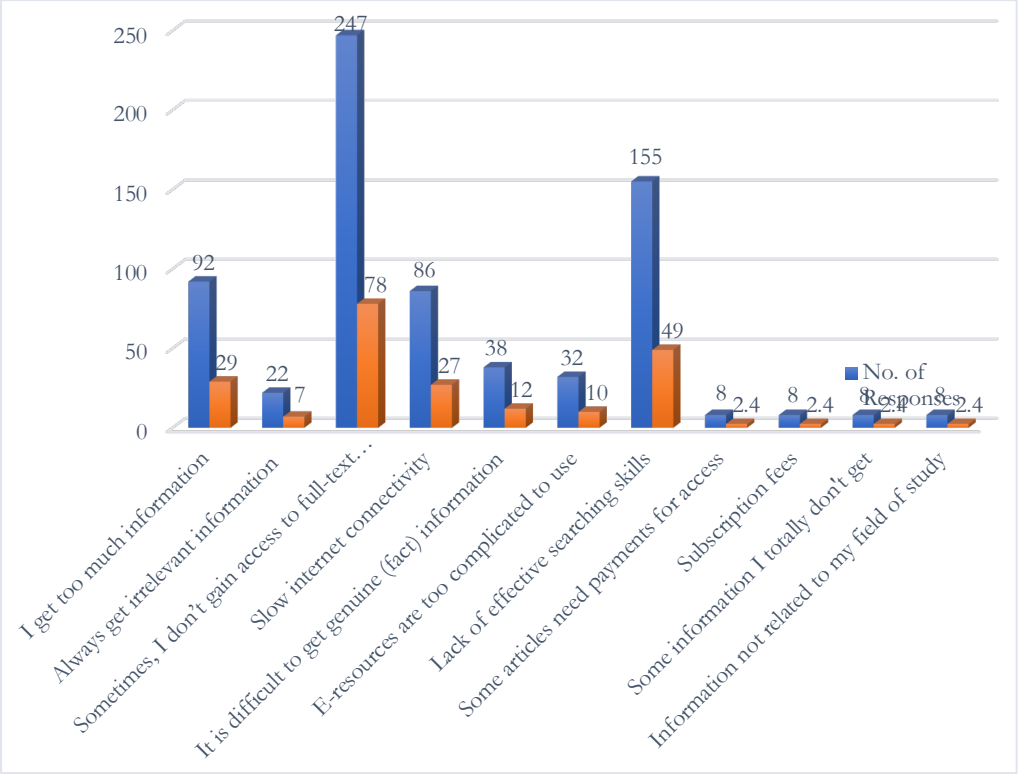

Figure 2: Challenges Encountered in Accessing e-Resources

5.5 Research Time and the Need for e-Resources Accessibility

The researchers were interested in knowing at what time during the research process postgraduate students need more access to and use of e-resources. The results presented in Figure 3 revealed that the majority of the postgraduates (98%) mainly access and use e-resources during the literature review stage of the research writing process.

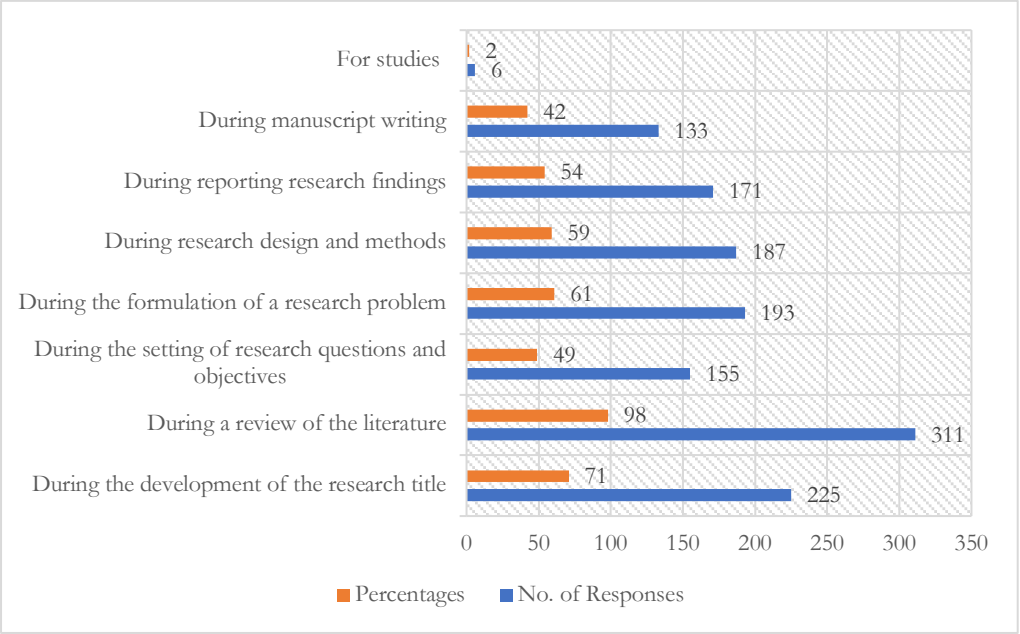

Figure 3: Research Time and the Need for more Access to e-resources

Similarly, medical postgraduate students tend to have a high rate of access to and use of e-resources during the development of research titles (71%), formulation of research problems (61%), research design and methods (59%) and reporting research findings (54%). On the other hand, some postgraduates had a view that they wanted more e-resources at the stage of setting research questions and objectives (49%) and only 2% of the postgraduates reported having high access to and using e-resources during learning and other related educational studies.

5.6 Research Support Services Offered by the University Library

Academic libraries are integral parts of higher education institutions designed to support the institution's core functions of teaching, learning and research. They often provide access to a wide range of resources, including books, journals, databases, multimedia materials and digital archives. In addition to providing access to information, academic libraries offer various services such as research assistance, information literacy programmes, interlibrary loan services and collaborative spaces for studying and research commons. They also contribute to scholarly communication by hosting institutional repositories for publishing research outputs and supporting open-access initiatives. Overall, academic libraries serve as essential pillars of higher education by supporting teaching, learning and research activities

while fostering intellectual growth and exploration within academic communities. Data presented in Table 3 reports the research support services offered to medical postgraduate students. On the one hand, the research support services accounted for over 50% including access to e-resources databases, citation and reference management as well as effective search strategies.

Table 3: Research Support Services Offered

Research Support Services Provided	Frequency	Percentages
Provide access to e-resources databases	200	63
Guidance to relevant e-resources	139	44
Training on effective searching skills	178	56
Reference management and citations	184	58
Guidance on literature review	117	37
Awareness services to available e-resources databases	139	44
Research proposal writing skills	117	37
Have never benefited	8	2.4
I don't know	8	2.4

Source: Field Data (2023)

On the other hand, the services that were below 50% included guidance on literature review, awareness services to available e-resources databases and research proposal writing skills. Surprisingly, about 3% of the respondents reported that they had not benefited from the research support services the University library provided to them during the period of conducting research and thesis writing process.

5.7 Preference for Research Articles when Conducting Research

The preference for research articles in research endeavors can vary depending on the researcher and the specific requirements of the study. Researchers asked respondents through a questionnaire to indicate the research articles they prefer to use during learning and while conducting their research works. Data presented in Figure 4 revealed that 85% of the postgraduate medical students preferred to use original research articles, followed by review articles (66%) when conducting research. On the other hand, 27% reported that they prefer to use clinical trial studies, while case reports and book reviews were preferred by 22% of the respondents.

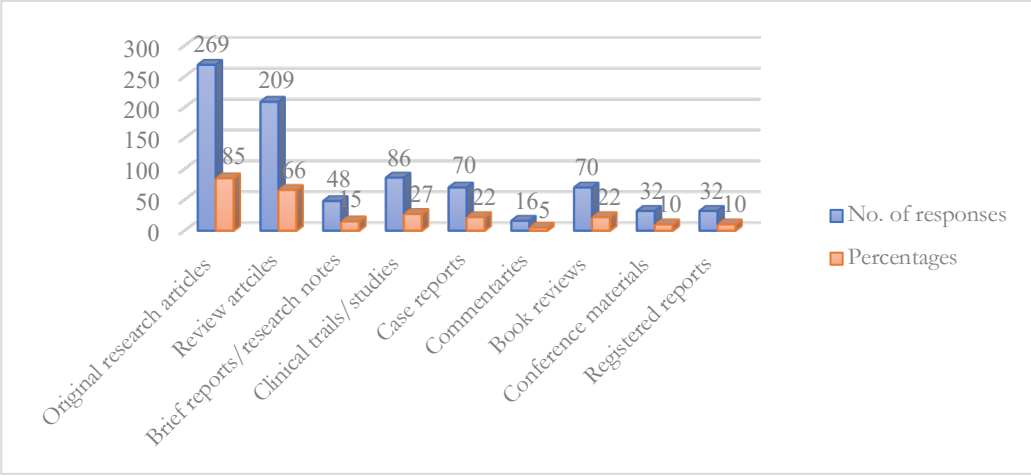

Figure 4: Type of Research Articles Preferred

The remaining article formats, such as research notes, conference materials, registered reports and commentaries were least preferred. It is important to note that while research articles offer numerous benefits, researchers should also consider the credibility and reliability of the sources they utilise. Peer-reviewed journals and reputable academic databases are generally considered reliable sources of scholarly research articles.

5.8 Postgraduate Competence in Accessing e-Resources

Competence in searching techniques is a valuable tool for medical postgraduate students to access relevant scholarly articles. There are various searching techniques and competencies that postgraduates require in order to access and use e-resources effectively. The researchers asked respondents through a questionnaire with Likert scale (e.g., 1 = Often, 2= Sometimes and 3 = Never) to indicate their searching technique abilities in accessing e-resources. Data presented in Table 4 indicate that the majority of postgraduate students find relevant e-resources using simple search strategies (63%) as well as keyword searching (48%).

Table 4: Searching Techniques Competencies

Search Techniques	**OU**		**SU**		**NU**	
	F	%	F	%	F	%
Simple search	200	63	117	37	0	0
Keyword searching	152	48	152	48	13	4
Phrase searching	96	30	144	45	48	15

Boolean operators	72	23	136	43	104	33
Word truncation	24	8	120	39	152	48
Query modifiers	48	15	136	43	104	33

Source: Field Data (2023)

Note: Often Used (OU), Somewhat Used (SU), Never Used (NU), Frequency (F), Percent (%)

However, it was surprising to see that postgraduates have never used word truncation (48%), Boolean operators (33%) and query modifiers (33%). This situation suggests that postgraduates have insufficient searching skills and a lack of awareness which lead to underutilization of available e-resources and, ultimately, poor research productivity. Regarding phrase searching, it was somewhat used by postgraduate medical students to access scholarly literature.

5.9 e-Resources Usage for Accomplishing Research Projects

Based on the results of this study, 96% of the postgraduate medical students indicate that the successful accomplishment of research projects depends on the effective utilization of e-resources. The response was supported by some reasons such as the access to e-resources makes it easier than manual searching by keyword, reliability of information sources and the provision of the most recent literature. For example, one of the respondents while answering an open-ended question narrated:

> *E-resources databases provide access to a vast and diverse collection of academic materials including research articles, journals, books, conference papers and more. This extensive range of sources allows you to gather comprehensive and up-to-date information on your research topic.*

This narrative shows that e-resources are useful in accomplishing research work since they can be accessed in different file formats, are easy to retrieve, and have multiple access points with no boundary limits. Therefore, using e-resources helps postgraduate medical students access current and relevant scholarly works which in turn improves the quality of their research. However, it is important to note that several factors can influence the use of e-resources.

5.10 Possible Ways of Providing Research Support Service

Successful research is accompanied by effective research support from the library. In other words, quality and good research output are the result of effective

research support offered by the library. For example, one of the respondents suggested some measures to be taken by the University library to ensure quality and successful research is being produced:

> *I think the Library needs to engage with postgraduate students during research development stages, provide regular research-related training, ensure effective and reliable internet connectivity is available, offer Wi-Fi service for the campus with restrictions on non-intellectual use and hold several sessions on the effective use of e-resources.*

In this excerpt, the respondent was talking about research-related capacity building and internet infrastructure that are essential for effective e-resources accessibility and usage. On a different note, another respondent had the following to say:

> *My opinion is that the Library needs to provide students with all necessary scientific writing skills in the early stage of their postgraduate studies. They also need to subscribe to e-resources from reputable journals and databases and allow wider accessibility to available e-resources from on-campus use of IP range to remote access.*

This quotation shows that postgraduate students are novices in scientific research writing as they lack some important research skills. The respondent had a view that the library should take affirmative action to provide postgraduate students with scientific writing skills to enable them to become adept with research issues at the beginning of their study programmes. They also raised concerns about remote access to subscribed e-resources to allow them to access them regardless of their geographical boundaries.

5.11 Predictors of e-Resources and Research Support Services Usage

The researchers conducted a multiple linear regression analysis to predict factors that might influence postgraduate's usage of e-resources and research support services during learning and while conducting research works. The multiple regression model was significant with six predictors, $R^2 = 0.134$, $F(11, 299) = 3.732$, $p = 0.000$. The results in Table 5 indicate that respondent's information literacy competence ($\beta = 0.251$), internet access reliability ($\beta = 0.188$), dissertation writing stage ($\beta = 0.377$), preferences for e-resources ($\beta = 0.156$), pace of information technology ($\beta = 0.305$) and awareness of e-resources and research support services

(β =0.281) influenced the postgraduate's usage of e-resources and research support services.

Table 5: Predictors of e-Resources and Research Support Services Usage

Variable	Unstandardised Coefficients		Standardised Coefficients		
	β	***Std. Error***	***Beta***	***T***	***Sig***
Gender	-0.016	0.066	-0.015	-0.235	0.814
Age	-0.015	0.069	-0.017	-0.236	0.936
IL competence	0.251	0.086	0.169	2.952	0.000
Internet access and reliability	0.188	0.081	0.168	2.581	0.016
Self-concept	-0.039	0.098	-0.030	-0.418	0.538
Peer influence	0.099	0.206	0.088	0.952	0.398
Dissertation writing stage	0.377	0.083	0.358	4.533	0.000
Preferences for e-resources	0.156	0.058	0.156	2.220	0.028
The pace of information technology	0.305	0.090	0.268	3.413	0.001
Information explosion	-0.014	0.062	-0.014	-0.229	0.819
Awareness of e-resources and research support services	0.281	0.096	0.211	2.921	0.004

Source: Field Data (2023)

6 Discussion

Medical postgraduate students who are proficient in search techniques may find it easier to locate relevant scholarly papers. Findings from this study demonstrate that most of the postgraduate medical students reported using search engines to find relevant scholarly literature. This poses a significant concern for academic libraries, which have invested significant effort and resources in developing large collections of subscribed and open-access e-resources databases. As a result, it is shocking to see many postgraduates still rely on search engines to find scholarly literature for their research projects (Alison et al., 2012; Akpojotor, 2016). The resounding question is whether academic libraries have used effective marketing strategies to reach out to postgraduate medical students about the availability of e-resources databases and if so, how these e-resources databases can be utilized appropriately without difficulty? In line with this, Alison et al. (2012) identified several challenges in using e-resources databases in academic libraries including lack of awareness of the availability of e-resources at the library and a lack of information literacy skills on how to access e-resources.

As a result, this study's findings support the notion that if postgraduates are not made fully aware of the available e-resources databases, it is quite likely that they will focus their search for scholarly literature on search engines. Such a situation raises concerns about the quality and credibility of the information retrieved, as there is currently an enormous amount of misleading and fake information emanating from predatory journals. This study went further by asking postgraduate students if they were aware of the 14 databases offered at the MUHAS library. Only four databases, HINARI, UpToDate, PubMed and Google Scholar, were mentioned by more than half of the postgraduate students. This demonstrates that more effort must be invested in educating postgraduate students about all the scholarly databases available in university libraries and their potential to support research. A similar study on the awareness of postgraduate medical students in using e-resources databases showed that postgraduate students were aware of the e-resources in the library but preferred to access information from Google Scholar and other web-based databases more frequently than the databases in the library (Akpojotor, 2016).

It was clear that postgraduates' use of e-resources and research support services was influenced by factors such as information literacy (IL) competence (information searching skills), dissertation writing stage, and awareness of the availability of e-resources and research support services. Other influencing factors included Internet accessibility and reliability, the pace of information technology, as well as a preference for e-resources. The biggest challenges affecting medical postgraduate students in making full utilization of e-resources for research, as revealed by the study findings were that 70% of the respondents failed to get access to full-text publications, lacked effective searching skills (40%) and received too much information (7%). This highlights the significance of information literacy education for researchers, as supported by another study which reported that postgraduate students of library and information science were quite aware and highly used e-resources due to their information literacy competency (Akpojotor, 2016; Azonobi et al., 2020).

Competency required to access e-resources is another issue, with 61% of the respondents having moderate ability and 21% reporting a low ability to find relevant literature from e-resources databases. Most of them use a simple search strategy in either e-resources databases or search engines. These findings imply that postgraduate's information literacy competence has a significant correlation with their ability to find relevant scholarly literature for their research works. Postgraduates who use e-resources databases are more likely to find relevant

scholarly literature useful for their research works, while those who use search engines are less likely to find relevant scholarly literature. These findings corroborate the study conducted by Ruzegea and Msonde(2021) in Tanzania, which suggested that integrating information literacy skills into postgraduate curricula and improving information literacy training may enhance students' competencies for effective search strategies and utilization of e-resources for research purposes. According to the findings, the course needs to be incorporated in the early stage of postgraduate studies to impart students with all the necessary skills for exploiting information resources to support learning and research.

Furthermore, the study indicated that the nature of research support services offered by academic libraries was strongly associated with the ability of postgraduates to use relevant e-resources databases for research purposes. Remarkably, postgraduates who received research support services from the library were competent enough in e-resources usage during the dissertation research writing process. Academic libraries are encouraged to harness the importance of research support services tailored to support library users who are research-oriented. The findings of this study have significantly shown how academic libraries play crucial roles in supporting postgraduates' research. Therefore, there is a need to establish or improve research commons where researchers will be assured of all necessary research support services from the academic libraries. The research commons should be well furnished with all the information resources and infrastructures to support researchers while conducting their projects. Related studies by Mtega et al. (2013); Tandi Lwoga and Sukums, (2018); Joseph Jeyaraj et al. (2022) stated the significance of research support services that are unique to the needs of graduate students including professional development workshops, writing help for thesis/dissertation proposals, dedicated librarians, statistical support, plagiarism check and orientation.

7 Conclusion

Apart from efforts being made by academic libraries to subscribe to several scholarly databases, the issue of awareness among library users (postgraduate medical students) is still a big challenge. The majority of postgraduate students rely on search engines as the main information source to support their research and learning instead of making full utilization of the available library-subscribed e-resources databases. The findings also suggest that there are limited searching skills among postgraduate students because the majority of them used simple search techniques to access scholarly literature from e-resources databases and search engines. These findings raise serious concerns for academic libraries to rethink and reform strategies

to employ in promoting awareness of their subscribed e-resources databases to their clients. Additionally, academic libraries are also reinforced to develop appropriate means to capacitate postgraduate students with required information literacy skills and integrate IL skills into postgraduate curricula, which will enhance the utilization of e-resources databases and improve research projects among postgraduate medical students.

