RELATIONSHIP BETWEEN AWARENESS OF REFERENCE MANAGEMENT SOFTWARE AND ITS ADOPTION AMONG POSTGRADUATE STUDENTS AT TANGAZA UNIVERSITY, KENYA

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE (LIBRARY AND INFORMATION SCIENCE) IN THE SCHOOL OF PURE AND APPLIED SCIENCES OF KENYATTA UNIVERSITY.

MAY, 2025

DECLARATION

I declare that this research project is my original work and has not been presented in any other university / institution for the award of a degree

Signature: ……..… Date ……...…….

Nancy Wachira

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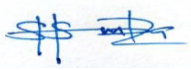
SUPERVISOR

This research project has been submitted for appraisal with my approval as university supervisor

Signature: …  ……..… Date ……26.05.2025……...…….

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I am grateful to God almighty for the providences, guidance and sustenance that have enabled me to come this far.

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DEDICATION

My special dedication to my parents and son Angelo Wachira for their enduring support through the journey of my studies and research.

I also dedicate this work to my supervisor at work, Dr. Agava and my employer for the support, time and encouragement. Finally, to my supervisor Dr. Goudian Gwademba for believing in me.

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LIST OF ABBREVIATIONS AND ACRONYMS

CLM	Centre for Leadership Management
CUEA	Catholic University of East Africa
DIT	Diffusion of Innovation Theory
IOP	Institute of Philosophy
ISC	Institute of Social Communication
IST	Institute for Social Transformation
IYS	Institute of Youth Studies
KU	Kenyatta University
NACOSTI	National Commission for Science, Technology, and Innovation
OER	Open Educational Resources
REO	Research and Extension Office
RMS	Reference Management Software
TAM	Technology Adoption Model
TOE	Technology-Organization Environment
TU	Tangaza University
UTAUT	Unified Theory of Acceptance and Use of Technology

ABSTRACT

Proper referencing is an important indicator of the quality of scientific and academic papers. The usage of reference management software (RMS) facilitates and improves the referencing process. This study investigated how awareness impacts the adoption of RMS among postgraduate students at Tangaza University, employing the lens of the Diffusion Innovation Theory. The study employed a mixed-methods approach to the collection and analysis of data. The target population of the study was 150 postgraduate students and 12 library staff from Tangaza University. Through random and purposive sampling, the researcher selected a sample of 109 postgraduate students and 4 library staff from which data was collected through survey questionnaires and key informant interviews. SPSS and Excel were used to analyze quantitative data, whilst thematic analysis was used for qualitative data. Regression analysis was used to evaluate inferential statistics. The study attempted to address the level of awareness of RMS, the attitudes, and the factors influencing the adoption and usage patterns of RMS. The findings revealed that limited awareness and familiarity levels were associated with a low adoption rate of RMS among the respondents. Despite this, the study revealed a positive perception of RMS and its benefits among these respondents. The study also revealed a variety of individual characteristics and organizational elements that influenced the adoption process. The study contributes to both academics and library management experience by making propositions and support mechanisms to enhance RMS adoption and guide future technology integration initiatives.

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Introduction

This chapter presents the introduction of the research study. It reviews the background of the study, the statement of the problem, research objectives, the hypothesis, justification, significance of the study, scope, and limitations.

1.2 Background Information to the Study

Higher education has become research-intensive with postgraduate programs requiring students to undertake various research activities culminating with academic articles and thesis or research projects. These research studies aim to add to the field of knowledge while contributing to the improvement of organizations and policy-making. However, many of these manuscripts developed by postgraduate students and researchers remain unpublished because they do not meet the requirements. Part of these requirements is proper citation and reference management.

Scholars agree that appropriate referencing is a significant determinant of the quality of scientific or academic publications. Thus, having a system that accelerates and improves the process is of enormous benefit. (Francavilla, 2018; Proske et al., 2023). Reference Management Software(RMS) has become instrumental in this having evolved from merely gathering information and incorporating it into writing to more efficient collection, storage, organization, collaboration, and management of resources (Panda, 2023). The most commonly used RMS are Zotero, Mendeley, Citeforme, Endnote, Procite (Murphree et al., 2018).

The adoption of reference management software is high among developed countries such as European countries, North America, Asia-Pacific, Middle East among others due to their high adaptability to technological innovations (360 Research Reports, 2023). However, developing countries continue to face challenges in infrastructure and resources that derail the equitable diffusion of technological innovations. According to the reports, RMS has a lot of potential in Africa because of the increased demand for education and research. Some African countries, like Nigeria, Egypt, and South Africa, have made significant progress in the adoption of RMS. However, Kenya is not mentioned among the top populations (360 Research Reports, 2023).

Globally, there are mixed responses on the usage of RMS, with studies in Greece revealing a low acceptance rate (Nitsos et al., 2022), while a study in Manitoba, Canada reports a high utilization rate of over 70% (Speare, 2018). On the contrary, studies in South Africa and Tanzania observed that good attitudes and awareness do not always translate into high utilization of RMS (Mhokole & Kimaryo, 2023; Motlhake, 2021). There is little recorded on the level of adoption of RMS in Kenya, especially among postgraduate students.

The choice to adopt or reject RMS may be attributed to several factors, as guided by the Diffusion of Innovation Theory (DIT) with an eye on awareness and knowledge, perceived relative advantage, compatibility, adaptability, availability, and user-friendliness (Bakkabulindi, 2014). However, these factors are context-specific concerning social systems, communication channels, and individual characteristics, as will be expounded by this study. Understanding how these characteristics are linked to RMS adoption aids in developing strategies that promote RMS adoption by addressing

significant challenges highlighted by the study, as well as adopting best practices the literature provides from other institutions.

Research stands at the core of Tangaza University and its mission to "prepare ethical servant leaders for the church and society" (Tangaza University, n.d.). The institution offers a variety of programs ranging from postgraduate to certificate courses. The study focused on postgraduate students because this level is the epitome of research, requiring students to publish academic articles as well as submit a thesis for the attainment of their degree.

1.3 Statement of the Problem

Despite the rising use of technology in learning, as evidenced by various studies, many students across the globe remain unaware of the various RMS tools and their usage (Ariyanti & Fitriana, 2020; Lonergan, 2017; Okodero & Mutwiri, 2021). Publication statistics have also revealed high levels of manuscript rejection by publishers due to quality, which may suggest that poor referencing is one of the factors (The American Psychologist, 2021).

In various regions, the level of RMS usage has remained low. This has been linked to certain challenges such as a lack of awareness, low technical skills, insufficient institutional support, unstable power supply, and unreliable internet connectivity (Nilashi et al., 2016; Adeyemi et al., 2020; Mhokole & Kimaryo, 2023).

The focus of this study was to explore how awareness of RMS among postgraduate students at Tangaza University influenced their adoption. By examining the level of awareness of RMS among students, the study uncovered their perceptions and usage patterns of RMS, as well as the key barriers to effective usage. The study offers insights

that enhance effective and widespread usage of RMS to improve quality research output.

1.4 Justification

Although RMS has been observed to be crucial in research and academic writing, studies show that utilization of RMS remains low among postgraduate students and researchers. Tangaza University is one of the universities in Kenya that has embraced Reference Management Software. However, it is not clear how students have utilized the tools in their daily academic workflow. This study examined whether the students are aware of the tools, and how they have utilized them. By understanding this, the study offers possible mechanisms to increase the adoption rates and enhance effective use of RMS for higher research productivity.

1.5 Objectives

1.5.1 General Objective:

The study established the awareness of Reference Management Software among Postgraduate students at Tangaza University and how this awareness has influenced their adoption of the software.

1.5.2 Specific Objectives

The study's specific objectives were to:

i. Determine the current level of awareness of reference management software among postgraduate students.
ii. Analyse the factors influencing the adoption or rejection of reference management software among postgraduate students.

iii. Assess the perceived benefits of reference management software among postgraduate students.

iv. Evaluate the usage patterns of Reference Management Software among postgraduate students.

1.6 Hypothesis

The null hypothesis of this study was that there is no correlation between awareness and the adoption of Reference Management Software.

1.7 Significance of the Study

The research aimed at aiding Kenyan higher learning institutions in understanding the impact awareness on RMS adoption, inform students about RMS benefits, assist policymakers in establishing standards, and sensitize users to utilize RMS tools for improved research output.

1.8 Scope and Limitation

The study looked at how awareness and other intervening factors influence adoption of RMS among Tangaza University postgraduate students. The institution provides postgraduate programs, which are the basis of this study. The study applied mixed methods and collected data through questionnaires and interviews. Due to accessibility and resource constraints, the study utilized a sample of 109 postgraduate students and 4 library staff. The study adhered to all ethical standards.

1.9 Assumptions

The researcher investigated the adoption of reference management software among postgraduate students with the assumption that all postgraduate students at Tangaza

University are required to undertake research projects or theses. The researcher also assumed that the institution has subscribed to reference management software, or helps students to download and install free software.

1.10 Theoretical Framework

This study utilized the Diffusion of Innovation Theory (DIT) to explore the adoption of Reference Management Software (RMS) among post-graduate students at Tangaza University. DIT, developed by Everett Rogers in 1962, explains how new ideas spread within a population. It outlines four critical components that influence individuals' decisions to adopt or reject innovations: innovation attributes, communication channels, time, and social systems. The innovation-decision process consists of awareness, persuasion, decision, and implementation phases.

DIT classifies adopters as innovators, early adopters, early majority, late majority, and laggards according to their readiness to accept innovations in technology. The study attempts to understand how various components of DIT play out in the innovation adoption process and to explain the variables influencing an individual's decision to embrace RMS. Other studies have employed alternative theories to explain technology adoption, such as the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and Technology-Organization-Environment (TOE). However, Bakkulindi (2014) points out that DIT is the most extensive theory, and the key tenets of the majority of other related theories are drawn from DIT. Furthermore, the focus of this study is on awareness and its impact on RMS adoption, making DIT the most applicable theory.

DIT has been widely used in educational settings, for example, in studies focusing on Open Educational Resources(OER) (Menzli et al., 2022) and mobile learning during the Covid-19 era (Frei-Landau et al., 2022). In this study, DIT unravelled the intricate dynamics influencing the adoption patterns of innovation tools providing a robust framework for investigating RMS adoption among postgraduate students in Tangaza University.

1.11 Conceptual Framework

This study examined the complex relationship between key variables influencing the adoption of Reference Management Systems (RMS), primarily focusing on awareness of RMS as the independent variable. It highlights the role of intervening factors such as technological competencies and training, which can facilitate or hinder this adoption process. Additionally, perceived benefits of RMS play a crucial role in encouraging users to embrace the system, as individuals are more likely to adopt it if they see the advantages. The institutions also have a role in providing customized support to their students at different levels of technological competencies. Ultimately, controlling the external factors such as academic discipline, software access, internet reliability, and power supply was vital for accurately assessing the determinants of RMS adoption in an educational setting.

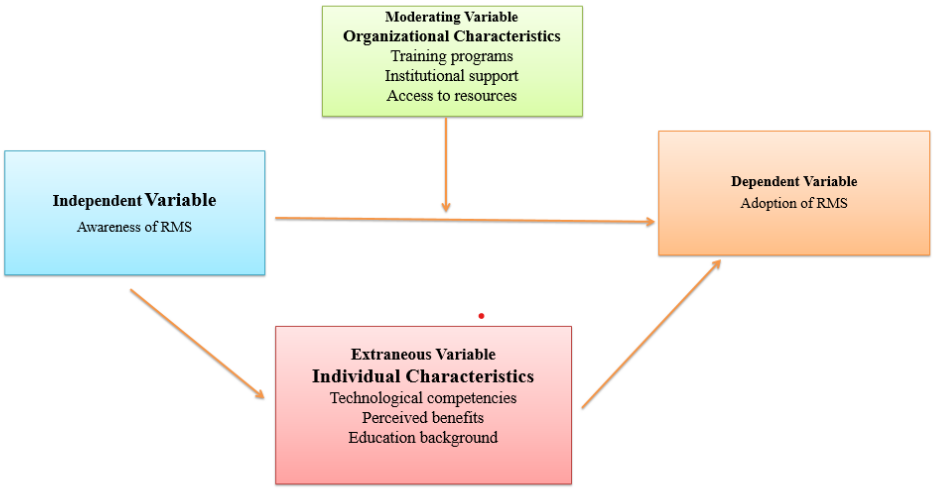


Figure 1. 1: The relationship between Awareness and the Adoption of RMS(A conceptual Framework)

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examines relevant literature, listing key elements that researchers have investigated. This aids in the identification of research gaps, which are the focus of this work. The literature review was presented in empirical domains resulting from the research objectives and the theoretical framework.

2.2 Reference Management Software

Reference Management Software (RMS) is a digital tool that helps authors organize and create a library of references. It allows authors to tag or create folders, produce bibliographies, citations, and references in various styles, and import records from library catalogues (Osmani et al., 2016; Tramullas et al., 2015). RMS software often comes with Word processing software plug-ins, allowing users to add references directly into a Word document (Quach, 2021). Key roles of RMS include creating a citation database, organizing and tracking relevant documents, and formatting citations and references. Popular RMS packages include Zotero, Mendeley, Endnote, and Refworks. Others include CiteMe, Scientific Social Bookmarking, CiteULike, BibSonomy, BibDesk, JabRef, Papers and Bookends, Citavi, and Qiqqa (Nitsos et al., 2022; Rincón Castillo et al., 2022).

2.3 Perceived Benefits of RMS

Academic writing involves citing multiple sources which can be time-consuming and frustrating, but proper citation and referencing are crucial for credibility,

acknowledging sources, and preventing plagiarism (Vijai et al., 2019). Reference Management Software (RMS) has made the process faster and more effective, allowing researchers to store, organize, output, and share their references (Hendal, 2019; Mhokole & Kimaryo, 2023; Wahyuningsih, 2020). RMS has evolved to integrate with other software like MS Word, making citation and reference list generation easier. This tool streamlines the citation locating process, enables in-text citations in various styles, formats reference lists, stores files, and bibliographic details, and facilitates team annotation of shared sources (Hermanns & Skinner, 2022). Thus, RMS are essential tools in enhancing academic writing and promoting research productivity.

2.4 Awareness and Knowledge of RMS

Rogers' theory suggests that adopting an innovation requires awareness of its existence, usage, and purpose. However, previous research does not bring out the role of awareness and knowledge in the adoption of RMS. Motlhake (2021) observed a 59% awareness rate at the University of Limpopo in South Africa and a usage rate of 45%. This insinuates that the lower usage of RMS is not associated with low awareness rates. On the contrary, Hendal's (2019) study purports that a higher percentage of respondents did not use RMS tools because they did not know how to use them. 58.6% of the respondents indicated a low level of familiarity, while 25.9% indicated that they found the tools too complicated. Over half of the respondents (72.1%), including users, indicated a need for RMS training to understand how the tools work (Hendal, 2019). Mhokole and Kimaryo (2023) also revealed a need for more targeted training and practice of RMS usage. The findings of the study provide more understanding of this phenomenon.

