

**UTILISATION OF INFORMATION SERVICES FOR ACADEMIC  
ACHIEVEMENT BY POSTGRADUATE STUDENTS AT SELECTED  
UNIVERSITY LIBRARIES IN KENYA**

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**A Thesis Submitted to the Graduate School in Partial Fulfilment of the  
Requirement for the Award of a Degree of Masters of Science in Information  
Science of Tharaka University**

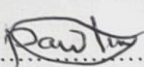
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**NOVEMBER 2024**

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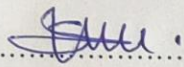
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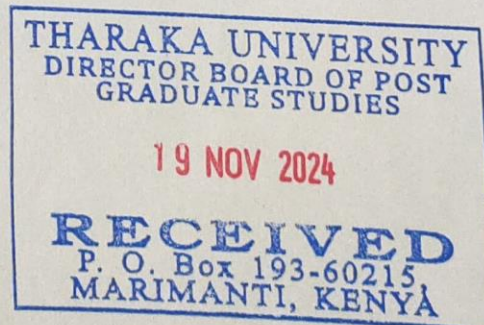
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## **DEDICATION**

I dedicate this work to my lovely daughter Blessings Museo, my Late father Praxedes Kavila Ndeng'e, My mother Juliann Muusi Kavila, my sisters, brothers and friends. Your financial, moral and spiritual support towards excellence in my education gave me the energy to move despite the many challenges I encountered.

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## ABSTRACT

Kenya is a developing country that is facing numerous challenges of poverty, infrastructure, budget constraints and lack of management support leading to underutilisation of information services. Utilisation of library and information services enables library users to locate relevant library resources, expand their knowledge and develop quality research projects and theses. For postgraduate students to conduct research and finish their studies successfully, they must utilize the available information services. However, there is a gap in the utilisation of information services by postgraduate students, where under-utilisation has been reported. Understanding the utilisation patterns, preferences and challenges of postgraduate students is key for universities to provide effective information services tailored to their needs. Therefore, this study explored how postgraduate students utilize the information services available to them through their university libraries. The study specifically focused on utilisation of virtual reference services, institutional digital repository information services and circulation services, by postgraduate students at selected universities libraries in Kenya. The study adopted, Diffusion Innovation (DIT) Theory and Technology Acceptance Model (TAM) Theory. The target population was 2,452 consisting of 2372 postgraduate students and 80 librarians from selected university libraries, which included University of Embu, Kenya Methodist, Kirinyaga University, Meru University of Science and Technology and Chuka University. Random sampling technique was employed to select a sample size of 493 respondents that consisted of 475 postgraduate students and 18 librarians. Questionnaires were self-administered to gather data from postgraduate students on the extent of utilisation of library and information services. The librarians were purposively sampled to participate in the interview to obtain in-depth insights into the experiences and perspectives of postgraduate students in utilising information services. Quantitative data was analysed by descriptive and inferential statistical methods and qualitative data was narratively presented. Research findings established that circulation services had a statistically significant positive effect on library use by postgraduate students ( $\beta=0.096$ ,  $p = 0.002 < 0.05$ ). Additional findings showed that Virtual reference services positively and statistically significantly influences utilisation of library by postgraduate students,  $\beta=0.126$ ,  $p = 0.004 < 0.05$ . Further, it was found that digital repository services had a positive and statistically significant effect on library utilisation by post-graduate students, ( $\beta = 0.109$ ,  $p < 0.05$ ). It is concluded that circulation services, virtual reference services and institutional digital repository services positively influence library utilisation by postgraduate students. It is recommended that libraries fully automate their circulation service operations so that users get effective services and do sensitization on these services. It is also recommended that university libraries have reliable internet connectivity and well-trained staff for effective service delivery to the students.

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## LIST OF ABBREVIATIONS AND ACRONYMS

<b>CS</b>	Circulation Services
<b>CUE</b>	Commission for University Education
<b>DIR</b>	Digital institutional repository
<b>DIT</b>	Diffusion of Innovations Theory
<b>ICT</b>	Information Communication Technology
<b>IFLA</b>	International Federation of Library Associations and Institutions
<b>KLISC</b>	Kenya Library and Information Science Consortium
<b>LCC</b>	Library of Congress Classification Scheme
<b>NACOSTI</b>	National Commission for Science, Technology & Innovation
<b>PEOU</b>	Perceived ease of use
<b>PU</b>	Perceive of Use
<b>SMS</b>	Short Messaging Service
<b>SPSS</b>	Statistical Package for Social Sciences
<b>TAM</b>	Technology Acceptance Model
<b>TEEL</b>	The Essential Electronic Agricultural Library
<b>VRS</b>	Virtual Reference Services

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

University Libraries play a crucial role in assisting their parent organisations' research and teaching initiatives. The swift development of technology has enabled how libraries create and share information. University libraries must embrace new technology and implement them to improve their services and satisfy the community's changing information demands to remain relevant. (Nyakweba et al., 2021). To achieve these fundamental functions university libraries have created interfaces in which users can find the needed information independently and also availed a range of services that allow librarians to provide users with information directly (Baryshev et al., 2018).

Information services in university libraries encompass a range of activities such as virtual reference services, circulation services, digital institutional repositories services, multimedia services, knowledge management services, user education services, selective dissemination of information, interlibrary loan services, and literature searches among others (Nyakweba et al., 2021). The International Federation of Library Associations and Institutions (IFLA) is globally recognized documents that guide university libraries on the rules, principles, guidelines, best practices or models for various library services. Academic libraries particularly benefit from these standards as they guide libraries on information service provision (IFLA, 2015).

University libraries in Kenya are guided by the CUE guidelines of 2014 on the nature of services they should avail to all categories of users in their libraries. Specifically, the guidelines state that libraries should ensure relevant, adequate, and quality information services. Further, the guideline notes that libraries should subscribe and facilitate access to information resources; establish institutional repositories, and have systems in place that support data exchange (CUE, 2014).

University libraries serve a variety of users including postgraduate students. This category of users are at the advanced level of their academics and are required to carry out extensive and independent research that relies heavily on library resources

and services to fulfil academic goals (Alcober, 2022). Because of the type of research, they are expected to conduct as a measure of their academic success, postgraduate students are considered the most significant user group within the university. Therefore, university information services are dedicated to serving this category of users (Bodhinayaka, 2016). Effective utilisation of information services enables postgraduate students to complete their programs on time. A successful library should satisfy all customers to validate why it exists (Onifade et al., 2013). While examining the information demands of users versus information services, (Bodhinayaka, 2016) observed that quality information services for postgraduate students are essential.

One essential component of meeting the academic and research demands of the university community is the usage of information services in university libraries. According to Shiferaw (2019), utilisation encompasses the practical application of information resources and services in the field of teaching, learning, and research. When students are conversant with the electronic databases and the entire information resources available in the library they tend to effectively utilize the services. This familiarity not only speeds up their search for information but also results in a solid understanding of the library's organizational structure, including shelving arrangement and the formation of a positive relationship with library staff.

Nyakweba et al. (2021) noted that effective utilisation of information services by postgraduate students supports their academic achievement, while underutilisation leads to low academic goals, poor quality research output, and longer academic periods. Although previous studies have linked inadequate resources and the emergence of technologies to poor utilisation of information services among postgraduate students there are other factors such as inaccessibility of information services and delayed feedback contribute to the underutilisation of information services in university libraries.

Adamu and Maidabino (2020) studies utilisation of information services from three concepts, that is, materials, facilities and personnel. Their study established that personnel facilitate the use of information materials while facilities provide the required conditions for effective use and finally, users visit the library when they have information needs that they expect the library to satisfy.

Abdallah and Bilal (2015) noted that the utilisation of information services is very elaborate in developed countries of Europe, the USA, and Asia. In the USA for example, effective utilisation is attributed to the emergence and application of information technology (IT), librarians' efforts in creating awareness through library marketing and having a collection that meets user's needs. Lasig et al. (2022) have observed that the Postgraduate students' use of information services at universities varies depending on their goals for which the student intends to use the library and the facilities available including space, resources, staff approaches to users and the perception of postgraduate students. In Pakistan, postgraduate students use electronic materials more than print ones as the former can be accessed from any place while the latter requires physical presence in the library.

Acheampong and Dei (2020) argued that the underutilisation of information resources is affected by the emergence of new technologies and innovation, therefore the library must invest in technologies for effective service delivery to postgraduate students. Evidence from library use studies has shown that postgraduate students in developed countries effectively use information services while those in underdeveloped countries underutilize the services. Mairaj and Naseer (2013) noted lack of time, lack of knowledge of information services, and language obstacles experienced by postgraduate students in underdeveloped countries are the main causes of postgraduate students' underusing information services.

In Africa, Agboola et al. (2019) emphasize the critical importance of providing quality information services in libraries for effective utilisation. They highlight that how library staff interact with users significantly influences the use of information services. The authors suggest that library patrons should be regarded as valued clients, similar to how customers are treated in financial institutions. This highlights the importance of libraries to prioritize customer service and ensure that users feel valued and supported in their information-seeking endeavours. The effectiveness of information services depends greatly upon the accessibility of resources (Onifade et al., 2013).

In East Africa, the underutilisation of information services is often linked to inadequate knowledge regarding the use of available resources (Katabalwa, 2016). Another challenge to effective utilisation is the lack of awareness about the wide



range of information services. This issue is caused by the fact that postgraduate students frequently overlook induction sessions, which serve as crucial opportunities to disseminate information about information services. The use of information services requires information literacy skills and, the availability of adequate and relevant information resources among the users (Yebowaah & Sanche, 2021). Kotoroi (2018) identified several issues hindering the effective use of library services in universities: low internet connectivity, frequent power outages, inadequate and irrelevant resources, and poor customer care by library staff. This corresponds with Momanyi and Achimwayi's (2017) findings in Kenya where a lack of adequate resources and poor ICT skills were identified. At Makerere University Library in Uganda, the staff places significant emphasis on their training programs and the development of their library web page to effectively raise awareness of the array of information services available to students. However, the utilisation of these valuable information resources fluctuates to the varying levels of awareness among students and the academic calendar (Namugera, 2017).

Several postgraduate students are working this makes them to have limited time to access the library. Nyakweba et al. (2021) noted that the utilisation of information services by university students is affected by inadequate facilities such as low budget, erratic internet connectivity, poor library stock, and unfriendly library staff. Momanyi and Achimwayi (2017) in a study at Lukenya University argue that inability to use technology is an hindrance to effective utilisation of library services is the to enhance access to information resources. The postgraduate students, owing to the amount of research work expected should be able to use the available technologies to navigate the library collection to meet their information needs.

The utilisation of information services by postgraduate students has been affected by diverse factors, depending on the location, facilities, and perception of the postgraduate students (Nyakweba et al., 2021). This study examines the utilisation of information services such as Virtual reference services, digital institutional repositories, and circulation services by postgraduate students at the University of Embu (UoEM), Kenya Methodist University (KeMu), Kirinyaga University(KyU), Meru University of Science and Technology (MUST) and Chuka (CU)University Library. University o Embu offers around 60 Postgraduate programs, Kenya

Methodist offers over 21, Chuka University 122, Kirinyaga University 40, and Meru University of Science and Technology 27 Postgraduate Programmes (KyU, MUST, CU, KeMU and UoEM websites, 2024).

## **1.2 Statement of the Problem**

University libraries play a crucial role in supporting the academic endeavors by providing a wide array of information resources and services to scholars. The government of Kenya through the Commission for University Education (CUE) has stipulated operating standards for university libraries. Some of the major services offered by university libraries include: virtual reference services, institutional digital repository information services, and circulation services. CUE further expects university libraries to run promotional capacity-building programs to foster their utilisation. Studies from countries like Uganda, Tanzania, Nigeria and South Africa have reported under-utilisation of these services. Several factors like: mode of service delivery, distance, low budget, poor library stock, network failure and technology have been attributed to be the problem.

The service utilisation will influence the students' ability to optimize their information services in meeting their specific needs especially postgraduate students. This in turn affect the quality of their research and academic progress. It also negates the value of investment done by universities in supporting library service delivery compounded by imprudent resource utilisation. On this background the researcher intends to address the underutilisation of information services, specifically, virtual reference services, institutional digital repository information services, and circulation services, by postgraduate students in selected universities in Kenya.

## **1.3 Purpose of the Study**

The purpose of this study was to assess on utilisation of information services for academic achievement by postgraduate students at selected university libraries in Kenya to provide remedies for the issues that the study highlighted.

## **1.4 Objectives of the Study**

The specific objectives of the study were to;

- i. Examine the effect of virtual reference services on utilisation of library resources by postgraduate students at selected university libraries in Kenya.

- ii. Evaluate the effect of institutional digital repository information services on utilisation of library resources by postgraduate students at selected university libraries in Kenya.
- iii. Examine the effect of circulation services on utilisation of library resources by postgraduate students at selected university libraries in Kenya.

### **1.5 Research Questions**

- i. To what extent do virtual reference services affect utilisation of library resources by postgraduate students at selected university libraries in Kenya?
- ii. What is the effect of digital institutional repositories services on utilisation of library resources by postgraduate students at selected university libraries in Kenya?
- iii. How do circulation services affect utilisation of library resources by postgraduate students at selected university libraries in Kenya?

### **1.6 Significance of the Study**

Access to information services is crucial for postgraduate students conducting research and completing their courses successfully. This study investigated how postgraduate students in Kenya use information services provided by university libraries and other sources to identify appropriate resources, broaden their knowledge, and develop excellent research projects and theses. Understanding these consumption patterns, preferences, and issues is critical for universities to provide successful information services that meet their demands. The study's goal was to compare utilisation across institutional and regional contexts, revealing differences in resource availability and training in information skills. The findings will assist university libraries identify gaps or impediments to information access, improve services, and influence policies on information availability for graduate students.

The study findings will help the university administration as it will highlight the services that need more resource allocation to enhance utilisation, and also help the University with planning resources to satisfy the information users' needs of the postgraduate students.

### **1.7 Scope of the Study**

This study focused on how postgraduate students at several Kenyan university libraries namely University of Embu library Kenya Methodist library, Kirinyaga

University library, Meru University of Science and Technology library and Chuka University library used information services, such as virtual reference services, digital institutional repository information services, and circulation for their academic achievements. It analysed the factors that influenced the use of these services, as well as the barriers that hinder their consumption. The research focused on postgraduate students since they had sophisticated and specialized research needs that necessitated separate or unique information services. Their improved research skills and independence allowed students to interact with these services in more complicated ways, providing greater insight into academic research processes. Postgraduate students may encounter specific challenges face in obtaining the required materials for their study. Understanding their use of virtual reference services, digital repositories, and circulation services can show how useful these tools are for conducting detailed and in-depth research.

### **1.8 Limitations of the Study**

The fact that data was collected from a small number of selected Kenyan universities was a drawback. therefore, it did not represent the status of all libraries. The study faced a number of challenges for instance slow response rate especially because postgraduate students and faculty were busy with exams and others were uninterested in participating. researcher overcame by conducting the respondents through emails and phone calls.

### **1.9 Assumptions of the Study**

- i. It was assumed that participants understood, responded meaningfully and provided honest and correct answers to interview questions
- ii. Selected Universities were offering diverse information services to Postgraduate students.
- iii. The sample size was reflective of the larger population in the university libraries

### **1.10 Operational Definition of Terms**

<b>An academic library</b>	Is a library that provides material resources and services to support in learning, teaching, and research activities of the student
<b>Developed countries</b>	Is an advanced nation, or a sovereign state with a high quality of life, a sophisticated economy, and cutting-edge infrastructure.
<b>Developing countries</b>	Nations that are in the process of industrialization and experiencing economic growth.
<b>Information need</b>	A personal or categorized urge to get information to fulfill a known or unknown need.
<b>Information resources</b>	Information resources refer to the various types of content and data that can be used to acquire knowledge, make decisions, and support research or other activities.
<b>Information services</b>	Include an aid in which information professionals directly provide patrons with knowledge and links modified in a way that the patrons can find the information they require by themselves
<b>Library</b>	A library is a collection of information materials for reading, learning, and research, such as books, digital media, and research tools. It supports education and knowledge sharing by providing study areas and services including digital repositories and reference help
<b>Library Users</b>	An individual who enters a library with the intention of utilising the available resources to meet his or her own needs is referred to as a library user.
<b>Postgraduate students</b>	Students with a first degree at honours, masters, and doctoral levels and pursuing an advanced degree
<b>Research</b>	Research is an approach of investigation and study used to solve problems, enhance understanding, or find new information.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Utilisation of Information Services in University Libraries for Academic Achievement**

The availability of information resources themselves do not guarantee effective utilisation but also the services offered advocates for marketing of library services to create awareness and improve acceptance by graduate students. The extent to which postgraduate students can enhance their studies depends on how they utilise library information resources and services. Relevant and adequate materials should be kept in the library to attract usage. Several studies such by Abdallah and Bilal (2015), Agboola et al.(2019), Bodhinayaka, (2018), Khan, (2014), and Uche et al., (2018) on the Postgraduate students' use of the information services noted that the library could only serve its purpose when the available resources and services are effectively utilised by the target users.

Globally, library services have been recognized as critical in the lives of postgraduate students and for their academic achievements (Kilemba,2016).In developed countries, research has concentrated on the utilisation of the library as a physical facility including resources and space (Nakitare et al., 2020). A study by (Burn et al., 2016) at York and Loughborough universities in the UK established that physical space alongside traditional resources is what most affects library utilisation by students revealing that library users come with their laptops and smartphones to use in the library. The study implies that it is not only the resources that attract users to the library, but also the physical facilities and the surrounding environment. Alcober (2022) carried out a study on graduate students in the Philippines and revealed that the utilisation of the library's information services was influenced by the competency of library staff, balanced library stock, availability of relevant materials, and the programs the students enrolled. The study reveals that elements that impact the utilisation of library services differ from one category of user to the other. In Australia (Du and Evans, 2011) acknowledged that meeting the information needs of postgraduate students is a function of the library which is realized by providing research-related information services.