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4 EMERGENT PRACTICES OF CHATGPT IN SUPPORTING EDUCATION AND RESEARCH IN HIGHER LEARNING INSTITUTIONS IN TANZANIA

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Abstract
The new era of providing education and conducting research based on Generative Pre-trained Transformer (GPT), a Chatbot OpenAI technology, is growing quickly. ChatGPT provides comprehensive support for education and research at different stages of the teaching and learning processes, and it helps in generating entire academic journal articles. The application of Chatbot OpenAI technology in education and research sparked a heated debate among scholars in Higher Learning Institutions (HLIs) about the future of education and research. Whilst some publishers question the authorship and integrity of ChatGPT-generated products, others accept its role as co-creator and co-author. Therefore, this paper explored the potential use of Chatbot OpenAI in education and its impact on research. The study used a comprehensive literature review methodology to identify the current practices and potential challenges associated with the use of Chatbot OpenAI in HLIs in Tanzania. Findings from this research demonstrate that the correct application of Chatbot OpenAI and other AI tools in education and research may significantly reduce the potential for human error and improve the accuracy of research results. Despite the positive effect brought by the application of Chatbot OpenAI in HLIs, there are some concerns about the ethics and academic integrity in academic and research outputs. Findings reveal that there is an increased risk of plagiarism and educational dishonesty as there are no existing anti-plagiarism tools that detect whether AI has been used in generating research or educational content. As such, the culture and habits of observing academic integrity in HLIs become jeopardised. The study recommends a

dire need for librarians, researchers and academics in HLIs to take affirmative action to create awareness of the ethical use of AI technologies in teaching, learning and research practices. They should adopt appropriate legislation against dishonest people to strengthen institutional academic and research integrity.

Keywords: *Artificial Intelligence, Chatbot OpenAI, UTAUT, ChatGPT, higher learning institutions, research.*

1 Introduction

Amongst the recently pivotal technological advancements and widely adopted Artificial Intelligence (AI) is the Chat Generative Pre-trained Transformer (ChatGPT). ChatGPT is an AI-based natural interactive model developed to provide users with answers to prompts for questions or requests. It is a machine-learning computer robot trained on a large text dataset to predict the next human-like coherent words. On November 30, 2022, an AI-based Chatbot known as ChatGPT was launched as an OpenAI. ChatGPT reached 100 million users two months after its launch (Sabzalieva & Valentini, 2023). Currently, ChatGPT has 570 GB of data with 300 billion words and around 175 billion data parameters for data, data analysis, or opinions on a certain phenomenon based on statistical analysis from the internet (Sabzalieva & Valentini, 2023).

The extant literature shows the benefits of ChatGPT including helping staff and students access teaching and learning resources for education and research, saving time and learning the skills of fact-checking and critical thinking (Ngo, 2023). ChatGPT functions as a model of teaching, learning and researching to help scholars and researchers generate rough drafts of their academic work for revision and decision-making. Scholars and researchers can write lucidly, and create their concepts and meaning by drawing on their experiences and perspectives and synthesising new knowledge, skills and information from AI technologies adapted to their real-world scenarios and professions. Moreover, ChatGPT helps to create educational materials, enhances students' engagement and interactions during learning, customises learning experiences and generates multiple-choice questions with accurate and inaccurate responses in the teaching and learning processes (Haglund, 2023). However, the acceptance and use of ChatGPT have created a technophobic fascination and controversies about the drawbacks in education and research in HLIs (Spennemann, 2023; Viljoen, 2023). The HLIs perceive the use of

ChatGPT as dishonest, especially when ChatGPT organises assignments, projects, or research works on behalf of the authors. They believe that ChatGPT leads to ghostwriting and paper mills that compromise academic integrity in education and research (Viljoen, 2023). It also contains factual errors that require fact-checking and critical thinking (Eaton, 2023). This is why some of the publishers have banned papers submitted to them from ChatGPT-generated content, regarding them as plagiarised or inaccurate (Viljoen, 2023).

Despite the prominent application of ChatGPT, its use and acceptance in education and research in HLIs are limited in the literature (Haglund, 2023). The study by Adejo and Misau (2021) confirms that there is little or no literature on the application of AI in developing countries. Besides, the study by Crawford *et al.* (2023) confirms that there are decimal studies on the use of ChatGPT in HLIs. The HLIs in Low- and Middle-Income Countries (LMICs) including Tanzania, lack consciousness of AI's use in education and research, which is a critical gap (Wheatley and Hervieux, 2019). Furthermore, few studies incorporate AI in academia in Tanzania and the extant literature is from the Western world, missing a link to explain the use and acceptances of ChatGPT in HLIs in Tanzania. As such, it is crucial to explore the use of ChatGPT in education and research for informed decisions in HLIs (Viljoen, 2023) to understand the reality of the use and acceptance of ChatGPT in HLIs (Haglund, 2023). The study would help scholars and researchers thrive in the digital world and a rapidly technology-driven workforce (Viljoen, 2023). This study embarks on exploring the published literature on ChatGPT in supporting education and research in HLIS in Tanzania and the way forward. The study aims to fill the gap in knowledge and literature toward the use of ChatGPT, awareness, unforeseen assumptions, opportunities, and challenges through the lenses of the Unified Theory of Acceptance and Use of Technology (UTAUT). This is to enable HLIs in Tanzania to thrive and remain relevant in the global system.

2 Theoretical Framework

This study adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) to inform the study on the use of ChatGPT in education and research in HLIs in Tanzania. UTAUT theory was developed by Venkatesh *et al.* (2003), combining eight theories including the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivation Model (MM), the Theory of

Planned Behaviour (TPB), Combined TAM-TPB (C-TAM-TPB), the Model of PC Utilisation (MPCU), the Diffusion of Innovation Theory (DoI) and Social Cognitive Theory (SCT) (Venkatesh *et al.,* 2003; Marikyan and Papagiannidis, 2023). UTAUT theory identified limitations of the variables and moderators of eight models to derive a comprehensive theoretical framework (Marikkyan and Papagiannidis, 2023). The fact that a combination of variables and moderators from different theories into UTAUT would provide insights and predict the use of ChatGPT in education and research.

The UTAUT theory has seventy percent (70%) of application variation and behavioural intention for the individuals to use technologies, whilst other theories and models have sixty percent (60%) (Attuquayefio and Addo, 2014). UTAUT theory is widely used to inform studies on the adoption of technologies in daily life (Arista & Abbas, 2022) and predict the acceptance of technologies (Hassan *et al.* 2023; Uncovska *et al.,* 2023). Various studies explain the ChatGPT and UTAUT Model applications. These studies include 'Students Acceptance and Use of ChatGPT in Academic Settings' by Haglund (2023), 'The Utility of the UTAUT Model in Explaining Mobile Learning Adoption in Education' by Thomas *et al. (*2013), 'Extended Unified Theory of Acceptance and Use of Technology (UTAUT2): A Systematic Review and Theory Application' by Tamilmani *et al.* (2020), and 'Using the UTAUT Model (see Figure 1) to analyse students' ICT adoption' by Han and Conti (2020).

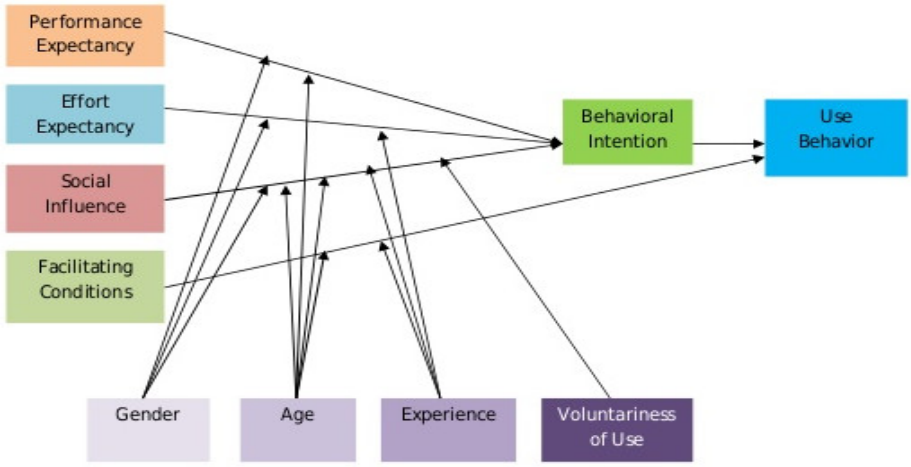

Figure 1: UTAUT Model (Venkatesh *et al.,* 2003)

UTAUT theory is more useful in underpinning the use of technologies and ChatGPT in particular, to predict behavioural patterns in HLIs (Han and Conti, 2020). It incorporates specific variables and moderators influencing the use of ChatGPT in education and research in HLIs as follows:

2.1 Performance Expectancy (Perceived Benefits or Advantages)

This is perceived usefulness, extrinsic motivation, job fit of technologies from experiences and practical usage of other users (Marikyan and Papagiannidis, 2023). UTAUT theory underpins that the behavioural intention of the users determines the anticipated outcomes and usefulness of ChatGPT in education and research accrued from literature reviews. In this study context, it is a belief that benefits in terms of job performance and individual gain from the use of intention to adopt ChatGPT in education and research will be achieved.

2.2 Effort Expectancy

This is the perceived ease or complexity of the use of technologies. It is the anticipated level of ease ordifficulty in using ChatGPT and publishing scholarly content with the reputable publishers, which might buttress or demotivate individuals to use or not to use it. The ease of use of ChatGPT and the increase in users of ChatGPT reached 100 million two months after launching (Sabzalieva & Valentini, 2023) reinforced users to use it. The study by Chauhan and Jaiswal (2016) confirms that the effort expectancy of the use of technologies is insignificant if the use of such technologies has been extended to a wider population.

2.3 Social Influence

This is the degree to which users perceive the importance of others in using technologies. It is a subjective norm and social factor that influences observers to adjust to the perceptions of other users. Therefore, individuals might decide to use technologies because of compliance but not individual preferences. Social influence is perceived as the impact of fellow scholars or colleagues on using technologies. In this study, social influence emanates from the influence of scholars, publishers and editors in HLIs using ChatGPT in education and research.

2.4 Facilitating Conditions

These are necessary infrastructure to support the use of technologies (Venkatesh *et al.,* 2003). This is accrued from the compatibility of the technological infrastructure and perceived behavioural control, which is directly related to intentional behavior

to use the technologies (Venkatesh *et al.,* 2003). For this study, facilitating conditions are the infrastructure necessary for ChatGPT including the devices, skills, bandwidth, management support, policies and guidelines, open access softwareas well as the attitude and behaviour of individuals towards the use of ChatGPT.

Other moderators include age, gender, experience and voluntariness to predict the intention to use technologies (Venkatesh *et al.,* 2003). In this context, age is a link moderating other moderators, including gender, experiences and voluntariness, whilst gender impacts the relationship amongst the variables such as performance expectancy, effort expectancy social influence and other facilitating conditions including infrastructure. Voluntariness means the use of technologies is regarded as a volunteering individual act. It moderates the relationship between the intention to use technologies and behavioural intention built from the ease or complexity of using technologies (Venkatesh *et al.,* 2003). Figure 1 demonstrates UTAUT's variables and moderators as enablers for the use of ChatGPT in HLIs. They are in line with a process that involves individuals' beliefs that there are benefits to using AI and ChatGPT in particular (Attuquayeflo and Addo, 2014). The belief creates positive attitudes and behavioural intentions for individuals to practice using ChatGPT in education and research in HLIs. The practice of using ChatGPT becomes congruent with the perceived usefulness of experiences from other users and the benefits associated with it in the course.

3 Methodology

This systematic review of literature focused on ChatGPT in supporting education and research in HLIs in Tanzania. The study combined literature sources that inline ChatGPT in education and research in HLIs. The study included books, journals, theses, electronic search engines and databases such as Emeralds, Web of Science, Scopus, ScienceDirect, ProQuest, EBSCOhost and ERIC. The sources were chosen due to their extensive coverage of scientific and scholarly publications across disciplines, including information technology, information science, computer science, AI and education. Table 1 shows the literature inclusion and exclusion criteria.

Table 1: Literature Inclusion/Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
o ChatGPT Generative Pre-trained Transformer, education, research, Higher Learning Institutions (HLIs) in Tanzania o The use of ChatGPT in education and research for informed decisions o Incorporating ChatGPT into education and research in HLIs worldwide o Incorporating ChatGPT into education and research in HLIs in Tanzania o The role of ChatGPT in education and research in HLIs o challenges and the way forward o English literature sources	o Literature sources unrelated to Chatbot Generative Pre-trained Transformer, education, research, and Higher Learning Institutions o Non-English literature sources

3.1 Search Strategies

The review process used a protocol that defined search terms, keywords and other search criteria including language and scope of the study. The abstracts, full-texts, search terms and keywords employed using Boolean operators AND, OR and NOT such as "Chatbot Generative Pre-trained Transformer", "education", "research", "Higher Learning Institutions" and "Tanzania". The keywords were combined such as "ChatGPT in education", "ChatGPT and research", ChatGPT and Higher Learning Institutions", "ChatGPT and informed decisions" and "ChatGPT and University" to search for the literature.

Also, the search strategies included the inclusions and exclusions criteria such as language, the domains of the study, scientific papers in the areas of Chatbot Generative Pre-trained Transformer, education, research, Higher Learning Institutions in Tanzania, the use of ChatGPT in education and research for the informed decisions, Incorporating ChatGPT into education and research in HLIs world over, the role of ChatGPT, the challenges and the way forward were consulted.

3.2 Study Selection

The selection criteria were based on the Preferred Reporting Items for Systematic Reviews and Metadata Analysis (PRISMA) statement (see Figure 2). PRISMA statement was developed by a group of 29 review authors, methodologists, clinicians, medical editors and consumers. The PRISMA flow chart was proposed to show the numbers of identified records, including and excluding articles and studies. PRISMA has the strength to improve the reporting of systematic reviews, critical appraisal with an item checklist and the quality of research. Therefore, a total of 258 papers were screened by analysing the titles of the literature. The inclusion and exclusion criteria (see Table 1) excluded unacceptable literature. The abstracts were analysed and low-quality studies were omitted along with papers that did not inform the study objective. Only 60 qualifying papers were examined to improve the validity of the findings and to allow fair comparisons. Figure 2 shows the systematic inclusion and exclusion criteria outlined in the PRISMA statement.

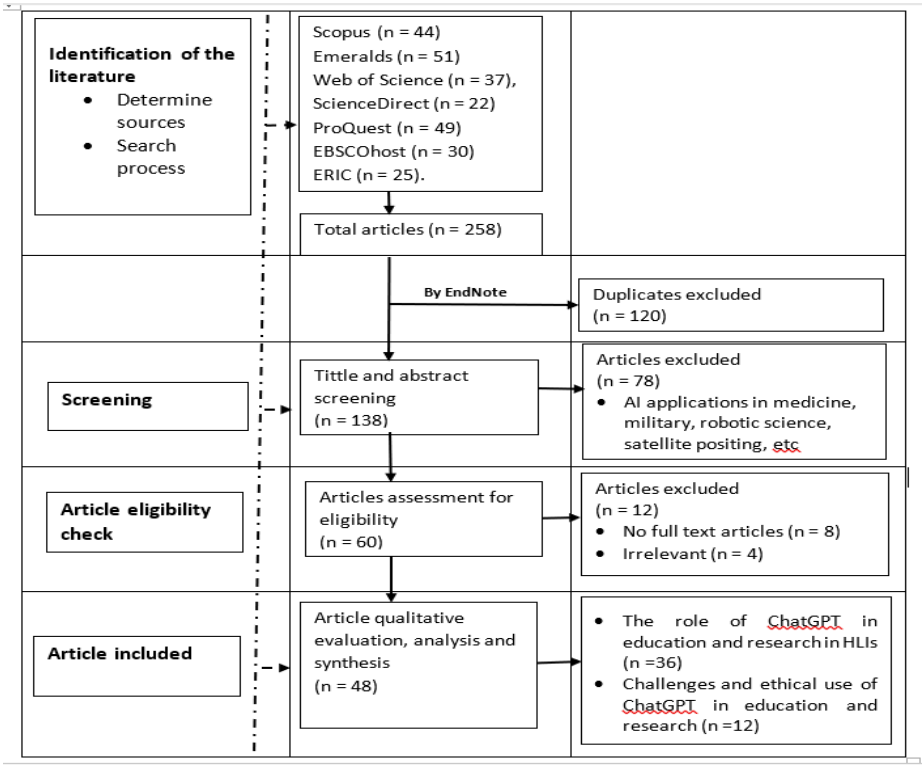

Figure 2: Systematic Article Inclusion and Exclusion

The screening was based on inclusion and exclusion criteria (see Table 1) and 60 resources were chosen. The abstracts were scrutinised and valid sources that demonstrated criteria in comparison were included in the study. The literature was analysed through the lens of ChatGPT, education and research in tandem with the incorporation of ChatGPT into education and research in HLIs, the role of ChatGPT, the challenges and the way forward. The results were compared and contrasted to create gaps for further studies.

4 Study Results

4.1 The Role of ChatGPT in Education and Research in HLIs

AI tools have been reported to revolutionise education, research (Haque *et al.,* 2022), and the way academics and students approach their writing. AI tools such as Quilbot, Grammarly, WordTune and ChatGPT among others, are proven to promote teaching, learning and research in HLIs across the world (Marzuki *et al.,* 2023). AI tools have a positive impact on students' writing ability (Marzuki *et al.,* 2023). For example, Grammarly, an AI tool, can analyse the student's written text and provide real-time suggestions to improve grammar, spelling, punctuation and writing clarity (Tambunan *et al.,* 2022). Similarly, QuillBot, another AI tool, helps students and researchers paraphrase written research works (Kurniati & Fithriani, 2022) while maintaining the context of the original content. Paraphrasing is among the research skills required in academic writing that help students and researchers avoid plagiarism. On the other hand, Lam and Moorhouse (2022) found that using the WordTune AI tool may help students promote effective research writing ability and recognise their writing weaknesses.

More recently, the emergence of ChatGPT, developed by OpenAI, marks a significant development in language model technology. This type of AI tool has significant capability to generate coherent and relevant contextualised sentences during the research writing process (Marzuki *et al.,* 2023). The literature demonstrates that ChatGPT can be used in academia to improve research and scholarship in different ways, as follows:

Firstly, Chatbot GPT can assist researchers in identifying the vast amount of relevant scholarly information from various sources based on a given topic (Lund & Wang, 2023). It can potentially be used to help researchers in literature review, data collection and analysis. Researchers can design ChatGPT-based surveys or experiments to gather data from users which can then be analysed to gain research

insights and easily generate summaries of the entire research papers. Such a situation saves time and effort in the research writing process (Mhlanga, 2023). As such, Lund and Wang (2023) found that ChatGPT is a significant AI tool that can help researchers analyse a large amount of partially structured data (eg. social media posts) and identify their associated patterns (Wagner *et al.,* 2022). A good example can be witnessed in healthcare and social sciences fields, where researchers often go through enormous scholarly literature while writing their research works.

Secondly, ChatGPT can provide virtual teaching assistance and personalised learning. On the one hand, ChatGPT provides students with instant access to course-related information, clarifications on assignments and answers to frequently asked questions. This practice can help ease the faculty workload and improve student learning engagement. ChatGPT can further be used to offer personalised learning experiences by tailoring content and resources based on individual student needs and learning preferences. ChatGPT can also recommend relevant study materials, online courses and academic resources, and enhance the overall student learning experiences.

Thirdly, from education and student learning perspectives, ChatGPT may help students practice and improve their language skills through interactive conversations. It can engage learners in real-life language use of scenarios, offering valuable practice and feedback. Therefore, HLIs can use ChatGPT as a platform for conducting research in natural language processing (NLP). Researchers can explore fine-tuning model for specific tasks, mitigating biases, improving language understanding and enhancing interactions. Intrinsically, the ChatGPT's capability to provide a relevant answer to domain-specific questions, and create human-like research articles (Liu *et al.,* 2022) makes it a powerful tool for researchers to save time and effort while writing their creative and analytical research works. Therefore, the emergence and application of the Chat GPT AI tool mark a significant technological development in language models and the world of scholarly writing. These advancements not only streamline the scholarly writing process but also improve the quality of research output produced by students and researchers in HLIs and beyond.