2.5 Attitude towards RMS

Some studies reveal that users' attitudes toward reference management software (RMS) significantly influence its initial adoption and continued use. For instance, in Indonesia, RMS received high acceptance from teachers and students (Setiani et al., 2020), leading to high usage. Similarly, in Egypt, scholars have a positive attitude toward the ease of use and usefulness of RMS, which drives its adoption (Farag, 2019). However, Mhokole and Kimaryo (2023) discovered that despite having a positive attitude towards RMS, many users faced challenges such as internet connectivity, stable power supply, and technical support, resulting in low usage rates.

It is largely believed that researchers' attitudes towards RMS play a critical role in its adoption, as they influence decisions to embrace or reject innovations. Rogers suggests that a positive attitude toward innovation is linked to higher adoption rates (Rogers, 2003). However, this study unveiled the relationship between attitude and the choice to adopt or reject RMS.

2.6 Innovation Characteristics

Various innovation characteristics drawn from the Innovation of Innovation Theory are likely to influence the adoption of RMS. These characteristics include perceived relative advantage, complexity, compatibility, trialability, and observability. The term perceived relative advantage relates to the perceived superiority of an innovation over its alternatives. Adeyemi et al. (2020) observed that RMS is perceived to be more time-efficient, less costly, and accurate, leading to higher research productivity. However, low usage records have been recorded due to users not being aware of these benefits or finding the tools difficult to use (Adeyemi et al., 2020; Setiani et al., 2021).

Compatibility is the ability of an innovation to fit into existing values, needs, and practices. Reference Management Software can be seamlessly integrated with various research tools, including web browsers and Microsoft Office applications, to streamline and enhance academic workflows. According to Parabhoi, Kumar and Pathy (2017), and Speare (2018), most users prefer Mendeley and Zotero because they can be integrated with Microsoft Word, Google Docs, and other applications through plugins. Complexity is the perceived ease or difficulty of understanding and/or using an innovation (Bakkabulindi, 2014). Lonergan (2017) and Nilashi et al. (2019) observed that Students are more willing to adopt an innovation that is easy to use and reject one that is perceived to be complex. Thus, low rates of RMS usage have been documented, largely because of the complexity of the tools. On the contrary, most individuals who reported to have frequently used RMS mentioned that they had received training on how to use them, thus found them to be less complex (Mhokole & Kimaryo, 2023; Speare, 2018).

Trialability refers to the degree to which an innovation can be tried before it is fully embraced. This allows users to explore the features of specific RMS tools and decide on their suitability to meet their needs before fully adopting them. Observability is the degree to which the outcomes of implementing an innovation are evident to others. The visible benefits and success stories, such as time-saving and accuracy, are likely to impact the perception of potential users, and consequently their decision to adopt RMS (Almaiah et al., 2022).

2.7 Challenges Faced by Reference Management Software Users

Research shows that despite the acknowledged benefits, the usage of RMS remains low among students and researchers. Researchers associate this low usage with a variety of

drawbacks such as time-consuming familiarization with features, licensing requirements, frequent updates, and the need for a constant internet connection (Lonergan, 2017; Nilashi et al., 2019). Lack of technical support, lack of awareness of alternatives, difficulty in installation, and technical support are also cited as key challenges in the utilization of RMS (Adeyemi et al., 2020; Osmani et al., 2016). Other challenges include cloud storage costs, learning difficulties, complex software, insufficient training, and language barriers (Rangaswamy & Babu, 2021). Users also find learning and practicing RMS challenging and time-consuming (Speare, 2018).

Summary

Reference Management Software (RMS) is a crucial tool in research, enabling faster and more accurate creation, organization, and formatting of references. However, literature showed that the adoption of RMS is minimal. Despite positive attitudes towards RMS, challenges like perceived complexity and lack of training persisted in the literature. This study investigated context-specific awareness gaps, perceived benefits, adoption factors, and usage patterns at Tangaza University, contributing to the broader discourse on RMS adoption and confirming previous studies findings.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter discusses the methodological aspects of how the research study was conducted. These include the research design, study location, target population, sample methodologies, data collection procedures, research tools, as well as logistical and ethical considerations.

3.2 Research Approach

The study adopted a mixed-method approach to collect quantitative and qualitative data. Survey questionnaires for quantitative data were distributed to students and key informant interviews conducted with library staff for qualitative data.

3.3 Research design

The study employed a correlational design, combining qualitative and quantitative methods to understand postgraduate students' awareness and attitudes, and their impact on the adoption of RMS.

3.4 Study Site

The study was conducted at Tangaza University which is located in Nairobi county near Karen. The university hosts a diverse population from across Africa allowing for a comprehensive examination of perceptions and patterns. The institution offers a range of programs from short courses to postgraduate programs. Its strong emphasis on

research and academic excellence implies a commitment to adopting learning tools and technologies, making it an ideal setting for this study.

3.5 Target Population

The study targeted a population of 150 postgraduate students from the five institutions-Institute of Philosophy (IOP), Institute of Youth Studies (IYS), Centre for Leadership Management (CLM), Institute of Social Communication (ISC) and Institute for Social Transformation (IST) and 12 library staff at Tangaza University.

Table 3. 1: Target Population

Category	Number of Postgraduate Students
Postgraduate Students	150
Library Staff	12
Total	162

3.6 Sampling Technique

3.6.1 Sampling Design

The researcher selected a representative sample from the target population through random sampling for the students and purposive method for library staff. According to Etikan and Bala (2017), a sample should be selected to accurately represent the population and should possess similar characteristics to the general population.

3.6.2 Sample Size

According to Mugenda and Mugenda (2003), a sample of 10-30% of the target population is sufficient to represent the study population and draw conclusions on the findings. However, to increase reliability, a higher percentage would be better. The

Yamani formula was applied to determine the sample size resulting in 109 postgraduate students:

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

Where:

n=minimum returned sample size

N=Population size=150

e= Margin error expressed as a decimal=0.05

n=1501+150(0.05)^2 n=1501.375 n=109

Therefore, the sample size for the study as calculated through Yamane's (1967) formula, was 109 postgraduate students. Four (4) targeted library staff were interviewed.

Table 3.2: Sample Size Matrix

Category	Estimated Population	Sample Size	Percentage (%)
Postgraduate Students	150	109	72.6
Library Staff	12	4	33
Total	162	113	69.75

3.7 Data Collection Methods and Tools

3.7.1 Data Collection Methods

Structured online survey questionnaires were administered to postgraduate students through email. The questionnaires helped to gather data on the awareness, attitudes, and usage patterns of reference management software. The researcher conducted key

informant interviews with library staff to acquire insights into the organizational context, the difficulties, and the support systems linked to RMS adoption.

3.7.2 Data Collection Tools

Structured survey questionnaires with both closed and open-ended questions were used, as well as interview guides for key informant interviews.

3.8 Pre-testing

Dikko (2016) emphasizes the importance of pre-testing data collection tools and methods to identify flaws and ensure they are relevant, clear, and effective. Yogesh (2006) suggests that piloting results should have a 10% sample size. This study involved a pilot study of 9 questionnaires and one interview with library staff at the Catholic University of East Africa(CUEA), to ensure the instruments were relevant and effective.

3.8.1 Validity and Reliability

The validity of the study was ensured through expert judgement from the supervisor and concurrent validity where questionnaires were administered to a pilot group at the same time and the responses were compared for appropriateness. Reliability of the study was ensured through the test-retest method, where the researcher administered the same questionnaire to a 9-member pilot sample twice in the interval of one week. The results were correlated. The outliers observed were corrected before administering the questionnaires to the actual sample.

The research also carried out triangulation of data for a contrast between the data derived from questionnaires and interviews. The results of the different tools were consistent confirming that the tools were valid and reliable.

3.9 Data Analysis and Presentation

The quantitative phase used Excel and SPSS to analyse quantitative data, identifying themes and trends. Qualitative data was fused with the themes and analysed to support the initial data. The research carried out a regression analysis to test the hypothesis that determined the relationship between awareness of RMS and the adoption behaviour of users. The data was presented in narratives, verbatim, tables, and figures.

3.10 Logistical and Ethical Considerations

The researcher adhered to ethical standards, obtaining a letter from Kenyatta University(KU), a research permit from NACOSTI, a Data collection permit by Tangaza University, and university ethics clearance. Participants were informed of the research's purpose, methods, risks, and obligations through a consent form. The researcher ensured confidentiality and anonymity of the data by not collecting emails or any other identifying information. The data was extracted into Excel through Google Drive, which was only accessed by the researcher.

CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

The chapter covers the study's findings, interpretation, and the discussion connecting them to the objectives, hypothesis, and the literature review. The study's objectives were to analyse the existing level of awareness, assess the perceived benefits, investigate the factors driving acceptance or rejection, and evaluate the usage patterns of RMS among postgraduate students at Tangaza University. Data obtained from respondents were presented and interpreted using tables, graphs, charts, and verbatim.

4.2 General and Demographic Information

4.2.1 General Information

The study was conducted at Tangaza University, located in Nairobi, Kenya. The program leaders (who act as administrative assistants) of all the institutes at Tangaza University were very helpful in administering the online survey to the students through emails and WhatsApp groups. They acted as the link between the researcher and the students since they coordinated and communicated with the respondents.

The researcher, upon receiving authorization from the Research Office, approached every institute and met the program leaders. The researcher introduced herself and the purpose of her study, and how she intended to carry out the data collection. Some program leaders offered to administer the survey questionnaire, while others shared the email addresses of their students, through which the researcher shared the survey questionnaires. Physical administration of the questionnaires would have contributed

to a higher response rate. However, a greater number of the students were not physically present in the institution which compelled the researcher to opt for online survey. The researcher waited up to 3 weeks after administering the questionnaires before analysing the data. This allowed the respondents ample time to submit their responses. Since the survey was done online, it was difficult for the researcher to follow up on the respondents.

The researcher conducted 4 interviews with targeted library staff with the guidance of the Deputy Chief Librarian. The researcher met the interviewees on a single day and spent at least 40 minutes with each interviewee. The interview discussion was recorded through note-taking and audio recording. The respondents were allowed to go through the interview guides before the interviews. They were also asked if they were comfortable with audio recording to which they all consented.

4.2.2 Response Rate

The researcher targeted a population of 150 postgraduate students at Tangaza University and 12 library staff. From the 150 postgraduate students, the researcher randomly selected a sample of 109 respondents from all institutes (Institute of Philosophy (IOP), Institute of Youth Studies (IYS), Centre for Leadership Management (CLM), Institute of Social Communication (ISC) and Institute for Social Transformation (IST)) that had postgraduate programs in the university. The researcher realized a significant response rate with 61 responses out of 109. This amounts to 56% which, according to Durbarry (2017) a response rate of more than 50% is acceptable and suggests a significant level of engagement with the respondents.

4.2.3 Demographic Information

The study sought to understand the distribution of personal characteristics of the postgraduate students such as age, gender, and educational levels. It connected these to their interactions with other variables in influencing the adoption, usage patterns, and or rejection of reference management software at Tangaza University.

4.2.3.1 Gender

Both male and female postgraduate students responded to the questionnaires. Male and female respondents were distributed as follows:

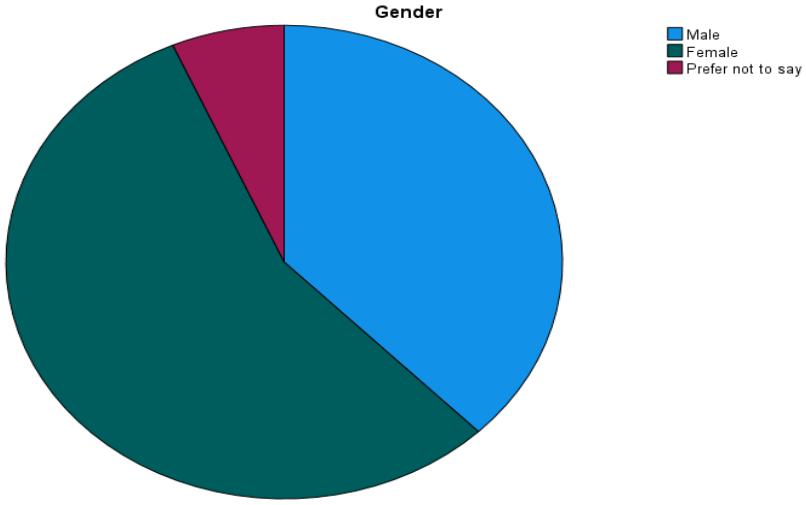


Figure 4. 1: Gender Distribution
Source: (Research Data, 2024)

Figure 4. 1 revealed that female respondents superseded male respondents with 54.8% against 38.7%, respectively. 6.5% preferred not to disclose their gender. These findings indicate an imbalance in gender distribution that suggests a need for further study to investigate the factors that affect gender distribution in the adoption of RMS.

4.2.3.2 Age Distribution

The researcher sought to understand the age distribution of the respondents which is shown in figure 4.2 below:

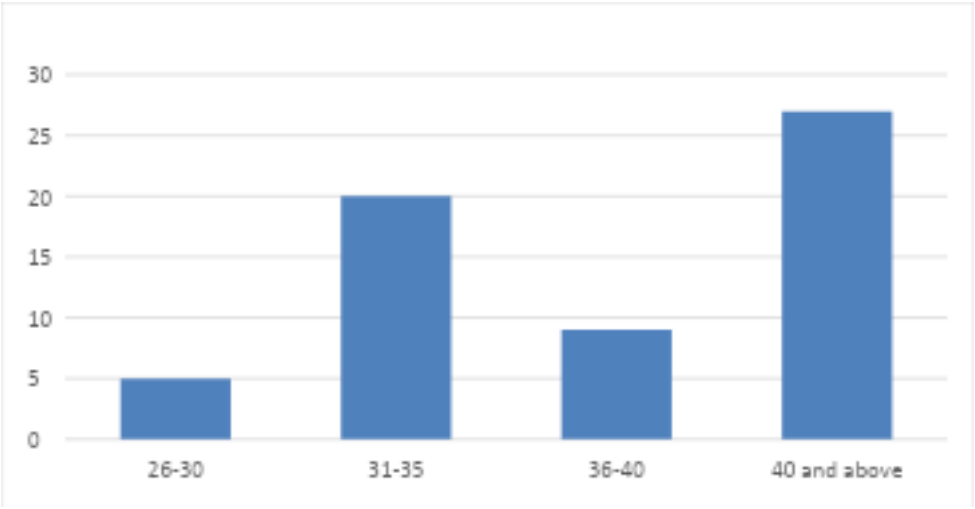


Figure 4. 2: Age Distribution
Source: (Research Data, 2024)

The findings in Figure 4. 2 denote that most postgraduate students in Tangaza University (44.3%) are 40 years and above, followed by 31-35 (32.8%). Those that within 36-40 and 26-30 ranges are 14.8% and 8.2% respectively. These findings imply that a significant portion of postgraduate students are older adults, where 44.3% are above 40 years, and 14.8% are between 36-40 years old. The significant 59.1% group of learners may have returned to postgraduate programs for professional development, self-actualization, or career advancement. This is unlike the 41% of younger groups between 26-35 years of age who often seek higher qualifications for better jobs, change of career, and promotions.