Sri Lanka, (Bodhinayaka, 2018) revealed it is necessary to invest in electronic resources to encourage remote access because of its convenience and saves time for the users. In Pakistan a study by (Mairaj and Naseer,2013) reported mixed findings on one hand, postgraduate students expressed their satisfaction with reference services, circulation services, and the conduct of library staff however they also expressed dissatisfaction with library collection, opening hours and available furniture. The study suggested strengthening the available services and improving on those areas where users raised concerns. However, each of the studies used different approaches, methodologies and at different times which meant the findings may fail the test of time.

In Africa, the standard of higher education, student's ability to complete programs within schedule, and the university's research output are linked to the accessibility of effective library resources, facilities and services. In a study to assess the effect of library use on postgraduate students at Babcock University in Nigeria, Onuoha et al. (2013) pointed out that the aim of offering information services is to enhance access to information resources for teaching, learning, and research. The research findings established that library services were essential in the life of a postgraduate student. The study highlighted on how the library staff helps users in accessing information resources and further recommended their training to improve relationships with users. Several factors impact postgraduate students' use of information services, including the availability of information resources, how users perceive those information services and the professionalism of library staff.

In South Africa, (Irenoa et al., 2018) sought to establish strategies for enhancing library services in the 21<sup>st</sup> century. According to the study findings the library services was low quality and blames it on a lack of collaboration among library staff and ineffective service priorities. Irenoa pointed out that for libraries to be effective there was a need to repackage services, enhance library staff skills, and embrace applying technology to provide library services. Adejo investigated on usage of information resources and services in language libraries in Nigeria. Findings showed that the main factors hindering the use of library services were poor reading culture, lack of ICT facilities, irregular power supplies, and the availability of materials that didn't match students' information needs. The research suggested that the library

ensure an uninterrupted power supply, employ more staff and build staff capacity to attract users and enhance the utilisation of library resources and services.

In Ghana, a study by (Evelyn and Lydia, 2019) found out users were satisfied with the current services. Additionally, the revealed that the usage of information services and its impact contributed to students completing their academic programs on time. However, there was a need to improve the electronic infrastructure, upgrade the stock, improve staff capacity, and increase the library space to accommodate more users. Salubi et al. (2018) revealed that in South Africa students who utilise information services have higher grades compared to those who do not use library services. In a study of graduate students' perception of information services at Makerere University in Uganda, the assessment of information services to establish the extent of use by postgraduate students was found to be important (Musoke & Naluwooza,2013). However, a study conducted in Nigeria by Onifade et al. (2013) found that because most postgraduate students do not use library services, it is difficult to determine the degree of satisfaction among them.

Adamu and Maidabino (2020) investigated postgraduate students' perception of quality services in universities in Nigeria and reported user satisfaction. The results showed that postgraduate students expect the library to offer services that meet their research needs. However, a study conducted in Nigeria by Onifade et al. (2013) found that because most postgraduate students do not use library services, it is challenging to me to determine the degree of satisfaction among them. A similar situation was observed by (Onuoha et al., 2013) that the impact of library use on a postgraduate student is exhibited by the number of publications, journal articles, and conference papers they can publish.

Olajide and Omotayo (2016) in a study done at Bowen University Library in Nigeria, argued that offering information services to library users facilitates utilisation. This study additionally noted further that libraries should recognize the role of information technology and exploit the possible areas that will enable users to gain maximum benefits. While pointing out that a university library has three major users, Bodhinayaka (2018) singled out postgraduate students to be the most important of them all. They use the library significantly as their study involved research which requires frequent utilisation of information resources and services.



The utilisation of information services has attracted very little attention in Kenya; instead, the country has concentrated on information resources and collection development. Maina et al. (2017) described information services as activities aimed at improving access to information resources held by the library. In addition, outlines lending, reservation, literature search, and photocopy as the core activities that comprise information services. Effective utilisation of information services depends on the ease of use and provision of sufficient reading materials. Orayo et al. (2019) suggested that to increase usage it is important for the library to improve its approaches to postgraduate students and make sure the acquired resources are relevant to their needs. Similarly, observed that the idea of information services needs to be re-examined to suit the demands of the students. The literature clearly shows that postgraduate students make substantial use of information services (Alcober, 2022; Bodhinayaka, 2018; Kumar, 2017; Onifade et al., 2013; Onuoha et al., 2013). These studies focus on various elements of information services use among postgraduate students, such as access to digital resources, research assistance, and the impact on academic performance. The results of these studies demonstrate how crucial libraries are in advancing academic research and improving postgraduate students' overall educational experience. The findings of these studies highlight the value of libraries in advancing academic research and improving postgraduate students' overall educational experience.

There is a knowledge gap because most of research has not addressed the utilisation of information services but rather on the evaluation of information resources and satisfaction of students' academic needs. the knowledge gap will be filled by this study by looking at the utilisation of information services; virtual reference services, Institutional digital repositories, and circulation services, in selected university libraries in Kenya.

## **2.2 Utilisation of Virtual Reference Services by Postgraduate Students for**

### **Academic Achievement**

Communities have traditionally had active libraries that provide services to the local population. Reference services are among the crucial resources that academic libraries have provided over the years. Although reference services are typically offered at a

desk, libraries have begun to adapt and alter in response to all the current technology advancements.(Tsang & Chiu, 2022).

Virtual Reference Services is delivered in several ways, including phone, email, live chat, video conferencing, texting, additionally currently the use of social media platforms like Twitter. It could either be synchronous, like in a live chat room, or asynchronous, like via email or a web form. This is measured through transaction log which shows the date and time of interaction and nature of inquiry, user surveys and feedback, usage statistics to show trends and patterns, user registration which helps in tracking individual usage, chat transcripts, and recorded sessions are used to understand the information need of students, analysing social media platforms to get user feedback and engagement.

Arya and Mishra (2012) defined VRS as an online reference service that allows a user to ask a reference librarian a question through the website. The basic example of a VRS in libraries is the “ask A librarian”.Tsang and Chiu (2022) defined virtual reference service (VRS) as personal assistance extended to postgraduate students by a librarian by identifying the relevant sources of information that help to meet information needs.

VRS is executed through email reference, chat reference automated routing, and real-time personal assistance to users (Arya & Mishra, 2012). Jabir (2008) hailed (VRS) for empowering the reference librarian to attend to multiple users. Arya and Mishra, (2012) further explained that how to enhance the utilisation of information services is by trying to meet the user demands and improve the library services, hence the use of VRS. However, to help reference librarians deal with the increasing information needs and the prevailing information environment, Jabir's study highlighted the necessity of capacity building. This, according to Jabir will translate to efficiency in service delivery and effectiveness in use of information resources and services. The mode of learning has shifted from a physical to a virtual method influenced by the integration of technology. Academic library services, like offering of virtual reference services, have been redesigned to address the trend in education, as claimed by Bickley and Corral (2011). Otike et al.(2022) observed that VRS expand the role of the library, improve information services, and support the flow of scholarly information that transcends boundaries.

Virtual Reference Service, Otike added, allows postgraduate students to submit their information requests to the librarian via Internet and receive feedback through the same means. In the age of online and remote learning, virtual reference services are a very convenient to offer services to users who live far away. virtual reference services extend scope of information services users can access.

Globally, Studies by Bandyopadhyay and Boyd-Byrnes (2016); and Beard and Bawden, (2012) agreed that there is a significant decline in the physical reference and an increase in the VRS in the USA and UK respectively. Bandyopadhyay and Boyd-Byrnes (2016) further revealed in their study that libraries are using telephone, email, chat and text messaging, instant messaging, and audio and videoconferencing facilities to offer virtual reference services at Long Island University in the USA. Beard and Bawden (2012) established through a study that postgraduate students use virtual reference services. However, there is a section of some students who are not aware of such services. Bandyopadhyay and Boyd-Byrnes (2016) have welcomed VRS pointing out that it has the potential to improve postgraduate students' engagement with information resources and increase the visibility of the library among researchers and students. Bandyopadhyay and Boyd-Byrnes (2016) maintained that the core function of reference service of linking users with information that suits their user needs remains the same.

A study by Patrickson Stewart and Newman (2017) revealed that many libraries across the globe offer VRS, but only differ in the form in which it is provided, with more advanced approaches recorded in developed countries. Patrickson explained in their study that at the University of the West Indies in Jamaica library postgraduate students prefer virtual reference services due to convenience, quick responses, and effective service delivery. The study recommends investment in technology to improve the interaction between library resources and university students, enhance library and user relationships, and conform to the international standard. However, the findings by Patrickson Stewart and Newman were based on the reviewed literature articles and, hence may not depict the present situation. It is therefore important to do an empirical study to get the true findings.

There is a remarkable improvement in library services in developing countries due to technology although there is still much to be performed to achieve success experienced in developed countries with virtual reference services.

Henok and Wilson (2019) pointed out that libraries ought to make sure they have the right resources in electronic formats and other digital devices to facilitate access and attract users without which libraries will not be used. Virtual reference service is a synchronous exchange of information between library staff and postgraduate students using online software (Duncan & Gerrard, 2011). They are information services initiated electronically where computers and other internet-enabled technologies are used to communicate with and between library users and staff and to access services without physical visits to the library. VRS aims to serve the demands of remote users, that is, those users who would like to use the library facilities but are outside the physical location.

Duncan and Gerrard mention several goals of reference services, including guiding readers through the library, answering his/her questions, helping them choose worthwhile reading, and promoting the library in the local community. A study by Onuoha et al.(2013) showed that students' perception, poor customer relations with the staff, lack of appropriate information policies, and limited budget are the major impediments to not only usage but the implementation of reference service.

Adejo (2020) has further cited the absence of adequate ICT facilities, incompetent staff, poor funding, unstable power supply, and lack of awareness among users are the challenges to implementing effective reference services. Otike et al.(2022) support (Patrickson Stewart and Newman's (2017) observation of the role of reference services in assisting students access information for learning and research. Even though the virtual reference service is approved in various research reports, it is highly used among postgraduate students in developed countries more than in developing countries (Patrickson Stewart & Newman, 2017). It is for this reason a research focused on developing countries like Kenya to establish the perspective of postgraduate students is necessary. In a few Kenyan academic libraries, Wachira (2013) investigated the provision of information services to users who were far away.

The study pointed out that, academic libraries offered some information services to users who were located remotely. Ndakalu (2014) in his study noted that Libraries must upgrade their physical spaces to include group study areas and integrate social software like IM, blogs, online chat, and Wikis into their teaching and reference services. He emphasizes how academic libraries in Kenya will keep using inventive methods to handle information. In addition, libraries must use a professional strategy to sell their information products and services.

### **2.3 Use of Digital Institutional Repositories by Postgraduate Students for Academic Achievement**

The role of Digital institutional repository (DIR) in universities cannot be overemphasized. DIR is implemented in academic institutions to preserve the scholarly output of the institution and to demonstrate commitment to knowledge generation (Henok & Wilson, 2019). Research works such as theses, dissertations, journals, books, and conference papers are stored in institutional repositories.

DIR ensures that postgraduate students and information resources are in addition giving students the opportunity of exploiting the importance of university research output through an established standard. It collects the entire intellectual output of academic institutions and exposes them for use by students and other researchers to contribute to knowledge generation and utilisation. This information service is measured through, making track of downloads and views to know the most accessed materials, user analytics to show page viewed, navigation patterns, which helps to know how students interacted with the content, user surveys to show satisfaction levels, tracking citations on materials in the DIR which can be an indicator of impact materials.

Mgonzo and Yonah's (2014) study described an institutional repository as an online archive for a university's scholarly documents. IR contains grey literature such as reports, dissertations, and conference and seminar papers which are critical in research (Nunda & Elia, 2019). The utilisation of DIR facilitates the preservation and dissemination of research work, gives the host institution a global face in the research world, postgraduate students gain a broad view of research concepts as they are exposed to a variety of previous studies, helps students avoid duplicate research topics

and instead choose areas which lead to generation of new knowledge, the researcher gains more citation which improves their visibility and recognition in teaching and research field. As a result of distance and online learning, DIR enables distance learners to interact with information resources, allowing simultaneous access to the same resource by multiple users.

Globally DIR is highly utilised in developed and Asian countries and there are improved efforts to implement the same in developing countries (Patrickson Stewart & Newman, 2017). In Finland for example, Soltani and Nikou (2020) carried out a study and found out that postgraduate students are conversant with and use DIR for research as they have access to computers and reliable internet. They further observed there was a challenge to DIR use among international students from developing countries pursuing their studies in Finland.

Past studies established there is the integration of DIR in African universities although at a slower pace due to a lack of efforts by management (Henok and Wilson, 2019 ; (Makori et al., 2015); Micheni and Murumba, 2014; Nunda & Elia, 2019).

In Namibia for instance, (Henok and Wilson, 2019) demonstrated that postgraduate students utilise institutional repositories to access current information resources. In addition, Henok and Wilson (2019) defined DIR as a set of services that universities offer to manage and disseminate digital content created by the organization as well as its members. Digital Institutional Repositories (DIR) are vital for sharing scholarly materials, enhancing access to research output, and supporting information storage. However, Henok and Wilson ( 2019) lamented that poor response by authors and other researchers in depositing their work at the university repository leads to information gaps and that is affecting the utilisation of the repository.

Among challenges of digital repositories is that it is technology-based and users are required to possess special skills to access them (Henok & Wilson, 2019). It is therefore listed that lack of appropriate skills to access resources impedes their use. Another challenge is the lack of commitment by the authors to deposit their work in the institution's repository. This creates a gap in the flow of information and this affects the research output.

Similarly in Tanzania Nunda and Elia (2019) highlighted awareness and users' needs as some of the factors affecting the use in higher learning institutions although the postgraduate students are increasingly using them. The findings from the study suggests that the librarians and the lecturers should work together to persuade the learners to utilise digital resources by explaining to them their advantages. In regards to the types of resources (Nunda and Elia, 2019) established that thesis, dissertation, and journal articles are most prevalent resources that students prefer in the digital repository.

The study has also found out that the content of the DIR affects usage with a lack of adequate resources and awareness. The majority of the students understand the value of the DIR and its benefits. There is also laxity in the implementation, something that is greatly affected by a lack of institutional policy, funding, and unwillingness to deposit. The study blames lecturers and library staff for lack of awareness as they are the source that links DIR and the students. The study found out that there is lack of awareness of DIR among students even though usage is increasing.

Research done by Makori et al. (2015) at the University of Nairobi, Kenya outlined the importance of the digital repository such as increasing institution's research output visibility, preserving the intellectual capital of the university, sharing the research papers, and most importantly to bridge the gap created by an increase in the price of subscribed resources by providing open access to resources for learning. Within the university, digital repositories are domiciled in the university library. Resources that digital repositories host include theses, journals, books, and conference papers. They are dynamic and versatile, the most current and convenient to use hence indispensable in the university library. Postgraduate students utilise digital repositories because they are more aware of their availability and find them to be efficient and effective resources.

Achieng (2016) attributed usage to training offered by the university to postgraduate students. Makori et al. (2015) identified poor funding, lack of DIR policies, low internet connection, sustainability, and copyright laws among others are the challenges to implementation of the DIR in universities in Africa.

## **2.4 Utilisation of Circulation Services by Postgraduate Students for Academic Achievement**

Circulation is the procedure of borrowing and returning information resources in the library and it is through circulation that the users can make use of information resources outside the library premises, it's an avenue through which utilisation of information service is actualized both within and outside the library. The degree of satisfaction postgraduate students can have when they utilise information resources and services is what determines a library's value (Evelyn & Lydia, 2019).

The fundamental laws of library science are thus satisfied by CS; books are for use. It is illogical when a library has all the relevant information resources and a user is not able to locate them. The library must make sure that its services make it easier for users to access information resources. Circulation is one of the services that brings postgraduate students into contact with information resources through book borrowing, book reservation, reference services, and advisory services by library staff. According to Onifade et al. (2013), postgraduate students utilise the library for research purposes and to update their knowledge.

The library staff should be able to determine what information the users need for them to use the circulation services efficiently. This is by procuring relevant information materials that will satisfy their needs by doing so, the users will fully utilise the materials. Borrowing information resources, using the available books within the library, and finding out at the customer's desk whether a particular book is available in stock and whether it is on loan and due date are some of the circulation services.

When Postgraduate students regularly use circulation services it leads to excessive shelving at the end of the day, an increased number of issued statistics per day and there is always a request for reservation at the service desk. The postgraduate students are familiar with the stock and are conscious of the shelve arrangement which makes them independent users as well as easy for identification and retrieval of suitable information resources. The library collection is frequently updated as Postgraduate students place information requests when they fail to get the resources needed for their studies, and library staff are also aware of the users' informational needs making it easier to prepare and satisfy those needs. A well-utilised circulation service satisfies postgraduate students' information needs.



In a study carried out at Alagappa University, India Murugan and Jeyshankar (2019) noted that Postgraduate students frequently utilise the university library for research, education, and knowledge expansion. The primary purpose as to why users visit the library is to borrow books, as well as use the resources and services to advance their knowledge. However, the lack of library orientation and the short lending periods for books were the biggest challenges.

According to Megwalu and Barron, (2019) in a study carried out at San Jose University California, many postgraduate students consult librarians to locate resources, such as books and journal articles. Students require time to get used to the interfaces of systems as library resource finding and resource integration techniques change. Challenges with missing or inaccurate cataloging records, inappropriate item listings in search result lists, incorrect facets or pre-defined category functionality, and presentation of data lacking institutional authorization can arise at any time.