4.2 Challenges towards the Use of ChatGPT in Education and Research in HLIs

The literature demonstrates that AI technologies may help instructors promote effective teaching and student learning (Lo, 2023). ChatGPT is a valuable AI tool for providing students with an interactive and personalised learning environment. For example, the tool can be used as a virtual tutor to scaffold students during online learning (Lo, 2023; Nisar & Aslam, 2023), provide real-time feedback to their queries (Nisar & Aslam, 2023) and promote online learning group dynamics (Ali & OpenAI, 2023; Pallivathukal *et al.,* 2024).

Despite the potential benefits ChatGPT offers in promoting teaching, learning and research, it has created new drawbacks (challenges) in education and research in HLIs. In this context, instructors can use ChatGPT as a starting point for creating relevant teaching materials and assessment tools for their students. However, instructors still have the responsibility to ensure the accuracy of the generated content. Similarly, the capability of ChatGPT to generate coherent, systematic and informative human-like responses has led it to gain much attention worldwide (Zhai, 2023). Previous research noted ChatGPT's ability to generate human-like responses (Zhai, 2023; Pallivathukal *et al.,* 2024) and complete written assignments on behalf of the students (Lo, 2023). Such a situation raises concerns about academic cheating. As such, instructors in most HLIs become worried about unethical research practices if students rely heavily on ChatGPT to rapidly generate acceptable research outputs. Thus, librarians need to take affirmative action to train researchers and students on the ethical and responsive use of ChatGPT in teaching, learning and during the process of conducting research (Mhlanga, 2023). Such training will ensure the ChatGPT benefits are optimised while its drawbacks are minimised through the lens of academic integrity.

Another challenge concerning the use of ChatGPT in education and research is the habit of researchers and students committing plagiarism and inaccurate citations while performing their educational and research works (Rudolph *et al.,* 2023). In most instances, student's assignments and research works are criticised for being poorly written, duplicated, plagiarised and uninteresting. Such a situation makes it easier for students and some researchers to unethically harness the potential of ChatGPT in writing their assignments and developing research papers that are appealing to their instructors and supervisors. Although plagiarism detection tools such as Turnitin and iThenticate are used to detect copied materials in student

assignments and research works, ChatGPT has been found to bypass these detectors (Lo, 2023) and facilitate students to generate high-quality work. The ChatGPT's ability to facilitate plagiarism not only impairs research and academic integrity but also hinders instructors from assessing and evaluating teaching and learning objectives in HLIs.

Literature has noted that students' over-reliance on ChatGPT in learning and research is likely to impair the natural teaching and learning processes, development of writing skills and critical thinking (Iskender, 2023). For example, students may use ChatGPT to quickly fix their assignments without a deep understanding of their educational and research contexts. Although ChatGPT may improve students' writing skills (Farrokhnia *et al.,* 2023), it may not be able to promote the student's creativity and higher-order thinking such as coherence of ideas and argument structure (Johinke *et al.,* 2023). Creativity and higher-order thinking require a deeper understanding of the topic (Farrokhnia *et al.,* 2023; Marzuki *et al.,* 2023), logical thinking and the student's ability to connect ideas (Marzuki *et al.,* 2023). These aspects are currently beyond the capacity of ChatGPT AI tools.

While the application of the ChatGPT tool in education and research has promising benefits, instructors need to be aware of these challenges and find the best ways to address them during the teaching and learning processes. Therefore, academics and students should rethink their teaching and learning processes and cheat on online examinations (Rahman and Watanobe, 2023). Hence, HLIs that rely on online examinations should rethink bringing back pen and paper examinations. Librarians, as information professionals, should take a proactive role in training instructors on the best way to identify the students' assignments and research works generated by ChatGPT. Such a practice can be achieved through the application of specific AI detection tools designed for that purpose. Similarly, librarians should also train library users on academic integrity, the importance of it while using ChatGPT and the associated consequences.

5 Discussion

This study explored the use of ChatGPT in education and research in HLIs by staff and students. The study is informed by the UTAUT theory's variables and moderators. The literature review revealed diverse viewpoints on the use of ChatGPT in education and research in HLIs. The results show that the use of AI and ChatGPT especially in HLIs is prevalent. Staff and students in HLIs are

increasingly using AI in at least all academic endeavours. In Tanzania's HLIs, ChatGPT helps staff and students contextualise and situate contents from English to Kiswahili to make education and research more exclusive and meaningful to a wider population. However, experiences show that HLI authorities in Tanzania are yet to formalise the use of AI and ChatGPT in HLIs. This follows the ongoing debates on whether to adopt ChatGPT in HLIs or not. However, experiences show that academics and students use ChatGPT in the teaching and learning processes (Rahman and Watanobe, 2023). Despite all these debates, there is decimal literature on the use of ChatGPT as an academic aide or co-author in HLIs in Tanzania. This means there is a reluctance to formalise and put in place some guiding mechanisms, such as policies and guidelines, to regulate the use of ChatGPT in education and research work in HLIs in Tanzania.

As pointed out earlier the results show that the use of AI and ChatGPT in HLIs in particular is prevalent. This might be due to ChatGPT being in free access mode where everyone can access a tool. However, if the free access is removed, HLIs will be responsible for subscribing; therefore, increasing expenses for the staff and students to use for academic purposes and beyond (Kasneci *et al.,* 2023; Romero-Rodríguez *et al,* 2023). Currently, staff and students in HLIs are increasingly using AI in at least all academic endeavours including student services, admissions, retention and significant enhancements to teaching and research activities with low costs which enhances academic achievement in HLIs. However, there are ongoing debates on the adoption of ChatGPT in HLIs at different levels. Staff and students accept the use of ChatGPT in their academic endeavours with reluctance in light of its disadvantages.

The reluctance of the education authorities in Tanzania to formalise the use of AI and ChatGPT in particular in HLIs might be because of a technophobic attitude and behaviours and threats towards academic integrity in some HLIs. Besides, the study by Keengwe (2023), on 'Creative AI Tool and Ethical Implications in Teaching and Learning' recommends that because there are fears of the use of AI education and research landscape in HLIs, there is a need to create awareness of the practical and ethical use of ChatGPT in HLIs. There is a necessity to observe academic integrity in the course of using ChatGPT in education and research. This is why Spanish universities have developed policies and guidelines towards the use of ChatGPT in education and research (Romero-Rodríguez *et al.,* (2023). For instance;

the University of Tasmania in Australia formalised the use of ChatGPT with specific guidelines to observe academic integrity.

Some HLIs have endeavoured to update their policies (Tlili *et al.,* 2023) and recognise the authorship of ChatGPT (Stokel-Walker & Van Noorden, 2023) to create room for the use of ChatGPT. But this is different for the case of medical scientific papers where ChatGPT won't qualify a paper unless the International Committee of Medical Journal Editors (ICMJE) or Committee on Publication Ethics (COPE) guidelines are modified to accommodate ChatGPT (Sallam, 2023). The staff and students are struggling with the pedagogical integration of ChatGPT in the course of teaching, learning and researching in HLIs in Tanzania. The study by Haglund (2023) recommends that there should be policies, guidelines and protocols to control the use of ChatGPT in education and research to address dimensions of ChatGPT. This would enlighten staff and students about engaging creatively in the classroom, whether face-to-face, online, or blended.

The acceptance part of the use of ChatGPT in HLIs is accrued in the UTAUT theory's variables such as performance expectancy, usage experiences from other users and social influences demonstrated to others. UTAUT theory holds that engaging staff and students in the use of ChatGPT in education and research should reflect the attitudes and behavioural patterns that determine the intention to use it. In this context, behavioural intention to use technologies is determined by performance expectancy, effort expectancy and social influence for the individual to use the technology (Venkatesh *et al.,* 2003). The study results show that HLIs recognise the potential of ChatGPT in the teaching, learning and researching processes. The results align with the studies by Dempere *et al.* (2023) and Keengwe (2023) which demonstrate that ChatGPT in education and research improves students' services to retain staff and students.

ChatGPT is used in all academic and research endeavours to adopt content for research, projects, assignments and term papers. It improves human-computer interactions, the automation of students' enrollment and the grading of the student's scholarly works. This means the use of ChatGPT enhances educational and research innovations as well as teaching and learning processes in HLIs (Rasul *et al.,* 2023). However, it is argued that ChatGPT decreases in-person human interactions in the course of teaching, learning and researching processes. It reduces the level of personal interactions, connections and support among individuals and groups. This

may result in biased teaching and learning experiences with reduced human connection and support. Hence, it leads to plagiarism, privacy violations, misinformation, misuse of such tools and bias (Dempere *et al.,* 2023). That is why some universities in Hong Kong and France have banned the use of ChatGPT.

The study by Dempere *et al.* (2023) suggests the application of AI-based plagiarism detection and text predictive systems that analyse students' data in learning settings using Machine Learning (ML) algorithms to detect cheating scenarios. However, the use of ChatGPT also brings about concerns about AI implementation, especially its technical and operational parts. ChatGPT in education and research would affect the acquisition of some competencies (O'Connor, Permana & Denis-Lalonde, 2022). Lecturers in HLIs will be overloaded to examine contents from ChatGPT (Lim *et al.,* 2023). However, the limitations are insignificant to contend with in comparison to ethical and academic integrity (Lim *et al.,* 2023). UTAUT theory views the use of ChatGPT as part of a technology that, at first, users should refrain from because of technophobic attitudes and behavioural patterns. The fact is that performance expectancy is the determinant of behavioural intention for the staff and students to use ChatGPT. The study by Romero-Rodríguez *et al.* (2023) found that experience and performance expectancy influenced behavioural intention to use ChatGPT in education and research.

The findings demonstrate that there are concerns about the risky part of using ChatGPT in education and research in HLIs. This follows the current debate about whether ChatGPT would lead to plagiarism, misinformation and misconduct. The risks involved in using ChatGPT in education and research are sensitive issues such as privacy and unethical use, misinformation, technology overreliance, cognitive bias and replacement of human interaction. However, it is the staff and students to blame for the use of ChatGPT and not the technology itself (Eaton, 2023) as ChatGPT in education and research has both risks and benefits to observe (Dempere *et al.,* 2023). ChatGPT cannot create new ideas or manifest critical thinking out of the installed or fed contents from the internet (García-Martínez *et al.,* 2023). Besides, contents from ChatGPT contain errors and the answers depend on the context. Furthermore, the contents from ChatGPT have features of plagiarism as they do not include attribution to the original authors and they are culturally biased, reflecting only Western culture as their primary originators (Curtis, 2023; Romero-Rodríguez *et al.,* 2023). In tandem, Crawford *et al.* (2023) view ChatGPT as stressful for the users who expect it to overperform to a higher level than what the tool offers them.

However, students in HLIs are in favour of using ChatGPT in education and research in light of academic integrity (Crawford *et al.,* 2023; Dempere *et al.,* 2023; Dwivedi *et al.,* 2023; O'Connor, 2023; Sallam, 2023). This is because ChatGPT is expected to offer quick responses to at least everything including concepts, theories, treatments and diagnoses (Fatima, Shafique, Alam, Ahmed & Mustafa*,* 2024). The fact that experiences in using ChatGPT depend on the perceptions of facilitating conditions such as ICT infrastructure in the relationship with UTAUT theory's variables and moderators to reinforce the use of ChatGPT in HLIs, there should be some mechanisms to control the use of ChatGPT to prompt users to be responsible and ethical conscience. Staff and students need to be encouraged to utilise such technologies consciously observing academic integrity to mitigate the risks. Also, HLIs are subjected to the rethinking of teaching, learning and researching using ChatGPT for the sake of acquisition of necessary knowledge, skills and experiences to achieve integral goals of HLIs of training, research and consultancy.

6 Conclusion

The use of ChatGPT in Education and research in HLIs aids academics and students in academic endeavours. It can be a valuable tool in education and research in HLIs but it should be taken into consideration, especially in cases of ambiguous information, as ChatGPT may create hallucinations. On the other hand, ChatGPT has associated risks of academic misconduct, misinformation and plagiarism that promote superficial teaching and learning processes. Staff and students should be aware of ChatGPT limitations and exercise academic integrity. HLIs should devise assessment and evaluation strategies that the use of ChatGPT won't replicate, including assessing and evaluating it based on teaching and learning processes rather than outcomes. Finally, there is a necessity to integrate Information Literacy (IL), the ethical use of AI and ChatGPT in particular, into the curricula of HLIs to ensure students acquire accurate knowledge, skills and experiences for their lifelong learning. This would balance preventive measures against academic integrity for the usefulness of AI in education and research in HLIs.

7 Recommendations

It is high time for the education authorities and stakeholders to rethink the formalisation of the use of ChatGPT in HLIs. Therefore, the study recommends as follows:

1. a necessity for the government and other education and research stakeholders to establish frameworks and practical applications of ChatGPT for the HLIs to inline the inevitable global paradigms;
2. the education authorities and stakeholders must develop a nuanced awareness of the ethics and academic integrity of the users in HLIs in Tanzania (Keengwe, 2023);
3. there is a necessity to put in place domesticated policies, regulations and guidelines that reflect the cultural orientations of specific countries (Engen, 2019) to control the use of ChatGPT in HLIs;
4. there is a need to improve skills, knowledge and information to influence attitudes and behaviours of staff and students towards sole dependence upon ChatGPT without observing academic integrity;
5. academics and students should be equipped to apply and use ChatGPT with multi-faceted pedagogical approaches (Viljoen, 2023);
6. as part of daily lives, staff and students need to be encouraged to utilise such technologies, consciously observing academic integrity to mitigate the risks;
7. scholarly publishing with the use of ChatGPT should contain a declaration of the tools as human responsibility and non-human replacement;
8. there should be frameworks for instrumentation of the culture of academic integrity to allow ChatGPT to write with the authors and not write for them for the humans to remain responsible for the results;
9. the use of ChatGPT in education and research should be in line with the integral goals of HLIs to produce critical thinking, skills and knowledge for lifelong learning (Salvagno, Taccone and Gerli, 2023);
10. HLIs that evaluate students through online examinations should embrace pen and paper;
11. HLIs should do capacity building on the understanding of ChatGPT and its impacts in education and research in HLIs; and
12. further studies should be undertaken within the context of AI and ChatGPT in particular on the ethical consideration of the integration of ChatGPT in education and research in Tanzania.

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5 EXPLORING THE UNDERGRADUATE STUDENTS' PERCEPTIONS AND UTILISATION OF YOUTUBE VIDEOS IN ENHANCING THE LEARNING PROCESSES: A CASE OF MWENGE CATHOLIC UNIVERSITY, TANZANIA

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Abstract

The study explored the undergraduate students' perceptions and the utilisation of YouTube videos in enhancing the learning process at the Mwenge Catholic University (MWECAU). The case study research design was employed. The study used the sample size of 81 students obtained from a target population of 231 sociology and social work undergraduate students. Questionnaires and interviews were specific tools used for data collection. Quantitative data were analysed using the Statistical Package for the Social Sciences (SPSS) version 21 software, while qualitative data obtained from interviews were analysed using the content analysis method. The findings indicate that 69% of undergraduate sociology students at MWECAU had a perception that YouTube videos are helpful sources of sharing academic information. It was also found that some undergraduate students taking sociology faced challenges when using YouTube videos, which hindered the flow of knowledge. The challenges include inadequate experience in using YouTube videos (52.3%), the teaching approach is teacher-centred only (49.2%) and technophobia (47.7%), among others. All these challenges act as obstructions for the students to utilise the YouTube platform to its maximum potential. The study suggests that lecturers should promote the use of YouTube videos for enhanced academic information sharing. Lecturers should also assess these videos and suggest reliable channels from which students can access pertinent and up-to-date study materials. These findings prompt higher learning institutions, specifically MWECAU to consider adopting a blended learning approach to facilitate effective knowledge delivery.

Keywords: *YouTube videos, learning process, undergraduate students, audio-visual contents, blended learning*

1 Introduction

The role played by YouTube as a tool for sharing information should not be underestimated. YouTube stands out as a prominent social media platform within the category commonly referred to as 'video-sharing platforms' or video-enabled social media, which is capable of handling audio-visual contents largely used by educators as a pedagogical resource for teaching new knowledge and skills. It is the largest audio-visual medium with a huge number of audiences compared to any other social networks (Arunkumar & Premalatha, 2019) and the fast-emerging communication technology (Maziriri et al., 2021; Prabhu et al., 2017). Fynn et al. (2021) noted that YouTube videos are regarded as an amasing way of inspiring and stimulating instructions and learning for improving knowledge transfer among different audiences. Furthermore, YouTube videos are communication tools which can attract learners' attention towards learning, address both eyes, and ears and have a high level of effectiveness in learning as learners remember and understand better when they see, hear and do (Chen, 2013; DeWitt et al., 2013). When YouTube videos are seamlessly incorporated into conventional instructional approaches, they become a fundamental element in numerous blended courses, often serving as the primary means for delivering information in online courses (Brame, 2016).

In addition, YouTube is an increasingly popular social media platform where users can share and upload their recorded videos, which can be viewed in real time as well as downloadable at any time and anywhere (Godskesen et al., 2023). Sharing of YouTube videos is done either by linking on other websites, directly posting on other social media platforms, such as Facebook and Twitter or pasting a URL within an email (Buzzetto-More, 2014). The motivations to share YouTube videos include knowledge sharing, information and innovation to support development, education and learning (Arndt & Woore, 2018; Aytar et al., 2018; Kabooha & Elyas, 2018; Carvalho & Gomes, 2020), progress and advancement of a social group or society in a hope that others will do the same (Ahmed et al., 2019). YouTube also allows educators to rapidly and easily disseminate and distribute learning materials, content, and information (Christensen, 2013). On the other hand, students can use YouTube as a source of inspiration for developing their works (Liberatore et al., 2019; Waldron, 2012), which can also be shared as the Open Educational Resources (OERs) (Wiley, 2010). OERs are text, media, educational videos and other digital

assets that are freely available, openly licensed and can be used for research, teaching as well as learning and assessment (UNESCO, 2020). Furthermore, OERs are freely available which can make users get connected for lifelong programs (Oluwayimika & Idoghor, 2023).

Authors like Burke et al. (2009) reported that teachers use YouTube videos in teaching effectively. More importantly, educators incorporate YouTube videos as a supplementary tool in learning environment for enhancing students' involvement and making them more engaged in the classroom teaching pedagogy (Buzzetto-More, 2014). Nacak et al. (2020) observed that YouTube videos are effective instructional materials which enable to create an independent learning environment in terms of individual learning opportunities, time and location. It goes like saying that, the ultimate goal of using YouTube videos is to improve the quality of learning which is built through effective communication and more especially when tools are used as interaction-intermediaries between instructors and learners for improving learning processes (Abbas & Qassim, 2020). Thus, the function of media such as YouTube is to improve the quality of learning with indicators that all materials are delivered for students' understanding of the subject matter, especially when learners can "hear", "see", and "do", which are fundamentals of leaning processes described by Confucius's View of Learning (Lin, 2017).

The reasons for the use of YouTube videos have been reported by other authors. For example, Jawed et al. (2019) found that 65% of individuals are visual learners. Tatiana (2022) highlighted that human brains can process visual images 60,000 times faster than text. Kokoç et al. (2020) argue that video can effectively capture attention, as human eyes are naturally drawn to movement and visual stimuli more than text. Hébert et al. (2020) emphasise that videos enhance the ability to remember information, with viewers retaining approximately 95% of the messages compared to just 10% when reading text.

In the context of higher learning education in Tanzania, YouTube videos are regarded as supplementary materials which can provide university students with a good understanding and knowledge of their lectures. In addition, they are more likely to make the learning process more fun and meaningful. Jenkins and Dillon (2013) reported that YouTube videos allow students to memorise their lessons more easily. Instructors and learners are highly encouraged to use YouTube videos so as to facilitate learning and teaching process (Yunus et al., 2019; Buzzetto-More, 2014).