Understanding the age distribution of the population enables the institution to design and develop programs, strategies, and services tailored toward meeting the individual needs of different age groups. Drawing from the results of this investigation, Tangaza University have more mature (older) postgraduate students. This implies a need for training programs and support services designed to accommodate the learning needs of the older students.

4.2.3.3 Age Versus Gender

The research further sought to unveil the relationship between gender and age. Figure 4.3 shows the age distribution in relation to gender.

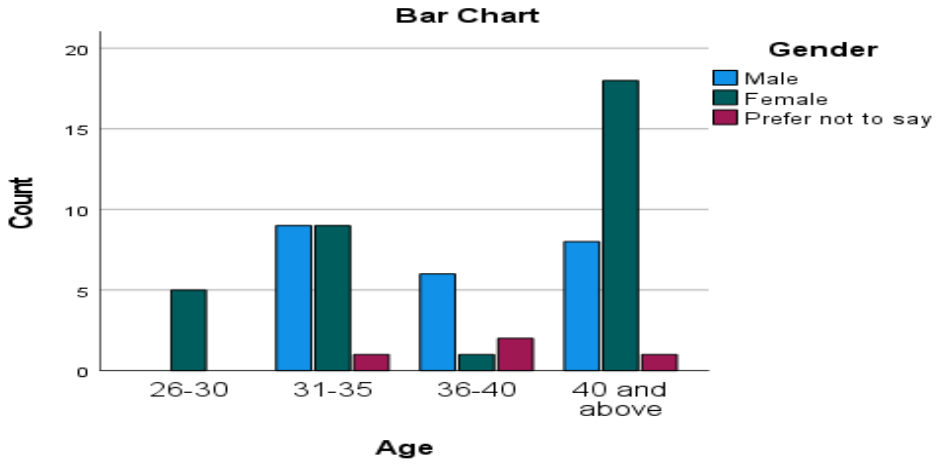


Figure 4. 3: Age versus Gender
Source: (Research Data, 2024)

Figure 4. 3 revealed that the category of ages 40 and above had more females as compared to males at 18 versus 8, respectively. There was a shift at 36-40, where 6 respondents were male, and only one female. Males and females tied at 31-35 years with 9 each, with no males under 26-30 years of age, and 5 females.

The statistics may imply that Tangaza University enrols more females for postgraduate programs at an older age than males, probably because at an earlier age, 36-40 years, they are occupied with parenting. On the contrary, it seems that more men enrol for postgraduate studies at 36-40 years. This could be because men are not very engaged in parenting and other domestic tasks. At the age of 31-35 years, there is an equal distribution in gender, which insinuates that both males and females at this age are chasing careers and better job positions, which sends them back to school to gain further education and qualifications.

The lack of any males at the age of 26-30 years could be associated with the fact that most young men at this age enter the job market directly from undergraduate programs to gain a footing in the job market. Their female counterparts could have better chances to continue post-graduate studies since there are less expectations of them by society.

4.2.3.4 Level of Education

The study targeted postgraduate students either at Masters' or PhD level. The figure 4.4 shows the distribution of students by their level:

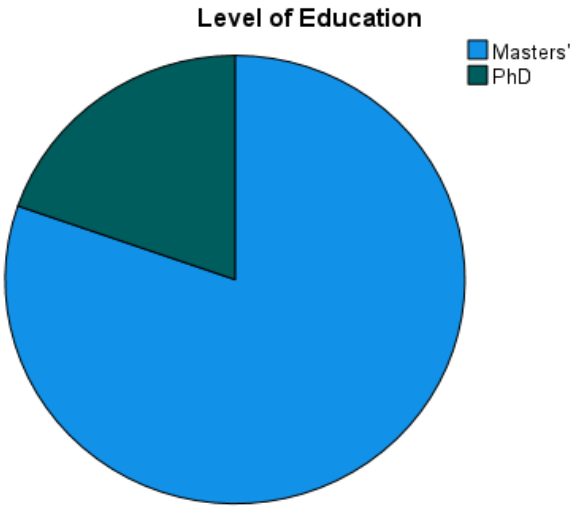


Figure 4.4: Education Level
Source: (Research Data, 2024)

Figure 4. 4 shows that most respondents (80.6%) were pursuing a master's degree, while only 19.4% were pursuing PhD programs. This implies that the greater portion of postgraduate students in Tangaza University are master's students as compared to only 19.4% of PhD students. This could mean that, while many students enrol for Master's programs very few, after completing their master's proceed to PhD, or it takes time before they return, which makes their enrolment at any given time less than that of master's programs. It may also mean that the university has a generally low

enrolment for PhD for various other factors such as programs available, fee requirements, and availability of resources among others.

4.3 Awareness of Reference Management Software

The researcher sought to understand the respondents' level of awareness of reference management software. To achieve this, respondents were asked to rate their level of familiarity with RMS (*very familiar, familiar, I have heard about it and I have never heard about it)*. The respondents reported as follows:

Table 4.1: Level of Familiarity

Level of Awareness	Frequency	Percentage (%)	Cumulative Percentage (%)
Very	5	8.2	8.2
Familiar	17	27.9	36.0
I have heard about it	30	49.2	85.3
I have never heard about it	9	14.8	100
Total	61	100	

Source: (Research Data, 2024)

From the findings in Table 4. 1, only a small number of respondents (8.2%) reported being very familiar with RMS, which suggests that the 8.2% have a high level of knowledge and understanding of the tools, and a high likelihood that they have used the tools. 27.9% of respondents reported that they were familiar with the tools, which implies a significant level of awareness and understanding of the tools and how they are used, and a likelihood of occasional usage of the tools. The largest percentage, 49.2% reported to have only heard about it. This implies that although the respondents are aware of the existence of the tools, they have little or no knowledge and understanding of the tools and their usage. There is a high likelihood that they have not utilized the tools. A notable number, 14.8% of the respondents said they had never

heard about it. This implies that this group of respondents has no exposure at all to Reference Management Software or its use.

The low level of awareness and knowledge indicates a significant gap in knowledge dissemination and interest in technological innovations that are meant to aid learning and research activities. Therefore, there is a need for more user-tailored and effective strategies for creating awareness and training on emerging trends in education, technology, and research such as Reference Management Software. The institution has a great opportunity to enhance the usage of RMS among students by training them on available tools, how they work, and their importance in expediting their research processes. Consequently, the institution will experience a growth in research productivity, which could also lead to a high ranking in their education productivity.

4.3.1 Communication Channels

The researcher wanted to find out how the respondents got to know about the Reference Management Software. The researcher categorized the possible channels of communication into *Library orientation, information literacy training, self-discovery, peers and associates, and workshops and library training*. Figure 4.5 shows the findings:

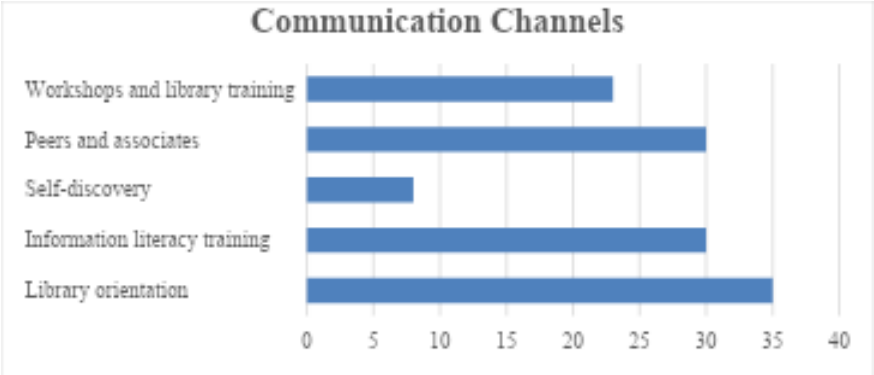


Figure 4. 5: RMS Communication Channels
Source: (Research Data, 2024)

The findings from Figure 4. 5 indicate that most respondents (35) learned about RMS through library orientation, followed by information literacy training, peers, and associates (30). 23 respondents learned about RMS in workshops and library training, and only 8 learned the RMS through self-discovery. These findings are correspondent with the findings from the interviews where some respondents indicated that postgraduate students get introduced to RMS through training and library orientations (R1 & R3, 2024).

4.4 Adoption of Reference Management Software

The research sought to understand the adoption rate of RMS among postgraduate students in Tangaza University. According to Rogers (2003), adoption is the decision made by an adopter to use and continue utilizing an innovation after they have heard about it. The respondents were asked to indicate yes or no on whether they had ever used RMS tools. Figure 4.6 shows the findings:

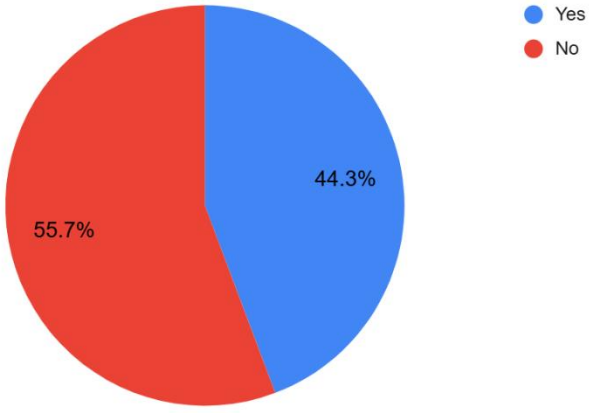


Figure 4.6: RMS Adoption Rate
Source: Research, 2024

Figure 4. 6 above reveal that a higher percentage, 55.7% of the respondents have never used RMS tools, while only 44.3% have used the tools. The findings suggest gap in awareness and knowledge of RMS among postgraduate students. It may also imply that

the respondents find the tools to be complex, difficult to learn and use, or have a generally negative attitude towards RMS tools.

Further, the researcher sought to understand how the respondents had adopted compared to their level of familiarity with the RMS. The table below shows how the respondents have adopted RMS depending on their level of awareness.

Table 4.2: Level of Familiarity versus Usage

Familiarity	**RMS Use**		**Total**
	Yes	**No**	
Very familiar	5	0	5
Familiar	16	1	17
I have heard about it	6	24	30
I have never heard about it	0	9	9
Total	27	34	61

Source: (Research Data, 2024)

From Table 4. 2, 21 respondents who had a reasonable level of familiarity with RMS have used the tools. Furthermore, 6 respondents who had heard about the tools reported having used them. In contrast, 33 of the respondents who were either unaware of the tools or had never heard of them stated that they had never used them. Furthermore, one responder who was familiar with RMS stated that they had never utilized the software. These data imply that awareness of RMS is positively connected is RMS adoption, as the vast majority of respondents who were aware of the tools have utilized them. However, there may be some people who are familiar with RMS but have not used the tools for different reasons. The findings revealed a need for more awareness campaigns and sensitization on RMS and their benefits.

To lay the basis for calculating the relationship between the two variables; Level of awareness (denoted by level of familiarity of RMS) and Adoption rate (denoted by the frequency of RMS use), the sum of the scores of x (Level of awareness) and y (Adoption

rate) were computed. The sum of products and squares of the two variables were then calculated as shown in table 4.3 below.

Table 4. 1: Relationship between Level of awareness and Adoption of Reference Management Software

Adoption of Reference Management Software				n=30
Level of familiarity of RMS (x)	Frequency of RMS used (y)	(xy)	(x^2)	(y^2)
1	1	1	1	1
1	1	1	1	1
1	1	1	1	1
1	2	2	1	4
2	2	4	4	4
2	2	4	4	4
2	2	4	4	4
3	4	12	9	16
3	4	12	9	16
3	2	6	9	4
3	4	12	9	16
3	4	12	9	16
3	4	12	9	16
4	5	20	16	25
4	2	8	16	4
4	4	16	16	16
4	4	16	16	16
4	4	16	16	16
4	4	16	16	16
4	4	16	16	16
4	4	16	16	16
4	2	8	16	4
4	2	8	16	4
4	2	8	16	4
4	4	16	16	16
4	5	20	16	25
4	5	20	16	25
5	2	10	25	4
5	5	25	25	25
5	5	25	25	25
1	1	1	1	1
1	1	1	1	1
1	1	1	1	1
$\Sigma x=98$	$\Sigma y=95$	$\Sigma xy=346$	$\Sigma x^2=368$	$\Sigma y^2=359$

Source: Research Data, 2024

In order to measure how strong a relationship is between the two variables; Level of awareness (x) and Adoption rate (y), a Pearson Correlation Coefficient (r) formula was

applied on the data analyzed in Table 4. 3 above in order to calculate the correlation coefficient. A covariance of the two variables was calculated and then divided by the product of their standard deviations as shown below: -

$\Sigma x=98$ $\Sigma y=95$ $\Sigma xy=346$ $\Sigma x^2=368$ $\Sigma y^2=359$

$r = 30(346) - (98 \times 95) / [\sqrt{\{[30(368) - (98^2)] \times [30(359) - 95^2]\}}$
$r = 10,380 - 9,310/\sqrt{\{[11,040 - 9,604] \times [10,770 - 9,025]\}}$
$r = 1,070/\sqrt{(1,436 \times 1,745)}$
$r = 1,070 /\sqrt{2,505,820}$
$r = 1,070 / 1,582.98$
$r = 0.676$

From the calculation, the numerical value of the correlation coefficient was 0.676 and on a scale of −1 to +1 this figure was closer to 1.0, therefore suggesting the presence of a strong positive relationship between the Level of awareness (x) and Adoption rate (y), The sign of the correlation coefficient being positive also suggested that increased awareness of RMS strongly increased adoption rate and vice versa.

The effect of the size of the correlation called the coefficient of determination defined as r^2 showed that the percentage Level of awareness (x) and Adoption rate (y), could be predicted from the relationship between the two variables. For $r = 0.676$ then r^2 is 0.457, which predestined that 45.7% of the variation in Adoption rate (y), could be credited to the Level of awareness. Conversely, 54.3% of the variation in Adoption rate (y), could not be explained as resulting from Level of awareness (x) on use of RMS).