Postgraduate students borrow information resources for use outside the library premises, hence provision of circulation services is essential in their academic lives. The traditional function of circulation services where students walk into the library to borrow reading materials has been significantly affected by the emergence and application of internet and digital technologies. The finding of a study by Kumar (2017) has pointed out that students are now shifting from print resources to electronic and that postgraduate students and other researchers are embracing accessing electronic resources.

Kumar (2017) added that communication with the librarian has been facilitated by the use of emails and users only make occasional visits to consult printed journals and reports, which can be offered through document delivery services. The convenience of electronic resources lies in their remote accessibility, allowing users to access them without visiting the library in person. Onifade et al. (2013) found out from a study of the usage of library resources by postgraduate students in private universities in Nigeria that students use more internet facilities than print materials. The research suggested that a library must adequately provide internet facilities to attract postgraduate students as part of its core users. Onifade has further submitted that loan services were the most used circulation services followed by document delivery services. This is because the majority of postgraduate students are employees who

work during the day and therefore borrow information resources to use at home after work. Rathnakara et al. (2011) discovered that most students use books more than other resources such as journals and electronic databases. The study suggested the improvement of library stock to influence how information resources and services are utilised in the library. Alcober (2022) asserted that books are more frequently used by graduate students than electronic resources. This study revealed that library users tend to use libraries with a rich and updated collection.

However, Bodhinayaka (2018), in a study examining satisfaction among postgraduate students, reported that most respondents preferred printed books over other information resources in the library. Mairaj and Naseer (2013) agree with Bodhinayaka's opinion but revealed that limited library collection, inadequate copies of relevant sources, and lack of current editions were affecting postgraduate use of the circulation services in developing countries.

As much as technology and the internet have enhanced circulation services in libraries, there are still challenges that must be addressed and which may necessitate further studies. While researching on how library use affects postgraduate students in Nigeria, Onuoha et al. (2013) recommended that for the circulation and other services to be effective there is a need to improve the internet connectivity, train library staff to improve the relationship with users, expanding the number of current information resources as well as expansion of desktop computer availability.

Other factors hindering postgraduate students in accessing library resources are; lack of up-to-date information materials, poorly and mixed up information materials, books having been loaned out, poor network, lost, misplaced, or damaged reading materials. Ngcongolo and Oyelana's (2017) study emphasized library services are important for postgraduate students in enhancing their research productivity as it was found that all respondents who indicated use of the library have been able to publish a journal article.

## **2.5 Theoretical Framework**

A theoretical framework is an existing theory used by a researcher to develop their research study. It is the basis upon which the study is built from the topic to data analysis and interpretation. There exist several theories upon which the use of

information services by postgraduate students can be explained. Two theories were used in this study the Diffusion of Innovation theory (DIT)the Technology Acceptance Model (TAM).

### **2.5.1 Technology Acceptance Model (TAM)**

Fred Davis created the Technology Acceptance Model (TAM) in the late 1980s, which is a well-established framework for examining users' acceptance and adoption of technology. According to TAM, consumers' intentions to adopt a technology are shaped by two main factors: perceived usefulness (PU) and perceived ease of use (PEOU), which in turn affect how the technology is actually used. TAM can be applied to understand postgraduate students' perceptions and attitudes towards virtual reference services and circulation services. It focuses on the perceived ease of use and perceived usefulness, which are particularly relevant when studying the adoption of technological or information services (Sinha & Bag, 2023).

In Virtual reference services, TAM looks at how users accept and adopt technology focusing on factors like perceived utility, usability, and intention to use. The TAM model was applied to examine whether postgraduate students perceived virtual reference services such as email reference or online chat with librarians as useful for their academic achievement. The model further was used to determine whether students viewed these online resources as being easy to use and accessible (Sinhababu & Kumar, 2021).

In Circulation Information Services the theory was applied to find out if students think that the online renewal and book borrowing and returning services are helpful in managing their academic resources, examine students' views of the perceived ease of use of various services, including how user-friendly the online catalogue is and how effective the in-person borrowing procedure is. TAM focuses on perceived utility, usability, and intention to use which are particularly relevant when studying the adoption of technological or information services.

### **2.5.2 Diffusion of Innovations Theory**

Everett Rogers a scholar in communication and sociology developed the theory of diffusion of inventions. Rogers first introduced the theory in his 1962 book titled "Diffusion of Innovations." The hypothesis seeks to explain how, why, and how rapidly novel ideas and innovations spread throughout society. This theory explains

how innovations and technologies diffuse through a population over time. It highlights five crucial elements that affect an innovation's adoption (Rogers,1995).

The extent to which an invention is seen as being better than the idea it replaces is known as its relative advantage. Compatibility: How well the idea fits potential consumers' needs, backgrounds and moral principles. Complexity-how difficult the innovation is to understand and use, Trialability-How much of the innovation can be put to restricted testing, Observability-The degree to which an invention is thought to be superior to the concept it replaces. The theory was used to assess objective 3 on use of digital institutional repository which was a new innovation. The theory was applied to assess if students perceived these repositories as better than other sources of academic sources of information, examine how well these repositories integrate with the research and academic workflows of postgraduate students, and understand the difficulties the postgraduate students undergo while using the theory.

DIT Look at whether students can do a trial exploration of the repositories, assess the degree to which the student population can observe the benefits of accessing these repositories. The main focus of Rogers' theory is how innovations are embraced and spread across social systems., in this case, digital institutional repository information services. The DIT theory provided insight into how institutional repositories have diffused and been adopted by postgraduate students. The theory will be used to explore factors influencing the rate of adoption of DIR among postgraduate students, including the role of early adopters, communication channels.

## **2.6 Conceptual Framework**

The library's principal goal is to help postgraduate students' study and research by offering services that improve their access to information resources. Onuoha et al. (2013) “Perceived impact of library use on the research productivity of postgraduate students at Babcock University Nigeria” Use of information services by postgraduate students is important in linking with the relevant information resources during their study. This is illustrated by the figure below.

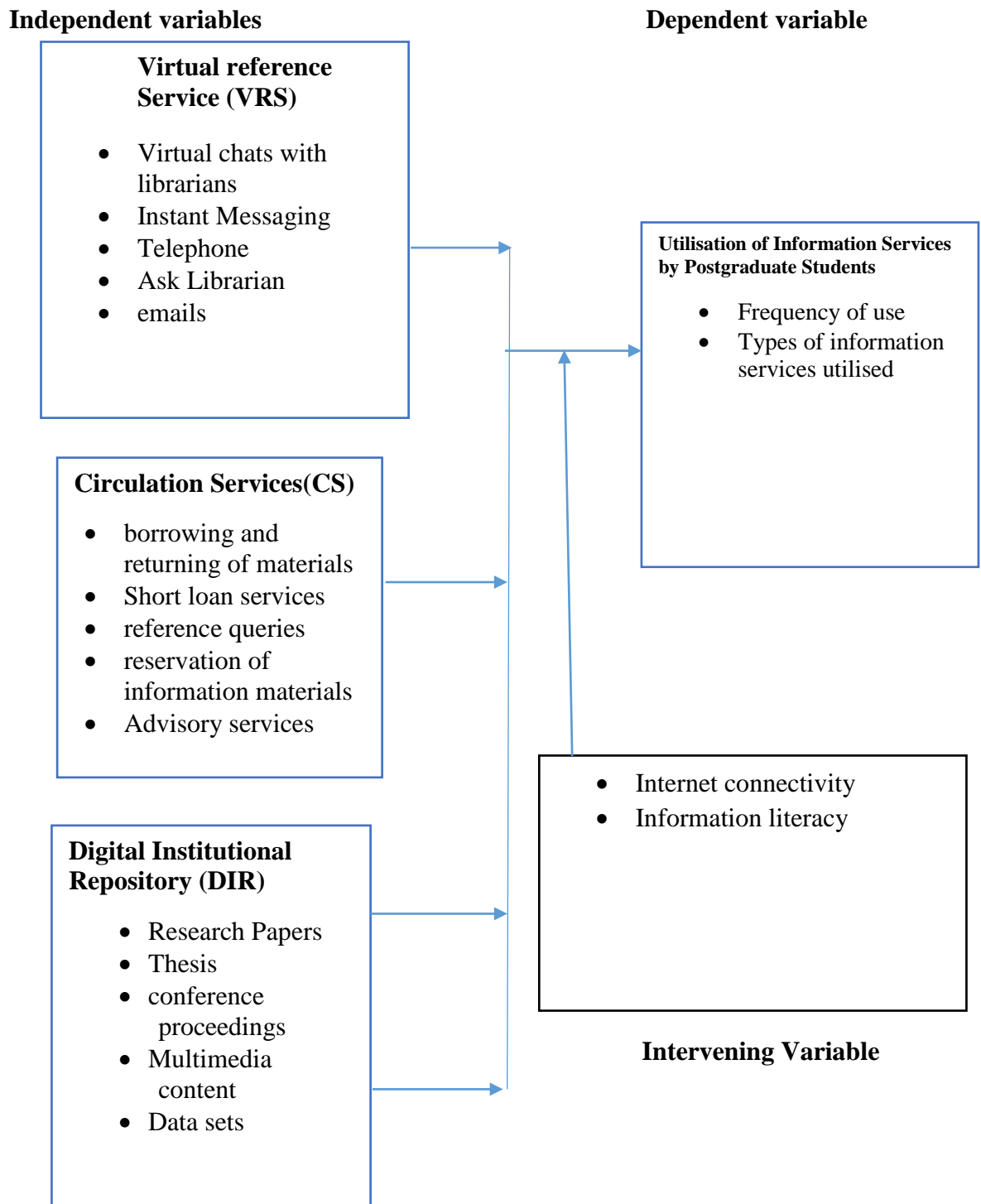


Figure 1:Conceptual Framework (Source Researcher 2024)

### **2.6.1 Description of Variables in the Conceptual Frame work**

The conceptual framework aimed to outline various components of the utilisation of information services. Independent variables were Virtual reference information services, Circulation information services and Digital institutional repository. Virtual reference service were video conferencing/online tutorials, emails, live chats with librarians, instant messaging, telephone calls and Ask librarian services.

In Circulation services, the variable was borrowing of information materials, shortlaon services, returning of information materials, reference queries, reservation of information materials, advisory and advisory services. Digital institutional repository were research papers, Thesis, conference proceedings, datasets and multimedia contents

Dependent variables were utilisation of information services by Postgraduate students

**Intervening variables-** Intervening variables (also known as mediating variables) are components that aid in explaining the link between the independent and dependent variables **Internet Connectivity:** The reliability and speed of internet connections, which might impact the utilisation of VRS, DIR and CS services.

**Information Literacy:** Students' capacity to effectively find, assess, and use information, which can influence their use of virtual reference services, digital repositories and circulation services.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

The study used a descriptive and correlational research design. Mugo (2019) states that a descriptive study is typically conducted to define how the study's variables interact with one another to affect the subject in some manner. Descriptive was used because it was possible for the researcher to thoroughly examine how postgraduate learners were utilizing information services, and gathering data that explained the phenomena that were presented by asking respondents about their beliefs, attitudes, behaviours, and values. On the other hand, correlational helped in assessing relationships between variables (how information services affected utilisation of library resources) Data was gathered via interview schedules and questionnaires. The study included both qualitative and quantitative methods.

#### **3.2 Location of study**

The research was conducted at University of Embu, Kenya Methodist University, Kirinyaga University, Meru University of Science and Technology and Chuka University. The five were selected to represent the academic institutions in Kenya, the selected universities included a mix of public and private institutions, with varying levels of investment in technology and library resources they also offered a variety of postgraduate programs, which made them a suitable location for research. Examining this diversity allowed for a comprehensive understanding of information service usage and helped identify common challenges and opportunities across different contexts data was obtained from postgraduate students and librarians.

#### **3.3 Study Population**

The target population was 2,452 consisting of 2372 postgraduate students and 80 librarians from selected universities inclusive of University of Embu at 434 students and 9 librarians, Kenya Methodist University 500 students and 11 librarians, Kirinyaga University 350 students and 12 librarians Meru University of Science and Technology 438 students and 25 librarians and Chuka University 650 students and 23 librarians. Table 3.1 indicates the matrix.

**Table 1**

*Target Population for the selected Universities*

Category	UoEM	KeMU	KyU	MUST	CU
Postgraduate Students	434	500	350	438	650
Librarians	9	11	12	25	23
Total	443	511	362	463	673

Source UoEM, KeMU, KyU, MUST and CU 2024

### **3.4 Sampling Procedure**

The study employed a random sampling technique for the postgraduate students, the librarians were purposively sampled, where by the librarians who were directly engaged in offering DIR, VRS, and CS to postgraduate students were sampled.

### **3.5 Sample Size**

A sample size of 493 was obtained from a target population of 2372 which included postgraduate students who were both Masters and PhD students and librarians of University of Embu, Kenya Methodist University, Kirinyaga University, Meru University of Science and Technology and Chuka University. To calculate the sample size the study employed the below formula according to Pourhoseingholi et al., (2013) is  $n = (Z^2 * p * q) / d^2$

Where:

- $n$  = sample size
- $Z$  = the Z-score associated with the desired level of confidence (e.g., for a 95% confidence level,  $Z = 1.96$ )
- $p$  = the proportion of the population that possesses the characteristic of interest (if unknown, use 0.5 for a conservative estimate)
- $q = 1 - p$
- $d$  = the level of precision desired (the maximum allowable margin of error)

Table 2 below shows the study sample size.



**Table 2**

*Sample Size for each Selected University*

University	Postgraduate Students		Librarians	
	Population	Sample	Population	Sample
UoEM	434	87	9	2
KeMU	500	100	11	3
KyU	350	70	12	3
MUST	438	88	25	5
CU	650	130	23	5
<b>Total Sample</b>	<b>2372</b>	<b>475</b>	<b>80</b>	<b>18</b>

### **3.6 Data Collection Methods**

According to Mazhar (2021), the choice of data collection method for a given study depends on the design, depth of the study, and the time the researcher has to undertake the process. Guetterman and Fetters (2018) further noted that in a descriptive research design, a researcher can choose to use one or multiple data collection instruments, though the use of multiple is necessary to enhance in-depth information gathering. A good research instrument should be valid, reliable, and able to collect data that is significant to the research topic without bias. The researcher used questionnaires for postgraduate students and interviews with librarians to gather primary data.

#### **3.6.1 Interview Schedule for Librarians**

An interview is a person-to-person interaction between the interviewer and interviewee aimed at collecting information to answer specific questions (Wairimu ,2020). Interviews are recommended because they provide the researcher a chance to choose the questions and enhance the flow of information, additionally the researcher can further interrogate for clarity of information and to reduce bias. Interviews considered effective since they enable a researcher to better comprehend and articulate the research questions, as well as the thoughts and experiences(Husband, 2020).

The research used an interview schedule which is an organized plan that specifies the questions, subjects, and order of the interview. It acts as a roadmap for the interviewer, ensuring that all relevant areas are addressed. The research variables

were directed by the interview questions to get responses' thoughts perspectives, and experiences of respondents on using virtual reference services, digital institutional repositories, and circulation services. The interview schedule had five sections, Section 1 an introductory statement explaining the aim of the interview and what the interviewee will. Section 2 Biodata of the respondent Section 3 Is the Use of virtual reference services, Section 4 is, the asses to use of a digital institutional repository, and Section 5 is, Use of circulation services. The researcher made an appointment in advance to conduct a face-to-face interview with librarians in their offices so they can adequately prepare. See Appendix III for the interview schedule.

### **3.6.2 Questionnaires for Postgraduate Students**

A questionnaire is a type of research tool that consists of a series of questions and additional prompts. designed to collect information from respondents and for which they are expected to provide responses. To guarantee the validity and reliability of the data gathered, questionnaires are customized to the particular study objectives and the characteristics of the target population. The researcher chose to use a questionnaire to get information from postgraduate students because it allowed them to freely respond to the question since issues arose that made them uncomfortable talking about them in front of the researcher. The questionnaire served as the main instrument for gathering data., it was self-administered to University of Embu, Kenya Methodist University, Kirinyaga University, Meru University of Science and Technology and Chuka University postgraduate students.

The questions were based on the study's objectives and were divided into five sections. Section 1 is background information, Section 2 utilisation of Library resources and services Section 3Virtual reference services, Section 4 Digital institutional repository and Section 5 Circulation services. Closed-ended questions were utilised, with closed-ended questions requiring responders to check the appropriate option on a Likert scale of 1-5. See Appendix II for the questionnaire guide.

### **3.7 Pilot Study**

A pilot study is a trial carried out in preparation for a complete study. It targets testing reliability of the research instruments in obtaining the intended data from the respondents. The outcome of a pilot study may lead to the modification of research

instruments to help in collecting relevant data. The study assists in estimating the time and costs that may be involved, as well as identifying challenges that may come up during the actual interviews. It helps the researcher to establish the relevance and effectiveness of research instruments thus providing the opportunity to further refine (Lowe,2019).

The pilot study was conducted at Tharaka University because the university offered postgraduate studies, the university library also offered Circulation services, Institutional digital repository, and Virtual references services which were also offered at University of Embu, Kenya Methodist University, Kirinyaga University, Meru University of Science and Technology and Chuka University, hence making Tharaka University suitable for the pilot study.

