

**THE TRANSFORMATIVE IMPACT OF CURRENT AWARENESS SERVICES ON
PROMOTING ACCESS AND USE OF OPEN ACCESS RESOURCES AT THE UNIVERSITY
OF ZAMBIA**

By

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DECLARATION

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I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

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ABSTRACT

The study of open access usage in higher learning institutions in developing countries has been an area of concern over the past years due to the many opportunities it offers in academia, such as making available and accessible scientific research freely. As such, the University of Zambia's library has strategically included open access resources in its collection.

Despite this effort, the use of open access resources by the University of Zambia's students and researchers has remained low. This study, therefore, purposed to identify and recommend appropriate current awareness services that the University of Zambia's library could use to promote awareness and uptake of open access resources in the University. According to the literature review, no study has been done on the use of current awareness services to promote open access resource use at the University of Zambia. Further, the extent to which current awareness services have been used to promote open resources at the University is also not known.

This study identified itself in the pragmatic paradigm and used the mixed methods approach and a case study-mixed methods design to investigate the problem. The Unified Theory of Acceptance and Use of Technology was used to provide the context for examining and explaining the study findings.

Although the overall results revealed an average level of awareness and low usage of the open access resources among students and researchers, the majority regarded open access resources as very useful, relevant in their academic and professional work and of academic quality, hence had a positive perception. The identified challenges associated with open access use include lack of awareness due to inadequate marketing of open access resources, lack of effective user search skills, poor institutional infrastructure for accessing online resources and continued use of print materials.

The study recommends the adoption of social media platforms, email/RSS/Google alerts, UNZA website, selective dissemination of information, WhatsApp groups, mobile phone alerts and vendor alerts to boost awareness. Other strategies include involving all stakeholders in promoting online resources, robust awareness programmes, enhanced training, improved Internet infrastructure and a user mindset change.

Keywords: Current awareness services, Alerting services, Open access resources, E-resources, Awareness, Promotion, Usage, Students, Researchers, University of Zambia

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LIST OF ABBREVIATIONS

- B : Unstandardised regression coefficient (Odds ratio)
- BI : Behavioural Intention
- BOAI : Budapest Open Access Initiative
- C-TAM-TPB: Combined Technology Acceptance Model and Theory of Planned Behaviour
- DF : Degree of freedom
- EE : Effort Expectancy
- EF : Effort Expectancy
- EIFL : Electronic Information for Libraries
- Exp (B): Exponentiated odds ratio
- FC : Facilitating Conditions
- IDT : Innovation Diffusion Theory
- ILO : Informed Librarian Online
- IS : Internet Self-efficacy
- KMO : The Kaiser-Meyer-Olkin
- MM : Motivational Model
- MPCU: Model of PC Utilisation
- OA : Open Access
- PG : Postgraduate
- RSS : Really Simple Syndication
- SCT : Social Cognitive Theory

SDI : Selective Dissemination of Information

SI : Social Influence

SOAP : Study of Open Access Publishing

TAM : Technology Acceptance Model

TOC : Table of Contents

TPB : Theory of Planned Behaviour

TRA : Theory of Reasoned Action

UG : Undergraduate

UNISA: University of South Africa

UNZA: University of Zambia

USC : University of Southern California

UTAUT: The Unified Theory of Acceptance and Use of Technology Model

CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 Background to the study

As gateways to knowledge and culture, libraries play a fundamental role in society. The resources and services they offer create opportunities that can transform learning, support literacy, and help shape the new ideas and perspectives that are key to a creative and innovative society (White 2012:1). The success of every library depends on its ability to meet the information needs of its users, which makes the availability and accessibility of information resources a fundamental characteristic of a library (Ari 2017:61; Opaleke 2002:100).

Higher learning academic institutions set certain goals to measure success, and affiliate libraries have the mandate to support these goals by providing information relevant to making informed decisions (Pinheiro 2019:4). Therefore, the quality of education, research, and academic programmes for any academic institution's intended human resource development will depend on the timely provision of the needed information resources and services to all stakeholders. Chigbu, Njoku and Uzoagba (2016:977) contend that to remain relevant in the contemporary age, academic libraries need to join the paradigm shift in service provision and communication methods. Consequently, most academic libraries in developing countries have not only prioritised their areas of expenditure towards electronic resources as opposed to print but have strategically included open access resources because these have fewer access restrictions (Kumari 2015:150).

A combination of shrinking library budgets, license restrictions on access to proprietary resources and increasing subscription costs for scholarly journals has negatively affected library collection building, leading to restricted access to scientific and educational research content. Most academic libraries and institutions have been unable to sustain the subscription fees or site license fees required to access the full range of research content (Canada 2009:5; Hinchliffe 2018; Suber 2015). This has resulted in a blending of subscription-based resources with scholarly open access content.

Describing the transformation to electronic collections with open access content, Elsevier (2017) reported that the majority of their academic, corporate and government clientele were shifting to electronic libraries to meet user needs by providing multiple user access to content. Other reasons for shifting to electronic resources include ease of use, multiple concurrent users, remote

accessibility, reduced space requirements, full-text downloads, unlimited content availability, comprehensive subject coverage and more current content.

The Budapest Open Access Initiative (BOAI) (2002) coined the term ‘open access,’ which means free and unrestricted availability of online scholarly literature accessible to all. Open access content allows any user to download, read, copy, distribute, print or search for a link to the full texts of such content. Users can use open access content for any other lawful purpose without financial, legal or technical barriers, apart from the cost of gaining access to the Internet itself. Even though authors of open access content do not get paid for their work, they are allowed to control the integrity of their work during production and distribution and be properly cited and acknowledged by users of their work (BOAI 2002).

The two main publishing models of open access are gold open access and green open access publishing (Lwoga 2014:117; Matheka, Nderitu, Mutonga, Otiti, Siegel & Demaio 2014:1-2; Suber 2015). Gold open access is further made of full gold open access and hybrid open access models. Full gold open access makes immediate, free and permanent access to peer-reviewed and published research articles or journals by everyone. Publications in this model fall under creative commons licenses or similar licenses and authors or funders may pay an article processing charge (APC) for managing the publications/journal. A hybrid open access model makes an article in a subscription-based journal freely and permanently accessible to everyone after an author pays an article processing charge to make an individual article open access. Authors of such articles have the option to make their articles accessible to all or not. Matheka *et al.* (2014:1) clarifies that the gold road does not charge users but uses other funding sources such as charging article processing charges (APCs) to the authors and community-driven and supporting funders. The gold model provides free of any access charge and offers maximum opportunities for re-use.

On the other hand, the green open access model is self-archiving of an author’s refereed journal article and other publications in an institutional or subject repository and is freely accessed by everyone. Such avenues include PubMed Central (PMC). Materials archived may include pre-prints, post-prints or publisher’s version and may fall under a Creative Commons License, specifying their usage. Other materials include theses and dissertations, course materials, departmental databases, data files, audio and video files, institutional records, or digitised special collections from the library Matheka *et al.* (2014:2).

According to Suber (2015), there is still ambiguity regarding what user rights are captured under the term “open access” as it is widely used to cover two non-equivalent sorts of free online access. Suber argues that despite all three components of the Budapest-Bethesda-Berlin (BBB) definition of OA, calling for the removal of both price and permission barriers, the term “open access “ is being used in at least two senses. To some, open access only relates to "removal of price barrier” and not the “removal of permission barriers”. To others, "open access " relates to removal of both price barriers and permission barriers (free of unnecessary copyright and licensing restrictions) and reuse rights exceed fair use.

To this cause, Suber (2015) introduces the terms Gratis and Libre Open Access to cater for the two distinct user rights. Gratis open access, on one hand, removes price barriers alone. It is free of charge, but not free of copyright or licensing restrictions. Users must either limit themselves to fair use or seek permission to exceed it through licenses. Libre open access, on the other hand, removes price barriers and at least some, permission barriers as well. It is free of charge, allows content to be shared and reused and expressly permits uses beyond fair use under open licenses.

However, it must be clear that there is a distinction between green/gold open access and gratis/libre open access. Green/gold open access refers to venues (repositories and journals), while the gratis/libre open access is about user rights or freedoms. Green/gold open access can be gratis or libre, but is usually gratis (Suber 2015).

Ultimately, open access gives researchers, educators and institutions in developing countries, which often face financial challenges, the opportunity to benefit from scholarly research literature. The open access movement seeks to provide people worldwide with equal access to knowledge and information through repositories and self-archiving in open access journals (Canada 2009:5,7). This makes open access an essential component of scientific publishing. Its availability should be immediate and apply to full texts, not just abstracts or summaries. The Directory of Open Access Journals (DOAJ) provides a comprehensive list of open access journals, the Directory of Open Access Repositories (OpenDOAR) and the Directory of Open Access Books (DOAB) lists open access books.

Despite the many opportunities open access resources provide, it is distressing to note that some African countries have not yet taken advantage of the privileges open access content offers. At the same time, some higher learning and research institutions that have invested in open access resources are still experiencing low uptake. The provision of information has no value in itself if the resources are not used and appreciated by the intended users. The available information

resources, whether open access or subscription-based, should be appropriately made known to and used by intended users for them to appreciate their value. Creating a sustainable approach to information access, promotion and use are more likely to create better services for user information satisfaction (Pionke 2016:317). One way of promoting information resources is through current awareness services.