Using the x (level of familiarity of RMS) and y (Frequency of RMS use) values a scatter graph was plotted to represent the direction of the relationship as shown in figure 4.7 below.

Regression analysis

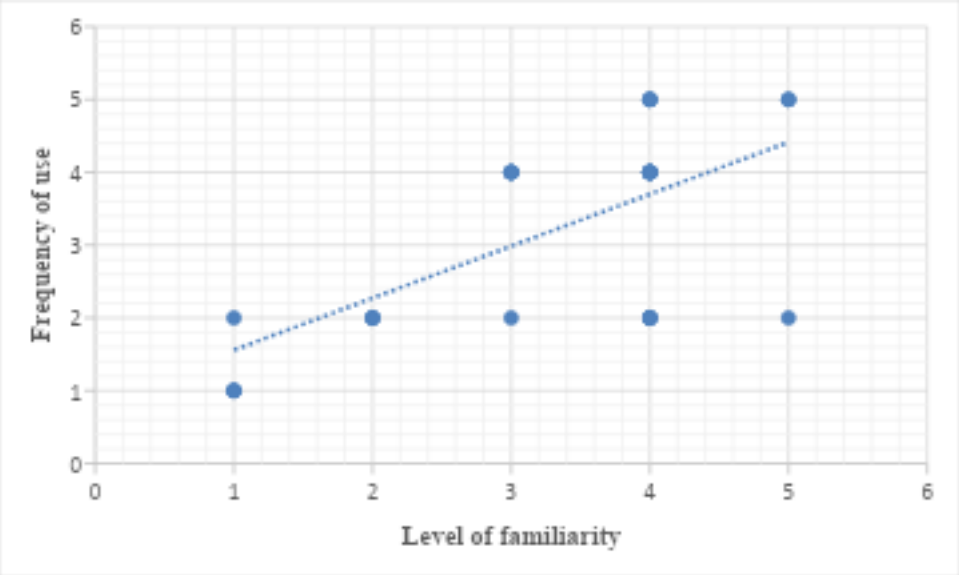


Figure 4. 7: Level of awareness and Adoption of Reference Management Software
Source: (Research Data, 2024)

As shown in the scatter graph in Figure 4. 7 above, a line was drawn through the data to get the best fit or the least square line. To draw comparison between **Level of awareness (denoted as level of familiarity of RMS) and the adoption of Reference Management Software (represented as the frequency of RMS use)**, this line of best fit was used to calculate the slope intercept form $y = mx + b$ that was used to make true predictions.

The study then used linear regression to forecast the value of y (**Adoption of Reference Management Software**) for a given value of x (**Level of awareness**), by determining, the line $y = mx + b$

According to Lial, Greenwell and Ritchey (2016), the "least squares" method is a form of linear regression that gives the relationship between the data points. Based on the

analyzed data in table 4.3, the equations below were used to solve for ***m*** first, and then solve for ***b***.

$\Sigma x=98$ $\Sigma y=95$ $\Sigma xy=346$ $\Sigma x^2=368$ $\Sigma y^2=359$

$$m = \frac{n(\Sigma xy)-(\Sigma x)(\Sigma y)}{n(\Sigma x^2)-(\Sigma x)^2} \qquad b = \frac{\Sigma y - m(\Sigma x)}{n}$$

m=30(346) – (98)(95)/30(368)-(98)^2,
=10,380-9,310 /11,040-9,604
=1,070 /1,436
m=0.745

b=95-0.745 (98)/30,
=95-73.01/30,
=21.99/30
b=0.733
y = mx + b

y =0.745x + 0.733

From the calculations, predictions of ***y*** (**Adoption of Reference Management Software**) were made from the given values of ***x*** (**Level of awareness*)*** using the equation y =0.745x + 0.733 as shown in the graph in figure 4.8 below.

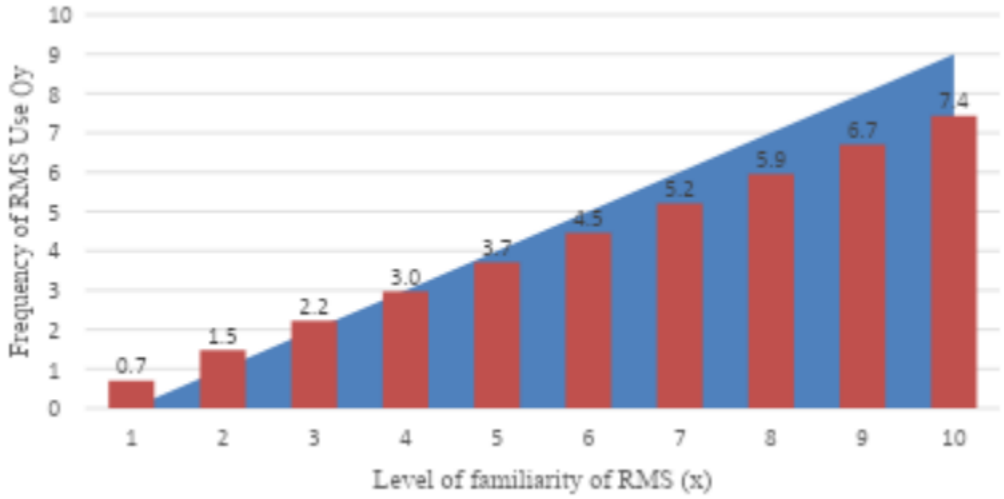


Figure 4. 8: Adoption of Reference Management Software based on Level of awareness
Source: (Research Data, 2024)

From the graph in figure 4.8 above, the line starts out at 1.6 as the rate of Adoption of RMS and the y-values increase at a rate of 0.7 for every single training on use of RMS (Level of awareness) created by the university.

Using the function y =0.745x + 0.733 predictions were made for the increase in Number of times RMS use (adoption) as a result of increase or decrease in Level of awareness (trainings). The regression analysis also informed that postgraduate students at Tangaza University, Kenya could still adopt the use of reference management software using the previously acquired knowledge or information from other sources other than from the awareness created by the university,

4.4.1 Respondents' Perception of RMS

The researcher went further to evaluate whether the respondents found RMS tools to be beneficial to them or not. According to Rogers (2003), Relative advantage is the extent to which an adopter finds an innovation to be more beneficial to the one preceding it. To understand this, the respondents were asked to rate how beneficial they felt RMS was to their research practices. The figure below illustrates the findings:

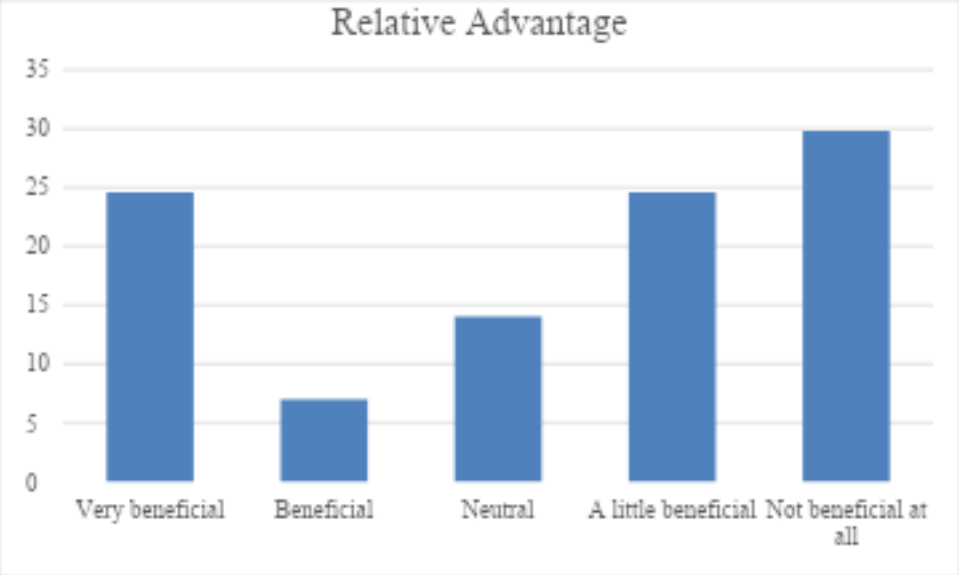


Figure 4. 9: Perceived Relative Advantage
Source: (Research Data, 2024)

From the findings in Figure 4. 9, the highest number of respondents, 29.8% indicated that they did not find RMS tools to be beneficial at all, compared to 24.6% who found RMS to be very beneficial. 45.6% ranged between beneficial and a little beneficial.

When generalized, 70.2% perceived RMS tools to be more beneficial than manual referencing, although to a varying extent. These findings suggest that although a significant 29.8% of respondents find RMS tools not beneficial at all, most respondents find RMS tools to be at least more beneficial than manual referencing.

The mixed feelings posed by a notable 45.6% of respondents who indicated that they found the RMS beneficial and a little beneficial suggest that there may be obstacles that bar respondents from experiencing the full benefits of RMS tools, or they have little or no training on the tools. This indicates a need for more targeted awareness and comprehensive training on RMS tools and their benefits. Furthermore, the respondents who found RMS to be very beneficial can act as ambassadors to share their success stories and best practices to encourage others to adopt the tools for their benefit. In order to introduce users to the benefits of RMS and help them make informed decisions about whether to use or reject it, trials and demonstrations could serve as valuable tools.

4.5 Perceived Benefits of Reference Management Software

The researcher wanted to find out the benefits experienced by the users. She outlined possible benefits guided by the Diffusion of Innovation Theory. These benefits include saving time, making referencing more efficient, facilitating collaboration and sharing, ensuring consistency, ensuring accuracy, helping manage PDF files, providing search interphase to online databases, and integrating with other applications like MS Word. Figure 4.7 shows the findings:

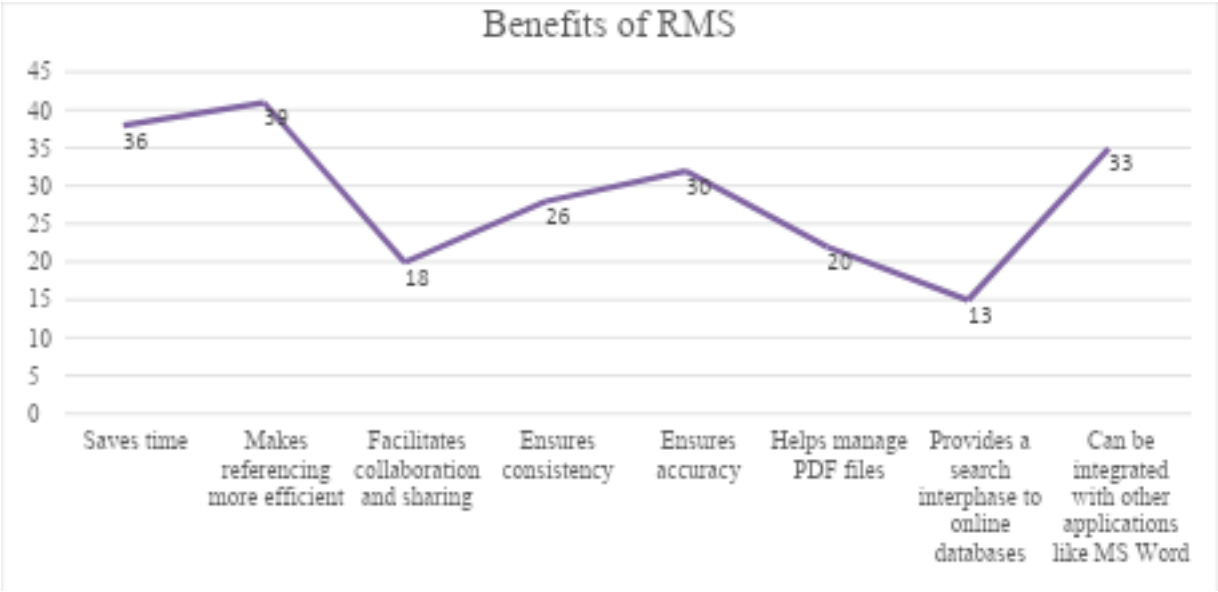


Figure 4. 10: Perceived Benefits of RMS
Source: (Research Data, 2024)

Figure 4. 10 revealed the benefits perceived by respondents as they interacted with RMS. Most respondents indicated that RMS tools save time (36%), make referencing more efficient (39%), and can easily be integrated with other applications such as word processing apps (33%). A significant number said that the tools ensure accuracy (30%), ensure consistency (26%), and help manage PDF files (20%). Although facilitating collaboration and sharing (18%) and providing a search interphase (13%) have less frequency, a significant number still indicated them as notable benefits. The findings are further discussed below:

a. *Efficiency and time saving*: According to Proske et al. (2023) the main aim of RMS is to expedite the referencing process. This is supported by the significant portion of respondents who indicated that RMS tools are beneficial because they save time, and make referencing more efficient. These benefits are crucial in streamlining academic workflow as they lead to more productivity and quality research output. Integration

with word processing also supports this productivity as it makes the process seamless and easy.

b. *Accuracy and consistency*: 30% and 26% of responses showed that RMS tools are also valued for their accuracy and consistency, which are paramount in avoiding referencing errors and upholding academic standards. The findings also emphasize the importance of academic integrity and indicate a need for improved training and advocacy to promote higher adoption and usage among postgraduate students, thereby enhancing the quality of academic work.

c. *Management of PDF files*: 20% of respondents indicated that they found RMS tools to be beneficial for managing PDF files. This is because the tools allowed users to organize, store, and access PDF files from their customized libraries. This adds to saving time and more productivity since the user does not need to search sources on the browser, but can access them directly from their RMS libraries.

d. *Collaboration and sharing*: Although only 18% of respondents noted this benefit from using RMS, it is recognized as important, especially in research processes involving group work and core authorship. This enables users to work simultaneously as a team or share resources when they are working on a common project.

e. *Search Interphase*: Although less frequently mentioned by respondents (13%), the findings show that RMS is valuable in that it provides a quick way of searching information materials directly from its search interphase. The modest proportion, however, demonstrates the higher need for consumers to get practical training that will allow them to reap some of the least studied benefits.