2 Statement of the Problem

In universities, YouTube videos are used to collect components of individual technical knowledge so that thoughts, experiences, social networks, and learning can be shared to prevent student knowledge loss. Romadhon and Qurohman (2017) opined that YouTube functions as a medium of learning to make the classroom learning environment more fun, interesting and interactive. Statcounter Global Statistics (2021) reported that 6.6% of Tanzanians use YouTube videos. However, the extent to which YouTube videos are used by Sociology and Social Work students at MWECAU is currently unknown due to a dearth of studies focusing on undergraduate students' use of videos for information sharing particularly in Tanzania. Several studies have been conducted with regard to the use of YouTube videos for learning purposes among students of higher learning institutions worldwide. Those studies comprise the impact of YouTube videos on skill development among university students in Lahore (Iftikhar et al., 2019); the Internet, YouTube and informal learning among undergraduate students (Sulaimanu et al., 2019); utilisation of YouTube as an information resource to support university courses (Almobarraz, 2018); and exploring the use of YouTube and its implications to teaching and learning in Technical University Education in Ghana (Fynn et al., 2021). However, all these studies did not examine the use of YouTube videos in the facilitation of learning processes for undergraduate students.

Specifically, this study was guided by the following research objectives (ROs):

RO1: To determine the perceptions of using YouTube videos by undergraduate students taking Sociology and Social Work at MWECAU,

RO2: To identify the level of utilisation of YouTube videos by undergraduate students Sociology and Social Work at MWECAU,

RO3: To examine the challenges encountered by MWECAU undergraduate students Sociology and Social Work when using YouTube videos.

3 Literature Review

3.1 Students' Perceptions on the Use YouTube Videos

Perception towards YouTube videos can either be positive or negative depending on the attitude on how useful it is. Various scholars have discussed students' perceptions on the use of YouTube as a learning site. Almobarraz (2018) in his study revealed that the use of YouTube videos in the classroom influenced students' engagement. June et al. (2014) conducted a study to assess the use of YouTube videos and interactive activities as a critical thinking stimulator for tertiary students.

In this study, it was found that participants had a positive view towards the use of videos with support from classroom activities as a good tool to expand their understanding of concepts while being able to sustain their attention throughout teaching and learning sessions.

Buzzetto-More (2014), on the other hand, reported that incorporating YouTube videos into course instructions improves students' perceptions of learning efficacy and increases their engagement in lessons. The author further added that gender has no bearing on the perceived value of YouTube videos in the teaching and learning processes and course delivery method influences student view. However, students who prefer full online instruction demonstrate a prediction to need YouTube videos in course instruction, watch course YouTube videos. and participate in course YouTube video discussion.

Maziriri et al. (2021) suggested that perceived usefulness was observed to have a more significant impact on student perceptions towards learning through YouTube videos in comparison to the perceived ease of use. Abbas and Qassim (2020) added that YouTube videos are an essential tool in classrooms as they attract the attention of students and develop their mentality and creativity. They also help to cover the materials comprehensively, especially in language learning. YouTube brings a fun element into classes, which thereby meets the interests of students.

Wasan et al. (2019) suggested that, generally, students have positive opinions regarding the use of YouTube videos as a source of learning in video media development courses. YouTube videos can improve students' learning motivation and creativity. Iftikhar et al. (2019) reported that there is overall positive impact of skill development on youth. YouTube videos help in understanding and building software aptitude among youth. Furthermore, the results of that study indicated that videos can prove the helpful to enhance students' academic performance in the future. Based on the re-viewed literature, it shows that students have a positive attitude towards the use of YouTube videos in the learning process. However, for an effective use of videos, students must be equipped with the necessary ICT skills that will enable them to use YouTube videos accordingly in learning activities.

3.2 Utilisation of YouTube Videos

The utilisation of YouTube videos is attributed to the students' perceptions about its importance in facilitating the learning process. YouTube videos will be frequently used in learning activities if students have positive perceptions about the benefits

accrued from those videos. A study by Almobarraz (2018) revealed that students are nowadays more digitally oriented and driven than they were in the pre-information age. For example, video-sharing websites are one of the most important types of social media which are nowadays used in the educational system. YouTube offers access to new and dynamic opportunities for effective and non-traditional patterns of teaching and learning. Videos uploaded by individuals and organisations influence universities and other higher education institutions to the extent that they have changed how students learn. They are used as effective instructional tools for enhancing learning content by providing free access to thousands of high-quality educational videos which are thus used by university students to improve their learning processes (Alwehaibi, 2015). Sulaimanu et al. (2019) revealed that despite the fact that many students have YouTube applications on their phones, only a minute percent uses them for accessing educational contents. Burnett (2008) found numerous opportunities to include YouTube videos in activities in marketing classrooms. For instance, students could be given the task of creating their own products and introducing the idea in a short online video. Students could also create product pitches to discover how persuasive they might be. Nafrees et al. (2020) revealed that students who have few practical subjects have an additional interest in e-learning practices.

3.3 Challenges Encountered by the Students When Using YouTube Videos

Various studies have shown that students face some challenges when using YouTube videos. One of the challenges they face when using YouTube videos emanates from the difficulties in keeping up with the latest trends in change of technologies. The world of YouTube is constantly changing and it can be difficult to keep up with the latest trends and ever-changing technologies. To be successful, one needs to make sure that the YouTube channel is up-to-date by using the latest technological tools (Rasheed et al., 2020). Producing high-quality YouTube video contents has been mentioned as another serious challenge. This means that to attract YouTube viewers, one is supposed to produce high-quality contents that are both interesting and engaging. The study conducted by Yunus et al. (2019) indicated that the majority of students could not use YouTube as an educational resource because of the inadequacy of devices such as computers, tablets, and smartphones. In that study, it was reported that unavailability of such resources or devices gave them a hard time to utilise and integrate technologies effectively in their learning activities. Snelson (2018) reported some challenges when using YouTube as an educational resource which include the necessity to review multiple videos to find good educational contents from the sidelined and inappropriate contents. Other

challenges include how to go about when downloading or uploading videos containing copyrighted materials. The procedure is that if one wants to include copyright-protected material in the YouTube videos, they will generally need to seek permission to do so first from the YouTube account owner(s) before the permission is granted. Lectures are successfully delivered and meaningful when the presentation style of the instructors and directing activities demand attention from learners. June et al. (2014) are of the views that using the traditional approach; a teacher-centred and one-way lecture format may not be an effective teaching technique. Teachers need to consider designing and presenting instructional videos so that a higher level of interactions and learning achievements can be established. It is further believed that the use of YouTube videos together with various other modes of instruction, such as lectures, texts, or classroom discussions, will increase overall understanding of the subject matter.

4 Media Richness Theory (MRT)

This study was guided by the Media Richness Theory (MRT). This theory, which proposes that technology-based channels of information are richer data sources than other media, was first presented by Daft and Lengel (1986). These authors theorized that the effect is better when communicators use richer media and by richness, they mean the ability of the medium to transmit the information from sender to receiver. Dennis and Kinney (1998) argue that MRT is about richness in communication and that the communication process should involve a rich source of effective communication. According to this theory, YouTube is a medium that is information-rich with unlimited videos in many languages, an instant feedback option through the comments and video contents that are most involving. The viewers can easily understand the message in the video with the help of the visuals and the voice-over. It contains thousands of videos in almost every language for its audience. Therefore, this theory is applicable to this study since it describes how students and tutors might be able to use the YouTube platform as a rich source of information for knowledge sharing in academic settings.

5 Methodology

The study employed a case study research design. This research design was chosen since the study focused at the single institution; it also allows the use of qualitative and quantitative research methods as well as multiple data collection techniques such as questionnaires and interviews (Yin, 2009). The study employed non-probability and probability sampling techniques. Using non-probability sampling technique, MWECAU was purposively selected because it is one of the institutions that offer a

course on Sociology and Social Work. Sociology and Social Work students were purposively selected because YouTube videos have educational contents that can supplement their learning, YouTube is a useful tool for engaging students in learning and it encourages creativity among sociologists and social workers. Thus MWECAU students taking Sociology and Social Work were information–rich for this study.

Using probability sampling technique, respondents for this study were randomly selected. The sampling frame was obtained from the MWECAU students' admission office. The sample size of this study was 81 respondents who were randomly obtained from a target population of 231 undergraduate students taking Sociology and Social Work. Yamane's (1967) formula for sample size calculation was used:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = Sample size
N= Total population (231)
e = Significance level (9%)

Hence;

$$Sample\ Size = \frac{231}{1 + 231(0.09)^2}$$

n = 81 students

After obtaining the sample size of 81 respondents, a representative sample per each year of the study was calculated to determine the total number of questionnaires to be distributed. The representative sample per each year of the study was then calculated as:

Total sample size x No. of students per each year of the study

Total number of students

The results are presented in Table 1 as follows:

Table 1: Sample Size Determination

Year of the Study	No. of Students Per @ Year of the Study	Proportion No. of Students Selected Per @ Year of the Study
First Year	62	22
Second Year	75	26
Third Year	94	33
Total	**231**	**81**

Data collection for this study was conducted from March to April 2022. A combination of methods was used to collect data. Questionnaires were used to collect quantitative data, whereas interviews were used to collect qualitative data. Before data collection; questionnaire and interview guides were pretested by engaging 10 students and five lecturers from the nearby university, the Moshi Cooperative University (MoCU). The recommendations obtained from the pretesting exercise were incorporated into the tools for improvement. Quantitative data were analysed by using Statistical Package for Social Sciences (SPSS) software Version 21 whereas qualitative data were analysed using content analysis. In this study, ethical issues were taken into consideration. Researchers were granted a research clearance letter from the Mzumbe University Research and Publication Directorate as well as permission from the MWECAU administration. The permit indicated the purpose of the study hence it gave confidence to respondents that the study was undertaken legally.

Ethical issues such as respect for privacy, vulnerable groups of people, confidentiality, and informed consents were taken into consideration and adhered to during data collection and throughout the entire process of data analysis.

6 Discussions of Findings

6.1 Demographic Information of Respondents

The use of YouTube contents may be influenced by gender. Findings of this study indicate that 31 (48.0%) of respondents were males and 34 (52.30%) were females, as shown in Figure 1.

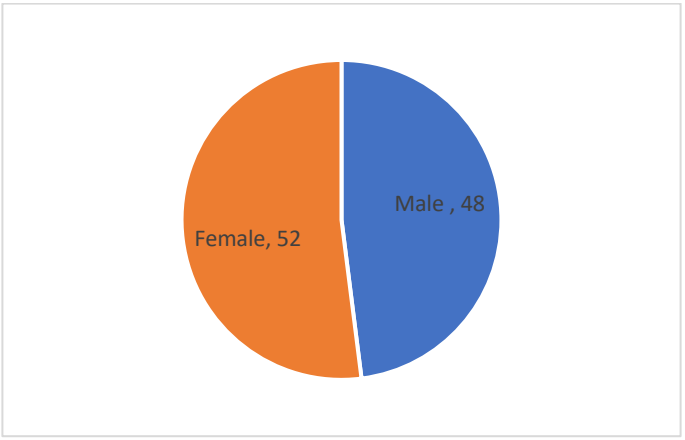

Figure 1: Respondents gender (n=65)
Source: Field Data (2022)

The findings of this study are contrary to other studies that have shown that YouTube videos are more regularly used by males than females (Fisher & Ha, 2018; Mayoral et al., 2010; Madden, 2009; Molyneaux et al., 2008). This study considered the age of respondents as one of the factors influencing the use of YouTube videos in facilitating the learning process.

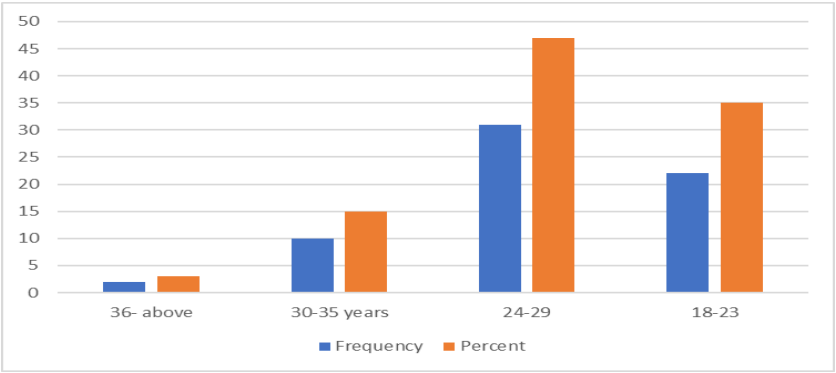

Figure 2: Age group of respondents
Source: Field Data (2022)

As shown in Figure 2, the study indicates that 35% of all respondents were in the age ranging between 18 and 23 years; 47% had an age range of 24-29 years, 15% of respondents had an age range of 30 to 35 and only (2%) were above 35 years old. This finding resonates the fact that most of the students in the higher learning institutions fall under the category of younger generation aged between 18 and 29 years old. As far as user demographics are concerned, YouTube is most popular within the age range between 18 and 34 years old. This age group prefers to use social networking sites like YouTube in their learning with some of them using such a platform more regularly than the more traditional methods to watch videos (Gaunt, 2015; Perrin, 2015; Smith, 2014).

6.2 Students' Perceptions on the Use of YouTube Videos

Respondents were asked questions with regards to their familiarity with whether YouTube videos were helpful in their academic activities such as preparing assignments, preparing for tests or final examinations, as indicated in figures 3 and 4.

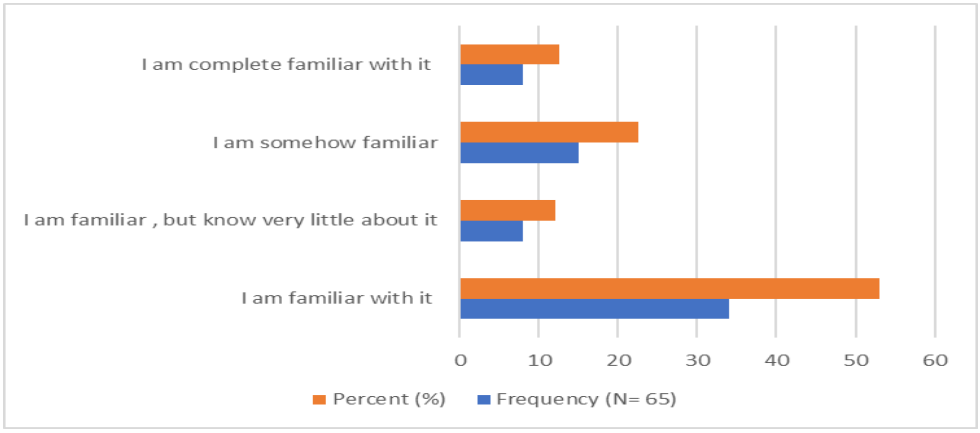

Figure 3: Respondents awareness about YouTube videos
Source: Field Data (2022)

Findings of this study indicate that 8 (12%) respondents said they were completely familiar with YouTube videos, 13 (20%) claimed to be somewhat familiar, 7 (10 %) said they were familiar but knew very little or nothing about YouTube videos, and 37 (57%) said they were familiar with YouTube videos. These findings imply that the majority of the surveyed respondents were familiar with YouTube videos. Furthermore, one lecturer was asked to indicate his opinion about students' familiarity with and use of YouTube videos in their learning process.

The lecturer's responses were as follows:

> *Students often turn to YouTube videos for certain purposes. However, when confronted with challenging activities or assignments that necessitate the utilisation of YouTube as a resource, there appears to be a reluctance among students to engage with the platform effectively. It seems that, despite the availability and potential benefits of YouTube for learning, students may face difficulties or hesitations when attempting to integrate it into more complex academic tasks assigned by their lecturers (Lecturer 1 at MWECAU on March 26, 2022).*

Another lecturer expressing a firm viewpoint stated that:

> *There is a clear trend of under-utilisation of YouTube videos as educational resources among undergraduate students. According to this perspective, only a limited number of students are aware of and comprehend the advantages that YouTube videos could bring to their learning processes. It appears that, despite the widespread availability of YouTube, there exists a significant gap in understanding among undergraduate students regarding the potential*

benefits that can be derived from incorporating YouTube videos into their educational journey" (Lecturer 2 at MWECAU on March 23, 2022).

The above findings concur with the study by Wasan et al. (2019) in which the findings revealed that students have positive opinions regarding the use of YouTube videos as a source of learning in video media development courses which can improve students' learning motivation, experiences, and creativity.

6.3 Usefulness of YouTube Videos in Academic Activities

Students were asked to show how YouTube videos are helpful in their academic activities. The results of their responses are presented in Figure 4.

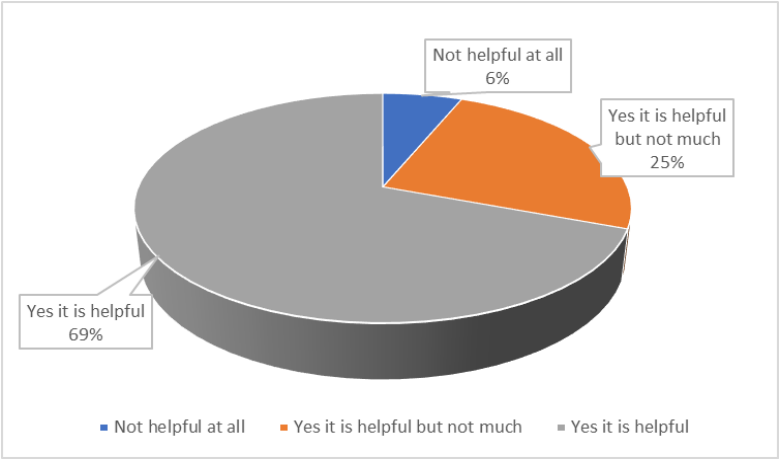

Figure 4: Usefulness of YouTube videos in academic activities

The results show that a minority (4;6%) of respondents said that YouTube videos are not helpful at all whereas the majority 45 (69%) of all respondents agreed that YouTube videos are very helpful in their academic activities. These findings are in line with those of Sulaimanu et al. (2019) and Almurashi (2016), who revealed that YouTube platforms need to be integrated into formal classroom teaching because they are more informative and useful tools that can help to build the knowledge of learners.

In one of the interviews, one lecturer testified that:

"... YouTube videos are helpful to students, especially in doing different assignments and other academic research paper works; but unfortunately

> *the trend of usage is not impressive (MWECAU Lecturer 3 at MWECAU on March 25, 2022).*

Another Lecturer had the following remarks that:

> *We all know that social networks like YouTube are helpful in formal and informal learning, which facilitates lifelong learning since we are now in a generation of globalisation; so, YouTube videos are helpful to students in performing academic activities (Lecturer 4 at MWECAU on March 25, 2022).*

These findings are in resonance to the studies by other authors like Abbas and Qassim (2020) who reported that YouTube has a high potential for improving the learning skills of students.

6.4 Utilisation of YouTube Videos in Academic Activities

Respondents were asked to indicate how often they use YouTube videos in academic activities and the results are shown in Table 2.

Table 2: Level of Utilisation of the YouTube Videos (n=65)

Level of Usage	Frequency (n= 65)	Percent
Frequently	11	17.0
Sometimes	47	72.3
Not at all	7	10.8
Total	**65**	**100.0**

The findings indicate that the majority of respondents, 47 (72.3%), pointed out that they sometimes used YouTube videos in their academic activities, 11 (17.0%) responded that they used them frequently, while the minority, 7 (10.8 %), did not use YouTube videos at all. The findings by Almobarraz (2018) revealed that nowadays students are more digitally oriented and driven than those in the pre-information age in which video-sharing websites are one of the most important types of social media now used in the educational system. Yaacob and Saad (2020) are of the views that the use of YouTube as a learning platform has the potential to support the lifelong learning experience for users.