Current awareness services aim to provide specific updates on current information or publications to professionals based on their subject interest. They are designed to keep specialists and professionals better informed through monitoring and communicating the latest developments in their respective fields of interest. Current awareness services support scholars in monitoring and sustaining relevant research and educational information in a timely manner and their preferred format for reuse. Furthermore, these services can provide professionals with opportunities for career development (Caborero, Tindaan, Attabam & Manat 2019:3; Guha 1983:46; Mishra 2011:6; Xu 2012:153).

As technology evolves, so does information packaging. As such, the library's methods of promotion and reaching out to users should match the prevailing information environment to remain effective. Since library collection re-stocking and information provision are a continuous activity, it calls for effective use of appropriate current awareness services to raise awareness of both new and existing services, resources and innovations in different areas of specialisation. Current awareness services can be tailored to the information needs of the involved users, such as an individual user, user group or an organisation as a whole. Since most peer-reviewed journals are now available electronically, the application of current awareness services to promote library information resources comes in handy. Users and professionals need to monitor publications on their interest through suitable alerting services to survive the information explosion being experienced in the electronic age (Caborero *et al.* 2019:3).

By 2021, the Zambian Higher Education Authority recorded a total of 60 institutions of higher learning, of which seven were public universities and 53 were private higher learning institutions/universities (UNESCO Institute of Statistics 2022). Among the seven public universities is the University of Zambia (UNZA). The University of Zambia is the biggest and oldest public university in the country, serving a student population of over 14,000. Since its inception in 1965, UNZA has grown, not only in the number of faculties and courses offered but also in the number of students, lecturers, researchers and support staff. One would expect that the

growth in the number of students and staff population should correspond with the availability of information resources the University's library provides.

While characterised by the challenges facing most academic libraries in developing countries, such as declining budgets, the UNZA library has not lagged in exploiting open access content's opportunities. Since 2000, the library has provided users access to electronic resources, most of which are both gold and green open access. The aim of providing open access content is to satisfy the sundry information needs of users since open access is mainly affordable (where certain charges exist) and widely accessible.

The Zambian Library Consortium (ZALICO), in collaboration with Electronic Information for Libraries (EIFL) and the International Network for the Availability of Scientific Publication (INASP), facilitates access to e-resources. While most of these databases are accessible at a minimal membership fee and discounted prices, the presence of hybrid open access resources has enabled UNZA's library to grow its electronic resources collection over the years. Users have access to a wide variety of full-text content from reputable scholarly databases and publishers such as ScienceDirect, Emerald, EBSCOhost, JSTOR, Cambridge, Oxford Online Journals, AGORA, HINARI, BioOne, OARE, Royal Society, Intellect and African Journals Online (AJOL) (University of Zambia Library 2020).

Additionally, UNZA's library has established an open access Institutional Repository meant to archive and showcase institutional research outputs while encouraging local researchers to participate in building open access content. The library also provides links to prominent open access platforms for e-books and e-journals. These include the Directory of Open Access Journals (DOAJ), Directory of Open Access Books (BOAB), Directory of Open Access Repositories (OpenDOAR), and World-wide Science. All these initiatives are aimed at generating easy and comprehensive access to both subscription and scholarly open access content.

Realising the benefits of open access resources in academia and the quest to improve usage, UNZA's library staged an open access campaign in 2015. The campaign was meant to promote the uptake and building of open access content, not only at the University but country-wide. The campaign targeted students, researchers and librarians at higher learning institutions. Activities included brochure and flyer distribution, discussions on radio, door-to-door campaigns, and exhibitions, culminating in a two-day workshop. One of the campaign's outcomes was the launch of the open access Journal of Preventive and Rehabilitative Medicine and an increase in the

number of researchers participating in building the institutional repository. Since that campaign, UNZA's library has also intensified awareness campaigns, training users in information search skills and upgrading search skills.

Despite all these efforts, research has found low usage of e-resources, which include open access resources at UNZA (Akakandelwa 2007:76; Kakana, Chitumbo, Namangala & Simui 2016:7; Miyanda 2010:52; Sakala 2013:33). As such, this study intended to identify and recommend appropriate current awareness services to promote the use of open access resources and all other e-resources at UNZA. The study also used the UTAUT model to determine the variables likely to influence behavioural intention and usage behaviour of UNZA students and researchers to use both open access resources and current awareness services as a technology (Venkatesh, Morris, Davis & Davis 2003:329).

1.2 Research problem

Open access is an essential component of higher learning education and scientific research because it makes existing research available and accessible. The availability of open access content widens the range of resources academic libraries can provide to their users. The UNZA library has grown its electronic collection from an initial seven databases in 2000 to over 20 in 2020. Sustaining subscriptions for e-resources, which include open access content, has been challenging and expensive. However, the library has continued to invest in these resources to meet users' information needs by increasing the range of accessible resources.

Despite this investment, the University has continued to experience low usage of these resources, including open access resources. Kakana *et al.* (2016:7) and Sakala (2013:33) found that the daily usage of open access institutional repository and e-resources in general by both faculty and students was low. This was due to various challenges, including lack of information retrieval skills, training and poor IT infrastructure such as Internet connectivity, bandwidth, accessible computers and Internet access points. Kakana *et al.* (2016:7) and Sakala (2013:33) recommended training and increased sensitisation programmes on the availability and importance of online resources. Out of these recommendations, training has been implemented while improved sensitisation programmes are yet to be introduced. This study drew on this recommendation to improve awareness programmes on the availability and importance of open access resources by investigating how the application of current awareness services could improve awareness of open access resources at UNZA.

Further, the quarterly and annual reports on e-resource usage compiled by the UNZA library and the Electronic Information for Libraries (EIFL) for 2016, 2017 and 2018 revealed a low usage of e-resources among students and researchers. For example, the 2016 EIFL report reported 8,161 full-text downloads for Oxford Journals Online, while JSTOR recorded 39,405 downloads. EIFL (2017) reported no usage for Intellect, 49 for Edward Elgar, 153 for BioOne, 8,161 for Oxford Online Journals and 54,848 full-text journal article downloads for JSTOR. This usage was against a student population of around 14,000 and 800 researchers.

It is not clear why the usage rate has continuously been disproportionate to the student/researcher population. Since scholarly online resources are expensive, the University and library need to ascertain the causes of the low usage of these resources to get value for these resources. It is also necessary to identify and put measures in place to improve the usage of open access resources other than those previously revealed and tried. The researcher found that no study had been conducted to establish the use of current awareness services in promoting the availability, access and use of open access resources at UNZA. There was also no research on the extent to which current awareness services had been used to promote open resources.

This study therefore, aimed to identify and recommend current awareness services that could be used to promote the use of open access resources and all other e-resources. This can assist the University to unlock the true value of these subscriptions and prevent its library from paying for and organising resources that are not being used.

1.3 Purpose of the study

This study set out to identify and adopt specific current awareness services that UNZA's library could use to promote and improve the usage of the available open access resources and all other e-resources in the University.

1.4 Research objectives

The specific objectives were to:

- i. Examine users' perception of the relevance of open access resources in their academic work and profession.

- ii. Assess possible opportunities open access resources could provide to higher learning institutions like UNZA.
- iii. Determine challenges students and researchers face in accessing open access resources.
- iv. Explore existing current awareness services at UNZA towards promoting open access resources and elsewhere.
- v. Identify current awareness services that UNZA's library could use to promote open access resources and all other e-resources at the University.

1.5 Research questions

The research questions were as follows:

- i. What are the users' perceptions of the relevance of open access resources in their academic work and profession?
- ii. What possible opportunities do open access resources provide to higher learning institutions like UNZA?
- iii. What challenges do students and researchers face in accessing open access resources?
- iv. What current awareness services exist or are used to promote open access resources and other resources in the University of Zambia and elsewhere?
- v. What alerting services are appropriate for promoting access and use of open access and all other online resources at UNZA?

1.6 Study hypotheses

- i. Current awareness services/awareness facilitates access and use of open access resources.
- ii. Performance expectancy determines the researchers' and students' behavioural intention and use of open access content and/or current awareness services as a technology.
- iii. Effort expectancy determines the researchers' and students' behavioural intention and use of open access content and current awareness services as a technology.

- iv. Social influence significantly influences or determines the behavioural intention and use of open access resources and current awareness services as a technology at the University of Zambia.
- v. Facilitating conditions determine UNZA's researchers and students' behavioural intention and use of open access resources and current awareness services as a technology.
- vi. Gender, age, experience and know-how (skill) influence user behavioural intention and use of open access resources and or current awareness services of UNZA's students and researchers.

1.7 Significance of the study

Maillard (2013) indicates that the significance of a study reflects the extent to which the study contributes towards improving the existing knowledge and changing a concept or promoting a new hypothesis in a particular field of research. Therefore, to assess the significance of a study, the purpose of its publication and whether it will make a significant scientific contribution to a specific field of research should be questioned. The significance of the study should also be written with a non-expert in mind.

The significance of the current study lies in the following: Despite UNZA providing scholarly open access resources from reputable publishers and databases, the usage of open access resources has remained low. This has created the need to explore strategies like current awareness services to effectively promote open access content at the institution. Based on the literature reviewed, it was clear that there had been no study done at UNZA to examine the students' and researchers' perceptions and use of open access resources and open access promotion using current awareness services. It is envisaged that this research could help establish the best ways to improve users' perceptions and usage of open access resources, not only at UNZA but everywhere where the importance of these resources has not yet been realised.