4.5.1 RMS tools used by the respondents

The researcher wanted to find out which RMS tools were known and used by the researchers who indicated that they had used RMS. The findings are illustrated in the figure below:

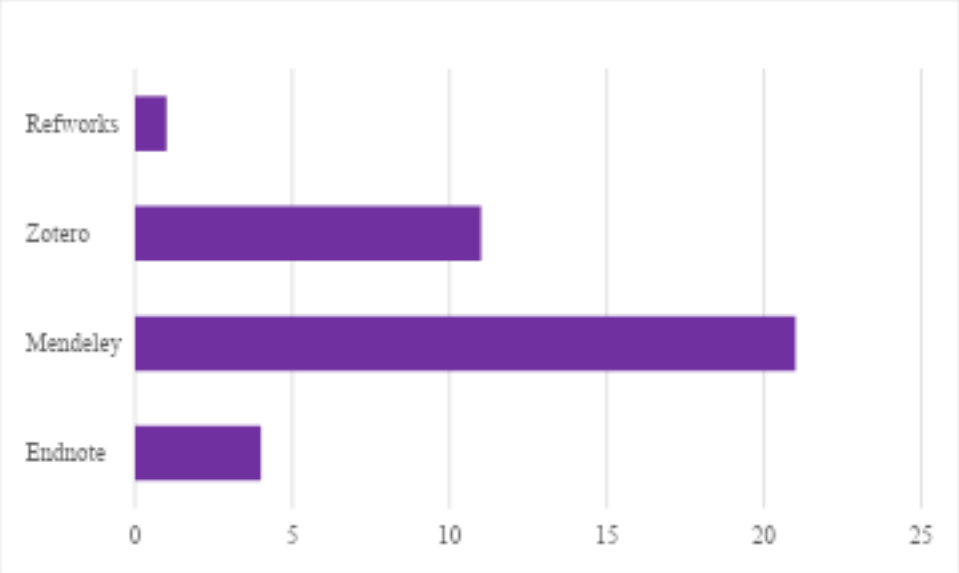


Figure 4. 11: Commonly Used RMS Tools
Source: (Research Data, 2024)

The findings in Figure 4. 11 indicate that Mendeley is the most commonly used RMS tool in Tangaza University with 56.8%, followed by Zotero with 29.7%, while Endnote and RefWorks only had 10.8% and 2.7% usage respectively. The purpose of this question was to identify the most popular tools, which would further help identify features in each tool that make them more preferable than others.

a. *Mendeley*: Mendeley is the most popular tool (56.8%) among post-graduate students in Tangaza University, perhaps due to its ease of use, accessibility, and cost among other benefits. Mendeley for a long time has been a cost-free RMS tool, which may have attracted more users. Although new users may have to pay going forward because it has become proprietary, all those who registered before this transition can still enjoy free services from Mendeley. This popularity may also be attributed to

training. If students attend training where Mendeley is used to train and demonstrate, they are more likely to prefer it to other tools with which they are not familiar.

b. *Zotero*: Zotero is the second most popular (29.7%) in Tangaza University. This shows that as much as Mendeley is the most popular tool, Zotero is also notably common among users in Tangaza University, which suggests that it is also able to meet the needs of post-graduate students in Tangaza University. Although Zotero offers a free package, the package has limited storage, which requires the user to subscribe for more space. This may pose a challenge for users to continue utilizing the tool when they cannot afford the subscription fee.

c. *Others*: Endnote and RefWorks are less common among post-graduate students in Tangaza implying that they are less known and used, which could be attributed to cost implication, complexity, and peer influence.

4.6 Factors Influencing the Choice of RMS

The researcher sought to understand the respondents' experience with RMS, and how this experience impacted their continued use or rejection of RMS. The respondents were asked to indicate the extent to which they agreed with the statements below:

a. Using RMS has enabled me to write my research more efficiently.
b. RMS has enabled me to save more time than manual referencing
c. It is easy to integrate RMS into MS Word making my workflow seamless
d. It is easy to learn how to use RMS
e. The features of the RMS I use are quite user-friendly
f. I use RMS because my peers use it
g. My faculty convinced me that RMS is crucial in my research process
h. I feel that our institution plays a key role in harnessing the adoption of innovative tools such as RMS
i. My academic community views the use of RMS as a positive practice to enhance the research processes
j. I easily adapt to new technologies
k. I am always willing to try a new tool for my research
l. I am confident that RMS is secure and reliable
m. I am not sure about the risks that could be involved in using RMS

n. I prefer to wait until my peers have successfully adopted a new tool before trying it out
o. The availability of trials and demonstrations has been helpful in my adoption of RMS

The following table presents the findings and their interpretation.

Table 4. 2: Factors influencing the Use of RMS

Category	Mean	Standard Deviation	Interpretation
Efficiency and Time Savings			
Writing research more efficiently	2.69	1.323	Moderate agreement, high variability
Saving more time than manual referencing	2.64	1.342	Moderate agreement, high variability
Ease of Use and Integration			
Integrating RMS into MS Word	2.67	1.235	Moderate agreement, some variability
Easy to learn how to use RMS	2.93	1.124	Somewhat easy, moderate variability
User-friendly features	2.82	1.133	Moderately user-friendly, some variability
Social Influence and Institutional Support			
Peers use RMS	3.42	1.062	Significant peer influence, moderate variability
Faculty recommendation	3.2	1.077	Important faculty role, moderate variability
Institutional support	2.79	1.28	Moderately positive view, high variability
Academic community's positive view	2.89	1.279	Moderately positive view, high variability
Openness to New Technology			
Easily adopt new technology	3.11	1.112	Generally adaptable, moderate variability
Willing to try new tools	3.18	1.176	Moderate willingness, some variability
Wait for peers before adopting new tools	2.3	0.972	Generally proactive, low variability
Security and Reliability			
Confidence in security and reliability	3.1	1.121	Moderate confidence, some variability

Uncertainty about risks	2.77	1.146	Some uncertainty, indicating the need for better communication
Support and Demonstrations			
Trials and demonstrations	3.02	1.19	Considered helpful, moderate agreement and variability

Source: (Research Data, 2024)

The survey results in Table 4. 5 show a moderate level of agreement across the several RMS usage factors. Respondents universally recognize the efficiency and time-saving benefits of RMS, yet there is significant variation in their experiences. Positive perceptions exist about simplicity of use and integration into procedures, while some users find it more challenging than others. Peer influence plays a significant role in the adoption of RMS, specifically in faculty recommendations and peer influence. There are various perspectives on respondents' moderately positive perceptions of institutional support. Overall, respondents are open to trying new tools and adapting to new technologies, showing a reasonably high level of openness to new technology. Users have a moderate level of confidence in the security and reliability of RMS, although some are concerned about potential risks.

From these findings, it can also be drawn that respondents prefer specific RMS tools such as Mendeley and Zotero for a combination of factors such as perceived ease of use, perceived efficiency, peer influence, perceived relative advantage, cost, recommendation by faculty among others that may vary from one tool to another. Comprehensive training and support are required for students to realize the full potential of RMS tools and their various capabilities in enhancing quick, efficient, and accurate research processes, eventually promoting research productivity.

4.6.1 Institutional Support

The researcher sought to understand further how Tangaza University as an institution supported the adoption of learning software such as RMS. The researcher categorized the findings into themes such as training and orientation, subscription and resources, positive support, and no support. The responses are recorded as below:

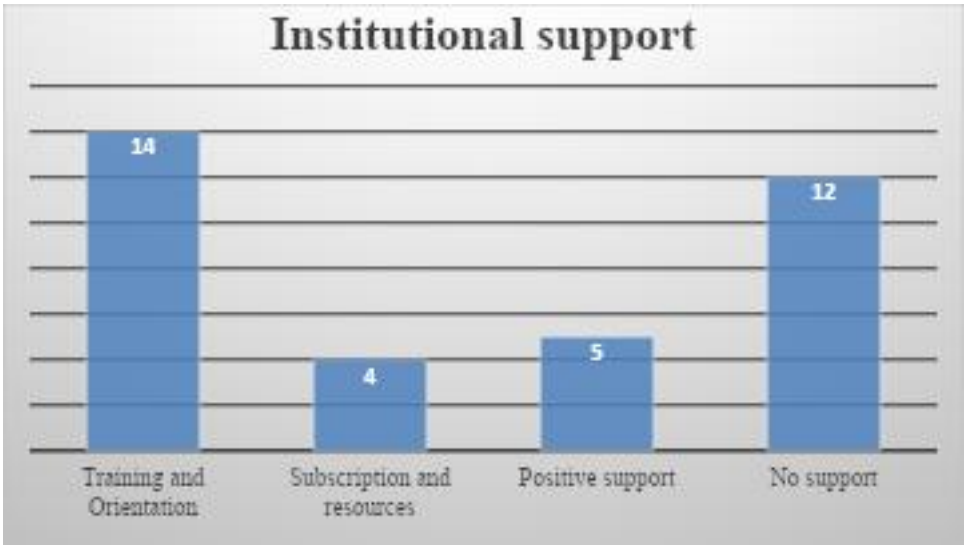


Figure 4.12: Institutional Support for RMS Implementation
Source: (Research Data, 2024)

The findings in Figure 4. 12 raised a great concern seeing that 12 respondents indicated that they had not received any support from the institution, suggesting the need for the institution to take up the role of supporting technological advancement for enhancing research and learning. However, a significant of 14 respondents indicated that the institution had supported their adoption of RMS through training and orientation. 4 respondents indicated that the institution supports them with subscriptions and resources. 5 respondents just indicated that they received positive support without indicating which support specifically.

The responses that were categorized under orientation and training included, "information literacy skill instruction by the research librarians; the library staff organized orientations and workshops, helped to install Mendeley on our laptops, frequent training on how to use RMS" (Respondents, 2024). Another respondent indicated that *"*they gave us a seminar one day*."* The findings were supported by the interviewees who indicated that library staff offer voluntary training and orientation to the students and faculty both individually and as groups. In these trainings, the first

respondent explained that they offer an introduction to a variety of tools, from which the learners choose.

As seen earlier, the librarians face various challenges which show that they lack support from the institution to enable and empower them to train and support students and faculty. To address this, library staff suggested that there is a need for monetary appreciation or incentives to acknowledge the effort and time spent training researchers. The second respondent further indicated the need for a budget to be set for information literacy training. This will enable the library to acquire necessary resources and organize regular, focused, and comprehensive training for both faculty and students. This will enable them also to populate resources to create awareness and sensitize the need for the adoption of RMS.

Respondents indicated that the institution offered sensitization, and provided WIFI. This shows a critical role of the institution in providing resources and facilitating training for researchers, to be able to access and use tools such as RMS as a way of supporting research and learning. The availability of WIFI is crucial for researchers to access online resources and collaborate with colleagues worldwide. Sensitization efforts by the institution also demonstrate a commitment to promoting awareness and understanding of important issues within the research community as recommended by Mhokole and Kimaryo (2023).

The responses that insinuated no support included, “I have not heard about it, not supported, I know, none*”* which suggests that there is a problem in creating awareness concerning RMS in the university, which is why a great number did not get to hear or attend training. This may be treated as a hindrance to the adoption of RMS as potential adopters cannot adopt that which they do not know. The response highlights the need

for the institution to arise and support software such as RMS that would yield many benefits in academic and research efficiency.

The findings also show that 12 respondents gave unclear responses such as, “available if asked for, I have not asked for help so far, but I know how to get to the online library.” This suggests that either the respondents did not understand the question or lack of interest in RMS. This finding suggests the need for enhanced communication and awareness creation, improved training programs, and follow-up support, which will enable the institution to address ongoing challenges and improve the attitude of adopters to accept the tools.

4.6.2 The Role of Librarians in Training and Support

From the findings, it is clear that library staff play a pivotal role in training and sensitizing postgraduate students concerning RMS tools. However, this role has not been very successful due to the challenges highlighted above. Interviews held with library staff revealed that the library has been charged with carrying out information literacy training which involves introductory training on RMS and other research tools such as anti-plagiarism software, library management software, data analysis tools, and e-resources access software. Respondent 1 emphasized that one-off training was insufficient; instead, users needed regular training with practical instructions to acquire the necessary knowledge and skills for using RMS and other tools comfortably.

Although the library offers one-off training at the beginning of an academic year, the respondents noted that library staff voluntarily offer continuous training to individuals on a need basis. This limits the scope for which the trainers can reach since very few are willing to approach a librarian for further training. Respondent 3 noted that even those who approach the library for help, “they are not interested in learning. They want

everything done for them." This poses a great challenge to the trainer since it takes more time and effort to convince the researchers to learn and take them through training when they already have a negative attitude towards it. The researcher asked library staff what feedback they received from the students concerning their interaction with RMS, and most students, according to Respondents 1 and 3, indicated that they "do not know how to use it," "it is hard to learn," and that they did not have time to learn how to use it.

As earlier indicated, the interviewees indicated that they felt the institution did not support their endeavour to train and sensitize the use of RMS among students. Respondent 2 complained that the training of research tools has been allocated under the research office. However, the research office does not collaborate with the library to organize and have more comprehensive training programs. Furthermore, there is no budget set for these trainings, which has forced the library staff to volunteer to offer the training out of goodwill. However, they complained a lack of motivation such as recognition, incentives or even capacity development.

This suggests that the decision-makers of the university have less understanding or little appreciation of the importance of RMS in academics and research. There is therefore a need for sensitization to start with the decision-makers, which means, there is a need for advocacy to the management and decision-makers, insisting on the importance of RMS in academic processes.

Furthermore, the first respondent highlighted the need to have younger professionals in the decision-making roles so that they can promote the adoption of technologies such as RMS as a strategy to promoting research and lifelong learning. Once the agenda has

gone through the management and decision-makers, it will be easy to set projects that support the library's efforts in training and supporting research processes. Furthermore, policies will be set which require all students to adhere to certain academic standards including proper referencing as supported by the use of RMS.

4.6.3 RMS training among students

The researcher examined whether respondents attended any training on RMS and its usage. The chart below shows the results:

Figure 4. 13: Training Attendance
Source: (Research Data, 2024)

The findings in Figure 4. 13 show that 67% of respondents have never attended any training on Reference Management Software or its usage, while only 33% attended any training. This data supports the low awareness rate as evidenced by the high percentage of individuals who have never received any training on the topic. This highlights the importance of increasing education and awareness around this tool to improve utilization and efficiency among users.