The pilot study helped to identify any unclear or confusing questions in the questionnaire, or any other issues that could have led to biased or incomplete responses. This helped to refine the research instrument and ensure that it accurately measures the variables in the study, it was possible to evaluate the outcomes from the pilot to the results from the main study at the University of Embu, Kenya Methodist University, Kirinyaga University, Meru University of Science and Technology and Chuka University and it also helped to identify any differences in the responses or outcomes that may be due to differences in the populations, rather than the research instrument or methods. A pilot study's sample size should be between 5% and 10% of the whole population (Perneger et al., 2015).The researcher distributed 50 questionnaires to the participants for the pilot study.

### **3.8 Validity of the Data Collection Instruments**

According to Rahardja et al.(2019), validity is the ability of a data collection instrument to measure what it is intended to measure. The researcher ensured that the interview questions were precise, simple, and clear for the interviewee to understand and interpret. If necessary, clarification was provided. Each question was logically connected to the research objectives and comprehensively covered the issues to be investigated. Content validity was employed in this study to assess if the instrument addressed the relevant dimensions of the concept it was designed to measure. The researcher aimed to measure the content validity by using a questionnaire to assess the relevance and comprehensiveness of information services for postgraduate students

and a conceptual framework that outlined the type of information. The researcher sought input from specialist in the field of information science, such as librarians, supervisors, or professionals with relevant experience. The identified content each item on the questionnaire was rated by specialists, for its relevance, representativeness, and clarity. The researcher analysed the feedback that was provided by the experts to measure central tendency, such as mean and median, and calculated to assess the level of agreement among the experts (Mode,2023).

The qualitative comments were reviewed to determine the items' benefits and drawbacks. based on the specialist feedback, the researcher assessed the content validity of each item. Items that received low ratings were considered irrelevant or unclear, the researcher opted to remove or modify them. Gaps were addressed by revising the wording or adding items. After making necessary revisions based on expert feedback, the researcher reviewed the questionnaire to ensure it aligned with the research objectives and the feedback that was received any final adjustments were made before proceeding with data collection.

### **3.9 Reliability of the Data Collection Instruments**

Reliability was to ensure that if the same study were undertaken later the same results would still be obtained. In other words, consistency and stability of the instrument in measuring the same variable over time, across different samples, and under different conditions. It is the extent to which the tool provides reliable outcomes. every time it is used to measure the same variable. This study ensured that the accuracy and precision of the procedures of measurements were observed. This study used internal consistency reliability specifically Cronbach's alpha to measure the degree of correlation among the items in a scale or questionnaire, with higher scores indicating greater internal consistency and therefore greater reliability. a Cronbach's alpha value of 0.70 or higher indicates acceptable internal consistency reliability, while values below 0.70 suggest poor internal consistency and potential issues with the scale or questionnaire (Singh, 2017).

### **3.10 Data Collection Procedure**

The researcher sought to defend the research proposal as per the university's requirement before data collection. Afterward, cleared by the University to carry out

the proposed study. The actual research was preceded by a trial to evaluate the effectiveness of research tools. The researcher collected primary data from the postgraduate students and librarians using closed ended questions(questionnaires) and interviews respectively.

### **3.10.1 Procedure for Conducting Interviews**

The researcher visited the research locations which were the selected Universities for the study University of Embu, Kenya Methodist University, Kirinyaga University, Meru University of Science and Technology of science and Chuka University. The researcher then organized face-to-face interviews with the library staff by scheduling the most convenient time for the interview, privacy and confidentiality was ensured by interviewing one librarian at a time. The research explained the study's purpose at the beginning and made sure the respondents understood their rights. The interview begun with some introductory questions to make the respondents comfortable and establish a friendly atmosphere. A guide with prepared questions was used which allowed smooth flow of conversation between the researcher and the interviewer. The interviews lasted for three weeks only. The researcher interviewed 18 librarians in the selected university libraries.

### **3.10.2 Procedure for Administering Questionnaires**

In order to distribute questionnaires to the respondents, the researcher visited the selected Universities for the study and issued the questionnaires to the postgraduate students with the assistance of the class representatives whose contacts were obtained from the departments. Two weeks were given to the responders to complete the questionnaires, this enabled them to take their precious time to go through the questions and be able to write the right information. Once the questionnaires were filled, the researcher liaised with the class reps and collected the filled questionnaires.

### **3.11 Data Presentation and Analysis**

The first step for the researcher was data cleaning, which entailed locating erroneous or incomplete responses and fixing them to raise the quality of responses. The raw data was grouped systematically in a way that made straightforward analysis possible. Data was analysed using both qualitative and quantitative methods. Qualitative analysis seeks to understand and interpret data by examining the characteristics of the data rather than focusing on numerical or statistical analysis. Qualitative analysis

involves collecting and analysing non-numerical data. The researcher applied narration analysis to analyse qualitative data. The researcher attempted to obtain thorough information about the phenomenon being examined.

Quantitative analysis is the use of numerical and statistical data to analyse and interpret research findings. Data analysis employed descriptive and inferential statistics, responses obtained from the questions were coded, tabulated, and analysed using the Statistical Package for Social Sciences (SPSS). This comprehensive approach involved calculating percentages, frequencies, means, and standard deviations to in order to extract valuable insights from the gathered data The regression technique used a multiple regression, which took the following form:

$$Y = \alpha + \beta_1 \text{VRS} + \beta_2 \text{DIR} + \beta_3 \text{CS}$$

.....

Where:

Y – Utilisation of library services

$\alpha$  - the constant

$\beta_1$ - $\beta_3$  are coefficients of the respective independent variables

VRS – Virtual reference services

DIR – Digital institutional repository services

CS – Circulation services

Since the study adopted the regression technique, it was necessary to ensure that the underlying assumptions of this method are upheld before further analysis of data. Therefore, the following diagnostic tests were conducted: normality (used Kolmogorov-Smirnoff test, histogram and Q-Q plot); multicollinearity (used variance inflation factor); and heteroscedasticity (used scatter plot).

### **3.12 Ethical Considerations**

The researcher sought permission and a letter of introduction from Tharaka University, and a permit from the National Commission for Science, Technology and Innovation (NACOSTI) to undertake academic research. The application and use of appropriate procedures, seeking information from unbiased respondents by following the correct sampling procedures, and using the appropriate data collection instruments were observed. Researchers ensured to obtain voluntary and informed consent from the participants before they participated in the study, this was done by informing them

about the purpose, procedures, risks, and benefits of the research, and they had the freedom to withdraw if they felt like without pressure penalty.

The Researcher ensured that participants' personal information remained confidential and that their privacy was protected. Any identifiable data was safeguarded, and participants' anonymity was maintained if possible. The researcher provided a debriefing session afterward, where the respondent were told the true nature and purpose of the research. Participants had a chance to ask questions and express any concerns. the researcher adhered to Intellectual honesty by Citing and referencing sources through APA to demonstrate honesty and integrity.

## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.1 Response Rate

A total of 475 questionnaires were distributed, as shown in table 3. However, the researcher was able to obtain 397 completed questionnaires, while 78 were incomplete and unreturned. Even though there are various levels of acceptable response rates, Ching, et al. (2020) propose at least 70%. Regarding the online interviews, Nulty (2008) notes that 50% is an acceptable response rate. Therefore, since the fully completed and returned questionnaire formed 83.6% of the total while interview schedules were 77.8%, this rate of response was judged appropriate and adequate for additional data analysis to address the study objectives.

**Table 3**

*Response Rate*

Respondents rate	Questionnaire		Interview schedule	
	Frequency	Percent	Frequency	Percent
Completed	397	83.6	14	77.8
Incomplete	78	16.4	8	22.2
Total	475	100.0	18	100

#### 4.2 Background Characteristics of Respondents

##### 4.2.1 Age of Respondents

Age is one of the factors influencing learners' decisions to enroll for a postgraduate degree. Therefore, this study analysed the respondents' ages, and data is displayed in Table 4. According to the respondents' age distribution, the majority 58.9% are aged 20-30 years, followed by 31-40 years at 30.2%. Respondents aged 41-50 years make up 9.6%, while only 1.3% are over 51 years. These findings imply that many people prefer to learn before hitting the 50 years mark.



**Table 4***Age of Respondents*

Age-group	Frequency	Percent	Valid Percent	Cumulative Percent
20-30 years	234	58.9	58.9	58.9
31-40 years	120	30.2	30.2	89.2
41-50 years	38	9.6	9.6	98.7
> 51 years	5	1.3	1.3	100.0
Total	397	100.0	100.0	

**4.2.2 Gender of Respondents**

Gender has been one the factors and a ground for stereotype that for a long time has disadvantaged the girls when it comes to education. Therefore, the aim of this study was to identify the gender distribution of the target respondents. The findings are shown in Table 5. *Table 5*

*Gender of Respondents*

Gender of the Respondents	Frequency	Percent	Valid Percent	Cumulative Percent
Female	157	39.5	39.5	39.5
Male	240	60.5	60.5	100.0
Total	397	100.0	100.0	

Distribution of respondents were 60.5% being male and 39.5% female. This indicates a higher proportion of male respondents compared to female respondents joining universities for their post-graduate studies. Similarly, in Achieng (2016) study, presented in the more males had matriculated for postgraduate studies at 65.2% compared to female participant at 34.7%. Contrary, a study presented by Tsenga and Gichohi (2023) by had more female respondents (50.7%) against male (49.3%). The results indicate a continued bridge of gap between males and females pursuing postgraduate studies.

**4.2.3 Study Level**

With continued rise in the number of enrolments in postgraduate programs, it was necessary to analyse its distribution across the various levels that include postgraduate diploma, masters and PhD. Table 6 displays these findings.

**Table 6***Study Level*

Education Level	Frequency	Percent	Valid Percent	Cumulative Percent
Master	336	84.6	84.6	84.6
PhD	59	14.9	14.9	99.5
Post graduate diploma	2	.5	.5	100.0
Total	397	100.0	100.0	

It is seen that a majority, 336 (84.6%), have matriculated for a master's degree. Of those pursuing a PhD 59 (14.9%), while only 2 (0.5%) were enrolled for a post graduate diploma. The results are similar to the findings by Tsenga and Gichohi (2023) who established that students pursuing master's degrees had a high representation of 71.6%. However, it differs in the representation of post-graduate diplomas who formed 14.9%, and those pursuing a doctorate at 13.4%. It implies that people are appreciating the importance of earning other qualifications such as significantly increased pay (Boneva, et al., 2022).

**4.3 Reliability Analysis**

It very important for researchers to make sure that their research instruments are reliable and valid to produce consistent results. Therefore, this section presents results on the analysis of internal consistency among the questionnaire items using Cronbach's alpha. The results are presented in Table 7.

Circulation services, virtual information services, digital institutional repository services and library resources utilisation had a Cronbach's alpha value of 0.952, 0.862, 0.939, and 0.793 respectively. Overall, there research items had a Cronbach's alpha value of 0.834. In reference to Singh (2017) that Cronbach's alpha values of 0.70 or higher indicate acceptable internal consistency, it follows that all the items were reliable.

**Table 7***Reliability Analysis*

<b>Variable</b>	<b>No of items</b>	<b>Cronbach's alpha</b>
Circulation services	12	0.952
Virtual information services	12	0.862
Institutional repository services	11	0.939
Library resources utilisation	6	0.793
Overall	41	0.834

**4.4. Utilisation of Library Services by Post-Graduate Students**

Utilisation of library services by postgraduate students was the study's dependent variable. It was tested using the frequency at which the library services were used for the virtual reference, digital repository services and circulation services. It was also measured through the types of services students sought under each of the three major categories of library services.

**4.4.1 Frequency of Use of Library Resources and Services**

The frequency included daily, weekly, monthly, every two weeks, monthly, and never. The results are shown in Table 8.

**Table 8***Frequency of Use of Virtual Reference Services in your University Library*

Frequency of Use	Virtual services		Repository services		Circulation services		Total (F)
	Frequency	%tage	Frequency	%tage	Frequency	%tage	
Daily	108	27.2	103	25.9	52	13.1	263
Weekly	125	31.5	103	25.9	92	23.2	320
Every two weeks	64	16.1	82	20.7	83	20.9	229
Monthly	63	15.9	81	20.4	136	34.3	280
Never	37	9.3	28	7.1	34	8.6	99
Total	397	100.0	397	100.0	397	100.0	

The data in table 8 reveals how often respondents use VRS in the university library. The highest usage occurs on a weekly basis, with 31.5% of users accessing the service weekly, followed by 27.2% who use it daily. Combined, these frequent users make up

58.7% of the total, indicating strong engagement with the service. Moderate use is seen with 16.1% of respondents using virtual reference services every two weeks, and 15.9% accessing it monthly. Together, this represents 32% of the respondents, who use the service less frequently, but still regularly. A smaller portion, 9.3%, report never using virtual reference services, suggesting that a minority of students either do not require or are unaware of these services.

Further findings indicate that the highest number of students who used university library repository services on daily and weekly basis were 103 (25.9%) each. Those who sought repository services after every two weeks were 82 (20.7%) while 81 (20.4%) use them monthly. Further results indicate that 28 (7.1%) of respondents never use the repository services. In a similar study conducted by Achieng (2016), the findings revealed that among the postgraduate students, 59.7% accessed and used university's digital repository while 36.1% did not. The gap indicates a need to improve computer access points as it hinders full utilisation of e-resources.

Additional results indicate that most postgraduate students (34.3%) borrow materials from the university library circulation desk monthly followed by 23.2% who do so weekly. About 20.9% borrow every two weeks while 13.1% borrow daily. A small percentage (8.6%) never borrow materials.

Overall, the highest number of postgraduate (320) use university library on weekly basis followed by 280 on monthly basis. Those who use library resources and services daily were 263, fortnightly were 229 and never were 99. The study supports the findings of Fagyan, et al. (2023) who established that over 43% of students used library services always and very often. The results, however, slightly contradict the findings of Ogunbodede, et al. (2020) who established that a majority of students used library resources and services on a daily basis. To a degree, they also fail to support the findings of Omeluzor and Aluko-Arowolo (2023) that most postgraduate students made use of the resources and services offered by library, monthly or quarterly with less on daily and weekly.

The presence of students not using the library at all is supported by Fagyan, et al. (2023) who found that some students never use a library. The none use of the library services could be attributed to students' perceptions and attitude towards their usefulness, which calls for librarians to do an evaluation of students' information

needs and satisfaction (Kiriri, 2018). In addition, it could be attributed to the use of non-library resources such as google as established by Gyau, et al. (2021) that their use on library premises led to a decline in the use of library resources.

#### 4.4.2 Types of University Library Resources and Services Used

These are the second dimensions used to measure the utilisation of library and covers virtual reference, digital repository services and circulation services and resources. The results are displayed in Table 9 through Table 11.

**Table 9**

*Types of Virtual Reference Services Used at the University Library*

Types of VRS	No (%)	Yes (%)
Video conferencing/online tutorials	39.0	61.0
Emails	19.9	80.1
Virtual Chats with Librarians	46.6	53.4
Instant messaging	48.6	51.4
Telephone	47.4	52.6
“Ask Librarian”	25.7	74.3
Valid N (listwise)	397	

Table 9 illustrates the types of VRS utilised at the university library. Among these, emails are the most popular service, with 80.1% of respondents using them, indicating that it is a reliable and accessible communication method for students. The Ask Librarian service is also widely used, with 74.3% of respondents utilizing it. This high engagement suggests that many students prefer directly seeking help from librarians through this service. Video conferencing and online tutorials rank third in usage, with 61.0% of respondents using them. This highlights the growing role of more interactive, visual learning and communication methods in supporting students. Virtual chats with librarians are used by 53.4%, while instant messaging is slightly less popular, with 51.4% usage. These services cater to students who prefer real-time communication, though just under half of respondents do not use these options.

Interviewee 1 and 3’s response on the preferred mode of communication when using virtual reference services for postgraduate students responded that:

My preferred modes of communication are email and WhatsApp. Flexibility and Convenience: It allows for asynchronous communication, letting both the student and the service provider respond at their convenience without needing to coordinate schedules. Instant Communication: WhatsApp allows for real-time

messaging, which can be very useful for quick questions and immediate assistance. Ease of Use: The platform is user-friendly and familiar to many students, facilitating easy and efficient communication. Multimedia Support: WhatsApp supports text, voice messages, images, and documents, making it versatile for different types of queries and information sharing.

### **Key informant interview, Interviewee 1**

WhatsApp and telephone since they allow real-time interaction.

### **Key informant interview, Interviewee 3**

Interviewees 1 and 3 identified WhatsApp, email, and telephone as their preferred communication modes for virtual reference services due to flexibility, real-time interaction, and user familiarity. WhatsApp was especially valued for its asynchronous communication and multimedia support, which enhance ease of use and versatility for handling various types of queries. Telephone was highlighted for enabling immediate, real-time assistance. These preferences underscore the importance of both flexible and real-time communication options in supporting effective virtual reference services for postgraduate students.

The telephone service, while slightly less popular, still has a notable usage rate of 52.6%, showing that some students prefer more traditional, voice-based communication for quick inquiries or guidance. Overall, the data reveals that a variety of virtual reference services are being utilised, with email and the 'Ask Librarian' service being the most preferred. However, real-time chat and video services are gaining traction as students seek more interactive options. These results align with the study of Achieng (2016) who found that students primarily use the help desk, and "ask a librarian" services. Further findings showed that most students preferred smartphones to computers in their communication and learning. The findings are further in agreement with Ubogu (2020) who found that telephone, emails, social media (Twitter and Facebook), live chat, and text based chats were among the main platforms via which DIR services were offered.