The researcher also believes that implementing the research findings would lead to improved usage of not only open access content but all available online resources. Should the usage of online resources improve, the University would be able to capitalise on the money spent on subscriptions. Other expectations are that the open access resource promotion would further help researchers actively build open access content through publishing in open access platforms such as

open access journals and institutional repositories. Active participation in publishing by UNZA's researchers has the potential to increase the visibility and ranking of the University on a global scale, while achieving its goals of providing quality education, research and academic programmes for strategic human resource development needed for national development. The researcher also hopes that this study will provide the basis for further research on promoting open access.

Since UNZA's student and staff population is growing swiftly, the promotion of open access content is likely to bring about satisfaction to the ever-changing, increasing and diverse user information needs, thereby solving the problem of students' over-enrolments at the institution.

1.8 Motivation for the study

The researcher developed an interest in studying the usage of open access resources at UNZA mainly because of working in an environment that deals directly with electronic information resources. At the time of the study, the researcher was working as a Serials Librarian at UNZA. At UNZA, the resource purchases are limited and more inclined to electronic resources due to low funding. Witnessing the low usage of electronic resources the library struggles to finance was disheartening. Consequently, the researcher felt that something should be done to improve the situation and hence this study.

As a Serials Librarian, the researcher was also directly involved in the students' access to e-resources, including the promotion of open access resources and training in their use. The researcher was also serving as EIFL's Country Coordinator for Zambia since 2013, which entails the coordination of subscriptions to EIFL resources in the country. Comparing e-resources annual usage statistics for Zambia to other EIFL member countries in Africa, such as Kenya or Ghana indicated that Zambia needed to step up e-resources usage to get real value for e-resource subscriptions. The low usage statistics in relation to the user populations of all member institutions in the Zambia Library Consortium could not be justified, hence the need for urgent efforts to help promote and improve the use of open access resources.

With this research, the expected outcome is a broader understanding of the value of using open access content among users in the University. The researcher further envisages that users will go beyond the mere use of open access resources but actively participate in knowledge creation and

advancement through publishing in open access platforms. This would improve the visibility and citation of researchers' works and improve the ranking of their institutions at a global level.

1.9 Study Delimitations

The study had several delimitations, which are discussed below.

The data collection started later than planned due to industrial unrest at UNZA, which kept affecting the presence of the students on campus, to the point of a forced closure. To make up for the time lost, the researcher had to engage two research assistants to help distribute and collect the questionnaires.

The coronavirus (Covid-19) outbreak also affected the data collection process and made it lengthier than planned. The researcher had to switch from face-to-face interviews to telephonic interviews to mitigate the challenges brought about by Covid-19. This was not easy and demanded more time to schedule the interviews and additional expenditure on airtime to avoid rushed interviews.

Although the sample was significant, at factor analysis level, most data was dropped because of non-responses. This could have affected the relationship of some key constructs on both intention and actual use of open access resources. The small sample size may not have been sufficient to confirm specific moderating effects on particular factors.

Despite these limitations, the study has provided preliminary evidence on the factors affecting both intention and the actual use of open access resources, although some showed effects opposite to the proposed direction in the original Unified Theory of Acceptance and Use of Technology (UTAUT) model. However, such findings should be expected in a study where the use of a technology is voluntary.

1.10 Definition of terms

1.10.1 Current awareness services

Uzohue and Yaya (2016:10) and Xu (2012:153) refer to current awareness services as services used by professionals to stay informed about new developments in and sources of information on topics of their interest. Xu (2012:153) adds that current awareness services can be tailored to the

information needs of an individual user or group of users. Fourie (2003:184) defines current awareness services as a selection of one or more systems that automatically notify users of new entities added to a system's database, such as books or newsletters. Current awareness services aim to provide users with current information in the shortest possible time (Chatterjee 2017).

Based on these two definitions, the term current awareness services, in this research refers to a system or systematic service that provides alerts or updates to users on the latest developments or information in their areas of interest. The researcher has coined it as systematic in that the alerting services follow a defined way to achieve a common goal of alerting a user. Current awareness services may also be used interchangeably with alerting services and current awareness tools.

1.10.2 Electronic resources

Baskar (2017:3588) describes an electronic information resource as an information resource provided in electronic form and may be available on the Internet such as e-books, electronic journals, full-text online databases, CD-ROM databases, image collections, and other computer-based electronic networks. Another definition of an electronic resource is a resource that requires computer access or any electronic product that delivers a collection of data, be it text referring to full-text bases, electronic journals, image collections, other multimedia products, or numerical, graphic or time-based data (Ashikuzzaman 2014; Baskar 2017:3588).

For this research, the term electronic resources refers to a collection of information in electronic or digital format such as encyclopedias, e-journals, e-dictionary, pamphlets, e-books, databases, reviews, reports, and so forth.

1.10.3 Open access content

According to the Budapest Open Access Initiative (BOAI) (2002), open access content is free and unrestricted availability of online scholarly literature accessible to all. Open access allows any user to read, download, copy, distribute, print, search for or link to the full texts of such resources. Suber (2015) defines open access content as digital, online research, free of charge and free of most copyright and licensing restrictions. Terras (2015:733) further views open access as the provision of unrestricted access to peer-reviewed scholarly research that allows others to replicate, investigate, substantiate and ultimately contribute to answering the underlying research questions.

For this research, the term open access content refers to online scholarly content that is easily or freely accessible by everyone or a group of users for research purposes, provided the original author is properly cited and acknowledged. Open access content is also used interchangeably with open access resources. It may include gold, hybrid or green models and gratis or libre open access literature.

1.10.4 Theory

According to Angielczyk (2017), a theory is a carefully thought-out explanation of natural world observations that brings together many facts and hypotheses that have been constructed using scientific methods. Corley and Gioia (2011:12) posit that a theory is a statement of concepts and their interrelationships that shows why a phenomenon occurs. Kivunja (2018:45) and Creswell (2014:86) view a theory as a generalised statement of interrelated abstractions or ideas, concepts, a set of constructs (variables) or definitions formed into propositions or hypotheses that systematically assert, explain or predict events or phenomena by specifying relations among variables (typically in terms of magnitude or direction). The purpose of a theory is to explain a natural phenomenon.

For this study, a theory means a set of accepted interrelated constructs, beliefs, definitions, statements or hypotheses that specify the relationships among variables in terms of magnitude or direction to explain or predict natural phenomena (Angielczyk 2017; Corley & Gioia 2011:12; Creswell 2014:86; Kivunja 2018:45; Moustafa 2014).

1.11 Literature review

Marshall and Rossman (as cited in Creswell 2014:60) reveal that the literature review accomplishes several purposes, such as sharing the results of other studies closely related to the current study, showing ongoing research trends, filling in gaps and extending prior studies. Therefore, the literature review provides a framework for establishing the importance of the study and a benchmark for comparing the results with other findings.

This section summarises the relevant literature consulted in preparation for the study. A comprehensive literature review follows in Chapter Two.

1.11.1 Use and user perception of open access

To explain user behavioural intention to use a technology, Davis (1989:319) and Venkatesh *et al.* (2003:329) argue that usefulness and ease of use are the main factors affecting an individual's acceptance of a technology. The perceived usefulness is closely related to performance expectancy (PE), while ease of use is related to effort expectancy (EE). This means that users are likely to accept and use open access resources if they find them useful in their academic work and can use them without problems.

Kaba and Said (2015:101) examined Al Ain University of Science and Technology (AAU) faculty members' awareness, usage and perceptions of open access resources in the Gulf Council countries. Their study showed a positive perception and frequent use of open access resources for teaching and research activities. The faculty members believed that open access resources are useful and trustworthy for scholarly and research activities, fulfilling both performance expectancy and effort expectancy. Their results also revealed that faculty members in Education, Engineering and IT used open access resources more frequently than those in Law. Further analysis revealed that female faculty members used open access resources more than male faculty members.

Mammo and Ngulube (2015:13) investigated academics' use of and attitude towards open access resources in selected higher learning institutions in Ethiopia through triangulation of qualitative and quantitative data collection methods. Their study found that most academics held a positive attitude towards open access journals. The academics' intention to use open access was motivated by the need to access scholarly literature and disseminate or publish their research findings. They recommended further research using the same approach to determine the generality of their findings. In an attempt to correlate this study's findings to those of Mammo and Ngulube, the researcher also triangulated the qualitative and quantitative data results.

Chisenga and Simumba (2009:118) explored the views of agricultural researchers on open access publishing in Zambia. The results of their study indicated that researchers basically supported the open access concept because they believed that open access improves the visibility and accessibility of their research, an indication of use prompted by PE. Their investigation revealed a vital indicator of success for future open access initiatives in Zambia.

In contrast, research conducted by Shuva and Taisir (2016:36) in Bangladesh showed that open

access journals were not widely accepted as a platform for research. This opinion was based on perceived improper peer-review processes for publications in open access journals. This could be a reason for the low usage of open access resources at other universities as well. Consequently, the present research sought to understand if this factor impacted the usage of open access content at UNZA.