4.6.4 Effectiveness of Training

The researcher further wanted to find out how effective the respondents perceived the training to be. The researcher asked the respondents to rate the effectiveness from highly effective to highly ineffective. The respondents reported as follows:

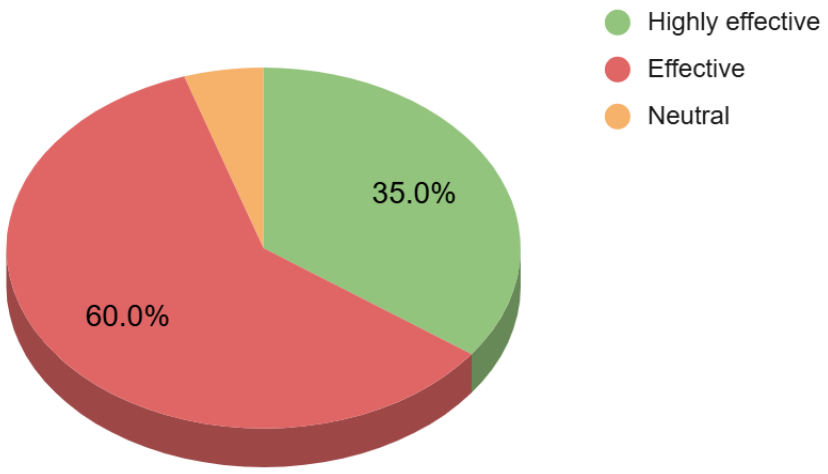


Figure 4. 14: Effectiveness of Training
Source: (Research Data, 2024)

The findings in Figure 4. 14 indicate that majority of respondents who had received training perceived it to be beneficial to them. A significant 60% indicated that the training was effective while an additional 35% rated it to be very effective implying that 95% of the respondents had a positive view of the impact of the training they had received. The 5% who indicated neutral represented a small a few respondents who were indifferent or unsure about the benefits of the training. Notably, no respondent rated the training as ineffective or highly ineffective. This implies that trainings would be an effective way of promoting awareness and enhancing students' skills which will in turn encourage more RMS usage.

4.7 Usage Patterns and Implementation of RMS

The researcher wanted to find out how respondents interacted with RMS tools. This included how often they used RMS, which features in the tools they used, and whether they attended any training associated with RMS. The findings offer a comprehensive overview of the usage patterns and practical application of RMS among the participants.

4.7.1 Frequency of Use

The researcher wanted to find out how often the respondents who had adopted RMS utilized the tools. Figure 4. 15 illustrates the findings:

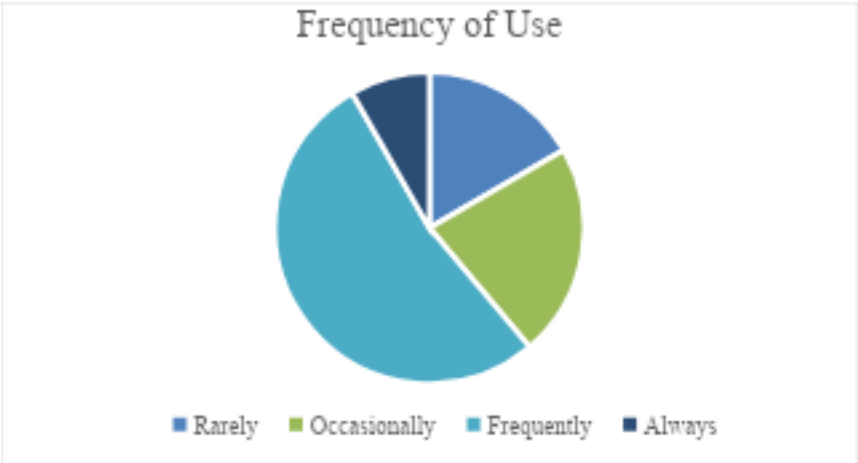


Figure 4. 15: Frequency of Use of RMS
Source: (Research Data, 2024)

The findings show that a significant 53% of the respondents who have ever used RMS used the tools frequently. This illustrates a significant level of reliance on and integration of RMS into the respondents' research workflow. RMS has been accepted among this group and they find the tools highly beneficial, thus becoming an integral part of their research process.

Furthermore, 22% of respondents who use RMS occasionally show that although the respondents perceive RMS to be beneficial, they have less reliance on the tools in their workflow. This suggests that although they find the tools beneficial, they do not always

require the tools in their workflow, and perhaps only use them on a need basis. This may mean that such users have other alternatives, or they are not heavily engaged in academic writing, and their faculty lay no emphasis to use of RMS, which lender them less reliant on the tools.

17% of respondents show that they do not really need the RMS tools in their workflow, thus they rarely use them. This suggests that this group of users do not find RMS essential in their workflow. They prefer manual referencing because they have limited familiarity or knowledge with the features of the tools, are less interested in new technologies, hire research assistants to manage their references, or their workflow does not necessitate frequent use of RMS.

8% of the respondents reported their dedication to using RMS tools always in their workflow, indicating their reliance and faith upon the tools in their workflow. This group could have experienced all the possible benefits of using RMS, and thus the tools became an integral part of their research processes. According to Rogers' (2003), this group could be in the innovators category of adopters, and can act as advocates to encourage others to adopt. These can also be used to train and demonstrate to their peers on how to leverage the tools to their advantage.

4.7.2 Features used by Respondents

The researcher wanted to find out what features of RMS are most commonly used by the respondents. The researcher categorized these features into: importing references, inserting citations, generating bibliography, managing PDF files, annotation and note-taking, searching and retrieving within the library, and customizing citation style. The figure below shows the report of the respondents on the most utilized features:

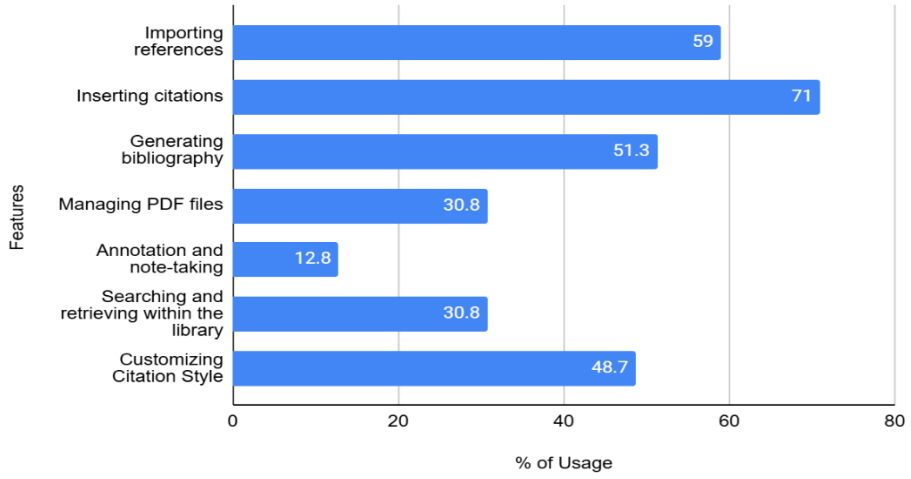


Figure 4. 16: Features Used Frequency
Source: (Research Data, 2024)

From Figure 4. 16, inserting citations is the most commonly used feature in RMS at 71.8%, suggesting that most respondents use RMS to help them insert in-text citations into their academic work. Likewise, 59% of respondents use RMS tools to import references into their workflow, while 51.3% use the tools to generate bibliography lists, and 48.7% use the tools to customize their citation style. This suggests that RMS tools are mostly used in managing references and citations into the required citation style and order. Only a few respondents use RMS tools in searching and retrieving within the library, managing PDF files and annotation and note-taking features with 30.8%, 30.8% and 12.8% respectively.

The findings show that the primary importance of RMS is in meeting the basic needs of the respondents which include inserting citations, importing references, generating bibliography and customizing citation style. The lower percentage of managing files, searching and retrieving, and annotation and note taking imply that the users do not find them critical in their workflow, thus they are less utilized.

4.8 Challenges encountered in the use and implementation of RMS

4.8.1 Challenges encountered by students when using RMS

The researcher wanted to understand what challenges postgraduate students face when implementing RMS. The responses were categorized into themes and presented as follows:

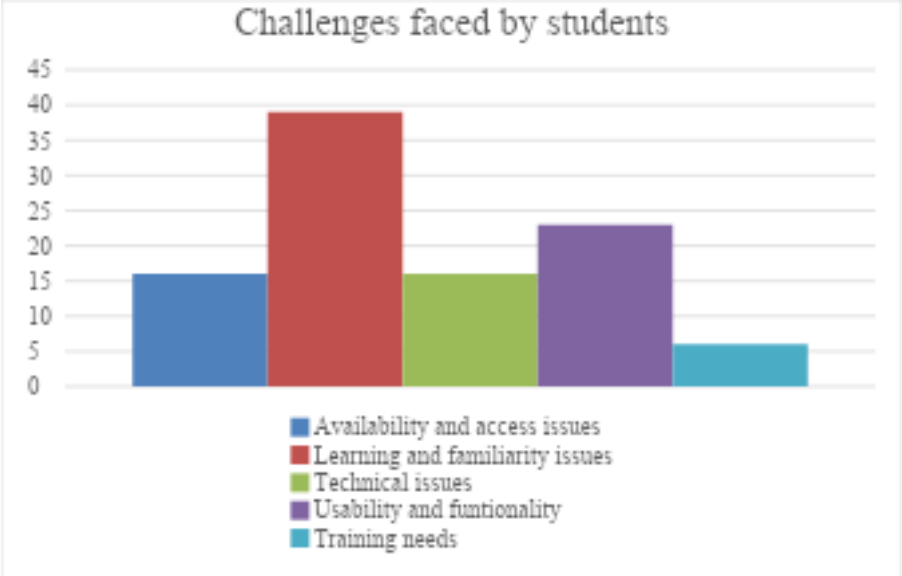


Figure 4. 17: Challenges faced by Students in using RMS
Source: (Research Data, 2024)

Figure 4. 17 shows the categories of challenges Among the challenges that respondents indicated they face are availability and access issues, learning and familiarity issues, technical issues, usability and functionality, and training needs. The challenges are further discussed individually below:

4.8.1.1 Availability and access issues

A significant group of respondents (16%) indicated that they had faced challenges associated with availability and access of RMS tools. These challenges included the need for internet connectivity in order to work with the tools; software that were free before becoming proprietary, which meant that the users had to pay to access; and

institutions not subscribing to any RMS tool. For instance, one of the respondents stated that “I cannot access it unless I have internet connectivity.”

Another respondent reported that “availability in the institution is not always there.” This was reiterated by other respondents who indicated that the shift from free to proprietary tools posed a challenge for new and continuing users who were accustomed to accessing the tools at no cost. Thus, without institutional subscriptions to RMS tools, researchers may face barriers in utilizing these resources effectively for their work. These findings highlight the importance of institutional support in providing access to RMS and other technological tools that enhance and support research and learning.

4.8.1.2 Learning and Familiarity Issues

39% respondents recorded challenges associated with learning and familiarity issues while adopting and utilizing RMS. This suggests that respondents were not familiar with RMS, its benefits, and/or how the tools work. It may also suggest that the respondents find the RMS tools difficult to learn, lack initial training, or have no time to learn new and complex features of the software. It is also possible that the challenges faced by the respondents were due to individual differences in learning styles and preferences, rather than a lack of familiarity or training with RMS. Additionally, the difficulties could be attributed to technical issues or limitations within the software itself.

Some of the responses given by the respondents include: “Not conversant, no time to learn how to use it, I need more training, it took me time to understand how to use it, not easily adopted,” among others. The responses above suggest the need for more

effective training, continuous support and improvement of software to become more user-friendly.

4.8.1.3 Usability and Functionality

A significant 23% respondents reported to have issues associated with usability and functionality, for instance difficulty in editing entries, formatting citations in required styles, entering items manually and learning new features. This insinuates that although the software offers a range of features which are meant to improve referencing, users may find these features difficult or complex to learn and use. For instance, a respondent stated that "For citation in line with 7th APA style is a problem." This was reiterated by a respondent who stated that "The citations are not always correctly done as expected." These responses suggest hindrances in usage which may explain the reason for lower adoption rates.

Therefore, to address this challenge, the tools need to be improved to make the commonly used features such as importing sources into the software library, inserting and editing citations, collaboration among others to be more user-friendly. Through regular practical training, users will be able to familiarize themselves and get used to RMS tools and integrate them into their academic writing.

4.8.1.4 Technical Issues

Technical issues were also mentioned as challenges faced by the respondents in their adoption and usage of RMS. For instance, some respondents highlighted the following challenges "word plugin sometimes is disabled; duplication of entries; low internet; lacked technological skill of using different program at the same time; managing PDF files*."* These issues may be the key hindrances in the adoption and continued use of

RMS which suggest the need for technical improvement in order to have better and more stable software functionality, thus gaining the confidence of the users.

A significant number of 21 respondents indicated that they had not faced any problem yet, which may either mean that they were satisfied with their experience with RMS, or they had not faced any significant challenge worth mentioning. On the other hand, this number may be associated to those who are not aware, or have never used RMS.

4.8.2 Challenges faced by Library Staff in supporting the Adoption of RMS

The study sought to find out the challenges that library staff face while supporting the students in adopting RMS and other research tools. The respondents gave various responses as follows:

i. Many respondents are aged which makes receptivity to technology low (R1&R4, Interview, May 2024).

ii. The library has not been allocated a budget to enable the library staff carry out training effectively (R1& R3, Interview, May 2024).

iii. The library staff who act as trainers feel undervalued since there is no monetary compensation or motivation for training and support (R1, R2& R4, Interview, May 2024).

iv. Some students are ICT illiterate which requires more effort and time. This can be demotivating (R1 & R2, Interview, May 2024).

v. There is a confusion of roles among library staff and over-reliance on one or two staff (R3, Interview, May 2024)

From these responses, the following themes emerged:

a. Library Mandate: Training in RMS can indeed be seen as part of the mandate of library staff, particularly in academic institutions where supporting student research is a critical function. Library staff are often expected to be knowledgeable about various resources and to assist students in navigating them. One of the respondents indicated that this role, however, has been allocated to the research depart, yet when it comes to execution, the library staff are called upon to do it. This insinuates a confusion on the mandate, but also a lack of cooperation between the library and the research department.

b. Motivation and Empowerment: While training is a fundamental responsibility for library staff, their effectiveness and enthusiasm in fulfilling this duty are critically influenced by their job satisfaction. When staff feel undervalued or lack sufficient resources, such as training budgets or opportunities for professional development, their ability to engage with students' declines. Motivation may not merely be financial compensation; it may encompass recognition, opportunities for professional growth, and strong institutional support. These elements are crucial and significantly impact productivity and staff morale.

c. Staff Collaboration: Effective training and student support in libraries depend on improved collaboration and organization among staff. Current findings show that some staff feel overwhelmed due to an over-reliance on one or two individuals for key tasks. This situation can lead to burnout and affect service quality. To address these issues, it is crucial to encourage teamwork and distribute responsibilities more evenly. Structured communication and regular meetings can help staff share insights and resources. Additionally, investing in professional development for all staff can enhance their skills and boost confidence, creating a more resilient team. By implementing these

strategies, libraries can improve training programs and student support services while promoting a healthier work environment.

The effectiveness of training and support provided by library staff to students relies on a thorough understanding of their roles, a high level of motivation, and a sense of empowerment, all of which are enhanced by collaboration among staff members. Therefore, institutions need to create an environment that encourages staff development, addresses job satisfaction, and provides sufficient resources. Additionally, fostering teamwork and clearly defining the allocation of duties can help reduce burnout and improve the quality of work.