The non-use of VRS could be attributed to a number of challenges such as internet failures. This support the study by Oyewole and Adetimirin (2015), which showed that constraints to the use of library resources and facilities by postgraduate students included inadequate power supply, lack of conducive environment, inability to access materials in the databases and shelves, lack of assistance from librarians, lack of ICT

skills, and lack of user education. Indeed, the study of Palma, et al. (2023) established that awareness of library resources and services by the users increased their frequency of use. Additionally, on the challenges librarians encounter when offering digital institutional repositories to postgraduate students, Interviewee 1 noted:

Lack of Awareness: Postgraduate students could be possibly be un aware of the existence or benefits of the institutional repository. Lack of Training: Students may not know how to use the repository effectively without proper training or guidance. Limited Support: Providing adequate support to address technical issues or answer queries can be resource-intensive. Intellectual Property: Navigating the complexities of copyright and licensing for various types of content can be challenging.

#### **Key informant interview, Interviewee 4**

Interviewee 1 highlighted key barriers to postgraduate students' use of the institutional repository, citing a lack of awareness about the repository's existence or benefits, insufficient training on its use, and limited support for technical or content-related queries. Additionally, intellectual property complexities, such as copyright and licensing issues, present challenges in accessing and using repository materials effectively. These insights point to the need for increased visibility, training, support, and guidance on copyright to enhance postgraduate students' engagement with institutional repositories

**Table 10**

*Digital Repository Services used by Postgraduate Students*

DIR Used	No	Yes
Research Papers	5.5	94.5
Thesis	14.4	85.6
Conference Proceedings	31.5	68.5
Datasets	51.9	48.1
Multimedia content	41.3	58.7
Valid N (listwise)	397	

Table 10 shows the institutional digital repository services used by postgraduate students and reveals varying levels of engagement with different types of content. Research papers are the most widely accessed, with 94.5% of students utilizing this

service, indicating a strong reliance on the repository for accessing academic papers. Theses follow closely, with 85.6% of students using this service, highlighting its importance for research and reference. Thus, the high usage of research papers and theses demonstrates their central role in postgraduate research, while the varied use of other content types reflects a broader range of needs and preferences among students. This is in line with the study of Omeluzor and Aluko-Arowolo (2023) who found that theses and dissertations were among the most used resources by postgraduate students.

Conference proceedings are accessed by 68.5% of students, showing a substantial interest in these materials, Despite being less commonly utilised, compared to research papers and theses. Datasets are used by 48.1% of students, suggesting a moderate level of engagement with data-driven research resources. Multimedia content, accessed by 58.7% of students, indicates a growing use of diverse formats beyond traditional text-based resources.

Interviewee 1 noted the following as the main institutional digital repository information services offered in their university:

Students are able to access full-text documents of theses and dissertations submitted by previous students, which act as valuable reference materials for their own research. They are also able to access advanced search and browsing. They also get digital tools and resources that include citation management and research guides. Postgraduate students also access research publications such as conference papers and journal articles. Other services noted include online helpdesk, copyright and licensing guidance, submission portal for research, these and other research outputs.

**Key informant interview, Interviewee 1**

Interviewee 2 stated the following as the digital institutional repository services in their university library:

Our university provides access to theses and dissertations, research publications that include open access e-journals, and submission and preservation services.

**Key informant interview, Interviewee 2**

Interviewees 1 and 2 identified key institutional digital repository services available to students. Both universities provide access to full-text theses, dissertations, and research publications, supporting postgraduate students with valuable reference materials. Interviewee 1's institution offers additional services, including advanced search and browsing, citation tools, research guides, an online helpdesk, copyright guidance, and a submission portal for research outputs. Interviewee 2 noted access to open-access e-journals and preservation services. These responses indicate that while



both institutions prioritize access to research materials, one institution offers a more comprehensive range of support services.

The results support Achieng (2016) study which established that electronic journals, the online catalogue, digital repository, and e-books were crucial for students' use of libraries, but databases were least used as they found the term "database" intimidating. In addition, the research shows postgraduate students use the digital repository more than undergraduates for research documents, theses, and papers, as they are more aware of it due to their own project requirements.

**Table 11**

*Types of Circulation Services used at the University Library*

Types of Circulation Services	Yes	No
Borrowing of information materials	357 (89.9%)	40 (10.1%)
Short loan services	243 (61.2%)	154 (38.8%)
Returning of information materials	314 (79.1%)	83 (20.9%)
Reference queries	264 (66.5%)	133 (33.5%)
Reservation of information materials	248 (62.5%)	149 (37.5%)
Advisory services	268 (67.5%)	129 (32.5%)
Valid N (listwise)		

Table 11 presents the various types of circulation services sought by postgraduate students at the university library. A significant majority of respondents, 89.9%, utilize the borrowing of information materials. Additional findings show that only 10.1% of respondents do not utilise the service, reflecting the central role that borrowing plays in academic work and research. These findings were conquered by Kavulya (2018) who found that all the studied libraries primarily offer book lending services, with Kenyan universities using open access systems for out-of-library use. The results also agree with the study of Ogunbodede, et al. (2020) that over 50% of students consulted textbooks in writing their assignments, and reading for tests and examinations.

Returning information materials also has a high usage rate, with 79.1% of respondents reporting that they use this service. However, 20.9% don't make use of the returning service. The short loan service is utilised by 61.2% of respondents, while 38.8% do not use it. Reference queries are used by 66.5% of respondents. This indicates a strong reliance on librarians and the library's support services for academic inquiries. However, 33.5% do not use this service. Reservation of information materials is used

by 62.5% of respondents, showing that many students plan ahead and secure necessary resources for their studies. The remaining 37.5% who do not use this service may either access materials readily or prefer using alternative sources like electronic resources. Advisory services are used by 67.5% of respondents. They concur with the study of Dongoran and Febriyana (2022) who found that Ask librarian services affected reading interest and consequently the library use. These librarians are required to have the requisite knowledge and skills about the available resources in order recommend the relevant books to students and arrange the reading room in a manner that makes it comfortable, fun, and interesting.

However, 32.5% do not use advisory services, suggesting some students may rely on personal guidance or external resources for similar support. The non-use of circulations by some postgraduate students could be attributed to challenges such as these noted by interviewees:

Challenges in offering circulation services to postgraduate students at our university include: High Demand: Managing high demand for popular resources. Limited Resources: Insufficient copies of essential texts and materials. Book Returns: Delays in returning borrowed items. Access Issues: Problems with library account access and system errors. Awareness: Lack of awareness about available services and resources.

**Key informant interview, Interviewee 1**

Untimely return of books, which leads to fines, lack of retrieval skills (some), system downtime, and an unstable internet connection.

**Key informant interview, Interviewee 5**

They prefer loaning a book for a long time, which is contrary to our library book lending policy.

**Key informant interview, Interviewee 6**

The challenges in providing circulation services to postgraduate students, as identified by Interviewees 1, 5, and 6, include high demand for popular resources, limited availability of essential materials, and delays in book returns, which can result in fines. Technical issues, such as system errors, account access problems, and internet instability, further complicate access. Additionally, some students lack the retrieval skills needed to navigate the library's resources effectively, while others prefer extended loan periods that conflict with the library's lending policies. A lack of awareness about available services also hinders optimal resource utilization.

#### 4.5 Virtual Reference Services at Selected University Libraries in Kenya

The first objective was to examine the utilisation of virtual reference services by postgraduate students at selected university libraries in Kenya. The VRS were assessed based on the satisfaction with these services and the perceived effectiveness.

##### 4.5.1 Satisfaction with Virtual Reference Services Offered at the University Library

The level of satisfaction with the virtual reference services was assessed through a five-Likert scale where: very satisfied (VS = 1), satisfied (S =2), neutral (N = 3), dissatisfied (D=4) and very dissatisfied (VD = 5). Results are as presented in Table 12.

**Table 12**

*Satisfaction with Virtual Reference Services at the University Library*

VRS in Selected University Libraries	VS (%)	S (%)	MS (%)	D (%)	VD (%)
Video conferencing/online tutorials	40.3	38.3	11.8	5.8	3.8
Emails	65.2	21.2	6.3	5.0	2.3
Virtual Chats with Librarians	55.9	25.4	10.3	5.0	3.3
Instant messaging	44.6	28.2	17.9	6.0	3.3
Telephone	52.9	23.2	11.3	8.1	4.5
‘Ask Librarian’	52.9	23.2	11.3	8.1	4.5
Valid N (listwise)	397				

Table 12 shows the levels of satisfaction with various virtual reference services offered by the university library. The highest satisfaction is observed with the email service, where 65.2% of respondents are very satisfied, and 21.2% are satisfied. Only 6.3% are moderately satisfied, while 5.0% are dissatisfied, and 2.3% are very dissatisfied. The high satisfaction rate suggests that emails are a reliable and efficient communication method for most users.

Virtual Chats with Librarians service also receives strong satisfaction ratings, with 55.9% very satisfied and 25.4% satisfied, totalling 81.3%. Around 10.3% of respondents are moderately satisfied, and 5.0% and 3.3% are dissatisfied and very

dissatisfied, respectively. The data indicates that real-time chat services are effective for most users, though a small percentage find room for improvement.

Satisfaction with video conferencing and online tutorials is positive but slightly more varied. 40.3% of respondents are very satisfied, and 38.3% are satisfied, making a total satisfaction rate of 78.6%. However, 11.8% are moderately satisfied, and dissatisfaction is higher than other services, with 5.8% dissatisfied and 3.8% very dissatisfied. This implies that as majority of users appreciate the interactive format, others may face challenges such as technical difficulties or availability issues.

Instant messaging garners moderate satisfaction, with 44.6% very satisfied and 28.2% satisfied, totalling 72.8%. However, a notable 17.9% are only moderately satisfied, and 6.0% and 3.3% are dissatisfied and very dissatisfied, respectively. The relatively higher percentage of moderate satisfaction and dissatisfaction may indicate that some users find instant messaging less efficient or responsive compared to other methods. Telephone services have 52.9% of respondents very satisfied and 23.2% satisfied, leading to a combined satisfaction rate of 76.1%. However, 11.3% are moderately satisfied, and 8.1% and 4.5% report dissatisfaction. This suggests that while most users find telephone services helpful, some may prefer more immediate or visual modes of communication.

Satisfaction with the Ask Librarian service mirrors that of telephone services, with 52.9% very satisfied and 23.2% satisfied, resulting in a 76.1% satisfaction rate. As with the telephone service, 11.3% are moderately satisfied, while 8.1% are dissatisfied, and 4.5% are very dissatisfied. This suggests that the "Ask Librarian" service is generally effective, though some users may experience delays or insufficient responses.

From the interviewee questions on the responses librarians receive from postgraduate students on the usage of virtual reference services, interviewee 1 stated that:

Moderately satisfied. Reluctance to adopt new tools: Some students may express dissatisfaction with new tools or changes in the virtual reference services, preferring the status quo and resisting adaptation.

**Key informant interview, Interviewee 1**

The second interviewee noted that the satisfaction was:

Good, they are able to access available resources.

**Key informant interview, Interviewee 2**

Interviewees highlighted differing levels of postgraduate student satisfaction with virtual reference services. Interviewee 1 observed moderate satisfaction, noting some reluctance among students to adopt new tools or changes, indicating a preference for familiar methods. In contrast, Interviewee 2 reported generally good satisfaction, attributing it to students' ability to access needed resources. These responses suggest that satisfaction may vary based on individual adaptability and perceived ease of accessing resources through virtual services.

#### **4.5.2 Effectiveness of Virtual Reference Services Offered at the University Library**

This study also sought to examine the effectiveness of virtual reference services and were thus measured on a five-Likert scale: strongly agree (SA = 1), agree (A=2), neutral (N=3), disagree (D=4), and strongly disagree (SD = 5). Table 13 shows results effectiveness of virtual reference services (VRS) at the university library across various dimensions.

**Table 13**

*Effectiveness of Virtual Reference Services Offered at the University Library*

Effectiveness of Virtual Reference Services	SA	A	N	D	SD
The services are timely	67.0	20.4	6.0	2.5	4.0
The services are accessible	67.5	17.9	3.5	5.0	6.0
The VRS services are reliable for users	51.4	28.0	12.8	4.0	3.8
The services is interactive	64.2	19.1	9.1	2.5	5.0
University staff provide user support	68.8	15.6	6.8	1.3	7.6
There are communication platforms	1.8	57.4	22.9	7.1	10.8
Valid N (listwise)	397				

The majority of respondents perceive the VRS services as timely, with 67.0% strongly agreeing and 20.4% agreeing, totalling 87.4% satisfaction. A smaller portion is neutral (6.0%), with 2.5% dissatisfied and 4.0% very dissatisfied. This high level of satisfaction indicates that most users find the services prompt and responsive.

Accessibility is similarly well-regarded, with 67.5% strongly agreeing and 17.9% agreeing, resulting in an 85.4% satisfaction rate. Only 3.5% are neutral, while 5.0% are dissatisfied and 6.0% very dissatisfied. This suggests that the majority of users

find the VRS services easy to access, although a few may encounter availability issues or technical barriers for a small segment of users. Users are generally well aware of the library services, but data shows a negative skew for certain services, indicating slight unawareness among users about specific offerings in the libraries studied (Ganaie & Wani, 2020).

Perceived reliability of the VRS services shows mixed results. 51.4% of respondents strongly agree and 28.0% agree that the services are reliable, totalling 79.4% positive feedback. However, 12.8% are neutral, 4.0% are dissatisfied, and 3.8% are very dissatisfied. This indicates that while many users find the services dependable, a notable portion experiences issues with reliability. VRS is crucial in various learning stages, sparking students' interest, enabling resource exploration, solving learning problems, and providing efficient, instant assistance (Tsang & Chiu, 2022).

The support provided by university staff is rated highly, with 68.8% strongly agreeing and 15.6% agreeing, leading to 84.4% satisfaction. Only 6.8% are neutral, and 1.3% are dissatisfied, with 7.6% very dissatisfied. This suggests that the majority of users feel well-supported by staff, though a small percentage experience insufficient support.

The perception of available communication platforms is more varied. Only 1.8% strongly agree and 57.4% agree that there are effective communication platforms, making a total of 59.2% satisfaction. However, 22.9% are neutral, and 7.1% and 10.8% are dissatisfied and very dissatisfied, respectively. This indicates that while many users find the communication platforms satisfactory, there is significant room for improvement, as nearly a third of users have concerns about the effectiveness of these platforms (Harsh et al.2020).

Interviewee 5 noted that virtual reference services were effective in that:

Saves time for the user, It is convenient, and has 24/7 accessibility, and remote access.

### **Key informant interview, interviewee 5**

Interviewee 5 highlighted that virtual reference services are effective due to their time-saving nature, convenience, 24/7 availability, and remote access, which collectively enhance user accessibility and flexibility. These features make virtual

services particularly valuable for postgraduate students with varying schedules and locations.

#### **4.6 Institutional Digital Repository Information Services at Selected University Libraries in Kenya**

The second objective was to evaluate the utilisation of institutional digital repository information services by postgraduate students at selected university libraries in Kenya. Institutional digital repository information services were measured through their effectiveness and satisfaction to students.

##### **4.6.1 Satisfaction with Digital Institutional Repository Services**

The study aimed to assess satisfaction with the usability and access of various types of digital institutional repository outputs provided by the library. It was assessed through a five-Likert scale where: very satisfied (VS = 1), satisfied (S =2), neutral (N = 3), dissatisfied (D=4), and very dissatisfied (VD = 5). Results are presented in Table 14.

**Table 14**

*Satisfaction with Digital Institutional Repository Services at the University Libraries*

Types of DIR	VS (%)	S (%)	MS (%)	D (%)	VD (%)
Research Papers	66.0	21.7	2.5	3.5	5.3
Thesis	59.9	25.2	8.8	2.3	3.8
Conference Proceedings	49.6	21.9	20.2	6.5	1.8
Datasets	53.4	25.7	13.9	4.8	2.3
Multimedia content	49.6	26.2	16.9	4.8	2.5
Valid N (listwise)	397				

It is shown that the highest satisfaction is with research papers, where 66.0% of respondents are very satisfied and 21.7% are satisfied, leading to a combined satisfaction rate of 87.7%. Only 2.5% are moderately satisfied, and dissatisfaction is relatively low, with 3.5% dissatisfied and 5.3% very dissatisfied. This indicates that research papers are generally well-regarded for usability and access.

Theses also receive strong satisfaction ratings, with 59.9% very satisfied and 25.2% satisfied, totalling 85.1% positive feedback. About 8.8% are moderately satisfied, and a small percentage are dissatisfied (2.3%) or very dissatisfied (3.8%). This suggests

that while most users are satisfied, there is room for improvement in accessing or using these content. Conference proceedings show a mixed satisfaction level, with 49.6% very satisfied and 21.9% satisfied, making a total of 71.5% positive responses. However, 20.2% are moderately satisfied, and 6.5% are dissatisfied, with 1.8% very dissatisfied. This indicates that while a majority are satisfied, there are notable concerns regarding access or usability. These results are supported by the study of Murithi, et al. (2020) who found that whereas postgraduate students found e-resources easy to access and download and were diverse, a good number of them were least satisfied with e-resources' relevance (42.9%) and sharing ability (37.7%).

Datasets are rated positively by 53.4% of very satisfied respondents and 25.7% who are satisfied, totalling 79.1%. However, 13.9% are moderately satisfied, and 7.1% report dissatisfaction, indicating that there may be issues with dataset accessibility or usability for some users. Multimedia content has similar satisfaction levels to conference proceedings, with 49.6% very satisfied and 26.2% satisfied, totalling 75.8%. About 16.9% are moderately satisfied, and 7.3% are dissatisfied, with 2.5% very dissatisfied. This suggests that while the content is generally well-received, there are areas that could be improved. Results on the high satisfaction levels are in support of the study of (Ogunbodede, et al., 2020) who found that postgraduate students consider institutional repository services as important places of learning and research activities.