1.11.2 Perceived opportunities of effective use of open access resources

Akuffo and Budu (2019:6) and Kowalsky (2015:949) assert that online resources are crucial in enhancing students' research and learning activities due to their quality and easy availability. Similarly, Suber (2015) argues that open access is essential for scientific publishing. Therefore, the results of scientific research should be as openly accessible and freely useable as possible. The Right to Research Coalition (2012) posits that open access seeks to return scholarly publishing to its original purpose through spreading knowledge and facilitating knowledge building. Open access content makes access to e-resources possible at a minimal cost while widening the range of resources academic libraries can provide to their users. Anunobi and Ape (2018) and Jain (2012) claim that open access provides enormous benefits to faculty, students and researchers, such as equal access opportunities to resources for teaching, learning and research despite their backgrounds. Anunobi and Ape (2018:33), Jain (2012:33) and Suber (2015) add that open access leads to wider visibility (a significantly more extensive and more diverse audience), increased usage (rate of citations) and a more significant impact for scholarly work. Open access also increases and creates avenues for researchers to collaborate and publish globally.

Despite the above-mentioned benefits of open access resources to researchers, authors and resource providers, Anunobi and Ape (2018:31) revealed that many universities in African countries and developing countries, in general, are yet to utilise the privileges open access offers. Similarly, a study by Tlakula and Fombad (2017:868) found low levels of awareness and basic usage of electronic resources (usage being limited to EBSCOhost) by undergraduate students at the University of Venda in South Africa.

There is a need for a strategy to persuade scholars in developing countries to find value in using open access. Anunobi and Ape (2018:31,34) also affirm that librarians in these universities are not only expected to collaborate in the development of open access resources in the area of repository implementation but are also considered to be champions of open access by ensuring that open access resources are discovered and accessed. Therefore, this research proposes the application of

current awareness services to promote the uptake of open access resources.

1.11.3 Challenges students and researchers face when accessing open access resource

Mutwiri (2014:88-89,154) conducted a study to establish the challenges academic staff in selected Kenyan universities experienced when accessing open access. The study revealed low awareness and a lack of information search skills. Similarly, a study by Dulle (2010:167-8) examining factors affecting the adoption of open access in research activities in Tanzanian public universities cited poor research conditions and researchers' low Internet self-efficacy as challenges in using open access. Other studies indicated technology (lack of infrastructure including poor Internet connectivity and inadequate bandwidth) as another challenge that researchers in many African countries, including Zambia face (Ivwithreghweta & Onoriode 2012:9; Mwantimwa, Elia & Ndenje-Sichalwe 2017; Solanke & Osuchukwu 2018; Ukwoma & Onyebinama 2021:486).

Additionally, Miyanda (2010:52) and Sakala (2013:33) discovered low usage of online resources at the University of Zambia due to poor Internet connectivity and inadequate bandwidth, fewer computers and Internet access points, lack of awareness and lack of or limited information retrieval skills. These authors recommended training, and increased and improved sensitisation programmes on the availability and importance of online resources, including open access. Since UNZA experiences low usage of open access, despite providing scholarly open access resources from reputable publishers and databases, it is necessary to identify the cause and put measures in place to improve the usage of these resources at the institution.

1.11.4 Existing and use of current awareness services in promoting online resources globally

McKee, Koltutsky and Vaska (2009:1-3) assert that current awareness services have evolved from the selective dissemination of information reference services, originally provided by libraries, to a set of database features provided by vendors or research databases. These include Table of Contents (TOC) services, monitoring agents (Google alerts), rooting of periodicals, forthcoming meetings, research in progress, selective disseminating of information, compiling agencies, news clipping services, and mobile alerting services (Chatterjee 2017; Ukwoma & Onyebinama 2021:487-488; Xu 2012:155). Mwinyimbegu (2018:9) revealed that perusing library websites is the most important technique to promote access to and use of open educational resources in selected public university libraries in Tanzania. Other alerting services revealed were social media (Facebook, Twitter and blogs).

Naqvi (2013:108) conducted research on the awareness and use of current awareness services in the College of Business, Hospitality and Tourism Studies (CBHTS) at Fiji National University's Nasinu Library. The study disclosed that the most popular current awareness services used by staff and students included the library's website, e-mail notifications and displays of the latest books and periodicals. In their study of the provision of current awareness services by medical librarians in Nigeria, Uzohue and Yaya (2016:14) revealed that these services provide educational resources to keep health professionals and researchers abreast with new developments in their areas of interest. Mondschein (1990:137) concluded that scientists who revealed high use of current awareness services were more informed of current developments than their colleagues who did not regularly use the same services. This is an indication of the value of alerting services.

1.11.5 Recommended current awareness services for the University of Zambia

Out of the various current awareness services, the literature review discusses six that are commonly used and readily available, and which the researcher believed would help promote open access resources at UNZA. The chosen services are publisher/vendor alerts (e-mail notification from publishers and vendors) JournalTOC/Table of Contents services (TOCs), selective dissemination of information (SDI), monitoring through intelligent agents (MIA) such as Google alerts, customised information delivery (CID) such as library websites, LibGuide and social media tools. All six alerting services are discussed in detail in Chapter Two.

The researcher chose these services due to their capacity to cater to a large user population and their ease of use. Furthermore, most of them are web-based alerting services, which can generate alerts automatically based on specific research interests in a subject area. Since most of UNZA's researchers are not regular users of online resources and are therefore not likely to create researcher profiles, the use of such alerting services would fill this information gap, hence, transforming the awareness and use of open access resources in the University.

1.12 Theoretical framework

1.12.1 The role of theory in research

The role of a theory in research cannot be overemphasised. A theory plays a vital role in guiding the study process from planning and data collection to the explanation of findings. Adom, Hussein and Agyem (2018:438) state that a theoretical framework explains the path of a research and

grounds it firmly in theoretical constructs to make research findings more meaningful and acceptable. A theory helps predict, explain or analyse a phenomenon such as relationships, events or behaviours and generalise the research findings. Grant and Osanloo (as cited in Adom, Hussein & Agyem 2018:438) add that a theory provides the structure of how a researcher defines a study philosophically, epistemologically, methodology and analytically.

This study adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) model as a theoretical framework to explain and analyse the problem of low usage of open access resources and how the application of current awareness services could improve the usage at UNZA.

1.12.2 Theory direction and levels of analysis

Theory direction can be deductive or inductive. This study applied elements of deductive and inductive approaches. The former supplied the basis for the argument and construct development based on quantitative data, while the latter assisted in validating the research propositions and relationships between and among study constructs. The inductive approach also catered for the open-ended interrogations. The level of analysis or inquiry forms the basis of social scientific investigations. The three main levels of analysis in social inquiries are micro, meso and macro level. This study used the macro-level approach. Macro-level analysis was found to be the most appropriate level of analysis because the study focused on individual students and researchers for data collection, as well as units of analysis towards assessing user behavioural intention to use open access resources and alerting services at UNZA.

1.12.3 Models and theories of technology acceptance and use

According to Alshammari and Rosli (2020:12), models and theories of technology acceptance and use are designed to examine, predict and understand factors that influence the behaviour and intention of users to accept, adopt and use new technologies, systems, or innovations in different disciplines and parts of the world.

There are several theories and models used to study technology acceptance and use. These include the Innovation Diffusion Theory (IDT), Theory of Reasoned Action (TRA), Social Cognitive Theory (SCT), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Ali & Arshad 2018:255-258; Hutabarat, Suryawan, Andrew & Akwila 2021:127-130; Kripanont 2007:3,7; Mensah

2019:4; Samaradiwakara & Gunawardena 2014:23-27; Venkatesh *et al.* 2003:428-232; Venkatesh, Thong & Xu 2016:330). These theories are discussed in detail in Chapter Three.

The current research applied the UTAUT to study the use of current awareness services to improve the usage of open access content at UNZA.

1.12.4 Justification of the chosen theory

The UTAUT model was adopted for this research as it was the most appropriate for the study based on its explanatory power. In comparison to the other theories and models mentioned above, UTAUT provided the best explanation, coverage, and comprehensive understanding of the drivers of behavioural intention of acceptance and use of new technologies (Abbad 2021:7210; Abdou & Jasimuddin 2020:39; Alshammari & Rosli 2020:15; Dulle 2010:90; Momani 2020:85; Samaradiwakara & Gunawardena 2014:29; Sejane 2017:24; Venkatesh *et al.* 2003:425).

Several studies have revealed that UTAUT draws its explanatory power from the eight models studied (TRA, TAM, MM, TPB, C-TAM-TPB, MPCU, IDT and SCT) and the theory has explained between 17 and 53 per cent of the variance in user intentions to use information technology. Furthermore, UTAUT provides a refined view of how the determinants of intention and behaviour evolve over time. Ultimately, compared to other theories, UTAUT proved to be the theory that explored technology acceptance behaviour the best.

UTAUT has four core determinants of user's behavioural intention to use a technology. These are performance expectancy, effort expectancy, social influence and facilitating conditions. The model further identifies four moderators - gender, age, experience and voluntariness of use (Venkatesh *et al.* 2003:429).

Performance expectancy is the degree to which an individual believes that using a specific technology will help them achieve job performance while effort expectancy is the ease of use associated with applying a technology. Social influence is the degree to which an individual perceives that others believe that he/she should use a technology or new system. Facilitating conditions refer to the degree to which an individual believes that organisational and technical infrastructure exists to support the use of a system or technology (Abdou & Jasimuddin 2020:39-41; Davis 1989:320; Hillmer 2009:22; Momani 2020:84; Sarfaraz 2017; Venkatesh *et al.* 2003:428,447,450,451,453).

1.12.5 Application of theory

This study applied the original UTAUT with three additional constructs, one direct construct (information search skills) and two moderators (level of education and profession) to assist in explaining and understanding problems associated with the use of open access content at UNZA and how current awareness can be applied to improve usage.