4.9 Respondents' Recommendations

the researcher asked the respondents to indicate what they could suggest to improve adoption and utilization of RMS. The respondents reported according to the themes highlighted in the chart below.

Figure 4. 18: Suggestions for Improvement
Source: (Research Data, 2024)

As shown in Figure 4. 18, respondents indicated that the most significant recommendation was training and education (75%), followed by awareness (11%), and sensitization and institutional integration (11%). A small but significant percentage

(4%) indicated the need for improved infrastructure. The remaining 1% did not provide a specific recommendation. The data suggests that investing in training and education programs should be the primary focus for addressing the issue at hand. Additionally, it is important to consider the need for increased awareness and sensitization efforts to complement these initiatives. Improved infrastructure was also identified as a priority by a small percentage of respondents, highlighting the importance of addressing physical barriers. Overall, a multi-faceted approach that includes training, awareness, and infrastructure improvements is crucial for effectively tackling the issue.

a. Awareness and Training

The respondents who suggested the need for training and education indicated responses such as *more time teaching, more training and exercises on how to use, frequent training on any new tools, continuous training for creating awareness, incorporating it in the academic curriculum, more training, and follow-up activities*. A respondent also indicated a very important response suggesting having *virtual training for students who are outside the campus since they miss some of the workshops*. This feedback highlights the importance of providing diverse training methods to accommodate students' needs, including virtual options for those unable to attend in-person sessions. Implementing a variety of training approaches can help ensure all students have access to necessary skills and knowledge.

b. Awareness and sensitization

Responses under this theme suggested the crucial need for increasing awareness and continuous sensitization to ensure that more users know about the existence and importance of RMS. A respondent indicated that there is a need to create more awareness of the presence of this service among the students. This could be achieved

through targeted marketing campaigns, information literacy sessions, and collaborations with student organizations and faculty to spread the word effectively. Additionally, incorporating RMS information into orientation programs for new students can help familiarize them with the service early on in their academic journey. They also emphasized the importance of providing regular updates and utilizing social media platforms and campus newsletters as effective ways to reach a wider audience of students. By consistently engaging with the student body through various channels, the visibility and utilization of RMS can be significantly increased.

c. Institutional Integration

The respondents suggested the need to embed training into the regular academic activities of the institution and develop policies that would support the adoption of RMS. A respondent stated that it is important to have regular integration in all the online tools. A respondent suggested embedding librarians into information literacy instruction, which will overcome the traditional one-shot instruction that leaves students unable to grasp the large amount of information given in the one-shot instruction.

Integration with academic activities would make RMS an integral part of academic processes and encourage consistent use of RMS by students, faculty, and staff. This approach would ensure that students are continuously exposed to research management skills throughout their academic journey, leading to better retention and application of these skills in their future careers. Additionally, embedding librarians into information literacy instruction would provide ongoing support and guidance to students in navigating the vast amount of information available to them.

d. Infrastructure

A respondent raised a suggestion that they should be provided with a stable internet connection. This is crucial because most RMS tools cannot be accessed without an internet connection. Having a stable internet connection is essential for ensuring seamless access to the RMS tools, which are necessary for efficient work processes. Without this, there may be delays or disruptions in completing tasks and accessing important information. Which will in turn lead to the loss of trust in the software and reduce relative advantage of using the RMS tools.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter consists of a summary of the findings, the conclusion, and recommendations drawn from the findings.

5.2 Summary

Drawing from the findings of this study, it is evident that Reference Management Software has not been well adopted by Tangaza University post-graduate students. This is largely attributed to insufficient training which has led to low awareness and knowledge levels and a higher preference for manual referencing.

The study revealed that there were more female post-graduate students than men. The study also revealed that master's programs have more students than PhD programs, with most of them being relatively aged. 40 years and above had the highest number of respondents which suggests that most postgraduate students do not enroll in these programs to qualify for better job opportunities but for self-actualization, career advancement, and capacity development.

The study revealed a relatively low level of awareness and familiarity with RMS among postgraduate students at Tangaza University. This indicated that there was limited understanding of the use of RMS as a higher percentage indicated that they had only heard about it, or had not heard about it at all. This can be attributed to the low usage rate that was revealed. However, the positive response on the perceived benefits of RMS

are the indication that those who had used RMS found them quite beneficial, although to a varying degree.

The study revealed that the most commonly used features of RMS among respondents are inserting citations, importing references, generating bibliographic lists, and customizing citation styles. Furthermore, the study found out that Mendeley and Zotero are the most commonly used RMS tools, major because of their ease of use, integration with word processing, efficiency, and availability of trials. The study also revealed that the adoption of RMS was majorly influenced by social influence, institutional support, openness to new technology, and availability of trials and demonstration*s.*

The study revealed several challenges faced by library staff in supporting the implementation of RMS and those faced by students in adopting RMS. Among them are age problems leading to low receptivity, budget constraints, lack of motivation and confusion of roles, and over-reliance on one staff member, which could lead to fatigue. The challenges faced by postgraduate students at Tangaza University in adopting RMS include limited awareness and familiarity with the tools, ICT illiteracy, technical challenges, inadequate availability and access to resources, as well as the lack of support from peers and the institution. This suggests that there is a critical need for training and institutional support as continuous efforts to improve awareness and promote the adoption of RMS.

5.3 Conclusion

The findings of this study reveal that there is a correlation between the level of awareness among postgraduate students and their adoption of RMS. However, this relationship may be affected by other factors such as institutional support, technical

competencies and the willingness of students to adopt. The study has resulted in three key conclusions: there is limited awareness and familiarity with RMS among postgraduate students at Tangaza University. Consequently, there is a low adoption rate of RMS. Furthermore, postgraduate students go through a variety of challenges in their experience with RMS such as low institutional support, ICT illiteracy, technical challenges, inadequate training, and lack of peer support. These findings reveal a great need for institutional support through training, awareness campaigns, resource allocation, and other initiatives to promote the adoption of RMS and consequently increase research productivity among postgraduate students.

5.4 Recommendations

Recommendations based on research were divided into two categories: policy and further research. The recommendations were created based on negative findings from the ended study to seek effective interventions.

5.4.1 Policy Recommendations

From the findings of this study, the following recommendations were made to the stakeholders:

i. To raise awareness and introduce students and faculty to RMS tools and other learning technologies, the university should run regular informational campaigns and provide educational resources.
ii. To improve research quality, university administration should prioritize the implementation of research management systems (RMS) by developing policies, allocating funds for training programs, providing ongoing support, and incorporating RMS training into the academic curriculum.

iii. To ensure continuous availability and usability for students and faculty, the university should prioritize providing dependable technical support and resources, such as internet and power supply, computer access, and RMS tools.

iv. Library personnel should be recognized, supported, and rewarded for their efforts in implementing research management systems and training students and faculty.

v. Peer mentorship programs at the university should be established to encourage students and faculty to use reference management software (RMS) tools.

vi. The study's findings highlight the need for institutional support in organizing and promoting awareness campaigns, training, and resources to promote the adoption of Reference Management Software (RMS) as a strategy for improving and enhancing research productivity among postgraduate students.

5.4.2 Recommendations for Further Research

Further studies could explore:

i. Specific features that users find most useful or challenging, and how can be tailored to better meet academic requirements.
ii. The influence of faculty and peers on RMS adoption
iii. The role of training in enhancing the adoption and utilization of RMS.

5.5 Contributions of the Study

i. Highlights a significant RMS awareness gap among postgraduate students. This gap could potentially hinder their ability to effectively apply research methodologies in their academic work and future careers. Addressing this issue through targeted training programs and resources can help bridge the knowledge gap and enhance research skills among postgraduate students.

ii. Highlights lack of institutional support, perceived complexity, and low ICT literacy as the main obstacles to RMS awareness and adoption.

iii. Provides insight into usage patterns of RMS tools, revealing commonly used and underutilized features.

iv. Assesses perceived benefits of RMS tools such as time-saving and increased accuracy, as well as potential drawbacks like data security concerns. Overall, the study sheds light on the current state of RMS adoption and its impact on postgraduate research practices.

v. Explored the role of social and institutional factors in RMS adoption. The research also examines the influence of training and support systems on the effective utilization of RMS tools among postgraduate students. Additionally, it investigates the potential barriers to the widespread adoption of RMS in academic settings.

vi. Makes practical recommendations for university administrators, librarians, and RMS providers to increase RMS awareness, adoption, and use.

vii. Identifies areas for future research, such as specific RMS tool features, adoption barriers, and the effectiveness of training programs.

REFERENCES

360 Research Reports. (2023). *Reference Management Software Market Size in 2023: Share, Trends, Opportunities Analysis Forecast Report by 2030*.

Adeyemi, I., Sulaiman, K., & Akanbi, L. (2020). Awareness and Usage of Reference Management Software: Perspectives of Faculty Members of the University of Ilorin Nigeria. *Journal of Islam and Humanities*, *4*(2), 75–87.

Almaiah, M. A., Alhumaid, K., Aldhuhoori, A., Alnazzawi, N., Aburayya, A., Alfaisal, R., Salloum, S. A., Lutfi, A., Al Mulhem, A., Alkhdour, T., Awad, A. B., & Shehab, R. (2022). Factors Affecting the Adoption of Digital Information Technologies in Higher Education: An Empirical Study. *Electronics (Switzerland)*, *11*(21). https://doi.org/10.3390/electronics11213572

Ariyanti, A., & Fitriana, R. (2020, May 11). *EFL Students Perception on Mendeley Reference Manager in Thesis Writing*. https://doi.org/10.4108/eai.16-10-2019.163223

Bakkabulindi, F. (2014). A call for Return to Rogers' Innovation Diffusion Theory. *Makerere Journal of Higher Education*, *6*(1), 55. https://doi.org/10.4314/majohe.v6i1.4

Dikko, M. (2016). Establishing Construct Validity and Reliability: Pilot Testing of a Qualitative Interview for Research in Takaful (Islamic Insurance). *The Qualitative Report*. https://doi.org/10.46743/2160-3715/2016.2243

Etikan, I., & Bala, K. (2017). Sampling and Sampling Methods. *Biometrics & Biostatistics International Journal*, *5*(6). https://doi.org/10.15406/bbij.2017.05.00149

Farag, A. (2019). Scholars' perceptions at Egyptian Libraries and Information Science departments towards the usage of Reference Management Software. *The International Journal of Informatics, Media and Communication Technology*, *1*(1), 24–56. https://doi.org/10.21608/ijimct.2019.66961

Francavilla, M. L. (2018). Learning, teaching and writing with reference managers. *Pediatric Radiology*, *48*(10), 1393–1398. https://doi.org/10.1007/s00247-018-4175-z

Frei-Landau, R., Muchnik-Rozanov, Y., & Avidov-Ungar, O. (2022). Using Rogers' diffusion of innovation theory to conceptualize the mobile-learning adoption process in teacher education in the COVID-19 era. *Education and Information Technologies*, *27*(9), 12811–12838. https://doi.org/10.1007/s10639-022-11148-8

Hendal, B. A. (2019). Kuwait University Faculty Usage and Perspectives of Reference Management Software. *OALib*, *06*(08), 1–11. https://doi.org/10.4236/oalib.1105685

Hermanns, M., & Skinner, M. (2022). The Benefits of Using a Citation Manager. *Research and Theory for Nursing Practice*, *36*(3), 219–220. https://doi.org/10.1891/RTNP.36.3.219

Lonergan, N. (2017). Reference management software preferences among liberal arts faculty. *Reference Services Review*, *45*(4), 584–595. https://doi.org/10.1108/RSR-06-2017-0024

Menzli, L. J., Smirani, L. K., Boulahia, J. A., & Hadjouni, M. (2022). Investigation of open educational resources adoption in higher education using Rogers' diffusion of innovation theory. *Heliyon*, *8*(7), e09885. https://doi.org/10.1016/j.heliyon.2022.e09885

Mhokole, E. L., & Kimaryo, C. (2023). Usage of Reference Management Software by Postgraduate Students at the University of Dar es Salaam, Tanzania. *University of Dar Es Salaam Library Journal*, *17*(2), 188–203. https://doi.org/10.4314/UDSLJ.V17I2.12

Motlhake, T. M. J. (2021). *Utilisation of Reference Management Software by Postgraduate Students in the Faculty of Humanities at the University of Limpopo, South Africa* [Dissertation]. University of Limpopo.

Mugenda, O. M., & Mugenda, A. G. (2003). *Research Methods, Quantitative and Qualitative Approaches*.

Murphree, L., White, M., & Rochen Renner, B. (2018). Reference Managers that Support Collaborative Research: Dreaming of the Perfect Fit. *Medical Reference Services Quarterly*, *37*(3), 219–233. https://doi.org/10.1080/02763869.2018.1477706

Nilashi, M., Dalvi, M., Ibrahim, O., Zamani, M., & Ramayah, T. (2019). An interpretive structural modelling of the features influencing researchers' selection of reference management software. *Journal of Librarianship and Information Science*, *51*(1), 34–46. https://doi.org/10.1177/0961000616668961/ASSET/IMAGES/LARGE/10.1177_0961000616668961-FIG4.JPEG

Nilashi, M., Ibrahim, O., Sohaei, S., Ahmadi, H., & Almaee, A. (2016). Features Influencing Researchers' Selection of Reference Management Software. *Journal of Information & Knowledge Management*, *15*(03), 1650032. https://doi.org/10.1142/S0219649216500325

Nitsos, I., Malliari, A., & Chamouroudi, R. (2022). Use of reference management software among postgraduate students in Greece. *Journal of Librarianship and Information Science*, *54*(1), 95–107. https://doi.org/10.1177/0961000621996413

Okodero, M., & Mutwiri, C. (2021). INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH AND KNOWLEDGE Skills of academic staff on Reference Management Software (RMS): a survey at Introduction and Background. In *International Journal of Innovative Research and Knowledge* (Issue 10). www.ijirk.comwww.ijirk.com

Osmani, M., Mza, R., Ahmad, B. A., & Arif, A. S. (2016). REFERENCE MANAGEMENT SOFTWARE (RMS) IN AN ACADEMIC ENVIRONMENT: A SURVEY AT A RESEARCH UNIVERSITY IN MALAYSIA. *Journal of Theoretical and Applied Information Technology*, *10*(1). www.jatit.org

Panda, S. (2023). *Reference Management Software for Assisting Researchers: A Comparative Analysis of Reference Management Software for Assisting Researchers: A Comparative Analysis of Usage and Usability*. https://doi.org/10.5281/zenodo.7898059

Parabhoi, L., Kumar, A., & Pathy, S. (2017). (PDF) Citation Management Software Tools: A Comparison with Special Reference to Zotero and Mendeley. *Journal of Advances in Library and Information Science*, *6*(3), 288–293. https://www.researchgate.net/publication/320414177_Citation_Management_Software_Tools_a_Comparison_with_Special_Reference_to_Zotero_and_Mendeley

Proske, A., Wenzel, C., & Queitsch, M. B. (2023). Reference Management Systems. In *Digital Writing Technologies in Higher Education* (pp. 215–230). Springer International Publishing. https://doi.org/10.1007/978-3-031-36033-6_14

Quach, T. (2021). Reference Management Software. *Australian Law Librarian*, *29*. https://heinonline.org/HOL/Page?handle=hein.journals/auslwlib29&id=182&div=&collection=

Ramesh Durbarry. (2017). Quantitative research. In *Research Methods for Tourism Students*.