#### **4.6.2 Effectiveness of Digital Institutional Repository Services**

The study rated the perception of postgraduate students regarding digital institutional repository services on a five-Likert scale: strongly agree (SA = 1), agree (A=2), neutral (N=3), disagree (D=4), and strongly disagree (SD = 5). Table 15 presents results on the evaluation of the rating of digital institutional repository scholarly outputs provided by the university library across six key dimensions: availability, currency, accessibility, timeliness, user support, and reliability.



**Table 15***Rating of Digital Institutional Repository Services Provided at the University Library*

Ratings of DIR	SA	A	N	D	SD
Digital content is available	72.3	19.6	3.0	1.3	3.8
Up-to-date information	62.0	22.9	8.1	3.3	3.8
Easily accessible	65.0	22.2	5.5	2.8	4.5
The services are timely	63.0	21.4	8.3	3.5	3.8
University library staff provide user support	72.8	12.3	9.6	1.3	4.0
The service is reliable	68.8	16.1	9.8	.5	4.8
Valid N (listwise)	397				

It is seen that a significant majority of respondents, 72.3%, strongly agree that digital content is available, and 19.6% agree, leading to a combined positive rating of 91.9%. Only 3.0% are neutral, 1.3% are dissatisfied, and 3.8% are very dissatisfied. This high satisfaction rate indicates that the availability of digital content is a strong point of the repository.

Regarding the currency of information, 62.0% strongly agreed and 22.9% agreed that the information is up-to-date, totalling 84.9% positive feedback. However, 8.1% were neutral, 3.3% expressed dissatisfaction and 3.8% were very dissatisfied. This shows that while most users find the information current, there is some room for improvement.

For accessibility, 65.0% strongly agree and 22.2% agree, bringing the total positive rating to 87.2%. Neutral responses account for 5.5%, while 2.8% are dissatisfied and 4.5% are very dissatisfied. This indicates that while most users find the repository easy to access, there are occasional issues. According to Tsenga and Gichohi (2023), the study found that 58.2% of respondents learned about the institutional repository through the library website, 40.3% via library tours and orientation, 0.8% through email notices, and 0.6% from brochures. The findings suggest the library management should better utilize diverse marketing methods to promote the repository effectively.

On the timeliness of services, 63.0% strongly agree and 21.4% agree, resulting in an 84.4% positive rating. Neutral responses are at 8.3%, with 3.5% dissatisfied and 3.8%

very dissatisfied. This shows that the repository generally provides timely services, though some users experience delays. Satisfaction with user support is high, with 72.8% strongly agreeing and 12.3% agreeing, totalling 85.1%. Neutral responses are 9.6%, with 1.3% dissatisfied and 4.0% very dissatisfied. This suggests that while most users are satisfied with the support provided by library staff, there are a few areas needing attention. Reliability is rated positively by 68.8% of respondents who strongly agree and 16.1% who agree, giving a total positive rating of 84.9%. Neutral responses are 9.8%, with only 0.5% dissatisfied and 4.8% very dissatisfied. This indicates that the repository is generally considered reliable, although a small proportion of users experience reliability issues. The university library's digital institutional repository scholarly output was evaluated, revealing varied satisfaction levels among users. Overall, the repository's contribution to academic research was positively rated, indicating its effectiveness in providing accessible, high-quality scholarly resources, as highlighted by Wakaro (2018). However, specific areas may need improvement to enhance user experience and resource quality further.

#### **4.7 Circulation Services at the Selected Universities' Libraries in Kenya**

The third objective was to examine the use of circulation services by postgraduate students at selected university libraries in Kenya. These services were measured based on their effectiveness and satisfaction with students.

##### **4.7.1 Satisfaction with Circulation Services Provided at the University Library**

The level of satisfaction with the circulation services was assessed through a five-Likert scale where: very satisfied (VS = 1), satisfied (S =2), neutral (N = 3), dissatisfied (D=4) and very dissatisfied (VD = 5). Results are presented in Table 16.

**Table 16***Satisfaction with Circulation Services Provided at the University Library*

Circulation Services	VS (%)	S (%)	MS (%)	D (%)	VD (%)
Borrowing of information materials	67.5	16.4	4.8	4.5	6.8
Reservation of information materials	44.8	27.0	16.6	7.8	3.8
Borrowing of short loan materials	46.9	30.2	8.6	10.8	3.5
Reference queries/inquiries	55.4	23.2	7.6	7.1	6.8
Returning of information materials	61.5	20.9	5.0	2.5	10.1
Advisory services	58.4	23.9	6.3	5.8	5.5
Valid N (listwise)	397				

The majority of respondent 67.5% are very satisfied with the borrowing services, according to the results, indicating that the libraries effectively meet users' needs in this area and an additional 16.4% are satisfied 83.9%. Only a small fraction of users report being moderately satisfied (4.8%), dissatisfied (4.5%), or very dissatisfied (6.8%).

Satisfaction with the reservation of materials is more moderate. While 44.8% of respondents are very satisfied, and 27.0% are satisfied, this service sees a larger portion of users who are moderately satisfied (16.6%). Dissatisfaction is somewhat higher, with 7.8% dissatisfied and 3.8% very dissatisfied. The higher percentage of moderate satisfaction and dissatisfaction could suggest delays or complications in the reservation system, such as issues with reserving popular or high-demand materials, as noted by Saikia and Gohain (2015).

Short loan services, which typically allow students to borrow materials for a limited time, show a strong satisfaction rate, with 46.9% very satisfied and 30.2% satisfied, totalling 77.1% of satisfied users. However, the proportion of dissatisfied users is somewhat higher compared to other services, with 10.8% dissatisfied and 3.5% very dissatisfied. This might indicate challenges with the availability of short-loan materials, potentially due to high demand during exam periods or course requirements.

The satisfaction with reference queries is high, with 55.4% of respondents very satisfied and 23.2% satisfied, giving an overall satisfaction level of 78.6%. This

suggests that library staff are generally helpful and responsive in addressing inquiries. However, 7.6% of respondents are moderately satisfied, 7.1% dissatisfied, and 6.8% very dissatisfied. A large percentage of users are satisfied with the process of returning materials, with 61.5% being very satisfied and 20.9% satisfied. Only 5.0% report moderate satisfaction while 2.5% are dissatisfied. However, 10.1% of respondents are very dissatisfied, the highest percentage across all services. This could indicate specific issues with the return process, such as penalties for late returns or confusion over return policies.

The advisory services, which likely provide guidance on library resources and research strategies, are well-regarded, with 58.4% very satisfied and 23.9% satisfied, totalling 82.3% overall satisfaction. A small percentage of users' report being moderately satisfied (6.3%), dissatisfied (5.8%), or very dissatisfied (5.5%). These lower satisfaction levels could stem from inconsistencies in the quality of advice or from a lack of personalized guidance.

Overall, results have shown a high levels of satisfaction on utilisation of circulation services. These results align with the study of Ogunbodede, et al. (2020), which established users' satisfaction with library services, including circulation services with 89% satisfaction level. As noted by Muthuraja, et al. (2018), the slightly higher dissatisfaction levels in some cases may reflect challenges in resolving more complex or specialized queries, where staff expertise or available resources may not fully meet user needs.

#### **4.7.2 Effectiveness of the Circulation Services Provided in the University Library**

The study also aimed to examine the effectiveness of circulation services and was measured on a five-Likert scale: strongly agree (SA = 1), agree (A=2), neutral (N=3), disagree (D=4), and strongly disagree (SD = 5). Results are presented in Table 17.

**Table 17***Effectiveness of the Circulation Services Provided in the University Library*

Effectiveness of the Circulation Services	SA	A	N	D	SD
Friendly circulation staff	67.3	18.1	6.0	1.3	7.3
The services are of high quality	61.5	24.2	6.0	1.3	7.1
The circulation services are accessible and reliable	68.8	17.9	5.5	1.3	6.5
The services are timely	67.0	17.9	9.6	1.0	4.5
University library staff are competent	67.0	20.4	4.3	1.3	7.1
The staff are helpful	65.7	20.9	3.8	3.5	6.0
Valid N (listwise)	397				

Results indicate that a majority, 67.3%, strongly agreed that the library staff are friendly, and 18.1% agree, meaning that 85.4% of respondents have a positive view of staff friendliness. Only 6.0% are neutral, while 1.3% disagree, and 7.3% strongly disagree. The results support the findings of Ogunbodede, et al. (2020) that good attitude of library staff increased satisfaction with library services and facilities. The results also suggest that while most users find the staff approachable and cordial, a small minority feel otherwise, possibly due to occasional negative experiences, as noted by (Ekpenyong & Esin, 2021)

The perception of service quality is similarly positive, with 61.5% strongly agreeing and 24.2% agreeing that the circulation services are of high quality, bringing the total positive response to 85.7%. Neutral responses are at 6.0%, while dissatisfaction is minimal, with 1.3% disagreeing and 7.1% strongly disagreeing. The data reflects overall satisfaction with the quality of services, though a small proportion of respondents may have encountered issues like delays or inefficiencies (mohindra& Kumar, 2015).

The highest rating is for the accessibility and reliability of circulation services, with 68.8% strongly agreeing and 17.9% agreeing, making a total of 86.7% positive feedback. Neutral responses are 5.5%, while only 1.3% disagree and 6.5% strongly disagree. This suggests that the library's services are generally dependable and easy to access, although a small number of users may have experienced challenges such as

system downtimes or limited availability of resources. The timeliness of services is rated highly, with 67.0% strongly agreeing and 17.9% agreeing, leading to a total of 84.9% of respondents satisfied with how promptly services are provided. However, 9.6% of respondents are neutral, and while only 1.0% disagree, 4.5% strongly disagree. These lower ratings could point to occasional delays, such as long wait times or slow processing of requests (Adeniran, 2011).

Library staff are seen as competent, with 67.0% strongly agreeing and 20.4% agreeing, resulting in an 87.4% positive rating. Only 4.3% of respondents are neutral, while 1.3% disagree and 7.1% strongly disagree. The high rating indicates that most users feel the staff are knowledgeable and capable in handling inquiries and supporting students. The small fraction of dissatisfied students may have encountered inconsistencies in service quality or expertise, as argued by Duane, et al. (2015).

Helpfulness is another well-regarded aspect of library service, with 65.7% strongly agreeing and 20.9% agreeing, for a combined 86.6% satisfaction rate. Neutral responses are low at 3.8%, while 3.5% disagree and 6.0% strongly disagree. This implies that most students feel well-supported by staff, though a small group may have faced difficulties in receiving the assistance they needed. Indeed, this supports the study by Oyewole and Adetimirin (2015) who found that lack of assistance from the library staff hindered students' use of library resources and facilities.

#### **4.8 Inferential Statistics**

It was necessary to conduct inferential analysis in the bid to draw conclusions about the variables and be able to make predictions of how they affect each other. Therefore, correlation and regression statistics were analysed.

##### **4.8.1 Correlation Analysis**

As noted by Kafle (2019), correlation analysis was useful in studying the relationship between variables with a focus on their direction and strength.

**Table 18***Correlation Analysis*

Correlation Analysis		Utilisatio n	Circulation services	Virtual services	Repository services
Utilisation	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	397			
Circulation services	Pearson Correlation	.189**	1		
	Sig. (2-tailed)	.000			
	N	397	397		
Virtual services	Pearson Correlation	.099*	.775**	1	
	Sig. (2-tailed)	.049	.000		
	N	397	397	397	
Repository services	Pearson Correlation	.167**	.704**	.842**	1
	Sig. (2-tailed)	.001	.000	.000	
	N	397	397	397	397

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Results in table 18 show that circulation services and library utilisation had a positive and statistically significant correlation ( $r = 0.189$ ,  $p < 0.01$ ). These findings support the study of Tom-George (2022) that circulation services and utilisation of library resources in universities had a statistically significant, positive correlation.

Virtual reference services and library utilisation also had a positive and significant relationship ( $r = 0.099$ ,  $p = 0.049 < 0.05$ ). Additional results indicate that digital repository services have a positive and significant correlation ( $r = 0.167$ ,  $p < 0.01$ ). The findings align with the study of Tom-George (2022) who established that reference services and utilisation of library resources in universities had a positive and significant correlation.

#### 4.8.2 Regression Analysis

As noted by Kafle (2019), regression analysis was used in establishing the nature of association among variables through an equation. As further noted by Costa (2017), it would help in modelling the relationships between variables. However, before

conducting regression analysis, diagnostic tests were carried out to make sure the multiple regression technique's numerous assumptions were met. The tested assumptions include normality, autocorrelation, multicollinearity, and homoscedasticity.

#### 4.8.2.1 Normality

Regression analysis assumes that errors are normally distributed and with a mean of zero and variance. A variety of methods are employed to achieve normalcy tests. This study used the Kolmogorov-Smirnov test, which is considered appropriate for large datasets the results are presented in Table 19.

**Table 19**

*Test of Normality*

Test of Normality	Kolmogorov-Smirnov <sup>a</sup>		
	Statistic	df	Sig.
Utilisation	.053	397	.071
Circulation services	.219	397	.056
Virtual services	.227	397	.063
Repository services	.210	397	.053

As observed in Table 19, the p-values for all variables under Kolmogorov-Smirnov are above the significance level of 0.05 (utilisation = 0.71. circulation services = 0.056, virtual reference services = 0.063, and digital repository services = 0.053).

Therefore, it follows that the sample was drawn from a population that was normally distributed.

As advised by Hickey, et al. (2019), normality test was further assessed through graphical methods, especially for the outcome variable. Figure 2 shows a histogram that indicates that the residuals are approximately normally distributed as it is bell-shaped. Further, figure 3 confirms the normality of data as the Q-Q plot has data points closely fitted along the straight diagonal line.



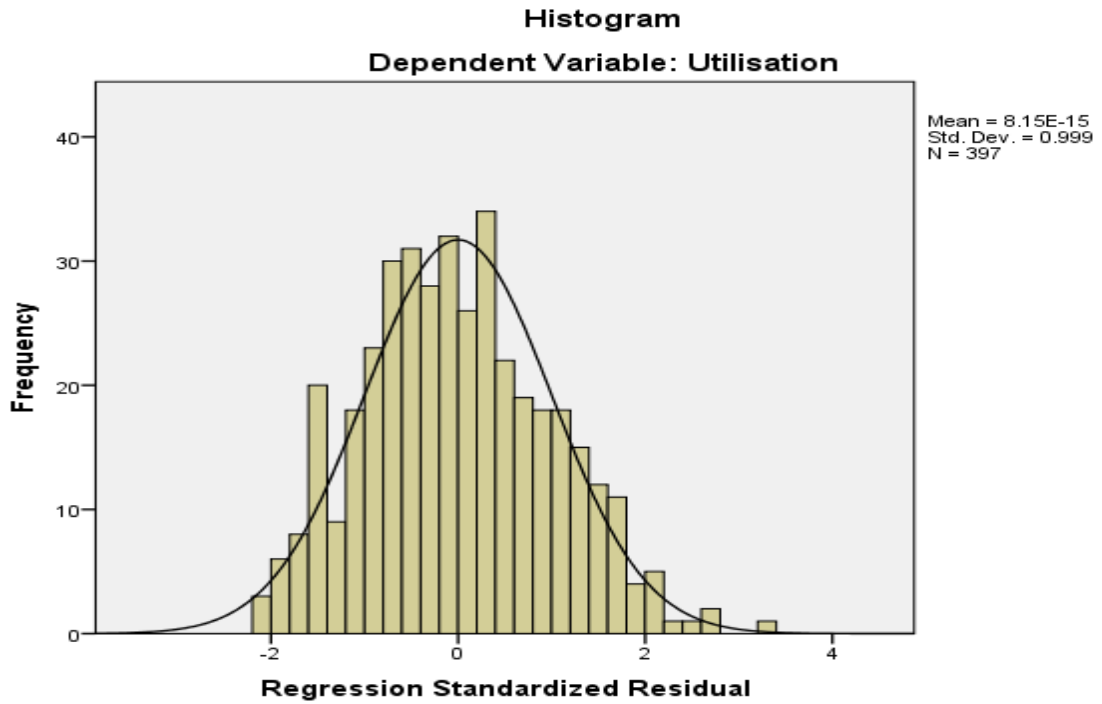


Figure 2. A histogram of residuals indicating normality of library services utilisation

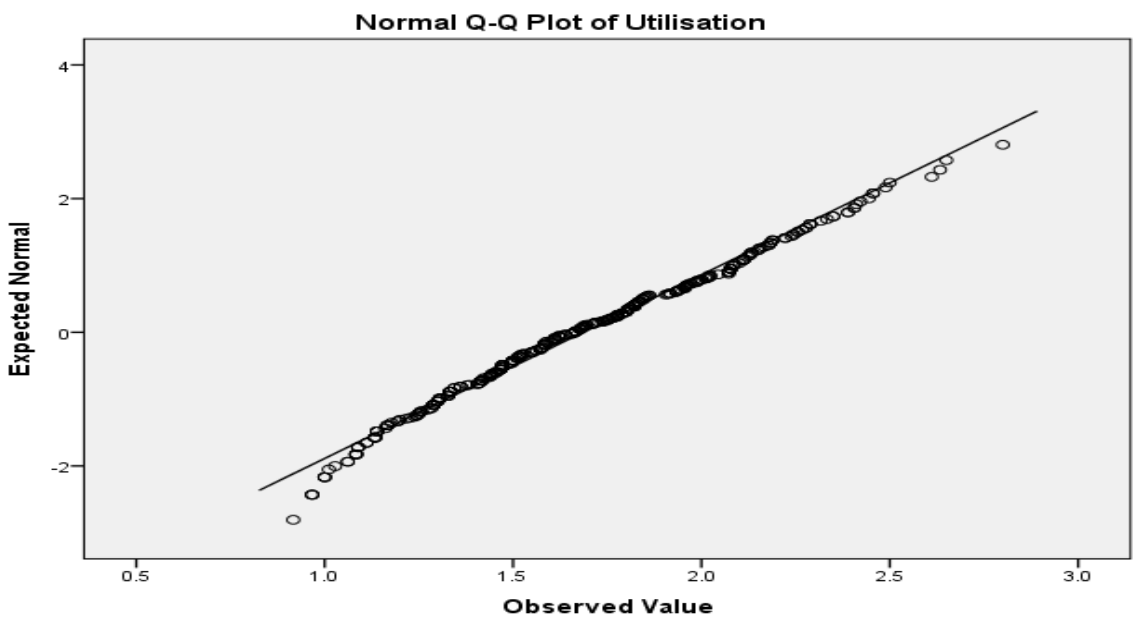


Figure 3. A Q-Q plot indicating normality of library services utilisation

#### 4.8.2.2 Multicollinearity

Regression assumes that the independent variable does not predict each other. They should not have a linear relationship and when two or more variables are linearly related, then the problem of multicollinearity arises. Variance inflation factor (VIF) was used to assess this assumption and results presented in Table 20.