Lecturers were interviewed and asked how they could comment on the students' level of utilisation of YouTube videos in their academic activities. One lecturer commented as follows:

> *Based on my experience with the usage of YouTube videos vary from one student to another. For instance, some students use them frequently for academic issues while others use them for entertainment. However, the level of usage of the YouTube videos depends on the information needs of the students (Lecture 5 at MWECAU March 24, 2022).*

Similarly, Abbas and Qassim (2020) argued that YouTube is an essential tool in classrooms as it attracts the attention of students, develops their mentality, and encourages creativity. Thus, YouTube nowadays is used by many students in their learning as well as in internships. It also helps to cover the materials comprehensively and brings a fun element into classes, which thereby meets the interests of students. Nafrees et al. (2020) commented that students who have fewer practical subjects have a greater interest in e-learning practices through YouTube videos, thus when faculty incorporate videos into their course materials, there is a significant improvement in university students' learning processes (Abbas & Qassim 2020). Other authors like Pratama et al. (2020) opined that videos serve as a stimulus for learning activities and teachers cannot leave YouTube outside the educational process as it offers all the advantages of having a more valuable and sensational teaching experience.

6.5 Challenges Encountered by Students When Using YouTube Videos

Respondents were asked to rank the challenges encountered when using YouTube Videos. Their responses were presented in Table 3 as shown below:

Table 3: Challenges facing students when using YouTube videos (n=65)

Challenges	Strongly Agree		Agree		Strongly Disagree		Disagree	
	F	%	F	%	F	%	F	%
Lack of experience in using YouTube videos	22	33.8%	34	52.3%	8	12.3%	1	1.5%
The teaching approach is teacher-centred only	15	23.0%	32	49.2%	11	1.5%	7	10.8%
Differences in student perceptions based on learning methods and the use of YouTube in the teaching and learning process	20	30.8%	30	46.15%	10	15.4%	5	7.7%
Culture and educational boundaries, for example difficult language or YouTube is not cited as a source of information	25	38.5%	28	43.0%	7	10.7%	5	7.7%
Teachers and students are facing serious issues in handling technological tools and applications (i.e. technophobia)	19	29.2%	31	47.7%	12	18.5%	3	4.6%
Poor user-friendly e-learning environment, for example inadequate free Wi-Fi	22	33.8%	25	38.51%	8	12.3%	4	6.15%

Source: Field Data (2022)

Inadequate experience in using YouTube videos was found to be one of the challenges in knowledge sharing. This is because some of the students fail to locate videos on the platform and select relevant materials about a particular topic. To find good educational contents, one needs to review multiple videos in the pool of sidelined, inappropriate contents, and copyrighted materials. These findings resonate with Snelson (2018) who revealed that there is a lack of YouTube videos-related literature which can be a challenging problem for students to understand the use of the YouTube platform.

The teacher-centred teaching approach was another identified challenge encountered by MWECAU students when using YouTube videos. When the videos are not student-centred; they make the subject matter difficult to be understood and an uninteresting one. June et al. (2014) reported that teaching by using the traditional approach, which is a teacher-centred and one-way lecture format, is regarded as an ineffective teaching technique. In that study, it was emphasised that teachers should consider designing and presenting instructional videos in such a way that a higher level of interaction, collaboration, and learning achievements can be established.

Lack of proper ICT infrastructure was identified as another challenge to using YouTube as an educational resource. This is associated with students' lack of Internet of Things (IoTs, computers, tablets, and smartphones which in the long run can lead to another problem in handling and using technological tools (i.e. technophobia). The unavailability of such resources or devices acts as one of the barriers for the students to utilise and integrate technologies in their learning activities (Yunus et al., 2019). In that study, it was also reported that limited skills in using IT was a critical issue since it was a barrier for them to utilise the available technologies effectively.

Other challenges include language and inadequate money to buy IoT facilities which makes it difficult to use YouTube videos because of cultural and educational backgrounds. In one of the in-depth interview sessions, one lecturer highlighted a significant challenge faced by students when utilising videos for learning. He stated:

> *The language used in these videos poses a difficulty for students in capturing the information effectively. Furthermore, one pointed out that the problem extends beyond language barriers, as some fields experience a shortage of comprehensive and relevant content on platforms like YouTube. This scarcity prompts students to resort to alternative sources like Google, indicating a preference for platforms that better cater to their*

> *information needs. In essence, the interviewee emphasised the dual challenges of language barriers within video content and the limited availability of comprehensive materials in certain academic fields, leading students to seek supplementary resources elsewhere, particularly through search engines like Google" (Lecturer 6 at MWECAU on March 28, 2022).*

Another interviewee explained:

> *Use of YouTube is so challenging to students because You Tube seem to be costly in terms of buying Mega Bites or Giga Bites, poor network connectivity, and some students do not have smartphones or laptops to help them to access YouTube videos (Lecturer 7 at MWECAU on March 28, 2022).*

The above findings contradict those of Chen (2013) who argued that among the challenges in using YouTube videos are differences in student awareness based on learning methods and the use of YouTube videos in teaching and learning developments.

7 Conclusion

YouTube has been very instrumental in the dissemination of knowledge for enhancing learning processes as it provides a massive number of educational materials for learners and instructors. If the challenges that act as obstructions to their utilisation are dealt with, including proper evaluation, YouTube videos are rich sources of information that can indeed help to meet the information needs of students in their learning process.

8 Recommendations

Based on the findings and conclusion of this study, the following recommendations are made:

i. YouTube videos should be used in the learning process as they simplify the process of knowledge transfer from educators to students and attract the attention of students by meeting their interests.
ii. Academicians should analyse the contents of YouTube videos and recommend to their students the credible channels where they can find relevant information for their studies. This is to say that lecturers need to be careful about what videos they should display to students; videos must be informative, appropriate, inspiring, and exciting.

iii. The study suggests that higher learning institutions particularly MWECAU should strive to develop a policy that will eventually guide the use of YouTube videos in the learning process.
iv. Educators and learners should attend information literacy programmes to improve their skills in employing YouTube technology in the learning process.
v. Higher learning institutions should consider a need to improve ICT infrastructure to facilitate the use of YouTube technology, more especially for distance learning programme students.

9 Policy Implications of the Study

Based on the usefulness of the YouTube videos, the government of the United Republic of Tanzania (URT) through the Ministry of Education, Science, and Technology (MoEST) should highly encourage the use of these resources in higher learning institutions. One of the strategies to ensure this situation is to develop an implementable policy that will guide the management and use of YouTube videos in the learning processes. Furthermore, the findings of this study may act as a base for the higher learning institutions in Tanzania to consider adopting a blended learning approach to facilitate effective knowledge delivery through the use of YouTube videos.

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6 LIBRARY STAFF PERCEPTIONS AND CHALLENGES REGARDING THE INTRODUCTION OF ROBOTS AT MZUMBE UNIVERSITY LIBRARY

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Abstract

Robots, as automated machines, are valuable for the precise performance of various tasks in different organizations, including libraries. Despite this benefit, the extent of their acceptance among library staff is unclear. This study examines the perceptions of Mzumbe University (MU) Library staff on the introduction of robots. It aims to understand staff attitudes toward robotic technologies currently being introduced in libraries to aid library management in future decision-making. The study was guided by three specific objectives: to establish the awareness level of robotic technologies among MU Library staff, to explore their perceptions of introducing robots, and to identify challenges that may affect the implementation of robots at the library. A case study design and qualitative approach were employed, involving 52 respondents selected from the total MU Library staff population of 63. Data were collected through focused group discussions (FGDs), interviews, and observations. Qualitative data were analyzed using content analysis and presented through texts and quotations. Findings revealed that MU Library staff are generally aware of robotic technologies, with perceptions ranging from positive to negative. While some staff recognized the potential benefits of robots in reducing routine tasks and improving efficiency, others expressed concerns about job security, as robots might replace human roles. Observations further revealed a lack of preparedness in terms of infrastructure, such as unreliable power supply and insufficient internet connectivity, which could hinder the successful implementation of robots. Other challenges identified include inadequate ICT expertise, budget constraints, and the absence of policies guiding robotic use. The study concludes that for the smooth introduction of robotic technology, MU Library must address these infrastructural, technical, and financial challenges. Training should also be provided to library staff to equip them with the necessary skills to operate robotic systems and enhance service delivery for current and future needs.

Keywords: *Robot(s), Robotic technology, academic libraries, artificial intelligence, library staff perceptions.*

1 Introduction

Robots are automatic machines that are used by human beings in different organisations to simplify works. The field of robotic technology is regularly explained as a subset of artificial intelligence (AI) which deals with perceptual and motor task along with machines (Abraham, 2019). A comprehensive definition of robot as provided by the Merriam-Webster (2018) is that, robot is a machine that resembles a living creature in being capable of moving independently (as by walking or rolling on wheels) and performing complex actions (such as grasping and moving objects); or a device that automatically performs complicated, often repetitive tasks as in an industrial assembly line.

These machines originated from daily innovative struggles of ICT savvy personnel to come up with artificial intelligent objects that may speed up and improve different activities in organisations. In a nutshell, robots were initially used in industrial settings in the early 1960's to carry out demanding and dangerous tasks (Royakkers, & Van,2015). The advancement in artificial intelligence (AI) according to Business Nes Co. (2023) enabled creation of different types of robots. These kinds of robots can be grouped into two main categories: those which move such as Wheeled, Legged, Swimming and Flying Robots and those which do not move or are in fixed/stationary location such as Articulated Robots/Cobots, Cartesian/Gantry Robots, Cylindrical Robots, Spherical Robots, SCARA Robots and Parallel Robots (Robotic Technology Centre (2016). Among those robots, the Humanoid Robots which resemble human beings are mainly used in libraries to improve services and to attract more customers. These Robots have been designed to be flexible and can work in social environments, and their topology, structure, and physical properties resemble the human body (Yamane et al., 2023).

In library context, Humanoid Robots are used to help in shelving and maintaining library collection, teach users basic computer programming and robotic skills because of their friendly appearance and ability to converse with clients (Pena, 2018; Schaffhauser, 2019). Due to having features such as arms, hands, and eyes, they can use body language to communicate with library users. For these reasons, Humanoid robots are sometimes referred to as 'a new library staff member' (Nguyen, (2020). On the other side, however, Humanoid robots are feared in libraries to replace jobs because of argument that they may outperform humans in different areas.

However, other scholars believe the contrary that robots need trained librarians next to them for troubleshooting purpose, whenever anything wrong happens, like power interruption, distortion in internet connectivity and battery failure (Calvert, 2017). Others argue that robots will create more jobs rather than replacing them, as stated that, 'robots are projected to replace about 85 million jobs by 2025 and will create 97 million jobs in the same period' (The World Economic Forum, 2023). With this projection, it is evident that robots have more benefits than drawbacks to the library discipline and other organisations.

1.1 Benefits of Introducing Robots in Academic Libraries

Introduction of robots in academic libraries embraces both positive and negative implications. Among the possible advantages for introducing robots in the library include assisting in doing routine and time-consuming tasks, such as shelving and arrangement of books (Liau, 2017; Vlachos et al., 2020). This will grant library staff time to focus on doing other complex and value-added activities to improve overall operational efficiency (Oliveira et al., 2019). The robot helps to increase utilisation of library services as it can provide services 24/7 which allows libraries to extend their operating hours without requiring additional human staff (Okunlaya, et.al.,2022). This is particularly favorable for students and researchers who may need service after non-working hours.

Likewise, libraries can use robots for security purposes such as patrolling the library buildings during off-hours to monitor illegal events. Equally, data robots can assist in collecting data on library usage patterns, book circulation and popular areas within the library. This data can be valuable for making informed decisions about resource allocation and improving overall user experience. Robots can also be designed in such a way that they can help academic librarians to offer service to users with mobility problems by providing them with remote services or delivering materials to nominated areas within the library. This will promote inclusivity and guarantees that the library is available to different types of users. Additionally, introducing robots into the library environment can inspire attention in technology and innovation. This is because, it offers chance for students and library users to network with cutting-edge technology, potentially sparking curiosity and interest in related fields (Vlachos et al., 2020).

1.2 Drawbacks of Implementing Robots in Library Environments

Although robots have noticeable benefits to the library, they also have disadvantages such as fear that they may lead to greater job losses in organisations and that robots also require highly skilled staff like programmers, operators, and repair personnel for maintenance purposes. While there are very few highly trained people of this kind in the market, it may act as draw back in implementing robots. Also, the cost of acquiring and implementing robots can be high, posing a barrier to adoption by organisations with financial constraints. Additionally, heavy reliance on robotic systems can also be risky, as the technology failure can lead to disruptions in operations. Correspondingly, as robots are becoming more connected through the Internet, they may be vulnerable to cyber-attacks/hacking. This may lead to unauthorised access, data breaches, and manipulation of their functions, posing security risks to industries and individuals. Furthermore, robot errors are difficult to be traced due to complicated process in their creation. Robots to some extent may not be suitable for all tasks, as they may struggle with complex or unpredictable situations that humans can handle easily.

Advancement in ICT has also has brought several opportunities to various organisations including libraries. One of them being the introduction of Robots in libraries that helps to improve speed in service provision and service quality, through reduction of human errors due to their high precision (Lin et al., 2022). Many experts like Oliveira et al. (2019) reported that the greatest benefits of robotic technology emanating from advancement in (AI) is their capacity to free humans from having to carry out tiresome and repetitive tasks (Javaid et al., 2022). This allows them to concentrate on more complex and rewarding projects for their personal and library development.

Since there are very few academic libraries in Africa that use robots (Odeyemi, 2019), and in particular the University of Pretoria (Mahlangu, 2019), it conversely means that many university libraries in Africa and particularly in Tanzania are not benefiting much from service improvement brought by these robotic technologies. This paper therefore, intends to answer the following questions:

1. What is the current level of awareness of MU Library Staff on robots?
2. What are the perceptions of MU Library Staff regarding robot introduction in the library?

3. What are the potential challenges that may hinder successful introduction of robots at the MU Library?

2 Review of Literature

2.1 Level of Awareness of Robot/Robotic Technology among Library Staff

The role of robot/robotic technology in library activities and in librarianship has been recognised by numerous professional bodies in the field of librarianships. Such bodies are the South African Library Association, the American Library Association and the International Federation of Library Associations and Institutions (IFLA). Tella (2020) elucidated that introduction of robots in libraries improve library services and offer users with reliable information for solving their needs in this information age. Nguyen (2020) describes robot as a machine that is guided by a computer programme which can do a multifaceted series of tasks such as welcoming guests and directing them to the library services they require.

Adebayo et al. (2018) stated that awareness plays a key role in manipulating individuals' decision to either receive or reject the new technology. As argued, 'in introducing robots in libraries, the perception of library staff is important and if combined with their awareness it can indicate their readiness level of acceptance of this technology' (Adebayo et al., 2018). Phillips (2017) elaborated that efficient use of robotic technology in university libraries depends on the availability of required facilities that can help management to guide its use. Examples of such facilities are policies and procedures, technical know-how and organisational resources, including human and technological resources. With regards to facilities, Tella (2020) detailed that many African university libraries do not have necessary facilities and policies that will promote access to and use of robotic technology. This implies that various issues need first to be resolved by library management before thinking of introducing robots in their libraries.

In a study by Guth and Vander Meer (2017), patrons and library employees gave positive feedback regarding the Telepresence robotic technology at the Western Michigan University Library in America and appreciated its remote communication capability. This implies that the Michigan University Library patrons and employees are aware of robotic technology and are willing to integrate it into their Library. According to such author, library employees' comfort with the robot grew consistently across departments after training sessions. Their robot was noted to be

well-suited for casual interactions, especially during library events such as tours. In addition to greeting people, it can also be used to remotely visit the library, to enable library employees to remotely attend and more fully engage in meetings in a multi-branch library system, and to foster communication within libraries. However, the robot was found not well suited to uses where it is necessary to view patrons' screens or conduct in-depth research consultations requiring database searching.

Another study by Adebayo et al. (2018) from Nigeria revealed that lack of awareness and sufficient knowledge regarding benefits and cost savings robotic technology could bring to the library, makes it difficult for library staff to implement this technology. Adebayo et al. (2018) also reported that when library managers are adequately aware of the necessity of offering routine services through robotic technology, the library staff will show confidence in using it. In terms of awareness, Owolabi et al., (2022) revealed that (98%) of respondents were aware of robotic technology used in library operations. Harisanty et al. (2022) study from Indonesian libraries, also indicated that different viewpoints provided by people through discussion and exchange of ideas, enabled full awareness of robotic technology among library stakeholders.

2.2 Perception of Library Staff on Introduction of Robots in Libraries

Librarians' perception of introduction of robots/robotic technology (RT) in libraries is among the factors that might facilitate its receipt or refusal. A study by Phillips (2017) in a City University in London, indicated that perception of library staff towards the future of robotic impacts varied. In 2017, library staff who said robots will steal their jobs were few compared to those in 2014, who were many (European Commission, 2015). This shows that initially, library staff had more fear but as they use to hear about robots and as years go by, their fear decreased. This also shows that library staff are slowly seeing the importance of robots which can do difficult and repetitive tasks and that they will not replace all library staff. Similarly, the studies by Phillips (2017), Chakrova and Trevert (2019) from Germany found out that library staff had positive perception about the introduction of robotic technology in libraries as pointed out that eighty percent (80%) of survey respondents are willing to delegate the task of locating misplaced books to a robot, especially university librarians who know well students' habit of hiding books for their use. Other reasons for the acceptance of robots according to the authors include enabling libraries to stay open 24/7 and liberating librarians from repetitive

tasks to be able to devote their time to better serve their customers (Chakrova and Trevert, 2019).

In another study by Nguyen (2020) on the impact of Humanoid Robots in Australian Public Libraries, it was reported that some librarians had positive perception that robots had positive influence on children with autism/difficulty in talking. According to Li, Liang, et. al., (2022) study on child patrons' perception in Taiwan public libraries, they found that child patrons had positive perception on robots because they were precise in locating resources in the library and also allowed individualised and adaptive services. The library robots connected the library resources with child patrons who were thus motivated to explore and enjoy more library services. These improvements in service provision increased motivation and interest of child patrons to visit the library to meet their information needs. Yueh, (2020) further indicated that when librarians are occupied with other users unfamiliar with the desired resource, child patrons often experience significant frustrations that diminish their motivation for further exploration of library resources. Under these circumstances, a robot becomes very useful in assisting library staff in locating needed resources by library users because it is quick and precise in retrieving misplaced resources.

Lin et al. (2022) study from Hong Kong indicated that robotic technology benefits librarians' daily works but some still see robots as a threat with significant adoption and implementation barriers. Those who are pessimistic see robots as a threat to their employment, resulting in heightened sense of job insecurity (Yam et al., 2023). This is because most would agree that robots are already more efficient and competent than humans in some jobs such as manual labour (Yam et al., 2022). Although people recognise that robots may not perform all activities which human beings do, but many are well aware that as struggles for improving their capabilities continue, they may outperform people in the near future because robots often work better than humans on specific tasks without getting tired (Lin et al., 2022; Calvert, 2017). Equally, Tella (2020) specified that among the things that can increase library staff positive attitude towards robotic technology is to be given assurance that adopting these technologies will not lead to job losses but more enjoyable works, such as doing more professional activities useful for their growth.

Owolabi et al. (2022) from Nigeria indicated that university libraries are not ready to adopt the use of robots despite high benefits they can offer in library operations. The main reason why robotic introduction has been rejected is because University libraries do not have adequate digital infrastructure, no policy framework that will guide adoption of robots, and no robotic experts in Nigerian academic libraries to handle robotic issues. Mahlangu's (2019) study at the University of Pretoria Library in South Africa indicated that library staff had positive attitude towards their Libby Robot because they were assured from the very beginning that its purchase was not meant to replace their jobs but to improve library services. This implies that librarians will be more willing to adopt and use robots if they are assured that a robot introduction is not meant to replace their jobs but to improve services and to attract more customers. Although no one knows with certainty how robots will shape our future society, Yam (2023) has cautioned that, 'a top manager who wish to introduce a robot in an organization should be mindful of its negative effects on his/her employees and take necessary steps for safeguarding employees job security. In this way, library management will be in a position to introduce any new emerging technology with less resistance from staff.