Rangaswamy, B., & Babu, R. H. (2021). Researcher's Perception on Zotero and Mendeley Reference Management Tools: A Study Open access and Resource sharing View project Altmetrics View project. *Library Philosophy and Practice*. https://digitalcommons.unl.edu/libphilprac

Rincón Castillo, A. G., Pacori Paricahua, E. W., Pacori Paricahua, A. K., Prado Lopez, H. R., Huayta-Meza, F. T., Rojas León, C. R., Hadi Mohamed, M. M., Bustinza Cabala, J. L., Castro Pérez, L. A., Rivera Mansilla, E. B., Tito Lipa, J. P., & Arias-Gonzáles, J. L. (2022). Bibliographic Reference management: The Role of Technological Appropriation in Students. *Eurasian Journal of Educational Research*, *2022*(100), 133–157. https://doi.org/10.14689/ejer.2022.100.010

Rogers, E. M. (2003). *Diffusion of Innovation Theory (DTI)* (4th ed.). The Free Press.

Setiani, N., Aditya, B. R., Wijayanto, I., & Wijaya, A. (2020). Acceptance and Usage of Bibliographic Management Software in Higher Education: The Student and Teacher Point of View. *2020 IEEE Conference on E-Learning, e-Management and e-Services, IC3e 2020*, 55–60. https://doi.org/10.1109/IC3E50159.2020.9288437

Setiani, N., Aditya, B. R., Wijayanto, I., & Wijaya, A. (2021). A study on awareness of bibliographic management software for the academic writing activity in higher education. *Journal of Physics: Conference Series*, *1823*(1), 012035. https://doi.org/10.1088/1742-6596/1823/1/012035

Speare, M. (2018). Graduate Student Use and Non-use of Reference and PDF Management Software: An Exploratory Study. *The Journal of Academic Librarianship*, *44*(6), 762–774. https://doi.org/10.1016/j.acalib.2018.09.019

Tangaza University College. (n.d.). *Educational Philosophy Teaching Minds, Touching Hearts, Transforming Lives*. N.d.

The American psychologist. (2021). Summary report of journal operations, 2020. *The American Psychologist*, *76*(5), 827–828. https://doi.org/10.1037/amp0000884

Tramullas, J., Sánchez-Casabón, A. I., & Garrido-Picazo, P. (2015). Studies and analysis of reference management software: A literature review. *Profesional de La Informacion*, *24*(5), 680–688. https://doi.org/10.3145/epi.2015.sep.17

Vijai, C., Natarajan, K., & Elayaraja, M. (2019). Citation Tools and Reference Management Software for Academic Writing. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3514498

Wahyuningsih, S. (2020). *The Importance of Reference Management Software in Academic Writing: The Case of EFL Learners*. https://www.researchgate.net/publication/342674175

Yamane, T. (1967). *Statistics: An Introductory Analysis* (2nd ed.). Harper and Row.

Yogesh, K. S. (2006). *Fundamental of Research Methodology and Statistics*.

APPENDICES

APPENDIX I: Post-Graduate Student's Questionnaire

a. Consent Statement

I invite you to participate in this study which aims to inform the development of mechanisms to improve the adoption of reference management software in research and academic settings. This will help to improve quality and increase research output. You are invited in the capacity of a postgraduate student and researcher to participate by filling in this questionnaire sincerely and openly as possible. You are assured that there are no risks involved in you choosing to participate in this study, and you are not required to pay anything. The information you will provide will only be used for this research study and for academic purposes. Anonymity and confidentiality will be ensured, and you do not need to share any associative information that could be used to trace you. Furthermore, the information collected will not affect your current or future status as a student or researcher. Your participation is voluntary, and you are free to withdraw from the study anytime without giving reasons. Withdrawing from the study will not affect your relationship with the researcher. The questionnaire will take roughly 30 minutes to fill.

By signing this consent statement, I acknowledge that I have read and understood the conditions for participating in this study. I freely accept to share my experience and perception for the sole purpose of this study.

Signature: ……...

b. Questionnaire

Section 1: Demographics

Kindly tick the appropriate box

1. Gender

   Male [ ] Female [ ]

2. Age

   - □ 20-25
   - □ 26-30
   - □ 31-35
   - □ 36-40
   - □ 40 and above

3. Level of Education

   - □ Masters' Degree
   - □ PhD

4. What is you program of study?

Section 2: Awareness and Knowledge of RMS

(Reference Management Software is a digital tool that is used in referencing and citation**).**

2. On a scale of 1 to 5 where 5 is the highest, how familiar are you with Reference Management Software (RMS)?

3. a. Have you ever used any reference management software such as Mendeley, Zotero, or Endnote?

   [ ] Yes [ ] No

   b. If yes, which specific software have you used?

c. How did you come know about it?

- □ Library Orientation
- □ Information Literacy Training
- □ Self-discovery
- □ Peers and associates
- □ Workshops and library training

Section 3: Attitudes towards and relative advantage of RMS

4. a. How do you perceive reference management software to be beneficial to you?

- □ Very beneficial
- □ Beneficial
- □ Neutral
- □ A little beneficial
- □ Not beneficial at all

b. Which among the benefits below do you get from using reference management software?

- □ Saves time
- □ Makes referencing more efficient
- □ Facilitates collaboration and sharing
- □ Ensures consistency
- □ Ensures accuracy
- □ Helps manage PDF files
- □ Provides a search interphase to online databases
- □ Can be integrated with other applications like MS Word

Section 4: Factors Influencing Adoption of RMS

5. This section assesses your experience with RMS and how it has impacted your adoption and continued use or rejection of RMS. Kindly tick appropriately.

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using RMS has enabled me to write my research more efficiently					
RMS has enabled me to save more time than manual referencing					
It is easy to integrate RMS into MS Word making my workflow seamless					
It is easy to learn how to use RMS					
The features of the RMS I use are quite user-friendly					
I use RMS because my peers use it too					
My faculty convinced me that RMS is crucial in my research process					
I feel that our institution plays a key role in harnessing the adoption of innovative tools such as RMS					
My academic community views the use of RMS as a positive practice to enhance the research process					
I easily adapt to new technology					
I am always willing to try a new tool for my research					
I am confident that RMS is secure and reliable					
I am not sure about the risks that could be involved in using RMS					
I prefer to wait until my peers have successfully adopted a new tool before trying it out					
The availability of trial and demonstrations has been helpful in my adoption of RMS					

Section 5: Usage Patterns and Implementation of RMS

6. How often do you use RMS in your academic work?

   □ Never

   □ Rarely

- □ Occasionally
- □ Frequently
- □ Always

7. Which of the following features do you use in your research work?
   - □ Importing references
   - □ Inserting citations
   - □ Generating bibliography
   - □ Managing PDF files
   - □ Annotation and note-taking
   - □ Searching and retrieving within the library
   - □ Customizing citation style
8. a. Have you attended any training on how to use RMS?

(Yes) (No)

b. If Yes, how effective would you rate them in enhancing usability?

- □ Highly ineffective
- □ Ineffective
- □ Neutral
- □ Effective
- □ Highly Effective

9. What challenges have you encountered while using RMS?
10. How has the institution's library supported you on your use of RMS?
11. What would you recommend for improving the implementation and support of RMS in the institution?

APPENDIX II: Interview Schedule

a. Interview Consent Statement

Title: Relationship Between Awareness of Reference Management Software and its Adoption among Postgraduate Students at Tangaza University, Kenya.

I, Nancy Wachira, am conducting a study on the adoption of Reference Management Software among postgraduate students at Kenyatta University. The aim is to understand the current situation and propose mechanisms to improve RMS adoption. Participants are invited to participate in an interview to discuss their experiences and perceptions of RMS adoption. The interview will last 40-60 minutes and will be audio-recorded for data analysis. Anonymity and confidentiality is guaranteed, and the information collected will be used for academic and research purposes only. The interview is voluntary and participants can withdraw at any point.

By signing this consent statement, I acknowledge that I have read the statement above and understood the conditions of the exercise and I freely accept to share my experience and perceptions for the sole purpose of this study.

Signature: …….

Date: …….

b. Interview Guide

1. Briefly talk about your role and how long you have served in the university college library.
2. What is your experience with the library supporting post-graduate researchers?
3. Which RMS are post-graduate students currently using?
4. From experience, what are the common challenges users face in adopting RMS?
5. Have there been any challenges that the library has faced while implementing and supporting users of RMS?
6. What feedback do you get from users regarding their experience with RMS?
7. How does the library get informed about new trends in RMS tools?

APPENDIX III Research Authorization

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: E65/OL/CTY/21888/2022

DATE: 19th April, 2024

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR NANCY WACHIRA – REG. NO. E65/OL/CTY/21888/2022.

I write to introduce Nancy Wachira who is a Postgraduate Student of this University. The student is registered for M.Sc degree programme in the Department of Computing and Information Science.

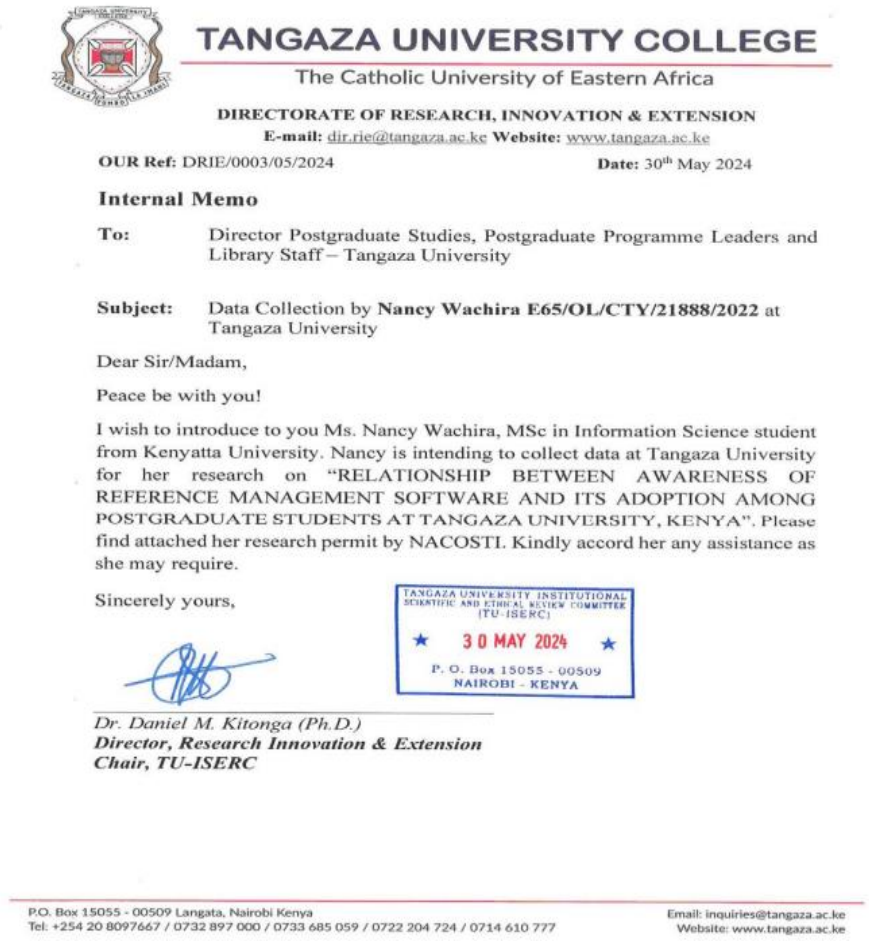
Nancy intends to conduct research for a M.Sc Project Proposal entitled, "Relationship between Awareness of Reference Management Software and its Adoption among Postgraduate Students at Tangaza University College, Kenya".

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. ELISHIBA KIMANI
EXECUTIVE DEAN, GRADUATE SCHOOL

APPENDIX IV: Tangaza University Data Collection Authorization



TANGAZA UNIVERSITY COLLEGE

The Catholic University of Eastern Africa

DIRECTORATE OF RESEARCH, INNOVATION & EXTENSION

E-mail: dir.rie@tangaza.ac.ke **Website:** www.tangaza.ac.ke

OUR Ref: DRIE/0003/05/2024 **Date:** 30th May 2024

Internal Memo

To: Director Postgraduate Studies, Postgraduate Programme Leaders and Library Staff – Tangaza University

Subject: Data Collection by **Nancy Wachira E65/OL/CTY/21888/2022** at Tangaza University

Dear Sir/Madam,

Peace be with you!

I wish to introduce to you Ms. Nancy Wachira, MSc in Information Science student from Kenyatta University. Nancy is intending to collect data at Tangaza University for her research on "RELATIONSHIP BETWEEN AWARENESS OF REFERENCE MANAGEMENT SOFTWARE AND ITS ADOPTION AMONG POSTGRADUATE STUDENTS AT TANGAZA UNIVERSITY, KENYA". Please find attached her research permit by NACOSTI. Kindly accord her any assistance as she may require.

Sincerely yours,

TANGAZA UNIVERSITY INSTITUTIONAL SCIENTIFIC AND ETHICAL REVIEW COMMITTEE (TU-ISERC)
★ 30 MAY 2024 ★
P. O. Box 15055 - 00509
NAIROBI - KENYA

Dr. Daniel M. Kitonga (Ph.D.)
Director, Research Innovation & Extension
Chair, TU-ISERC

P.O. Box 15055 - 00509 Langata, Nairobi Kenya
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Email: inquiries@tangaza.ac.ke
Website: www.tangaza.ac.ke

APPENDIX V: NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **774919**

Date of Issue: **22/May/2024**

RESEARCH LICENSE

This is to Certify that Miss., Nancy Wanjiku Wachira of Kenyatta University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: RELATIONSHIP BETWEEN AWARENESS OF REFERENCE MANAGEMENT SOFTWARE AND ITS ADOPTION AMONG POSTGRADUATE STUDENTS AT TANGAZA UNIVERSITY COLLEGE, KENYA for the period ending : 22/May/2025.

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Director General
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