**Table 20**

*Test of Multicollinearity*

Model	Collinearity Statistics		
	Tolerance	VIF	
	(Constant)		
1	Circulation services	.390	2.563
	Virtual services	.225	4.436
	Repository services	.285	3.509

It is seen that there was no multicollinearity as VIF values are below 10 (circulation services = 2.563, virtual reference services = 4.436, and digital repository services = 3.509).

**4.8.2.3 Heteroscedasticity**

It is assumed that the errors are equally distributed for all explanatory variables (homoscedasticity) and its violation leads to heteroscedasticity (Hickey, at al., 2019; Williams, et al., 2019). As noted, homoscedasticity was tested through a scatter of residual values against the predicted values and results presented in Figure 4 without forming a noticeable pattern, then the homoscedasticity was upheld.

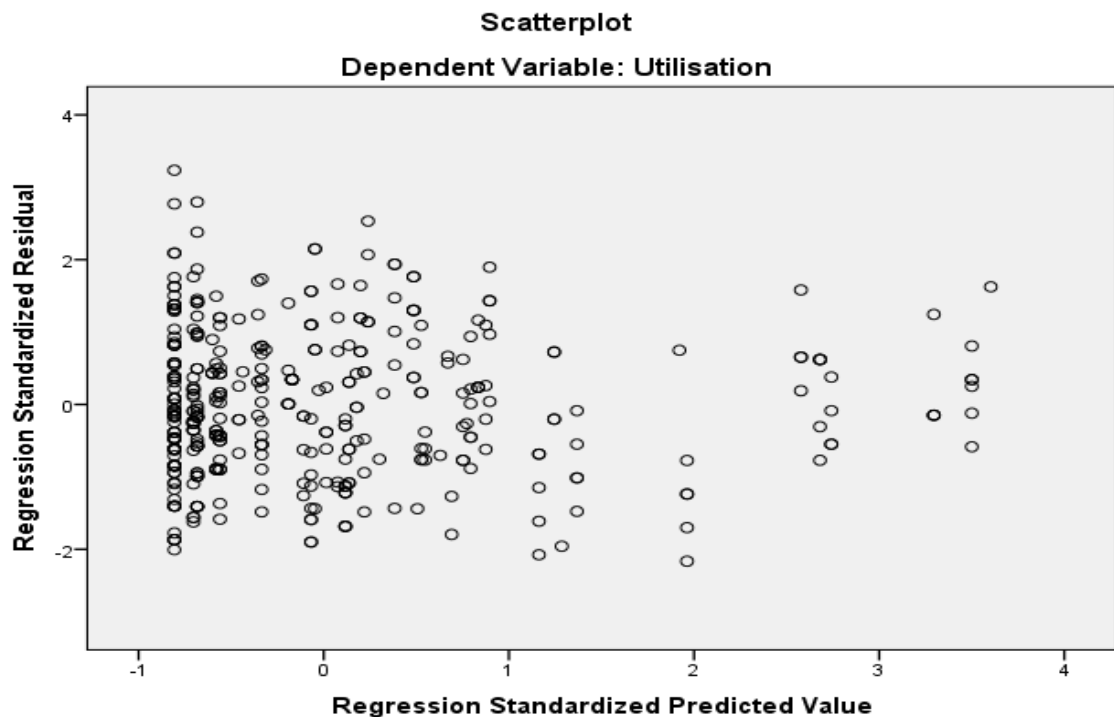


Figure 4. A scatterplot for heteroscedasticity of utilisation of library services

#### 4.8.2.4 Regression Analysis Results

After ascertaining that all the assumptions of the regression analysis technique are met, the analysis was carried out, and Tables 21 through 23 present the findings.

##### The Model Summary

This was computed to obtain an R-square and understand the proportion of change in the utilisation of library resources and services attributable to virtual reference services, digital repository services, and circulation services. Results are shown in Table 21.

Table 21

##### *Regression Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.641 <sup>a</sup>	.358	.271	.35458	1.968

a. Predictors: (Constant), Repository services, Circulation services, Virtual services

b. Dependent Variable: Utilisation

Results show that R-square is 0.358, which means that 35.8% of variability in the utilisation of library services was influenced by circulation services, virtual services, and digital repository services.

##### Regression ANOVA

This analysis was useful in assessing the fitness of the regression model to predict the effect of the explanatory variables on the outcome variable. Table 22 presents the analysis results.

Table 22

##### *Regression ANOVA Results*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.039	3	1.013	8.056	.000 <sup>b</sup>
	Residual	49.411	393	.126		
	Total	52.450	396			

a. Dependent Variable: Utilisation

b. Predictors: (Constant), Repository services, Circulation services, Virtual services

It is indicated that  $F = 8.056 (3,393)$ ,  $p < 0.01$ , implying that there was a linear relationship between library services utilisation and circulation services, virtual services, and digital repository services. Therefore, the model was fit for prediction of this relationship.

### Regression Coefficients

By analysing the coefficients, the study aimed to establish the proportionate change in the dependent variable following a one-unit change in the predictor variable. The results are presented in Table 23.

Results show that circulation services had a beta of 0.096, implying that increasing it by one unit was associated with a rise in library use by 0.096 units. This effect is statistically significant as sig. value is  $0.002 < 0.05$ . These results support the study of Tom-George (2022) who found that circulation services offered in universities had a significant effect on the use of resources by students. They also align with the study of Onyebuchi, et al. (2015) who found that automation of circulation services offered effective services to the users, which in turn led to higher utilisation rates of libraries. The results further support the study of Dongoran and Febriyana (2022) who found that librarian services and library facilities that included circulation services and references services among others had a positive and significant effect on student's interest in reading.

**Table 23**

*Regression Coefficient Results*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
	(Constant)	1.559	.042	37.065	.000	
1	Circulation services	.096	.030	.249	3.181	.002
	Virtual services	.126	.044	.299	2.896	.004
	Repository services	.109	.041	.243	2.645	.009

Further results show that virtual reference services had a beta of 0.126, meaning that whenever virtual reference services rise by one unit, the utilisation of the library by postgraduate students rises by 0.126 units. This relationship is also statistically significant because  $p = 0.004 < 0.05$ . These results concur with the findings of Ubogu (2020) that the provision of virtual references was linked with higher usage of libraries in the selected universities because of increased interactions of patrons and speed of service delivery.

The results also support the findings of Tsang and Chiu (2022) who showed that virtual reference services improved students' use of library services. It offered instant and efficient aid for learning, increased their interest in learning as well as information search, provided a good platform for learning problem solving, and permitted exploration of new learning resources. Additionally, these results support the study of Gupta (2021) who found that virtual reference services improved the use of libraries because they bridged users and librarians in a manner that saved time for all parties.

Indeed, regarding the advantage of using virtual reference services over physical reference in the provision of virtual reference services to postgraduate students, interviewee 1 and 2 answered that:

Anytime, anywhere: Virtual reference services can be accessed from any location with an internet connection, eliminating the need for students to be physically present on campus. Extended Hours: These services can often be available beyond the typical operating hours of physical libraries, providing support during evenings, weekends, and even holidays. Flexibility: Virtual services allow students to ask questions and receive help at their convenience, fitting into their study schedules more easily.

**Key informant interview, Interviewee 1**

Accessibility: Virtual reference services are accessible from anywhere, eliminating the need for students to be physically present in the library.

**Key informant interview, Interviewee 2**

Interviewees 1 and 2 highlighted the advantages of virtual reference services over physical reference for postgraduate students, emphasizing accessibility, extended hours, and flexibility. Virtual services enable students to access support from any location with internet access, removing the need for campus visits. Additionally, these services are often available beyond regular library hours, providing assistance during evenings, weekends, and holidays. This flexibility allows students to seek help at

times that best suit their study schedules, making virtual reference a highly convenient alternative to in-person support.

The findings concurred with the study of Abul and Al-kandari (2021) who found that virtual reference services adoption in universities' libraries enhanced their accessibility and consequently wide use. The study by Khan and Zainab (2015) is also supported as the use of virtual reference services increased users' satisfaction leading to their wide use.

Additional results show that digital repository services had a positive effect ( $\beta = 0.109$ ) on utilisation of library. One-point increase in digital repository services led to 0.109 units increase in library utilisation and in a statistically significant manner,  $p < 0.05$ . These results are in agreement with the study of Bamgbose, et al. (2024) who found that trustworthy digital repositories in universities increased their use because they were useful sources of scholarly information and knowledge.

Interviewees 1 and 2 responses on the importance of a digital institutional repository in the research process for a postgraduate student stated:

A digital institutional repository is crucial for a postgraduate student's research process because it: Provides Access to Resources: Offers easy access to a wealth of academic materials, including theses, dissertations, and research publications. Enhances Research Quality: Facilitates the review of previous research, helping students build on existing knowledge and avoid duplication. Supports Data Management: Provides a platform for storing and managing research data, ensuring it is organized and accessible. Increases Visibility: Enhances the visibility and impact of students' own research by making it accessible to a wider audience. Encourages Collaboration: Promotes collaboration and knowledge sharing among students and researchers within the institution and beyond.

**Key informant interview, Interviewee 1**

*Provide access to research outputs: this includes research articles, theses, dissertations, and conference papers produced by the institution's researchers.*

**Key informant interview, Interviewee 2**

Interviewees 1 and 2 emphasized that a digital institutional repository is vital for postgraduate research by offering easy access to a range of academic materials, including theses, dissertations, and research publications. Interviewee 1 noted additional benefits, such as improving research quality through access to previous studies, supporting data management, enhancing visibility for students' own research, and fostering collaboration within the academic community. Both interviewees agreed that the repository serves as a central resource for accessing the institution's research outputs, aiding students in advancing their own research effectively.

However, extant literature shows that while digital institutional repositories were vital sources of disseminating scholarly materials, their use was still low because some users were not aware of their existence (Nwachi & Idoko, 2021) while others did not meet users' quality needs (Saulus, 2018).

On challenges experienced by librarians when offering digital institutional repositories to postgraduate students, interviewee 1 noted:

The challenges encountered when offering digital institutional repositories to postgraduate students at Meru University include Awareness and Engagement: Low awareness and engagement among students. Technical Issues: Access problems and usability concerns. Data Management: Ensuring high-quality metadata and data security. Training and Support: Lack of adequate training and limited support resources. Content Submission: Cumbersome submission processes and maintaining quality control. Integration: Compatibility with other institutional systems. Copyright and Licensing: Navigating complex intellectual property issues.

#### **Key informant interview, Interviewee 1**

Interviewee 1 identified several challenges in providing digital institutional repository services to postgraduate students at Meru University. Key issues include low student awareness and engagement, technical access and usability problems, and difficulties in data management, particularly regarding metadata quality and data security. Additional challenges involve limited training and support resources, complex submission processes, compatibility with other institutional systems, and navigating intellectual property issues related to copyright and licensing. These factors indicate the need for improvements in user training, technical support, and streamlined processes to enhance repository accessibility and effectiveness.

Therefore, using these results, a multiple regression model can take the following form:  $Y = 1.559 + 0.126VRS + 0.109DIR + 0.096CS$

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Summary of Findings

The background's findings are summarised in this section characteristics of respondents and then as per the research objectives. The analysis was made using an 83.6% response rate of questionnaires and 55% of interview responses.

##### 5.1.1 Summary of Background of Respondents' Characteristics

Most respondents (58.9%) were between were aged 20-30 years, while 30.2% were aged 31-40 years This suggests that younger individuals constituted the largest segment of the study sample. Male respondents made up a larger percentage of the study (60.5%) compared to female respondents (39.5%). indicating a higher male participation rate. Most respondents (84.6%) were pursuing a master's degree, 14.9% PhD, and only 0.5% had enrolled for a postgraduate diploma.

##### 5.1.2 Utilisation of Library Resources and Services Dimensions

This dependent variable was the utilisation of services and resources in Kenyan libraries by postgraduate students it was measured through the frequency of use and the types of resources and services sought by students. Majority of respondents frequently utilize VRS, with 31.5% using the service weekly and 27.2% daily. The most popular VRS is email, used by 80.1% of respondents, indicating it is a highly accessible and reliable form of communication. A majority of librarians noted that emails were a commonly used virtual reference services for their flexibility and convenience. Others preferred telephone for its instant communication, quick response to questions and immediate assistance. Other librarians liked WhatsApp because it supports real-time messaging and multimedia. Librarians attributed the lack of use of virtual reference services to a students being not aware of the existence of the service, lack of training and insufficient support to students.

Research papers are the most frequently used resources, with 94.5% of students accessing them, indicating their centrality to postgraduate research. Theses are also highly utilised, with 85.6% of students accessing them, underscoring their significance in research and academic reference. Librarians noted that some of the institutional digital repository services that postgraduate students get include theses,



dissertations, digital tools and resources such as citation management, and access to conference papers and journals among other research outputs.

Further findings reveal that a majority of the postgraduate students (34.3%) borrow materials from the circulation desk at least once a month. Information materials form the most borrowed category of service with 89.9% of the respondents using this service, displaying its importance in postgraduate studies. Borrowing and then returning materials is also common with 79.1% reporting use. Librarians listed book loaning, queries, advisory services and return information as some of the services offered by their circulation desks.

### **5.1.3 Virtual Reference Services and Utilisation of Library Resources by Postgraduate Students at Selected University in Kenya**

The study aimed to examine the effect of virtual reference services on utilisation of library resources by postgraduate students in Kenyan university libraries. The research findings on the use of virtual reference services (VRS) at the university library show varied satisfaction levels, and perceptions of service effectiveness among students. Satisfaction levels are highest with the email service, where 65.2% are very satisfied and 21.2% are satisfied, indicating that email effectively meets user needs. The majority of respondents perceive VRS as effective in terms of timeliness (87.4%) and accessibility (85.4%), reflecting prompt and easy-to-access services. However, perceptions of reliability are mixed, with 79.4% finding VRS reliable but a significant portion (12.8%) remaining neutral. User support by staff is well-regarded, with 84.4% expressing satisfaction. Notably, the perception of communication platforms is more divided, with only 59.2% satisfied, and a notable 17.9% expressing dissatisfaction, indicating potential challenges in platform efficiency. Thus, while VRS is widely used and generally effective, there are areas for improvement, particularly in enhancing reliability, communication platforms, and real-time services. Librarians rated postgraduate students' satisfaction with virtual reference services as moderately satisfied or good because some expressed dissatisfaction and resisted adaptation. Virtual reference services were also considered effective because they save time, are convenient and remotely accessible. Virtual reference services positively and statistically significantly influences utilisation of library by postgraduate students,  $\beta=0.126$ ,  $p = 0.004 < 0.05$ .

#### **5.1.4 Institutional Digital Repository Information Services and Utilisation of Library Resources by Postgraduate Students at Selected University Libraries in Kenya**

The study also sought to examine the effect of institutional digital repository information services on utilisation of library resources by postgraduate students in Kenyan universities. Results reveal varied engagement levels with different types of scholarly content. Satisfaction with the usability and access of digital repository outputs is highest for research papers, with 87.7% of respondents expressing positive feedback. Thesis also receive high satisfaction, with 85.1% of students satisfied. The findings indicate that while students are generally satisfied with access and usability, there is room for improvement, particularly with non-text-based content. The digital institutional repository is rated highly across various dimensions. Availability of digital content is the strongest aspect, with 91.9% of respondents expressing positive views. Accessibility (87.2%), timeliness (84.4%), and reliability (84.9%) also receive favourable ratings. This shows that while postgraduate students heavily rely on digital repository services, particularly research papers and theses, there are areas for enhancement, especially in accessibility and support for other types of scholarly outputs. Librarians noted that postgraduate students were satisfied with institutional repository services as they helped them in access to resources for research, manage data and enhance research quality. Digital repository services had a positive and statistically significant effect on library utilisation by post-graduate students, ( $\beta = 0.109, p < 0.05$ ).