Performance expectancy was assessed to determine whether or not it influenced researchers' and students' behavioural intention and use of open access content and current awareness services as a technology. This assessment involved interrogations on the usefulness of open access and current awareness services in enabling students and researchers to achieve their daily academic commitments and goals. Effort expectancy was applied to assess the effects of gender, age, experience and know-how (skill) on user behavioural intention to use open access in their daily scholarly works. The study answered questions on how easy or difficult UNZA's students and researchers found accessing and using open access content and the application of current awareness services for information updates.

Social influence was assessed to establish whether or not it had a significant influence or was a determinant of behavioural intention to use the open access resources and current awareness services as a technology at the University, where usage is voluntary. A voluntary setup is an environment where the use of open access is not mandatory. Additionally, social influence was used to assess the extent to which students and researchers were influenced by fellow students/researchers and mentor students/lecturers to use open access resources and alerting services for updates.

The researcher used facilitating conditions to assess the existing technical support in the University, such as the availability of the technology (internet access points and laboratories, computers, bandwidth), training, research/scholarly funding and scholarships towards the upgrading of staff's skills and the availability of online research literature for researchers (Venkatesh *et al.* 2003:454).

1.13 Research methodology

The University of Southern California (USC, 2017) and Creswell (2014:45) define a methodology as a description of the actions to be taken to investigate a research problem. It includes the

rationale for applying specific procedures or techniques used to identify, select, process, analyse and interpret data to understand the research problem. The methodology covers the methods used and activities conducted in this research, from data collection to presenting and interpreting the research findings. It includes the research paradigm, research approach, research design, data collection instruments, study population, sampling and the data analysis. The research methodology is discussed in detail in Chapter Four.

1.13.1 Research paradigm

A paradigm is a philosophical way of thinking, a worldview, perception, school of thought or a set of shared beliefs and attitudes that inform the meaning or interpretation of research data (Kivunja & Kuyini 2017:26; Kuhn 1996; Žukauskas, Vveinhardt & Andriukaitienė 2018:133). The most widely used research paradigms are the positivist, interpretivist/constructivist, critical/transformational, and pragmatic paradigms.

This research is grounded in the pragmatic paradigm because of its flexibility, thus granting the researcher the freedom to use the most suitable methods, techniques and procedures associated with quantitative and qualitative research in examining the research problem (Mawlood 2017).

1.13.2 Research approach

Creswell (2014:31-32) defines research approaches as plans and procedures for research that range from broad assumptions to detailed methods of data collection, analysis and interpretation. The three most commonly used research approaches are quantitative (post-positivist worldview), qualitative (constructivist/transformational worldview) and mixed- methods (pragmatic worldview). The researcher applied the mixed-methods approach to capture detailed evidence/data for a complete understanding of and broader perspective on why open access resources are poorly used at UNZA (Creswell 2014:50; Guetterman & Fetters 2018:903; Plano Clark & Ivankova 2016).

1.13.3 Research design

A research design is a systematic plan of action the researcher follows to effectively achieve the research objectives. The University of Southern California (USC, 2017) defines a research design as an overall strategy that the researcher uses to coherently and logically integrates the study's different components to effectively address the research problem. Dulle (2010:112) and Makombe

(2017:3377) add that a research design should essentially determine where the data is located, the amount of the material or the number of cases needed, and how the data will be collected and analysed. Additionally, a research design provides an instrument or a combination of instruments with which the researcher conducts the research (Makombe 2017:3377).

This study applied a case study-mixed methods design. Guetterman and Fetters (2018:902) posit that researchers conducting a case study that uses qualitative and quantitative methods can benefit from recent innovations in mixed-methods and case study research designs by meaningfully integrating the two forms of data to yield new inferences and a better understanding of the research problem. Similarly, Schoonenboom and Johnson (2017:110-111) add that combining the two designs enhances the integrity and credibility of the findings.

This study's case study-mixed methods design comprised a multiple-case study design, sequential explanatory design and concurrent triangulation design. The multiple-case design involved collecting data from multiple levels and various units of analysis. Firstly, UNZA was identified as a case. Later, several other cases were selected, including the selection of the 23 respondents for the interviews, six databases for the content analysis, and 20 publications for the citation analysis (Guetterman & Fetters 2018:906). Meanwhile, the sequential explanatory and concurrent triangulation designs clarified the case study methods. They specified how the data was collected from different sources using different tools and how the collected data was analysed and integrated to understand the research problem better.

The sequential explanatory and concurrent triangulation designs are two of the four most commonly known types of the mixed-methods designs, which also include sequential exploratory design and the concurrent nested design (Creswell 2014; FoodRisc Resource Centre 2016).

The sequential explanatory design involves collecting and analysing quantitative data first, followed by the collection and analysis of qualitative data in the second phase, building on the initial quantitative results (Creswell 2009:211; FoodRisc Resource Centre 2016; Guetterman & Fetters 2018:903). While a sequential explanatory design can be easy to implement, and simplifies the description and reporting of results due to the design following clear steps through separate stages, it takes longer to complete all the data collection due to the separate data collection phases.

On the other hand, the concurrent triangulation design prioritises both quantitative and qualitative data collection. The researcher collects both quantitative and qualitative data separately yet

concurrently. Data integration occurs at the results interpretation or discussion stage, either by transforming one data type to another or by comparing the results of the two datasets side by side (Cook & Kamalodeen 2019:23; Creswell 2009:213; FoodRisc Resource Centre 2016; Guetterman & Fetters 2018:903). Although a concurrent triangulation design may complicate the comparison of results of different analyses using data of different forms, it takes less time to complete and has the potential to provide well-validated and substantiated findings (Creswell 2009:214; FoodRisc Resource Centre 2016). Its combination with the sequential explanatory design in this study helped shorten the time spent on the data collection while providing reliable conclusions.

The inclusion of the sequential explanatory design and the concurrent triangulation design in the main design (case study-mixed methods design) was motivated by the ability to collect certain data sequentially, starting with a survey questionnaire, which captured mostly the quantitative data, followed by the qualitative open-ended interviews and the citation analysis. Meanwhile, the content analysis and observations were completed concurrently with the rest of the data collection. These delivered both quantitative and qualitative data. The questionnaire enabled the researcher to collect data from an adequately-sized population to generalise the results and correlate the study variables to establish relationships. The other data collection tools (interviews, content analysis, citation analysis and researcher observation) helped build on the questionnaire's initial results to gain a broader and in-depth perspective on the research problem, by validating and correlating the results.

Ultimately, this case study-mixed methods design adhered to the following procedure: the identification and choice of the data collection instruments, identification of the study population, selection and determination of the sample size, sampling techniques and the choice of the data analysis tools. These are briefly discussed in the following sections, but elaborated on in Chapter Four.

1.13.4 Data collection instruments

According to Nalzar (2012:2,7), data collection is the process of collecting information from identified sources such as people, files, documents and databases to help investigate the research problem. Thus, data collection instruments are devices used to collect data from the field. The most commonly used data collection instruments in research include questionnaires, interviews, focus group discussions and observations (KENPRO 2012). This study utilised a questionnaire, an interview guide, researcher observation, content analysis and citation analysis. These research

instruments were chosen because they can produce quantitative and/ or qualitative data. More detail on the choice of research instruments and their application is covered in Chapter Four.

1.13.5 Pilot study

A study by In (2017) identifies a pilot study as a small study conducted to assess research protocols, data collection instruments, sample selection strategies and other research techniques in preparation for a more extensive study. It helps identify potential problem areas and deficiencies in the research instruments prior to implementation during the main study. It also helps to select the most suitable research method to answer the research question in the main study.

A pilot test for this study was conducted on the instruments that required testing, such as the questionnaire and the interview guide. The test was conducted to ascertain the feasibility of the study, the validity of data collected in relation to the study objectives, and the logical sequence and appropriateness of the questions and wording within questions. The questionnaire and interview guide were firstly circulated to three colleagues (two librarians and one researcher) for review and later pilot-tested on a small sample of respondents from the study population. The questionnaire was tested on 18 respondents (ten students, five researchers and three librarians), while the interview guide was tested on three respondents (two lecturers and one student), all randomly selected from the study population.

The results of the pilot test are discussed in Chapter Four.

1.13.6 Study population

Banerjee and Chaudhury (2010) assert that a study population is the sub-set of the target population available for study. A target population is a complete set of people with a specialised set of characteristics to which the results of the study can be generalised. Neuman (2014:147) adds that a study population is an abstract idea of a large group of many cases from which a researcher draws a sample and to which results from a sample are generalised.

The study population for the questionnaire, interviews and observation included all full-time returning students, researchers (academic staff) and librarians, both at the Great East Road main campus and the Ridgeway campus of UNZA. The study population for the content analysis was all databases the UNZA library was providing access to at the time of the research, while the study

population for content analysis was the 2018 publications of the twenty (20) prolific UNZA researchers for the year 2018.

At the time of conducting this research (2018/2019), UNZA had a total of 14,033 students, 833 researchers (academic staff) and fifty librarians, amounting to 14,916 people in total. The total number of databases UNZA was subscribing to was 33. The University had thirteen schools from which the respondents were drawn. Out of the 13 schools, 12 were considered. The one that was not considered operated on a part-time/distance basis, and it would have been difficult for the researcher to follow up with students on such arrangement.