2.3 Challenges that Can Affect Introduction of Robots in Libraries

According to Nguyen (2020), the Humanoid robot is a complex system that requires adequate understanding to operate it. A study by Harisanty et al., (2022) from Indonesia found several challenges affecting robotic introduction at the Airlangga University Library in Indonesia. Among the challenges found are those relating to management, human resources and facilities. The challenges relating to management are such as budgetary constraints, leadership vision relating to IT, institutions' unwillingness to adopt new robotic technology and unsupportive organisational culture (Nguyen, 2020). The challenges relating to human resources are such as staff lacking knowledge of operating and troubleshooting robots, resistance to accept changes in technological developments and fear of being replaced by robots. Other challenges relating to facilities are such as inadequate ICT infrastructure, unstable internet connectivity, and high electricity consumption.

A study by Vlachos et al., (2020) from Southern Denmark University Library, depicted challenges that may affect introduction of robots in libraries as follows: unreliable power supply, inadequate technological infrastructure, absence of technical skills, not too positive attitude towards advanced robotic automation,

perceived absence of senior management support, use of inappropriate library software and technophobia. Others include, anxiety and fear among librarians of being replaced by robots (threat to their jobs), lack of resources (time, money, space) for maintaining Robots, cost of restructuring library infrastructure to accommodate robotic requirements, maintaining enthusiasm around it over time and patrons' need for human contact. With regards to Robots replacing peoples' jobs, the 2016 IFLA's Trend Report indicated that robots have been improved and now have the ability to both enhance and replace existing library functions. Hence, librarians have been advised to be innovative in their thinking to stay relevant in their jobs (2016 IFLA Trend Report as cited in Ajakaye, 2022).

A study by Guth and Vander Meer (2017) at the Western Michigan University Library in America found that major challenges that may affect introduction of robots in libraries are weak internet connectivity and unstable power supply in areas where robot will be used. Similarly, a study by Odeyemi (2019) from Nigeria identified additional challenges, such as poor funding, intermittent power supply, weak telecommunication infrastructure, lack of technical skills, a not-too-positive attitude toward advanced automation, perceived absence of senior management support, the use of inappropriate library software, and technophobia. These challenges are also evident at MU Library, where they hinder introduction of robots. This highlights the need for organizations, including MU Library, to address these issues to facilitate the smooth introduction of robotic technology for enhancing service delivery.

3 Methods

This study adopted a qualitative approach and a case study research design focusing on Mzumbe University Library, aligning with the research objectives. The entire population of sixty-three (63) MU Library staff was included in the study sample, as the number was manageable. Data were collected from 52 respondents due to various reasons that prevented other staff members from participating.

3.1 Data Collection Phases

The data collection was conducted in two phases:

3.1.1 Secondary Data Collection

In the first phase of the study, secondary data were gathered through in-depth documentary reviews using academic search engines like Google Scholar and Semantic Scholar, as well as reputable databases such as EBSCOHOST, Emerald, Taylor & Francis, SAGE, JSTOR, and Research Gate. Simple search techniques included keyword searches and phrase searches using quotation marks for specific terms. In contrast, advanced search techniques involved the use of Boolean operators (AND, OR, NOT) to refine results, field-specific searches to target specific areas like titles or abstracts, wildcard characters for variations in search terms, and applying filters to narrow results by date or publication type. Additionally, citation chaining was utilized to find related sources by examining references in relevant articles.

3.1.2 Primary Data Collection

The second phase involved collecting primary data through various qualitative methods, including focus group discussions (FGDs), face-to-face interviews, phone interviews, and asynchronous email interviews (Ratislavová & Ratislav, 2014; Amri et al., 2021).

3.1.3 Observational Data

Additionally, observational data were collected during data collection and it focused on the following aspects:

i. **Current Technology Use**: An assessment of the existing technological tools utilized by library staff and the extent of automation in daily operations.
ii. **Staff-User Interactions**: Observations of how staff interacted with library users, highlighting the nature of these engagements and the importance of human assistance in the library environment.
iii. **Infrastructure Assessment**: An evaluation of the library's technological infrastructure, including internet connectivity, power supply reliability, and physical space for accommodating potential robotic systems.
iv. **Staff Adaptability**: Noting the comfort levels of staff with existing technology and their readiness for adopting new robotic solutions.
v. **Workflow Analysis**: Examination of manual workflows versus potential automated processes to identify areas where robotic technology could enhance efficiency.

4 Data Analysis

The qualitative data collected were analyzed using a content analysis procedure based on themes that aligned with the study objectives and research questions (Braun and Clarke, 2006). Observational data were integrated into the analysis to provide a comprehensive understanding of the library's operational context. Findings were presented in textual form, summarizing relevant ideas from narratives and including verbatim quotations that supported the study objectives regarding staff awareness levels and perceptions toward robotic technology.

5 Findings and Discussion

5.1 Mzumbe University Library Staff Awareness Level about Robot/Robotic Technology (RT)

This practical view aligns with Nguyen's (2020) literature review, which highlighted the multifaceted roles robots can play in libraries, such as welcoming guests and directing them to services. However, the tasks suggested by MU Library staff focus more on back-end operations than direct user interaction, possibly indicating hesitance to allow robots to take on more visible, customer-facing roles. This could stem from concerns about the potential loss of personal connection between library staff and patrons, which is a fundamental aspect of library services. Robots handling direct user interaction may challenge the relational and empathetic dimensions that staff provide, which technology alone may not replicate.

The responses on the types of tasks staff expect robots to perform reveal practical and operational considerations. Majority of the staff proposed that robots should handle repetitive tasks such as shelving, shelf reading, material retrieval, and stock evaluation/inventory management. These tasks are labor-intensive and time-consuming, making them ideal for automation. This indicates that staff visualises RT primarily as a tool for operational efficiency. By assigning such tasks to robots, human staff could be freed up for more complex, user-oriented services, thus improving the overall effectiveness of the library's service delivery. The recognition of these specific roles reflects an understanding that robots are particularly suited for high-precision, routine activities where human error may occur or where time savings are critical.

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The discussion of these findings highlights the importance of role clarity in the introduction of RT in libraries. MU Library staff appear to view robots as tools for efficiency in repetitive and technical tasks rather than as replacements for human interaction. This may imply a broader acceptance of RT if it is positioned as an enhancement to staff capabilities rather than as a substitute for them. However, there could be underlying concerns about job security, especially if robots are seen as displacing roles that staff members currently fill. Addressing these concerns will be crucial to managing the transition toward greater automation, ensuring that staff feel valued and their roles are redefined in a way that leverages human strengths, such as problem-solving and customer service.

Another key point of analysis is how the staff's awareness of RT might influence the library's broader strategy for technological adoption. Awareness suggests a level of readiness, but it also raises questions about infrastructure required to support such technology. For example, while staff may be aware of and potentially supportive of robotic technology, the MU Library may need to consider issues such as funding, technological infrastructure (e.g., strong internet connectivity), and staff training to ensure the smooth implementation of RT. The readiness of staff must be matched by the library's capacity to integrate robots into daily operations effectively.

5.2 Mzumbe University Library Staff Perceptions on the Introduction of Robot/Robotic Technology (RT)

The study highlights the negative perceptions held by the majority of Mzumbe University (MU) Library staff about introduction of robotic technology (RT). The main concern revolves around job security, with many respondents expressing fear that robots could replace human jobs. This sentiment is largely driven by the belief that management might prefer robots because they can work continuously—24 hours a day—without fatigue, as noted in earlier research by Lin et al. (2022) and

Calvert (2017). These findings underscore a key issue in the adoption of technology in libraries, where automation is often perceived as a threat to employment, rather than a tool to enhance the working environment. Addressing these concerns will be crucial in managing resistance and ensuring that staff see RT as a complementary, rather than competitive, addition to their works.

In addition to concerns about job replacement, some respondents pointed out the practical limitations of introducing RT in smaller campus libraries, such as those in Mbeya and Dar es Salaam. They argued that libraries' limited collection makes the introduction of robots unnecessary, as there is insufficient demand for automation in such settings. This view emphasizes the need for RT to be implemented based on actual needs of staff and the library. One respondent voiced concerns over the mismatch between the pressing issues faced by the library—such as staff welfare and the need for working tools—and the prioritization of robots. This highlights a broader institutional challenge, where staff feel that basic needs and infrastructural gaps should be addressed before introducing advanced technology.

Another common theme that emerged was the library's preparedness to integrate robotic technology. Several respondents raised concerns about the library's current lack of resources, infrastructure, and strategic planning for robot implementation. One respondent emphasized that the library must first allocate a budget and create a conducive environment for robots to function effectively. This insight points to the need for careful planning and investment before introducing RT, as poorly executed implementation could lead to inefficiencies and further dissatisfaction among staff.

Respondents also mentioned absence of critical frameworks such as robot policy and guidelines, which are necessary to guide the adoption and use of RT. Without these foundational elements, the introduction of robots could lead to confusion and operational challenges. One respondent emphasized that staff would need to acquire new skills to operate and manage robotic systems, pointing to the need for training as a critical part of RT adoption. Moreover, the lack of organizational resources, both human and technological, further complicates the library's readiness for this transition. This mirrors findings from Owolabi et al. (2022), where universities were deemed unprepared to adopt robots due to inadequate digital infrastructure and the absence of a clear policy framework. Lack of robotic experts within the institution

also hinders smooth implementation, suggesting that partnerships with external experts or training programs will be necessary.

The issue of research and evaluation before the introduction of RT was also raised. One respondent advocated for intensive research on user needs, available resources, and appropriate technologies specific to the Tanzanian context. This cautious approach reflects a desire to ensure that any technological innovation is aligned with the actual needs of the library and its patrons. Additionally, considerations around data security, privacy, and ethical issues were mentioned, highlighting that the introduction of robots in libraries is not merely a technical upgrade but also requires careful consideration of how these systems interact with users' information and privacy rights.

Interestingly, while most respondents expressed concerns or reservations about RT, one respondent had a positive perspective on its potential benefits. This respondent argued that robots could free library staff from routine tasks, allowing them more time to engage in complex, value-added activities such as research, teaching, and outreach services. This aligns with arguments from Oliveira et al. (2019) and Javaid et al. (2022), who noted that robots can relieve staff from repetitive, time-consuming duties, enabling them to focus on more intellectually demanding tasks. This positive view highlights that while RT might initially cause anxiety, it also has the potential to enhance productivity and elevate the role of staff to higher-level responsibilities. Such benefits could improve operational efficiency and ultimately enrich the library's service offerings.

5.3 Challenges that MU Library may Face When Introducing Robots/Robotic Technology

The introduction of robotic technology (RT) at the MU Library is anticipated to face several significant challenges, as highlighted by respondents. Lack of funds emerged as a primary obstacle, with no specific budget allocated for the introduction of robots. This lack of financial preparedness indicates that the institution may not have the necessary resources to invest in the technology, maintenance, or training required for a successful implementation. Without dedicated funding, it would be challenging for the library to acquire the equipment, develop necessary infrastructure, and support long-term operational needs.

In addition to financial constraints, unstable internet connectivity was pointed out as another critical challenge. Given that RT relies heavily on robust and consistent digital infrastructure, unreliable internet service could disrupt the functioning of robots, making it difficult to achieve seamless operations. This challenge suggests that before introducing robots, the library must prioritize strengthening its internet capabilities to ensure that the technology can perform optimally.

Unreliable power supply was also noted as a potential hindrance. In areas where the power supply is inconsistent, the introduction of robots could be compromised, as these machines require continuous power to operate. Frequent power outages or fluctuations could lead to interruptions in service, potentially damaging the robots or causing inefficiencies in library operations. To mitigate this issue, the library would need to explore solutions such as backup generators or alternative power sources to ensure the uninterrupted operation of robotic systems.

These challenges collectively highlight that infrastructural limitations and a lack of financial planning could significantly hinder the successful adoption of RT at the MU Library. Addressing these issues through adequate budgeting, investment in stable digital and electrical infrastructure, and thorough planning will be crucial steps in overcoming these barriers and ensuring that robotic technology can be effectively integrated into the library's operations.

5.4 Observation

In addition to interviews and focus group discussions, an observational approach was integrated into the study to provide a deeper understanding of Mzumbe University Library staff's readiness and interactions with current technologies. The observation method allowed for real-time, non-intrusive data collection, offering insights into how staff members currently engage with automated systems and other digital technologies in the library. The observation was conducted to:

1. Identify existing workflows and routines that may be impacted by the introduction of robotic technology.
2. Understand the staff's current interaction with technology and automation tools.
3. Evaluate the library's infrastructure, including power and internet connectivity, to assess its readiness for robotic technology.

4. Observe staff behaviour in carrying out repetitive tasks that could potentially be replaced or supplemented by robotic systems.

The observational findings provided critical insights into the current workflows, technology use, and staff dynamics that will influence the potential implementation of robotic technology. The analysis below discusses key themes emerging from the observations and their implications for introducing robots into the library environment.

5.4.1 Current Use of Technology

Observation highlighted that while the library employs some automated tools, many routine tasks remain manual. This reliance on human labour for repetitive activities such as shelving and inventory management suggests that there is considerable room for improvement through automation. Lack of automation can lead to inefficiencies, with staff spending excessive time on tasks that could be expedited by robotic systems. Implementing robots for these repetitive tasks could significantly enhance operational efficiency, allowing staff to redirect their efforts towards higher-value activities, such as user engagement, research, and professional development.

5.4.2 Staff-User Interaction

The importance of human interaction in the library context was evident in the observation. Staff members were not only performing operational tasks but also playing a crucial role in facilitating user experiences. The direct assistance provided by staff was valued by users, emphasizing that while robots can assist in certain functions, they cannot replicate the personalized service that staff provide. This finding indicates that the introduction of robotic technology should aim to complement, rather than replace, human interaction. Ensuring a balanced approach that incorporates both robotic assistance and human support will likely enhance overall service quality and user satisfaction.

5.4.3 Technology Infrastructure

The inconsistent internet connectivity and occasional power disruptions observed at the libraries raise significant concerns regarding the readiness of the infrastructure for robotic technology. For robots to operate effectively, stable and reliable power and internet connections are essential. This finding underscores the need for infrastructural upgrades prior to any robotic implementation. Libraries must invest

in robust technological infrastructure to support the seamless operation of robotic systems, as any interruptions could severely hinder their performance and reliability.

5.4.4 Staff Adaptability

The varying levels of staff comfort with technology observed during the study highlight a potential barrier to the adoption of robotic systems. Older staff members, in particular, showed hesitancy in using existing digital tools, which could translate into challenges when new technologies, such as robots, are introduced. This discrepancy in adaptability suggests that targeted training programmes will be necessary to build staff confidence and competence in working alongside robotic technology. Investing in professional development and ongoing training will be crucial for ensuring a smooth transition and fostering a positive attitude towards robotic integration.

5.4.5 Physical Space Constraints

The observation revealed that certain library spaces were cramped and cluttered, potentially impeding the movement of robots. This presents a logistical challenge, as robots need adequate space to navigate without disrupting library operations. Addressing physical space constraints may involve rethinking library layouts and workflows to create environments conducive to robotic functionality. Before implementing robots, a thorough assessment of space utilization will be essential to facilitate their effective integration.

5.4.6 Manual vs. Automated Workflows

The predominance of manual workflows in various library functions reinforces the notion that the library environment is ripe for automation. Observing staff handling tasks manually suggests that existing processes may be inefficient and labour-intensive. The introduction of robotic technology could alleviate the burden on staff, enabling them to focus on more complex tasks that require human judgment and creativity. However, the challenge lies in identifying which tasks can be effectively automated and ensuring that staff are prepared for this shift in operational dynamics.

6. Conclusion

In conclusion, this study has explored the perceptions of Mzumbe University Library staff regarding the introduction of robotic technology and identified both

the potential benefits and challenges associated with its implementation. Findings indicate a high level of awareness among staff about robotic technology; however, many expressed concerns about job security and the necessity of such technology given the library's current limitations. Observational findings highlighted that staff engagement and sentiments about robotic technology varied significantly, reflecting a mix of apprehension and openness to innovation.

Staff noted the importance of adequate preparation, including the development of policies, staff training, and infrastructural improvements, to support the successful integration of robots in the library environment. The study emphasizes the need for a strategic approach to address the existing concerns while harnessing the benefits of robotic technology, such as enhancing operational efficiency and freeing staff for more complex tasks. To facilitate this transition, the library management must create a comprehensive plan that encompasses funding, training, and infrastructure upgrades, ensuring that the implementation of robotic technology aligns with the library's goals and the needs of its staff and users. Overall, careful consideration and planning will be essential in navigating the introduction of robotic technology at Mzumbe University Library, paving the way for a more innovative and efficient library service.

7 Recommendations

To ensure the successful introduction of robotic technology (RT) at Mzumbe University Library, a series of strategic actions must be undertaken. The following key actions are proposed to guide the library's efforts in effectively implementing robotic technology:

1. **Develop a Strategic Budget for Robotic Technology Implementation:** MU Library should allocate a specific budget for the acquisition and maintenance of robots, including associated costs such as staff training, infrastructure upgrades, and policy development.
2. **Strengthen Infrastructure:** To ensure the smooth functioning of RT, the library should first address its infrastructural gaps, particularly by investing in stable internet connectivity and reliable power supply systems. Backup power solutions should also be considered to mitigate potential disruptions.
3. **Establish Policies and Guidelines:** Before introducing robots, MU Library needs to develop comprehensive policies and guidelines that will govern the

use of robotic technology. These should cover areas such as data privacy, security, staff roles, and user interactions with robots.

4. **Provide Training for Staff:** To ease concerns and improve acceptance, the library should implement a training programme for staff to familiarize them with robotic technology. This will ensure they have skills required to work alongside robots and manage the new systems effectively.
5. **Pilot RT on a Smaller Scale:** Given the concerns over the necessity and feasibility of RT, MU Library should consider running a pilot program in one of its branches or specific departments. This would allow the institution to evaluate the technology's effectiveness in a controlled environment and gather insights before full implementation.
6. **Conduct Further Research and User Evaluation:** MU Library should engage in comprehensive research to assess the specific needs of the library, users, and staff, ensuring that the chosen robotic technology align with these needs. This research will help in selecting appropriate RT solutions that provide tangible benefits while addressing local challenges.

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7 UTILISATION OF SOCIAL MEDIA IN THE DELIVERY OF LIBRARY SERVICES DURING PANDEMIC: A CASE OF SELECTED ACADEMIC LIBRARIES IN TANZANIA

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Abstract

The impact of the pandemic particularly COVID-19 has affected several services in almost all sectors including the delivery of library services in higher learning institutions. As such, the integration of social media was considered one of the measures that could enable academic libraries to deliver library services to meet the information needs of library users. Specifically, this study examined the types of social media employed, library services offered through social media, knowledge of librarians in delivering library services through social media, and the barriers that inhibited the deployment of social media in the delivery of library services. The study adopted a descriptive research design and collected quantitative and qualitative data using surveys (questionnaires and interviews). A total of 153 library staff were selected using census sampling technique while 7 staff members selected by purposive sampling technique from three academic libraries (Sokoine University of Agriculture, University of Dar es Salaam and Muhimbili University of Health and Allied Science). The findings indicate that whereas WhatsApp was the main social media, notification of new library arrivals, document delivery services (DDS) and current awareness services (CAS) as well as e-resources access information and details were the major library services delivered via social media platforms. The study also discloses that library staff had limited knowledge of the utilisation of social media in the delivery of library services. It was further identified that lack of social media literacy skills, resistance to change, poor funding and poor ICT infrastructure were the major challenges facing librarians in delivering library services on social media during COVID-19. The study recommends that training on the usage of social media in the provision of library services is pivotal in ensuring the effective delivery of library services during crises and emergencies. Also, library management should allocate an adequate budget for social media-mediated library services such as ICT devices and Internet connectivity, and develop enabling library policy for the effective utilisation of social media in library services.