#### **5.1.5 Circulation Services and Utilisation of Library Resources by Postgraduate Students at Selected University in Kenya**

Finally, the study assessed the effect of circulation services on utilisation of library resources by postgraduate students in the selected Kenyan universities. The findings reveal significant insights into satisfaction levels and the perceived effectiveness of these services. Overall, satisfaction levels are high, particularly with borrowing services where 67.5% of respondents are "very satisfied," and an additional 16.4% are "satisfied." Similarly, the process of returning materials receives positive feedback, with 61.5% very satisfied. Advisory services are also well-regarded, with 58.4% expressing high satisfaction. However, the reservation of materials and short loan

borrowing services saw relatively higher levels of moderate satisfaction and dissatisfaction, suggesting potential challenges such as delays or unavailability of resources during peak demand periods. Most postgraduate students view the circulation services as effective and high-quality. The staff's friendliness, competence, and helpfulness received positive ratings, with 67.3% strongly agreeing that staff are friendly and 67.0% affirming their competence. The accessibility and reliability of services also scored well, with 68.8% strongly agreeing that the services are easily accessible. However, librarians noted some students were dissatisfied with circulation services because of access failures arising from problems with library account access and system errors. Circulation services had a statistically significant positive effect on library use ( $\beta=0.096$ ,  $p = 0.002 < 0.05$ ).

## **5.2 Conclusion**

The conclusion has also been made in respect of the findings per objective.

### **5.2.1 Utilisation of Library Resources and Services by Postgraduate Students at Selected University in Kenya**

Emails are the common virtual reference services used by postgraduate students in Kenyan universities' libraries. They are closely followed by 'Ask the Librarian' services. Other services include instant messaging, virtual chats with librarians and telephone. These services were highly used weekly and closely followed by daily use. It is concluded that research papers, theses, conference proceedings, datasets and multimedia contents are the digital repository information services offered at the Kenyan university libraries. A majority of students are interested in research papers followed by theses. It is also concluded that the major circulation services sought after by a majority of post graduate students in universities' libraries include reference queries, short loan services, borrowing of information materials, returning of information materials, advisory services and reservation of information materials.

### **5.2.2 Virtual Reference Services and Utilisation of Library Resources by Postgraduate Students at Selected University in Kenya**

Generally, post graduate students consider these services effective and are satisfying. The study comes in to a conclusion that virtual reference services have a significant and positive effect on postgraduate students' utilisation of library resources in Kenyan universities.

### **5.2.3 Institutional Digital Repository Information Services and Utilisation of Library Resources by Postgraduate Students at Selected University in Kenya**

The postgraduate students are satisfied with their universities' digital repository information services. Additionally, the study concludes that the satisfaction with the digital repository information services have a statistically significant effect on the utilisation of library resources in Kenyan universities.

### **5.2.4 Circulation Services and Utilisation of Library Resources by Postgraduate Students at Selected University in Kenya**

The major circulation services sought after by a majority of post graduate students in. Overall, students are satisfied with universities' libraries circulation services that include reference queries, short loan services, borrowing of information materials, returning of information materials, advisory services and reservation of information materials. They also consider these services to be effective. It is also concluded that circulation services have statistically significant positive effect on the utilisation of library resources in Kenyan universities.

## **5.3 Recommendations**

Recommendations have been offered in line with the research objectives.

### **5.3.1 Recommendation on Utilisation of Library Resources and Services**

Results have indicated that some 9.3% of postgraduate students have never used the virtual reference services. Further results have shown substantial non-use of services such as virtual chats with librarians, instant messaging, video conferencing and telephone. Therefore, it is recommended that awareness is increased to postgraduate students on the available virtual reference services through social media, communication channels and websites and how to use them for their academic excellence. Similarly with some 7.1% of postgraduate students not using institutional digital repository information services at all and some services such as datasets, multimedia contents and conference proceedings having low usage, universities should create the right awareness to the students.

It has been noted that some postgraduate students have never used libraries' circulation services. Such non-use could be attributed to lack of proper sensitisation of these services and lack of up-to-date and relevant reading materials. Additionally, it

has been seen that some circulation services have low uptake among these students. Therefore, it is recommended that right publicity on the available circulation services be made to postgraduate students through a library orientation process, which should be carefully planned and executed.

### **5.3.2 Recommendation on Virtual Reference Services**

Results have indicated that there is also a portion of students who are dissatisfied with the virtual reference services offered by their universities' libraries. Therefore, there is the need to tailor the services to the preferences of postgraduate students and offer multiple platforms to get these services. The library leadership should also strive to have reliable internet connectivity for effective service delivery to the students. It is also recommended that the library staff gets the right training to enhance the overall virtual reference services of libraries.

### **5.3.3 Recommendation on Institutional Digital Repository Information Services**

The study recommends that universities through their librarians organise tailored workshops and trainings for postgraduate students to show them how to utilise repositories to retrieve useful resources and also store and disseminate their works. It is also recommended that universities offer an effective and reliable internet connectivity, sufficient computer systems and steady power supply to enable postgraduate students fully utilise the repository information services.

### **5.3.4 Recommendation on Circulation Services**

University libraries should ensure they have up-to-date and relevant reading materials. Additionally, libraries should fully automate their circulation service operations so that users get effective services. All library policies that include circulation policies should be availed at designated areas such as noticeboards and websites. The library to procure current and up-to-date information materials for the postgraduate students.

### **5.3.5 Implications of Theories, Policies and Practices**

The study has established the applicability of various theories in explaining the various services and resources offered in universities and their use by postgraduate students in Kenya. For instance The Technology Acceptance Model (TAM), developed by Fred Davis in the late 1980s, claims that, postgraduate students' acceptance and adoption of technology were determined by its perceived utility,

usability, and intention to use. Consequently, this affect their use of virtual reference services such as emails or online chat with librarians and circulation services that include online renewal, book borrowing and returning services. Additionally, the Diffusion of Innovations Theory developed by Rogers on 1962 helped in indicating how institutional repositories have diffused and been adopted by postgraduate students.

Universities should set policies and guidelines on effective usage of library resources and libraries. They should ensure that they employ rightly qualified staff on the use of new technologies as well as other social media platforms to facilitate and help postgraduate students in online activities of libraries. It is also recommended that libraries enhance proactive user education and information literacy programs by user offering education and training on library resources and services. Additionally, libraries should continuously expand their orientation programs through multiple channels, such as emails, text messages via library accounts, and face-to-face sessions, to encourage greater utilization of library services and resources by postgraduate students.

#### **5.4 Recommendation for Further Studies**

- i. This study's main focus was on the use of information services by postgraduate students in Kenyan universities' libraries. A further study is proposed with a focus on the contribution of information services from the public and community libraries.
- ii. The current study bundled public and private universities together. Therefore, a comparative study is also proposed to assess the utilisation of library resources in public and private universities in Kenya.
- iii. Additionally, an exploratory study is suggested to determine the barriers influencing postgraduate students' use of information services in Kenyan universities.
- iv. A further study should be carried out comparing utilisation of library resources between postgraduate students and undergraduate students in Kenyan universities.

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## **Appendix I: Introductory Letter**

Dear respondent,

I am Pauline Masaa Kavila a postgraduate student pursuing a Library and Information Science Master's degree at Tharaka University. I am carrying out a research thesis titled, "Utilisation of Information Services by for academic achievement by Postgraduate Students at Selected University Libraries in Kenya". I am requesting you to voluntarily participate in this research by assisting in completing this questionnaire. The information provided will be used for academic purposes only, and it will be treated with utmost privacy and confidentiality.

For enquiries contact me through:

Telephone 0723138643

Email: [masaakabz@gmail.com](mailto:masaakabz@gmail.com)

Thank you.



## Appendix II: Questionnaire for Postgraduate Students

### INSTRUCTIONS

Fill by ticking in the bracket or writing the answers in the blank spaces provided.

#### Section 1: Background information

1. What is the level of your study: Tick only one Master ( ) PhD( )
2. Department
3. Gender Female( ) Male ( )
4. Age Category -20-30yrs ( ) 31-40yrs( ) 41-50yrs ( ) 51 and above( )

### SECTION 2: UTILISATION OF LIBRARY RESOURCES AND SERVICES

#### The Use of Virtual Reference Services

5. How often do you use the Virtual reference services in your University Library?

Tick where appropriate

- Daily
- Weekly
- Every two weeks
- Monthly
- Never

6. Indicate in the table below the type of **Virtual Reference Services** you use at your University Library (tick below all that apply)

	<b>Virtual reference Services offered at your University library</b>	√
i	Video conferencing/online tutorials	
ii	emails	
iii	Virtual Chats with Librarians	
iv	Instant messaging	
v	Telephone	
vii	'Ask Librarian'	

### The Use of Digital Institutional Repository Services

7. How often do you use the Digital Institutional Repository services in your University Library? Tick where appropriate

- Daily
- Weekly
- Every two weeks
- Monthly
- Never

8. Indicate in the table below the type of Digital Institutional Repository Scholarly Outputs you use at your University Library (tick below all that apply)

	<b>Digital institutional Repositories Outputs offered in your library</b>	√
i	Research Papers	
ii	Thesis	
iii	Conference Proceedings	
iv	Datasets	
v	Multimedia content	
vii	Indicate if there are others offered in your University Library	

### Use of Circulation Services at the Library Circulation Desk

9. How often do you borrow materials from the University Library Circulation Desk?

Tick the appropriate

- Daily
- Weekly
- Every two weeks
- Monthly
- Never

10. Indicate in the table below the type of **circulation services** that you use at your University Library (tick below all that apply)

	<b>Circulation Services offered at the University Library</b>	√
I	Borrowing of information materials	
Ii	Short loan services	
Iii	Returning of information materials	
Iv	Reference Queries	
V	Reservation of information materials	
Vii	Advisory services	
Viii	Indicate if there are others offered in your University	

### **SECTION 3: VIRTUAL REFERENCE SERVICES**

11. Please rate on a scale of 1-5 how satisfied are you with virtual reference services offered at your University Library? Where 1-very satisfied,2-satisfied,3-moderately satisfied 4-unsatisfied 5-very dissatisfied

	<b>Virtual reference services offered to Postgraduate at the UoEM Library</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
i.	Video conferencing/online tutorials					
ii.	emails					
iii.	Live chats with librarians					
iv	instant messaging					
v	Telephone					
vii.	Ask a Librarian'					

12. Rate the effectiveness of virtual reference services provided in your University Library on a scale of 1-5 where 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly agree

	<b>Please tick the box next to the statement that best expresses your thoughts about the University Library's VRS services.</b>	1	2	3	4	5
i.	The services are timely					
ii.	The services are accessible					
iii.	The VRS services are reliable for users					
iv.	The services are interactive					
v.	University staff provide user support					
vi.	There are communication platforms					

#### **SECTION 4: DIGITAL INSTITUTIONAL REPOSITORY SERVICES**

13. How satisfied are you with the usability and access of digital institutional repository scholarly output provided at your library? Please rate on a scale of 1-5 where 1=very satisfied, 2=satisfied, 3=moderately satisfied 4=unsatisfied 5=very unsatisfied

	<b>DIR OUTPUT offered to Postgraduate at your University Library</b>	1	2	3	4	5
1.	Research Papers					
2.	Thesis					
3.	Conference Proceedings					
4.	Datasets					
5.	Multimedia content					
6.	Indicate if there are others offered in your University Library					

14. Rate the effectiveness of Digital repository services provided in your University Library on a scale of 1-5 where 1-is Strongly 2=Agree 3=Neutral 4=Disagree=Strongly disagree

	<b>Please tick the box next to the statement that best expresses your thoughts about the University Library's DIR services.</b>	1	2	3	4	5
i.	Digital content is available					
ii.	Up-to-date information					
iii.	Easily accessible					
iv.	The services are timely					
v.	University library staff provide user support					
vi	The service is reliable					

#### **SECTION 5: CIRCULATION SERVICES**

15. In The Matrix given rate your satisfaction with circulation services provided at your University Library, Tick on the level of your satisfaction on a scale of 1-5 where 1-very satisfied,2-satisfied,3-moderately satisfied 4-unsatisfied 5-Very unsatisfied.

	<b>Circulation services offered to Postgraduate at your University Library</b>	1	2	3	4	5
1.	Borrowing of information materials					
2.	Reservation of information materials					
3.	Borrowing of short loan materials					
4.	Reference queries/inquiries					
5.	Returning of information materials					
6.	Advisory services					

16. Rate on the effectiveness of the circulation services Provided in your University Library on a scale of 1-5 where 1 is Strongly Agree 2=Agree 3=Neutral 4=Disagree 5=Strongly Disagree

	<b>Please tick the box next to the statement that best expresses your thoughts about your University Library's circulation services.</b>	1	2	3	4	5
i.	Friendly circulation staff					
ii.	The services are of high quality					
iii.	The circulation services are accessible and reliable					
iv.	The services are timely					
v.	University library staff are competent					
Vi	The staff are helpful					

### **Appendix III: Interview Schedules for Librarians in Selected Universities in Kenya**

My name is Pauline Masaa Kavila a Postgraduate student at Tharaka University Studying Master's Science in information science. I am carrying out research for my Master's Proposal titled ""Utilisation of Information Services by for academic achievement by Postgraduate Students at Selected University Libraries in Kenya. You have been selected to participate in this interview. The information provided will be used purely for academic purposes and will be treated with confidentiality.

The interview will be based on four Sections. The first section has questions on personal information the second one has questions on the use of virtual reference services third section, is on asses to institutional digital repository services, and the fourth has questions on the use of circulation services, I look forward to your cooperation and full support. You can feel free to ask questions for clarification.

Thank you

Date of The Interview-----

Place of Interview-----

#### **Part A: Biodata**

1. Interviewee designation.....
2. Gender Female( ) Female ( ).....
3. Years you worked in the University Library? 1-10yrs ( ) 11-20yrs ( ) 21-30yrs ( ) 31-4
4. Section you work at the University Library-----

#### **Part B**

##### **Section 1**

##### **Use of virtual reference services by Postgraduate students.**

1. What is your preferred mode of communication when using virtual reference services for postgraduate students? Explain why you prefer it.
2. What challenges do you encounter when offering digital institutional repositories to postgraduate students?
3. How satisfied are you with the quality of responses you receive from postgraduate students on the usage of virtual reference services? Explain why

4. What do you consider to be the advantage of using virtual reference services over physical reference in the provision of virtual reference services to postgraduate students? Briefly explain

## **Section 2**

### **Use of Institutional Digital repository information services**

1. What kind of services do you provide to postgraduate students through the institutional digital repository?
2. What challenges do you encounter when offering digital institutional repositories to postgraduate students?
3. What improvement would you suggest to enhance the utilisation of the institutional digital repository?
4. In your own opinion what do you think is the importance of a digital institutional repository in the research process for a postgraduate student? Briefly explain.

## **Section 3**

### **Asses the use of Circulation Services**

1. what challenges do you experience while offering circulation services to postgraduate students?
2. What improvements would you suggest to enhance the circulation services provided by the Library?
3. What other services do you think can be introduced at the circulation desk to improve research for postgraduate students? Please state them.
4. In your own opinion what do you think is the importance of circulation services in the research process for a postgraduate student? Briefly explain.



## Appendix IV: Tharaka University Introductory Letter

**THARAKA**

P.O BOX 193-60215,  
MARIMANTI, KENYA



**UNIVERSITY**

Telephone: +(254)-0202008549  
Website: <https://tharaka.ac.ke>  
Social Media: tharakauni  
Email: [info@tharaka.ac.ke](mailto:info@tharaka.ac.ke)

**OFFICE OF THE DIRECTOR  
BOARD OF POSTGRADUATE STUDIES**

Ref: TUN/BPGS/PL/08/24

1<sup>st</sup> August, 2024

To Whom it May Concern

Dear Sir/Madam,

**RE: PAULINE MASAA KAVILA ADMISSION NO. AMT24/03142/20**

Ms. Pauline Masaa Kavila is a postgraduate student at Tharaka University undertaking a Master's degree in **Information Science**. The student has completed her coursework and expected to proceed for collection of data having successfully defended her proposal at the faculty level. The title of the study is, '*Utilization of Information Services by Postgraduate Students at Selected Universities in Kenya.*' The proposed study will be carried out in **Tharaka Nithi County, Embu County, Kirinyaga County and Meru County.**

Any assistance accorded to her will be highly appreciated.

Thank you in advance.

Yours Faithfully,

  
Dr. Ambrose K. Veng'ha

Director

Board of Postgraduate Studies



## Appendix V: Ethics Clearance

**THARAKA**

P.O BOX 193-60215,  
MARIMANTI, KENYA



**UNIVERSITY**

Telephone: +(254)-0202008549  
Website: <https://tharaka.ac.ke>  
Social Media: tharakauni  
Email: [info@tharaka.ac.ke](mailto:info@tharaka.ac.ke)

### INSTITUTIONAL SCIENTIFIC ETHICS REVIEW COMMITTEE

1<sup>st</sup> August, 2024

REF: TUNISERC/NSEC/M018

Dear, Pauline Masaa Kavila,

**RE: Utilization of Information Services by Postgraduate Students at Selected Universities in Kenya.**

This is to inform you that *Tharaka University ISERC* has reviewed and approved your above research proposal. Your application approval number is *ISERC04023*. The approval period is 1<sup>st</sup> August, 2024 – 1<sup>st</sup> August, 2025.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by *Tharaka University ISERC*.
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to *Tharaka University ISERC* within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to *Tharaka University ISERC* within 72 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to *Tharaka University ISERC*.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://research.nacosti.go.ke> and also obtain other clearances needed.


Yours Sincerely,

Dr. Fidells Ngugi  
Chair, ISERC Tharaka University

**Appendix VI: Research Permit**

REPUBLIC OF KENYA  
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION  
Ref No: 597552  
Date of Issue: 16/August/2024

**RESEARCH LICENSE**




This is to Certify that Ms.. PAULINE MASAA KAVILA of Tharaka University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Embu, Kirinyaga, Meru, Tharaka-Nithi on the topic: **UTILIZATION OF INFORMATION SERVICES BY POSTGRADUATE STUDENTS AT SELECTED UNIVERSITIES IN KENYA** for the period ending : 16/August/2025.

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NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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