1.13.7 Study sample, sampling techniques and data collection

A sample is any part of a fully defined population (Banerjee & Chaudhury 2010). Firstly, the researcher used a sample size calculator to determine the sample sizes required for the questionnaire (The Survey System 2016). The researcher used a margin of error (confidence interval) of 4% and a confidence level of 95% to select a sample that was as representative as possible. The sample for the questionnaire equaled 577, representing 4% of the total population.

Having identified the sample size for the questionnaire, the researcher then applied appropriate sampling techniques to select the actual respondents. Banerjee and Chaudhury (2010) discuss two types of sampling: probability/random sampling and non-probability sampling. According to Taherdoost (2016:21), probability/random sampling is where every case or unit of the population has an equal chance of inclusion in the sample. On the other hand, non-probability sampling involves selecting individuals based on non-random criteria and not every individual has a chance of being included in the sample (Etikan & Bala 2017:215; McCombes 2019).

The researcher applied two probability-sampling methods and two non-probability sampling methods to select the established numbers for this study. The simple random sampling and stratified random sampling made up the probability sampling, while the purposive sampling and convenience sampling made up the non-probability sampling.

The study analysis plan for the sample size determination was based on the following subgroups of the research population:

- i. The population was stratified according to schools to ensure that specific characteristics of individuals such as gender, field of specialization, and level of study were represented in the

sample and that the sample reflected a true proportion of the study population (Creswell 2014:204).

- ii. The actual respondents were then proportionately randomly drawn from the study population as follows: 542 students, 32 researchers and three librarians. Student respondents were followed in their classes just after a lecture and a few that came to the library's Serials department, while lecturers and librarians were followed in their offices.

The distribution of questionnaires to the sample above was followed by interviews with 23 respondents (ten researchers, ten students and three librarians), who were purposively selected from the target population. The interviewees were purposively selected to represent both active and inactive users of open access content to get typical views, representative of the general population. The researcher further analysed 20 publications by UNZA's most prolific authors/researchers in 2018. The researchers were purposively sampled while their publications were randomly selected. The selection of cases for observation applied convenience and random sampling as the observations were made whenever there was an opportunity to do so, especially during training and student internship. This helped the researcher take advantage of the training sessions conducted by the Serials Department in the library and during student attachments. Meanwhile, the six databases for the content analysis were purposively selected to ensure that the three subscription-based were also offering hybrid open access content and another three were gratis or libre open access-based databases UNZA library had access to through EIFL.

At the levels of the questionnaire, interview and citation analysis, the researcher endeavoured to select a gender-sensitive sample to remove all biases related to sex. The purposive selection of interviewees and authors was subjected to the ratio of females to males in each school/strata and active authors.

Furthermore, the school registers for students and personnel data records for staff were used as sampling frames for the questionnaire and the interview. The database list on the UNZA website and the UNZA 2018 research output report were used as sampling frames for the content analysis and citation analysis, respectively.

1.13.8 Data analysis

Data analysis is the process of making meaningful and valuable conclusions from large amounts of data obtained from an investigation of a problem (Ugwu 2017:2-4). Data analysis describes and

summarises data, identifies relationships between variables, compares variables and identifies trends. This process is used to provide answers to research questions or test hypotheses.

The data analysis for this study involved analysing quantitative and qualitative data. The quantitative data mainly involved data generated from the answers to the questionnaire's closed-ended questions, content and citation analyses. The qualitative data analysis mainly involved data generated from the questionnaire's open-ended questions, the interviews, researcher observation and to a lesser extent, the citation and content analyses.

The quantitative data analysis further involved descriptive analysis and multivariate analysis. With the descriptive analysis, the researcher was able to arrange and manipulate the data to generate descriptive information summaries about the sample and measures for easy understanding and interpretation of the results to address specific objectives of the study (Trochim 2020). The multivariate analysis generated multiple or multivariate measurements of interrelationships or correlations among several variables to address the aspect of the theory validation (Bartholomew 2010:12; Grimnes & Martinsen 2015:329). Both forms of analyses assisted in identifying variables that influence the usage behaviour and behavioural intention to use open access resources and current awareness of UNZA researchers and students. The detailed results of both the descriptive and multivariate analysis are presented in Chapter Five, and discussed in Chapter Six.

The Statistical Package for Social Sciences (SPSS), version 22 and Microsoft Excel 2010 were used to analyse quantitative data, while the content analysis was done thematically employing themes or headings and subheadings based on the research objectives. These themes were later used as sections and sub-sections in the chapters dealing with the presentation and discussion of the research findings. The researcher chose SPSS and Microsoft Excel because these tools are user-friendly, could perform various data analyses and presentation functions and provide accurate and reliable results to predict trends even in small samples (Paura & Arhipova 2012:10). The choice of content analysis for the qualitative data was based on the researcher's judgment and conviction that it was the most appropriate way of analysing that kind of data to make meaning. Content analysis is also user-friendly and gives results as close-to-accurate and reliable as possible.

The quantitative data analysis helped the researcher to quantify the research problem and determine how current awareness services can be used to improve the open access uptake, while

qualitative data analysis provided an in-depth understanding of the level to which each variable contributes towards the low uptake of open access resources and how the uptake can be improved. More details on the methodology are covered in Chapter Four.

1.13.9 Validity, reliability and objectivity

According to Shuttleworth (2008), the principles of validity, reliability and objectivity are fundamental cornerstones of scientific research. Reliability relates to consistency in the findings or measurements across time, items, and researchers (Price, Jhangiani & Chiang 2015:1,10). Validity is when a test or instrument accurately measures what it is supposed to or accurately reveals the data of the variables studied, hence its faithfulness (Mohajan 2017:67; Neuman 2014: 241). To ensure the validity, reliability and objectivity of the research and its results, the researcher took specific care at various levels of the research. A mixed-methods approach was chosen as the research approach to provide comprehensive data, evidence and a better understanding of the research problem, hence more reliable results.

At the sample determination and selection stage, the researcher ensured the selection of an accurate and representative sample by using an online survey system sample size calculator and applying a proportionate random sampling technique (The Survey System 2016). Using an online sample size calculator helped avoid the possibility of human error. At the same time, the application of proportionate random sampling of the respondents gave each member equal chances of being selected and facilitated the selection of a representative sample. The sampling also considered gender bias by selecting a sample proportionate to the gender ratio. The idea was to make it possible to generalise the findings to the larger population and to allow the researcher to draw appropriate conclusions.

Further reliability and validity tests were conducted on the questionnaire to ensure that the instrument was as adequately reliable as possible and to determine its usefulness as a measurement instrument using a Cronbach's alpha test on SPSS statistics. The reliability test results showed an overall Cronbach's alpha value of 0.874. This is an indication that the scale and the relevance of each question in the questionnaire used to get valid results from the research were acceptable. The results revealed a high level of internal consistency for the scale used on the current sample (see Table 1.1)

Table 1.1: Reliability test results

Cronbach's alpha	Cronbach's alpha based on standardised items	Number of items
0.873	0.884	49

Additionally, a validity test was conducted using Pearson Product Moment correlations via SPSS where sig. (2-tailed) was a significant level of 5% on the total survey respondents N (501). The results showed a strong correlation between and among variables intended to measure the same attribute. Out of 269 correlations measured, 224 had a correlation significant at the 0.01 level (2-tailed) while 45 had a correlation significant at the 0.05 level (2-tailed). Therefore, it is evident that the questionnaire as the research instrument used to collect the most information, measured what it was expected to measure. We can also consider the instrument trustworthy and the data collected reliable and valid.

1.14 Originality of the study

Shibayama and Wang (2019) define originality as the degree to which a scientific discovery provides subsequent studies with unique knowledge that is not available from previous studies. Originality could mean anything new that adds to the common stock of scientific knowledge, such as new methods, theories, or observations. Gill and Bernard (2012:477) and the University of Melbourne (2020) explain originality as follows:

- i. Developing a new product or empirical work that has not been done before.
- ii. Improving an existing piece of work.
- iii. Reinterpreting existing theory, evidence or information in a different context.
- iv. Applying unique techniques to test and idea/theory.
- v. Applying a different methodological approach to address a problem.
- vi. Repeating research, existing ideas or technique in other contexts or new areas of study.
- vii. Developing a new research tool or technique.
- viii. Adding to knowledge or revealing new findings in a way that has not been done previously in a particular discipline.
- ix. Addressing new areas that have not been previously explored.

The originality of this research is based on the lack of similar research on how current awareness services can be used to promote the use of open access resources at UNZA. Based on the literature available, the application of the mixed-methods approach and the case study-mixed-methods design to analyse the current status of online resource uptake has not been used in earlier research. The literature further suggests that the application of content analysis and citation analysis as data collection tools had not been explored by earlier research on factors that affect the uptake of online resources at UNZA.

Earlier research has recommended strategies to improve the uptake of e-resources such as increasing training, improving bandwidth, providing more Internet access points and creating awareness of online resources at the University. However, there was no record of research recommending and applying current awareness services to promote open access content as a specific component of its e-resources. This, therefore, allowed the application of different knowledge from a different perspective on existing systems. It also allowed for new discoveries and interpretations of the results using UTAUT as the theoretical model in the research.

1.15 Research ethics

Research ethics are standard principles/guidelines or a code of conduct to be followed in the responsible conduct of research. Kripanont (2007:158) states that ethics pervade every step of the research process. It applies during data collection, analysis, reporting and interpretation of the results and relates to the dissemination of information or study results. The researcher intended to, as much as possible, respect all expected, accepted and approved research ethics or principles of good behaviour before, during and after the research. As such, different research ethics were applied at different stages of the research process, including from before data collection, during data collection, data analysis, interpretation and discussion of the results, to the communication of the research findings.