Keywords: *Social media, Library services, COVID-19 pandemic, academic library, library users, Tanzania.*

1 Introduction

The hit of COVID-19 has changed the mode of library service delivery in almost all libraries. For example, through implementing the COVID-19 health protocols in all aspects, such as furniture and library programmes (Winata et al., 2021) and social distancing rules (Chisita & Chizoma, 2021) changed the normal delivery of library service practices. Some of the significant changes to note include the closure of educational institutions that shifted library services delivery from print and site services to online (Gmiterek, 2021; Rafiq et al., 2020; Mehta & Wang, 2020) and some library functions that could not thrive in online environment were kept on hold (Chisita & Chizoma, 2021). During the COVID-19 lockdown, libraries responded quickly to the new circumstances by taking many of their services online (Koulouris et al., 2020). Specifically, the majority of universities started online classes and university libraries had to help the students and teachers in this time of crises. As such, library services of such institutions were not closed as students were doing their tasks and assignments from home (Winata et al., 2021; Mehta & Wang, 2020; Rafiq et al., 2020). While students were not going to the classes, instructors and researchers continued to work. For instance, library resources were accessed remotely to support academic and research activities (Mnzava & Katabalwa, 2021).

Libraries' responses to the COVID-19 pandemic have been phenomenal, as evidenced by their capacity to provide services to users by exploiting the panoply of digital technologies specific to social media (Yu et al., 2022; Nadi-Ravandi & Batooli, 2023; Bakti et al., 2020; Koulouris et al., 2020; Chisita & Chizoma, 2021; Martínez-Cardama & Pacios, 2020). The significance of social media during the COVID-19 pandemic was more than before (Mehta & Wang, 2020); for example, the exploitation of social media such as Facebook (Gmiterek, 2021), WhatsApp (Rafiq et al., 2020) and Twitter (Alajmi & Albudaiwi, 2021) as essential tools for communicating, building relationships, attracting and engaging library patrons (see Bakti et al., 2020; Martínez-Cardama & Pacios, 2020; Koulouris et al., 2020). The availability of the content and ease of use (Gmiterek, 2021) were among the reasons for the popularity and exploitation of social media in libraries during COVID-19.

Despite the growing literature on the adoption of social media in the delivery of library services during the COVID-19 pandemic globally, in the context of Tanzania, studies such as that of Josephat et al. (2023) and Shikali et al. (2023) indicate that libraries responses to COVID-19 pandemic have also been remarkable such that the integration of social media was considered one of the measures that could enable academic libraries to deliver library services to meet the information needs of library users. However, the existing prior studies on the utilisation of social media in the delivery of library services in academic libraries in Tanzania (see for example, Kyumana, 2021; Lwoga, 2014) show that librarians' knowledge on the usage of social media during COVID-19 is not known. Along with that, the efforts in place on the utilisation of social media during the COVID-19 pandemic in supporting the provision of library services are not clearly stated. Therefore, this study fills the gap on the utilisation of social media in the delivery of library services during the COVID-19 pandemic in Tanzania. To address this gap, this study seeks to examine the types and purposes of social media used by library users, the types of library services offered through social media, the level of knowledge library patrons have in utilising social media and the challenges these patrons face in utilising social media.

2 Objectives of the Study

The main objective of this study was to examine the utilisation of social media in the delivery of library services during the COVID-19 pandemic in selected academic libraries in Tanzania. The specific objectives were to:

1. Ascertain the types and purpose of social media used to deliver library services during the COVID-19 pandemic in selected universities in Tanzania,
2. Identify the types of library services offered through social media during the COVID-19 pandemic in selected universities in Tanzania,
3. Establish the level of knowledge librarians have in the utilisation of social media and the challenges encountered in the utilisation of social media during the COVID-19 pandemic in selected universities.

3 Literature Review

The literature review of this study was carried out by analysing, summarising and synthesising the prior studies that were related to the topic understudy. Along with that, they were arranged based on the chronological order of the study objectives.

3.1 Social Media and their Purpose in Library Services

COVID-19 pandemic altered the need on the usage of social media to meet the swift and apt library users need. As such, the demand to shift library services to electronic-based became essential for all academic libraries during the COVID-19 pandemic. This forced most libraries to become active on social media amid the COVID-19 pandemic (Yu et al., 2022; Banda & Chewe, 2022; Nadi-Ravandi & Batooli, 2023; Friday et al., 2020; Koulouris et al., 2020). Whereas some social media were found to be mostly utilised to support library services, others were not. For example, the study conducted by Nwosu and Asuzu (2021) reported that WhatsApp and Facebook were mostly utilised in supporting academic library services while Facebook Messenger, Twitter, Instagram and YouTube were the least utilised during the COVID-19 lockdown in Nigeria. Along with this, Friday et al. (2020) reported that Facebook, YouTube, Twitter and WhatsApp were utilised during COVID-19 pandemic to fasten reach library service delivery to users even in remote locations. In other words, the usage of these platforms makes it faster and easier for librarians to reach large populations, anytime and anywhere.

Moreover, the purpose of using social media during the COVID-19 lockdown according to Banda and Chewe (2022) was to market the library's online services, events, programs and collection, to reach and interact with a wide range of patrons including the new audience of potential users, answering reference queries and to provide reliable, accurate news and updates. Regarding marketing, Facebook is the platform mostly used by libraries to market their resources and services (Kirita & Mwantimwa, 2021). Besides, in the study of Agyekum et al. (2016), it was found that social networking tools are relevant in the dissemination of library news, library events, group discussions, general library information, sharing e-resources and offering library resources. Along with that, a study by Bakti et al. (2020) reported that social media such as Facebook, YouTube and Twitter are the most popular platforms in library services and are mostly used to build bonding with library users, encourage more users to utilise library services and participate in various library events. Specifically, Spanish university libraries mostly use Twitter for its ability to generate engagement with the community (Martínez-Cardama & Pacios, 2020). Not only that but also, Facebook was mostly utilised during the COVID-19 lockdown followed by Instagram and Twitter; and to a small extent library used YouTube for communication with library users and share with them library resources (Gmiterek, 2021). Most libraries use WhatsApp as a platform for communicating with library

users (Rafiq et al., 2020). On the whole, geographical location of academic library determined the type of social media utilisation. For example, most of the academic libraries in Africa utilised Facebook and WhatsApp (Nwosu & Asuzu, 2021; Agyekum et al., 2016) whereas Twitter was mostly used in Spain (Martínez-Cardama & Pacios, 2020). On a different note, while other librarians and library users were not familiar with social media (Bakti et al., 2020; Agyekum et al., 2016), all (100%) respondents among librarians at the University of Zambia were familiar with WhatsApp (Chewe et al., 2021).

3.2 Types of Library Services Offered through Social Media

The impact of the COVID-19 pandemic on academic libraries has led to an increase in the utilisation of social media platforms in the delivery of library services around the world. According to Friday et al. (2020), the adoption of social media such as Facebook, Twitter, blogs, YouTube, Myspace, Flickr and Delicious has increased the effectiveness of the delivery of library services to library users during the COVID-19 pandemic. These services offered through social media during COVID-19 according to Mehta and Wang (2020) include providing electronic resources (e-resources), reference services and digital repository. This indicates that the utilisation of social media remained the only way of marketing and delivering virtual library services because lockdown and social distancing limited interaction between library staff and library users. On the other side, Tsekea and Chigwada (2021) and Chisita et al. (2022) reported that in Zimbabwe, subject librarians created WhatsApp groups, which were used to facilitate the lending and circulation of information resources to students and faculty members during the pandemic. Noting examples from Tanzania, the study by Kyumana (2021) found that Facebook, WhatsApp, Instagram, YouTube, Twitter and Goodreads were the preferred social media platforms for providing services such as current awareness services, announcements, links to scholarly documents, video tutorials, and virtual tours to the library. Besides, the study further found that reference services, answering queries using mobile application (WhatsApp) as well as the establishment of the library book club to boost reading culture amongst students were pivotal through social media.

Along similar lines, the reviewed literature indicates that WhatsApp, Facebook and Twitter were the most useful social media tools that facilitated the delivery of virtual reference services (Abubakar, 2021; Ifijeh & Yusuf, 2020; Mbambo-Thata, 2021).

For instance, the University of Lesotho Library provides reference services through chat facilities on social media (Mbambo-Thata, 2021). Besides WhatsApp, Instagram, Skype, blogging and YouTube, these facilitated remote access to library information resources, circulation and selective dissemination of information (Mbambo-Thata, 2021; Magut & Kiplagat, 2022). Social media has also been used by academic libraries to facilitate the delivery of online user education programmes and research support services to library users during lockdown (see for example, Koulouris et al., 2020; Chisita & Chizoma, 2020; Chigwada, 2022). Alongside, interlibrary loans and document delivery were offered through social media platforms (Ifijeh & Yusuf, 2020; Banda & Chewe, 2022; Magut & Kiplagat, 2022). A study by Koulouris et al. (2020) on COVID-19 and library social media use disclosed that Facebook was the most (96.3%) widely used platform and that other social media platforms are mainly used for general library operations, information about library events (exhibitions, seminars, conferences, etc.), photographs and/or videos from library events, and library services. In general, Mehta and Wang (2020) point out that the application of social media in academic libraries during COVID-19 helped librarians meet the scholarly information needs of library users from different backgrounds.

3.3 Librarians' Knowledge in Delivering Library Services on Social Media

There are mixed findings on the librarians' knowledge of delivering library services on social media. Whereas Chiparausha et al. (2022) indicate that librarians are knowledgeable, other scholars (see for example, Chewe et al., 2021; Friday et al., 2020; Gupta et al., 2015; Hosseini & Hashempour, 2012) indicate that librarians were not knowledgeable. Specifically, citing examples from 13 university libraries that are members of the Zimbabwe University Libraries Consortium (ZULC), Chiparausha et al. (2022) reveal that 83.7% of the librarians had the knowledge necessary to use social media for library service delivery. Although social media is often and very often used in communication and sharing of information (Chewe et al., 2021), more than half (64.9%) of librarians believe that they lack knowledge on the usage of social media (Hosseini & Hashempour, 2012). Besides, a study by Gupta et al. (2015) discloses that knowledge among library staff on social media applications was very poor.

Along similar lines, Agyekum et al. (2016) disclosed that lack of requisite knowledge stumbles the application of social media in delivering library services. This poor

knowledge among library staff informs that the majority of them are not utilising social media applications in delivering library services. The problem among library staff is accelerated by the lack of training on these social media (see for example, Friday et al., 2020; Gupta et al., 2015; Hosseini & Hashempour, 2012). For example, 63.4% of librarians at the University of Zambia were not trained on the utilisation of social media in supporting library services (Chewe et al., 2021). Inadequate training opportunities are among the problems that hinder the use of social media tools in delivering library services (Hosseini & Hashempour, 2012). On this, Friday et al. (2020) advise library staff to be provided with regular training in the use of new tools and social media platforms to make them IT compliant, and in turn, they can utilise these tools for effective library service delivery.

3.4 Challenges Facing Librarians in Delivering Library Services on Social Media

There are several challenges that librarians face in delivering library services via social media. While exploring COVID-19 and library social media use, Koulouris et al. (2020) found that lack of staff and time, lack of social media strategy and lack of management support were the reasons for librarians not using social media in delivering library services. Also, the study indicated other reasons such as social media usage does not support library goals, copyright issues and it is not among the priorities of the library. Along with that, a study by Mandrekar and Rodrigues, (2020) disclosed that interrupted internet connectivity, lack of technical skill, lack of manpower and lack of awareness were among the barriers in marketing library and information products and services through social media. Moreover, Agyekum et al. (2016) noted that lack of internet connectivity or network failure, unstable power supply, abuse of specific networking tool usage and lack of requisite knowledge and community acceptance as the common challenges facing libraries in delivering services through social media. In addition, Kyumana (2021) found monetary costs, dormancy of accounts, trolling and bullying and lack of management support to be the most challenges facing academic libraries in the implementation of social media in the delivery of library services.

Understandably, prior studies (i.e., Chiparausha et al., 2022; Chewe et al., 2021; Friday et al., 2020) disclosed that lack of social media literacy skills, inert fear of technology, lack of incentives, network problems, poor connection and low bandwidth are the challenges facing librarians in delivering library services on social

media. Despite the role played by social media in libraries, challenges related to infrastructure, awareness, information literacy, shortage of trained staff, policy/strategies, authentication, security, robustness and ownership of intellectual property are prevalent (Lwoga, 2014). Besides, too many social media platforms and their use are time-consuming and are among the challenges facing librarians in delivering services on social media (Chewe et al., 2020). Whereas poor funding and poor ICT infrastructure were the biggest obstacles to the adoption and use of social media in library services during the COVID-19 lockdown, other obstacles were resistance from some librarians and lack of policy on social media adoption (Banda & Chewe, 2022). On a different note, library users who are expected to access and utilise library services delivered via social media are found to have limited skill in the usage of social media (Friday et al., 2020) which lessens the efforts at hand.

4 Methods and Data

This section describes the methodology used in conducting this study. These include research design and approaches, study area, study population, sampling techniques, data collection methods and data presentation and analysis. Specifically, the study used descriptive research along with cross-sectional design. The study also used both quantitative and qualitative approaches. Besides, the data were collected from library staff from three academic libraries (MUHAS, SUA and UDSM). The selected academic libraries belong to the oldest public funded universities in Tanzania. Along with that, these academic libraries hold public responsibility in knowledge creation and dissemination of scholarly information to university community as well as the general public. Also, these university libraries were selected purposively because they have well-established ICT infrastructure and hence were in a good position to use social media to deliver library services during the COVID-19 pandemic era. A census sampling technique was used to collect data from librarians in the selected academic libraries. As such, the questionnaires were administered to all library staff members. On a different note, interviews were used to collect data from 7 library staff members either from reference librarians or library ICT officers who were also involved in completing the questionnaire. Whereas the SPSS version 22 was used for quantitative data to derive both descriptive and inferential statistics that were presented in Tables and Figures, the thematic analysis was used for qualitative data.

5 Results

This section presents the results of the present study based on the study objectives. But before embarking to the study results, the study described on the return rate of the questionnaires by the respondents and their socio-demographic characteristics. A total of 164 respondents participated in the present study. However, 153 out of 164 which is equivalent to (93.3%) of the librarians completed well the distributed questionnaire. Furthermore, the socio-demographic information of librarians in the selected academic libraries was asked to indicate their gender, age group and work experience as presented in Table 1.

Table 1: Socio-demographic Characteristics of Respondents

Characteristics (n = 153)	***Frequency***	***Percentage***
Institution affiliation		
MUHAS	13	8.5
SUA	32	20.9
UDSM	108	70.6
Gender		
Male	81	52.9
Female	72	47.1
Age group		
20-29	35	22.9
30-39	64	41.8
40-49	37	24.2
50 and above	17	11.1
Work experience		
Less than 10 years	49	32
10 to 20 years	76	49.7
21 to 30 years	21	13.7
More than 31 years	7	4.6

Table 1 indicates that the majority (52.9%) of the responding librarians were male. Regarding the age of librarians in the surveyed area, more than one-fifth (22.9%) had age ranges from 20 to 29, two-fifths (41.8%) had age ranges from 30 to 39, and about a quarter (24.2%) had age ranges from 40 to 49. The results further show that the least (11.1%) had age ranges from 50 years and above. Besides, the findings indicate that about one-third (32%) of librarians had work experience of less than

ten years, about a half (49.7%) had work experience of 10 to 20 years, 13.7% had work experience of 21 to 30 years and the least (4.6%) of the librarians had more than 31 years of work experience.

5.1 Types of Social Media Used in Library Services

The study sought to determine the types of social media used by librarians in delivering library services. The details of the types are presented in Figure 1.

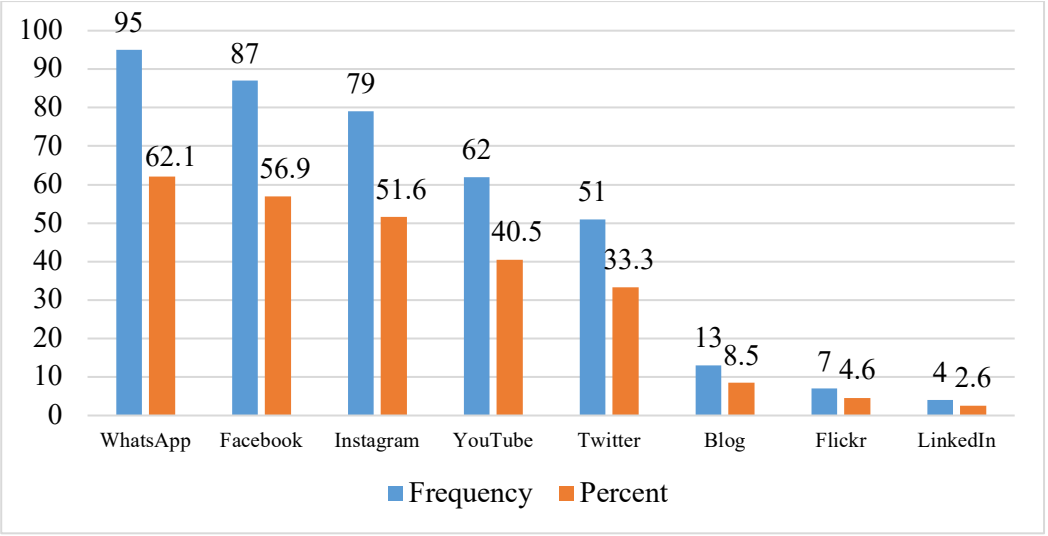

Figure 1: Types of Social Media in Library Services

The results in Figure 1 show that the majority (62.1%) of librarians in the selected areas used WhatsApp, a moderate percentage used Facebook (56.9%), Instagram (51.6%) and YouTube (40.5%). Besides, one-third (33.3%) are using Twitter and the least (<10%) of librarians used Blog, Flickr and LinkedIn. Besides, librarians were asked about the main purpose of using social media in library services. Likert scale with 5 points (i.e., Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree) were used to rate the purpose of using social media in library services as summarised in Table 2.

Table 2: Purpose of Using Social Media in Library Services

Purpose (n=153)	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	F	%	F	%	F	%	F	%	F	%
Used to reach large population quickly	-	-	1	0.7	9	5.9	76	50.7	67	43.8
Help to disseminate information	5	3.3	8	5.2	23	15	44	28.8	73	47.7
Easy to keep up to date with library clients	2	1.3	7	4.6	9	5.9	78	51	57	37.3
The fastest and easiest tool for disseminating information	4	2.7	14	11.2	21	13.7	81	52.9	33	21.6
Takes closer to library clients	16	10.5	22	14.4	11	7.2	49	32	55	35.9
Provides notices of upcoming events	10	6.7	27	17.6	30	19.6	26	17	60	39.2
Provides reference services quickly	13	8.5	20	13.1	38	24.8	53	34.6	29	19
Save time for library clients	24	15.7	42	27.5	29	19	22	14.4	36	23.5

The results in Table 2 indicate that the majority of librarians agreed that social media is used in library services because they reach large population quickly (94.5%), disseminate information (76.5%), easy to keep up to date with library clients (88.3%) and fastest and easiest tool for disseminating information (74.5%). Also, the results show that librarians use social media in library services as they take closer to library clients (67.9%), provide notices of upcoming events (56.2%), provide reference services quickly (53.6%) and save time for library clients (37.9%). These findings inform that there are different reasons for using social media in delivering library services. Mostly, the reasons include the usage of social media for disseminating information, keeping libraries closer to their clients, keeping clients up to date and last but not least provide prompt services.

Along similar lines, during interviews with key respondents, there were several insights on the usage of social media in delivering library services. For example, one respondent mentioned social media use and the main reason for using it:

> *Based on the restrictions such as social distancing and limits on the use of physical resources that were set during COVID-19, it was difficult for clients to visit the library. To make sure what we offer is disseminated to the clients, we created and used WhatsApp groups to keep informing library users of the available resources and new arrivals (R1, Male, SUA).*

This narration indicates that the health restrictions enabled librarians to transform from onsite library services to social media. These social media particularly WhatsApp groups enabled librarians to share the available resources and new

arrivals. Along with WhatsApp groups, information was uploaded to different social media platforms as witnessed by one library officer:

> *We use different platforms such as WhatsApp and YouTube to upload library resources. Through the usage of these media by uploading library resources, we were able to see the trends in the number of viewers and readers (R3, Female, MUHAS).*

This narration indicates that the library resources uploaded on social media were effectively used. These were evaluated through the number of viewers and readers.

5.2 Librarians' Awareness of the Library Services Offered through Social Media

Librarians were also asked to indicate their awareness of the types of library services offered through social media. Their responses are summarised in Table 3.

Table 3: Librarians' Awareness of the Library Services Offered through Social Media

Library Services (n=153)	Frequency	Percent
Notification of new library arrivals	123	80.4
Document delivery services	105	68.6
Current Awareness Services (CAS)	98	64.1
E-resources access information and details	95	62.1
Information about subscribed databases	84	54.9
Selective Dissemination of Information (SDI)	72	47.1
Reference Services	67	43.8
Library Orientation/virtual library orientation	59	38.6
Research Support Services	47	30.7
Library news alerts	26	17

The results in Table 3 indicate that the majority of librarians were aware that social media used to notify users of new library arrivals (80.4%), support document delivery services (68.6%), create current awareness services (64.1%) and inform E-resource access information and details (62.1%). Whereas the findings also indicate that more than half (54.9%) of librarians were aware of the usage of social media in informing about subscribed databases, about half (47.1%) were aware of the usage of social media in supporting Selective Dissemination of Information (SDI). The

study findings also show that moderate of librarians in the surveyed areas were aware of the usage of social media in supporting reference services (43.8%), library orientation/virtual library orientation (38.6%), and research support services (30.7%). The findings further show that at least (17%) of librarians were aware of the usage of social media in news alerts. Along with that, librarians were asked to rate their level of knowledge in delivering library services on social media. The summary of the responses is presented in Figure 2.

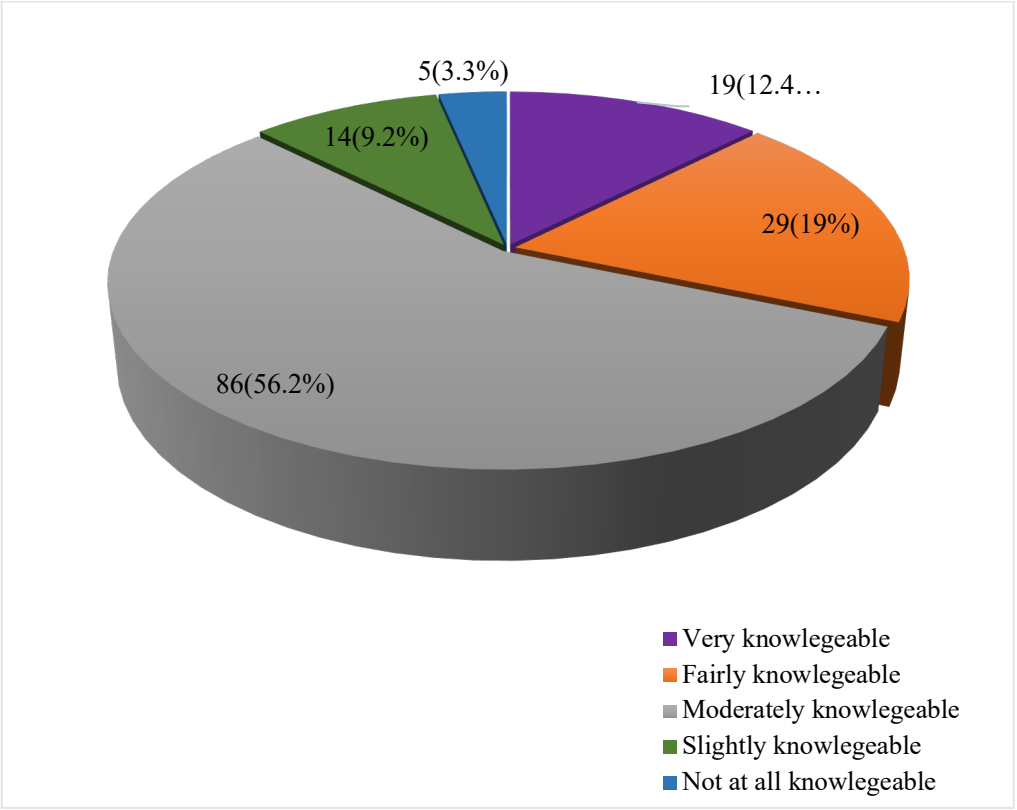

Figure 2: Librarians' level of knowledge in delivering library services on social media

The results indicate that a significant percentage (56.2%) of the librarians were moderately knowledgeable in delivering library services on social media. The results also indicate that whereas about one-fifth (19%) of the librarians were fairly knowledgeable, the insignificant percentage (12.4%) were very knowledgeable in delivering library services on social media. The results further indicate that a small

proportion of librarians were knowledgeable in delivering library services on social media. To compare librarians' level of knowledge and age group, the Pearson Chi-Square test was used as presented in Table 4.

Table 4: Librarians Level of Knowledge versus Age Group

Level of Knowledge (n=153)	Age group				Total	P*value*
	20-29	30-39	40-49	50 and above		
Very knowledgeable	10 (28.6%)	6 (9.4%)	2 (5.4%)	1 (5.9%)	19 (12.4%)	.000
Fairly knowledgeable	13 (37.1%)	8 (12.5%)	5 (13.5%)	3 (17.6%)	29 (19%)	.647
Moderately knowledgeable	31 (88.6%)	21 (32.8%)	20 (54.1%)	14 (82.4%)	86 (56.2%)	.513
Slightly knowledgeable	5 (14.3%)	4 (6.3%)	4 (10.8%)	1 (5.9%)	14 (9.2%)	.287
Not at all knowledgeable	0 (0.0%)	1 (1.6%)	2 (5.4%)	2 (11.8%)	5 (3.3%)	.024

Generally, the results suggest that the majority (88.6%) of librarians with age range from 20 to 29 were moderately knowledgeable. The study findings also show that whereas a moderate percent of age ranges 20-29 were fairly knowledgeable (37.1%) and very knowledgeable (28.6%), an insignificant percentage (14.3%) were slightly knowledgeable. The study further indicates that where there was no a single library staff aged 20 to 29 who was not knowledgeable, there were 2 (11.8%) librarians from age 50 and above who were not at all knowledgeable. These findings also indicate the variation in terms of the knowledge and age group of librarians. For example, there was a significant difference across the age group and very knowledgeable and not at all knowledgeable since the p*value* is <.05. Besides, the results indicate the insignificant percent of librarians' age group with moderate, fairly knowledgeable and slightly knowledgeable. Furthermore, the study gauged librarians' level of knowledge in delivering library services on social media against gender using the Pearson Chi-Square test. The summary of the results is presented in Table 5.

Table 5: Librarians Level of Knowledge against Gender

Level of Knowledge (n=153)	Gender		Total	P*value*
	Male	Female		
Very knowledgeable	11 (13.6%)	8 (11.1%)	19 (12.4%)	.588
Fairly knowledgeable	15 (18.5%)	14 (19.4%)	29 (19%)	.750
Moderately knowledgeable	45 (55.6%)	41 (56.9%)	86 (56.2%)	.376
Slightly knowledgeable	8 (9.9%)	6 (8.3%)	14 (9.2%)	.217
Not at all knowledgeable	2 (2.5%)	3 (4.2%)	5 (3.3%)	.392

The results show that more than half (>50%) of the female and male librarians were moderately knowledgeable in delivering library services on social media. Whereas about one-fifth (18.5%) of male and (19.4%) of female were fairly knowledgeable, an insignificant proportion of the female and male librarians were very knowledgeable, slightly knowledgeable and not at all knowledgeable in delivering library services on social media. In all, there was a slight difference in librarians' level of knowledge in delivering library services on social media between male and female. On this, the Pearson Chi-Square test shows that there were no statistical differences between (p*value*>.05) the level of knowledge of male and female librarians.

5.3 Challenges Facing Librarians in Delivering Library Services on Social Media

There are diverse challenges that librarians face in delivering library services on social media. Based on the findings collected from the surveyed area, these challenges are categorised on skills, funds, policy and ICT infrastructures as presented in detail in Figure 3.

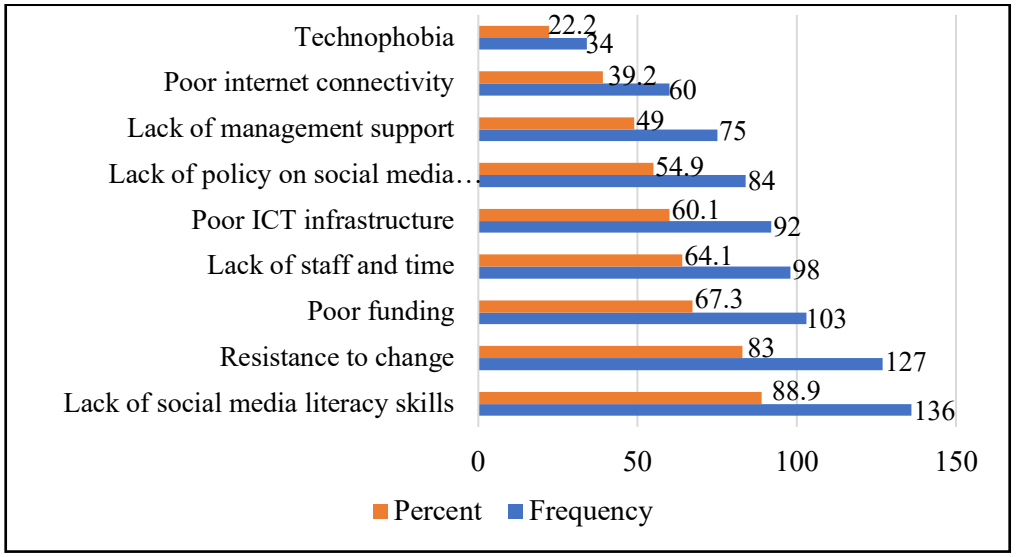

Figure 3: Challenges facing librarians in offering library services on social media

The results show that the majority (>80%) of librarians indicated that lack of social media literacy skills and resistance to change are the main challenges facing librarians in delivering library services on social media. Besides, the findings indicate that a large percentage (60 to 67%) of librarians cited poor funding, lack of staff and time

as well as poor ICT infrastructure. Whereas more than half (54.9%) of librarians indicated the lack of policy on social media adoption, a moderate percentage reported on the lack of management support (49%) and poor internet connectivity (39.2%). Furthermore, the findings indicate that the least (22.2%) of librarians pointed to technophobia as among the challenges facing librarians in offering library services on social media.

Along similar lines, there were insights from key informants from the surveyed areas on the challenges librarians face in delivering library services on social media. For example, one reference librarian witnessed the limited literacy skills among librarians as she asserts that:

> *Most of the library staff in our section have limited social media literacy skills. Lack of these skills lags behind the initiatives in place of embracing library services online. Also, other staff fear technology for it may replace their positions (R2, Female, UDSM).*

This narration indicates that a respective academic institution has initiatives to ensure that library services are delivered online, particularly on social media. Despite those initiatives, library staff are not equipped with the necessary social media literacy skills which limits delivery of library services on social media. Apart from limited social media literacy skills, the results also indicate that fear of technology is among the reasons. Librarians are afraid of social media to replace their position of librarianship. Along with that, another respondent linked the traditional and modern systems of delivering library services and resistance to change as he points out that:

> *The traditional system of delivering library services physically has few challenges compared to modern ones of integrating services on social media. They need fully versed ICT infrastructure and Internet connection that is always funded by the library management and sometimes university management. We are unlucky that we are not well supported let alone a library policy that motivates librarians to effectively utilise social media in service delivery (Male, aged 36, Library Officer, Master's degree, MUHAS).*

Along similar lines, another respondent disclosed resistance to change as follows:

> *Despite the need for libraries to adopt social media in delivering services to their users, some librarians do not want to cope with the changes in science and technology. They are resisting the changes of adopting social media in delivering library services (R2, Female, SUA).*

These narrations indicate that delivering library services on social media has a lot of challenges compared to physical ones. Delivering the same services on social media is expensive that not only needs to be funded by the library or university level, but also a policy should be well articulated to motivate the delivery of services on social media. The existence of these challenges increases the pressure on librarians to resist adopting social media in delivering library services.

6 Discussion of the Findings

This section provides the discussion of the findings based on the study objectives. The study objectives include examining the types of social media and their purposes in delivering library services, types of library services offered through social media, librarians' knowledge in delivering library services on social media and challenges facing librarians in delivering library services on social media. The study exposes that WhatsApp was mainly used by librarians in delivering library services during COVID-19. Prior studies (see for example, Abubakar, 2021; Ifijeh & Yusuf, 2020; Mbambo-Thata, 2021) disclosed that WhatsApp is more dominant than other platforms in facilitating the delivery of library services because of being technologically simple, huge userbase and supports instant communication interaction. Along with that WhatsApp is user-friendly, convenient and has a wide coverage (Kirita & Mwantimwa, 2021). This study's findings depart from voluminous studies (see for example, Gmiterek, 2021; Koulouris et al., 2020; Martínez-Cardama & Pacios, 2020) that highlighted Facebook, Instagram and Twitter as the most used social media during COVID-19. However, these studies were carried out in developed countries (Polish, Greek and Spanish) university libraries respectively. In developing countries such as Zambia, WhatsApp, YouTube (Banda & Chewe, 2022) and Facebook (Chewe et al., 2020) were used in delivering library services during COVID-19. The study also exposes that Facebook, Instagram, YouTube and Twitter were moderately used in delivering library services in the surveyed areas. The findings further indicate that other social media such as Blog, Flickr and LinkedIn were underutilised in delivering library services. In Tanzanian context, these platforms are underutilised because they are not integrated in academic settings (Kirita & Mwantimwa, 2021). Regarding LinkedIn, the findings depart from Agyekum et al. (2016) that LinkedIn is among the three most prominent and well utilised library resource tools after Facebook and Instagram in Ghana.

The intentions of using social media in library services are diverse. Noting from the findings, librarians agreed that most librarians use social media to reach large populations quickly, easy to keep up to date with library clients, disseminate information, fastest and easiest tool for disseminating information and take closer to library clients. The study findings further disclose that social media were used to provide notices of upcoming events, provide reference services quickly and save time for library clients. These findings inform that the usage of social media in the library favours fast communication and dissemination of information to support library users quickly. On this, Banda and Chewe (2022) disclosed that social media has rapidly become a crucial communication tool for information generation, dissemination and consumption for most libraries during the COVID-19 pandemic. However, these findings depart from Chewe et al. (2020) study that despite the high use of social media by academic librarians during COVID-19, their application for work-related purposes was non-existent, as they were mostly used for leisure and communication.

Apart from types of social media and their purposes in delivering library services, there were different library services offered through social media. Noting from the findings, social media platforms are mostly used to notify users of new library arrivals, support document delivery services, create current awareness services, and inform e-resource access information and details. Regarding these, Chisita and Chizoma (2021) reported that academic libraries' staff in South Africa during the COVID-19 lockdown period were working from home with the cooperation of publishers by creating remote access to the databases to which users subscribe. They also provide the users with current awareness services to help them with their research activities. This departs from the case of Zimbabwean university libraries as reported by Tsekea and Chigwada (2022) that during the COVID-19 lockdown libraries' digital services included remote access to e-resources, online reference services and checking for free resources for publishers and sharing with users. Moreover, the study findings indicate other services such as the usage of social media in informing about subscribed databases, supporting Selective Dissemination of Information (SDI), supporting reference services, library orientation/virtual library orientation, research support services and news alerts.

Despite the role played by social media in supporting the delivery of different services, the study findings indicate that librarians had limited knowledge of the utilisation of social media. These findings depart from Chiparausha et al. (2022). Along with that, the Pearson Chi-Square test was also used to gauge the relationship

between the level of knowledge and age group and between the level of knowledge and gender of librarians in the selected area. Whereas the findings indicate that there was a significant relationship between the very knowledgeable against age group (the young to older) and not at all knowledgeable (from older to young), there was no significant association between fairly, moderate and slightly knowledgeable and age group. Besides, there was the insignificant association between the level of knowledge and gender. Based on the knowledge level and age, these findings were contrary to Hosseini and Hashempour (2012) who found that there is no significant difference from Mann Whitney and Kruskal-Wallis tests ($p > .05$), but the findings corroborate on gender.

Along similar lines, limited knowledge of the utilisation of social media is associated with a lack of training on these social media (see for example, Chewe et al., 2021; Friday et al., 2020; Gupta et al., 2015; Hosseini & Hashempour, 2012). Like the present study findings, lack of social media literacy skills is the leading challenge facing librarians in offering library services on social media. On this, Chewe et al. (2021) reveal that lack of training related to social media literacy skills hinders effective library service delivery since librarians are not able to make productive use of social media technology in any given setting. Noting from the findings, resistance to change, poor funding, lack of staff and time as well as poor ICT infrastructure were among the major challenges facing librarians. The study also found that lack of policy on social media adoption, lack of management support, poor internet connectivity and technophobia hinder librarians from offering library services on social media. These challenges corroborate with voluminous prior studies (for example, Banda & Chewe 2022; Chewe et al., 2021; Agyekum et al., 2016). Therefore, libraries are urged to address these challenges if they want the utmost benefit from social media platforms in the new normal (Banda & Chewe 2022).

7 Study Implications

The findings of this study are expected to expand the theoretical body of knowledge on the utilisation of social media in delivering library services particularly during pandemic era. Along with that, this study is expected to expand the theoretical body of knowledge on the types and purpose of social media used, the types of library services offered through social media, the level of librarians' knowledge in the utilisation of social media and the challenges they encountered in utilisation of social media in delivering library services during the COVID-19 pandemic. In particular, the findings will inform stakeholders such as academic staff and researchers,

university administrators, students and external stakeholders such as donors and benefactors on the available library services offered through social media and the challenges librarians encounter in delivering library services through social media. On the whole, the study contributes to the literature on types and purpose of social media in delivering library services, types of library services offered through social media, knowledge of librarians in delivering library services through social media and challenges librarians face in delivering library services through social media from a global perspective.

8 Study Limitations

This study mainly deployed census for academic librarians in the selected academic universities in Tanzania. As such, other stakeholders including library user's involvement in providing their insights on the utilisation of social media in delivering library services is still needed. Apart from that, a new study on the impact of technophobia among librarians and resistance to change in hindering the utilisation of social media in delivering library services is pivotal. Also, further research should be conducted to assess the impact of policy on social media adoption in library service provision.

9 Conclusion and Recommendations

Social media particularly WhatsApp and Facebook are mostly used in academic libraries because they reach large population quickly, keep library clients up to date, and are fastest and easiest platforms in disseminating information. As such, the integration of social media platforms enables the academic libraries to make it easier and faster in the notification of new library arrivals, document delivery services, current awareness services, and access to e-resources. Despite the importance of social media in academic libraries, majority of librarians have limited knowledge on the utilisation of social media in delivering library services. This is accelerated by lack of social media literacy skills, resistance to change, poor funding and poor ICT infrastructure. As such, the study recommends that the academic libraries should ensure that social media are effectively utilised in supporting the delivery of library services. Besides, academic library staff should be well trained on the usage of social media in delivering library services. On the whole, library and university management should allocate an adequate budget for social media-mediated library services such as ICT devices and Internet connectivity, and develop enabling library policy for the effective utilisation of social media in the provision of library services.

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