Before beginning the data collection, the researcher obtained approval from the University of South Africa's (UNISA) Research Ethics Review Committee, to conduct the research. The researcher also obtained formal permission from UNZA to conduct the research at the institution. The researcher consistently consulted UNISA's code of ethics to familiarise herself with the issues of concern in the study. The researcher further piloted the research instruments that needed to be tested, such as the questionnaire and the interview guide, to ascertain their quality and suitability towards meeting the research objectives. The two research instruments were piloted on a small

number of respondents from the study population with characteristics similar to the sample population.

At the sample selection stage for the questionnaire, stratified random sampling was employed, after which respondents were drawn proportionally to give every unit in the study population an equal chance of participation. The researcher also endeavoured to select a gender-sensitive sample by considering the ratio of females to males in every stratum. Purposive sampling was applied to select interviewees to include active and inactive users of online resources to get typical views representative of the study population on how open access resources can be promoted using different alerting services.

At the data collection stage, the researcher provided and explained certain precautionary information in the cover letter of both the questionnaire and the interview guide. This included the study's purpose and objectives to ensure that the participants fully understood the study's requirements and implications, if any (see Appendices 1, 2 and 3). Based on the pilot study results, it became clear that the respondents did not understand the meaning of some terms, including scholarly open access content as provided for by the Berlin Declaration of Open Access (2003). For this reason, the researcher provided a more straightforward contextualised definition of open access. The cover letter also provided a simplified definition of current awareness services to help the respondents give appropriate responses based on their knowledge. This ultimately increased the results' reliability and validity and the respondents' participation levels. It also explained what their participation entailed to avoid feeling deceived at any point of their participation.

Respondents were further made aware of their rights to either consent to participate in the questionnaire and interview or not and that the information they provided was purely for academic purposes and would be treated confidentially to respect their privacy. The cover letter contained the researcher's contact details if any potential respondents had questions. For the interview respondents, once they accepted to participate in the study, they were provided with a consent form to sign (See appendix 6). This form served as evidence that the respondents understood what the research was about, what was expected of them and were willing to participate in the research. Respondents were also reminded of their responsibility to be truthful in answering questions to help solve the problem of low usage of open access resources at UNZA.

Furthermore, the research instruments included simplified research questions that dealt with one issue at a time for the respondents to easily understand and give appropriate responses. The use of

open-ended questions was meant to avoid asking too many leading questions and to help get detailed information from respondents.

At the data analysis and reporting stage, the researcher analysed and presented the research findings as was given, even if they were contrary to the expected views based on the reality presented. This was one way of respecting the respondents' rights. The respondents' privacy and anonymity were maintained by not mentioning their names. Instead, respondents were assigned numbers to differentiate one respondent from another in the discussion of the results. Additionally, all the sources cited in the study were correctly acknowledged both in-text and in the references using the Harvard referencing style as recommended by UNISA's Department of Information Science. This was to avoid plagiarising other researchers' works. The researcher further endeavoured to void any risk of harming people, the environment or property. As such, the research did not include issues that would harm respondents.

Upon completion of the research, the researcher committed to giving back to the two university communities (UNISA and UNZA) involved via publication of the research findings in their institutional repositories and other open access platforms if permitted by UNISA such as Figshare and Elsevier's (Bepress) Digital commons institutional repository (UNISA 2013:5,14).

Finally, the researcher has safely stored all the information compiled during the entire research, where it will remain until such a time it will be no longer useful for further research.

1.16 Outline of the study

This thesis comprises the following seven chapters:

Chapter One: This is an introductory chapter, which provides an overview of the study regarding the usage of open access resources at the UNZA and how current awareness services can help promote and improve uptake. It includes the background to the study, problem statement, aim and objectives of the study, research questions, significance of the study, definition of key terms, summaries of the reviewed literature, theoretical framework, and the methodology used in the study. The chapter also includes the research ethics adhered to during the study.

Chapter Two: The literature review chapter covers a comprehensive review of scholarly literature and related research on the topic of open access resources and current awareness services.

Chapter Three: The theoretical framework chapter outlines the UTAUT model as the theoretical framework chosen to guide this study. The model identifies factors that influence the usage behaviour and intentions of UNZA's researchers and students to use open access resources.

Chapter Four: The research methodology details all the research activities undertaken, from the research planning stage to the presentation and interpretation of the research findings.

Chapter Five: In this chapter, the research findings are systematically presented. It presents the findings of the study captured by the five data collection instruments and involves both the qualitative and quantitative data. This chapter is divided into sections based on the research objectives, questions and theoretical constructs.

Chapter Six: This chapter discusses and interprets the research findings presented in Chapter Five, bringing the research into perspective.

Chapter Seven: The final chapter of the dissertation. It provides the summary, conclusions and recommendations of the study based on the research findings presented in Chapter Five and discussed/interpreted in Chapter Six.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a comprehensive review of the literature relevant to the study's topic, the application of current awareness services in promoting open access resources usage. The literature review enabled the researcher to put the current study into perspective by relating it to other studies on the use and user perspective of open access resources, open access challenges and benefits to higher learning institutions. The literature review further helped the researcher understand and establish how certain current awareness services can improve the uptake of open access resources.

Marshall and Rossman (as cited in Creswell 2014:60) reveal that the literature review accomplishes several goals such as sharing the results of other studies closely related to the current study, showing ongoing research trends, filling in gaps in knowledge and extending prior studies. According to Fink (2014), a literature review is a survey of books, scholarly articles and any other information sources relevant to a particular area of study. The review provides a logical and clearly articulated description, analysis, summary and critical evaluation of the reviewed literature. It shows how they relate to each other and, more specifically, how they relate to the research problem at hand. The literature review further analyses how research supports the advancement of knowledge. Therefore, apart from analysing, synthesising and evaluating previous research, the literature review helps researchers to demonstrate where and how their research fits within the larger field of research and knowledge (Fink 2014; Lyons & Doueck 2010:3). Hence, this literature review on the topic of open access as it relates to current awareness services was necessary for conducting the present research.

Since a literature review must support the attainment of the research objectives, this chapter is divided into six subtopics based on the five research objectives. The first subtopic considers research debates on the use and user perception of open access resources in their scholarly responsibilities such as education, academic work and research. This section is followed by discussions on the perceived opportunities of effective use of open access resources and challenges students and researchers face in accessing open access resources worldwide. These discussions lead to a section that examines literature on the availability and use of current awareness services in information and resource updates, followed by a summary of the chapter.

2.2 Open access

The meaning of open access is widely contested among scholars. However, based on the debate over its meaning, it is clear that most viewpoints of various scholars are similar. The commonly accepted definition of open access is online research or published literature accessible to researchers or other users worldwide without paying for it. As defined in Chapter One, open access is online scholarly content that is free of most copyright and licensing restrictions, provided the original author is properly cited and acknowledged and is easily accessible by everyone (Anunobi & Ape 2018:33; BOAI 2002; Suber 2015; Terras 2015:733).

Suber (2015) further explains that the Budapest Open Access Initiative of February 2002 and February 2003 termed open access as online access to research literature that was free of charge and free of most usage restrictions. Later, in June and October 2003, the Bethesda and Berlin statements also adopted the Budapest statement in calling for the removal of both price and permission barriers of open access content. Hence, all three components of the Budapest-Bethesda-Berlin (BBB) definition of OA now called for both free online access and free of most license restrictions.

Despite this call and wish among open access scholars and advocates, we still remain with the two main venues of open access content namely; gold and green open access as explained in Chapter One.

Open access emerged in response to the ongoing access restrictions to knowledge in scholarly and scientific journals as a result of shrinking library budgets and rising subscription fees that most researchers, academic institutions, and libraries could not sustain (Anunobi & Ape 2018:34; Canada 2009:7; Christian 2008:9; Suber 2015; United Nations News Report 2015). This situation resulted in the formation of the open access movement with the mandate to help researchers negotiate free access to global research. As Christian (2008:6) and Suber (2015) state, the basic principle of open access was founded on the shared and equitable distribution of knowledge. The open access initiative makes scholarly research literature available to the public at a minimal fee or without any access charges at all.

2.3 Use and user perception of open access resources

To explain user behavioural intention to use a technology, Davis (1989:319) and Venkatesh *et al.* (2003:329) advance that a technology's usefulness and ease of use are the main factors affecting an individual's acceptance thereof. The perceived usefulness is closely related to performance expectancy (PE), while ease of use is related to effort expectancy (EE). This means that users are likely to accept and use open access resources and alerting services if they find them useful in their academic work and can use them without problems.

In a study by Anunobi and Ape (2018:38) to determine the promotional strategies adopted by Nigerian university libraries to improve access to open access resources and their users' perception of open access use, the results indicated high institutional acceptance of open access resources for teaching, learning, research and promotion/tenure purposes, despite the low usage of open access. Kaba and Said (2015:100-101) examined faculty's awareness, use and perceptions of open access resources at Al Ain University of Science and Technology (AAU) in the Gulf Council Countries. Their findings showed a positive perception and frequent use of open access resources for teaching and research activities. The findings also revealed a strong positive correlation between the awareness, level of use and perception of open access resources. Faculty members with a high level of awareness and use of open access resources also had a high level of interest in and regard for open access resources. The study, however, reveals very little correlation between the use of open access resources and faculty member discipline. Correspondingly, there was no relationship between faculty member discipline and level of awareness and perception of open access resources. The study further averred that female faculty members were more likely to use open access resources than male faculty members, although the reasoning behind this claim was not revealed. Consequently, the current study tried to establish whether there is a relationship between gender and open access usage and why.

Shuva and Taisir (2016:40) studied faculty members' awareness, perceptions and use of open access journals at the University of Dhaka in Bangladesh. Their study found that faculty members used open access journals more than subscription-based journals for their research and lecture preparations. The study also reported that users lacked awareness of subscription-based resources, indicating that open access has more visibility than subscription-based content. Likewise, Mammo and Ngulube (2015:1) conducted research on academics' use and attitude towards open access in selected higher learning institutions in Ethiopia through triangulation of qualitative and quantitative data collection methods. Their results showed that 78% of the academics held a

positive attitude towards open access journals. The study recommended further studies using a similar approach to determine the generalisation of the findings. The current study heeded this recommendation and intended to establish similarities and/or differences in the findings between the two studies using a triangulation method.

Chisenga and Simumba (2009:118) explored the views of agricultural researchers on open access publishing in Zambia. Their results revealed that researchers supported open access because they believed that it makes research visible and accessible to a larger audience. The researchers' support for open access and willingness to make their research outputs available via open access repositories are vital indicators for success in future open access initiatives in Zambia.

In contrast, Rodriguez (2014:606-607) found the opposite in his examination of the awareness and perceptions on open access publishing based on demographic characteristics of academic research faculty members at PhD level at United States universities and colleges. The research explored whether these variables correspond to specific perceptions and behaviour. The results indicated that although 67.1% of respondents indicated general familiarity with open access, the majority held negative perceptions of open access content based on the credibility of open access journals (Rodriguez 2014:606-607). Similarly, Serrano-Vicente, Melero and Abadal's (2016:595) study on the awareness and service satisfaction of open access among the academic staff at the University of Navarra, Spain, reported statistically significant differences in opinions concerning open access journals and services. Although the participants generally agreed on the need for open access resources, only half adopted open access practices. Uddin, Koehlmoos and Hossain's (2014:13) research on open access initiatives in Bangladesh also ascertained that the understanding, perception and awareness of open access in that country were still low. However, their research emphasised the importance of libraries embracing open access policies, building open access repositories to disseminate research outputs, and creating awareness about the open access movement.

Anunobi and Ape (2018:21) and Moller (2004:1) contend that many universities in Africa and other developing countries are yet to reap the benefits open access offers. Similarly, a study by Tlakula and Fombad (2017:868) revealed low levels of awareness and basic usage of electronic resources (usage being limited to EBSCOhost) by undergraduate students at the University of Venda in South Africa. Anunobi and Ape (2018:21,34) suggested that librarians are not only expected to collaborate in the development of open access resources in the area of repository implementation but are also considered champions of open access who must ensure that open

access resources are discovered and accessed. This is why the research at hand is proposing the application of current awareness services to promote the uptake of open access resources.

In examining the attitudes of staff members of the Faculty of Business towards open access journals and institutional repositories in the University of Oklahoma, USA, Hahn and Wyatt (2014:93) found poor usage. Some of the reasons cited for the poor usage included lack of awareness of open access journals and a negative attitude towards open access journals. Similar to Rodriguez's (2014:606-607) findings, Hahn and Wyatt's (2014:93) study revealed that open access journals were not fully accepted in the business field because of poorly renowned journal publishers and unqualified editorial boards of some open access journals. Additionally, Hahn and Wyatt (2014:93) reported that most of the researchers also believed that their academic reputation would be negatively affected if they published in open access journals.

Researchers believed that the widespread criticism of the quality of the peer-review processes of most predatory open access journals has led many universities to question researchers publishing solely in open access journals. The tremendous rise in predatory open access journals has made it more difficult for users to single out quality open access journals in their research fields (Bartholomew 2014:384; Bohannon 2013:62; Mutwiri 2014:88-89,154). In addition, Shuva and Taisir (2016:36) claim that open access journals are not widely accepted as a platform for research in some societies because most open access journals are not consistently peer-reviewed. As such, people question the quality of these journals and their editorial boards.

However, the characteristics of quality open access resources are debatable. The Study of Open Access Publishing (SOAP) (2011:7) survey on researchers' attitudes on and experiences with open access publishing across disciplines and around the world highlighted that users and researchers consider the availability, quality and prestige, impact factor, charges, speed of publishing and publishers' reputations before choosing open access journals to publish in.

Davis and Walters (2011:209) conducted an analysis of empirical studies done between January 2001 and December 2010. The aim was to evaluate the impact of free access to content on the behaviour of scientists as authors, readers and citers in developed and developing nations. The study's findings emphasised that researchers consider the journal's reputation and publication charges when deciding where to submit their work. While participants explained that free access was a far less significant factor than the journal's quality in deciding where to submit their work, they admitted to considering other aspects like article processing fees over the journal's quality.

This finding points to some open access content not only being free but found in high quality, high impact, prestigious journals. Librarians can use this fact to correct the perspective of many researchers who doubt the quality of scholarly open access research provided by academic institutions such as UNZA.

Earlier research conducted at UNZA affirms faculty and students' low usage of online resources. A study by Kakana *et al.* (2016:7) on open access services at UNZA disclosed low usage of open access content, particularly the institutional repository. Slightly more than half (56%) of the 60 respondents that took part in the study indicated that they were familiar with and used the institutional repository. The study recommended the extensive promotion of the open access institutional repository to the entire university community. The study also encouraged researchers to actively build open access resources at the institution. It is incomprehensible that UNZA's institutional repository remains unpopular among researchers when institutional repositories in other countries are widely developed, maintained and used (Islam & Akter 2013:12). In their study on institutional repositories and open access initiatives in Bangladesh, Islam and Akter (2013) stated that scholarly open access literature has received increasing attention in academic, research and publishing circles in most developing countries over the last few years. This should be sufficient evidence to the developing world that open access offers a means to solve the challenge of the inaccessibility of scientific research due to financial constraints (Anunobi & Ape 2018:34; Islam & Akter 2013:13).

Sakala (2016:33) conducted a citation analysis of education masters dissertations completed between 2000 and 2010 at the University of Zambia. The research aimed to analyse the use of periodicals available through UNZA's library. Despite confirming the use of periodicals in the analysed dissertations, Sakala found that periodicals were not popular information sources. The study revealed that students relied more on monographs than periodical articles when conducting their research.

A study conducted by Miyanda (2010:52) on factors affecting the use of online resources and services by medical students at UNZA revealed that only 40% of the respondents used these resources. The study identified poor Internet connectivity and access points, a lack of computers in the library, a lack of knowledge, and inadequate bandwidth as factors contributing to the low usage. Similarly, Akakandelwa's (2007:76) infometric analysis of research conducted at UNZA, with reference to the provision of library and information resources concluded that, despite respondents' revelation of high levels of computer literacy and awareness of online resources,

daily usage thereof was low. The study revealed that students' poor acceptance and low usage of IT-related services was due to a lack of operational skills and training, and poor IT infrastructure. Both studies recommended training, and increased and improved sensitisation programmes on the availability and importance of online resources. Therefore, the current study aims to establish appropriate current awareness services as a promotion tool for open access resources to help raise user awareness of not only available open access resources but all other e-resources in the University.

2.4 Perceived opportunities of effective use of open access resources

Increasingly, the capacity to close the gap in access to information between developed and developing countries, through open access resources has become very important for educational, cultural and scientific development. Open access can foster information and knowledge sharing through research (Canada 2009:6; Xu 2012:23). Canada (2009:7) and Christian (2008:9) argue that the potential for researchers, educators and institutions in developing countries to benefit from open access is great. Similarly, Akuffo and Budu (2019:1) and Kowalsky (2015:949) assert that online resources are crucial in enhancing students' research and learning activities due to their quality and easy availability.

In their investigation of the level of use of e-resources by students at the Akrofi-Christaller Institute of Theology in Ghana, Akuffo and Budu (2019:7,8) showed multiple benefits of using e-resources, such as their relevance in academic research. The study reported that open access allows multiple users concurrently, saves time, is less bulky- hence saves space, and allows users to access them at their own convenience. Similarly, Anunobi and Ape (2018:33) and Jain (2012) argue that open access provides enormous benefits to students and researchers, such as equal access to resources for teaching, learning and research despite their backgrounds. As such, Suber (2015) argues that open access has been and will remain an essential component of scientific publication. Considering the limited financial resources available for libraries and learning institutions in many countries, unrestricted access to research empowers researchers to do research and publish their research with fewer challenges.

Gul, Shah and Baghwan (2010:210,218-219) investigated researchers' viewpoints of open access at the University of Kashmir. Their study revealed that most researchers did not only use open access journals, but considered open access journals to be valuable tools for fast publication of their research output, increased productivity and citations. Similarly, Anunobi and Ape (2018:33),

Beaubien, Garrison and Way (2016:8), Jain (2012:3) and Suber (2015) demonstrate that open access leads to wider visibility (via a significantly more extensive and more diverse audience), increased usage (rate of citations) of research findings, and high impact for scholarly work. Open access further increases and creates avenues for researchers to collaborate and publish globally.

Harnad and Brody (2004:3) compared the citation impact of open access articles with non-open access articles published in the same journals in Web of Science. They found that open access articles had a more significant citation impact, indicating that open access increases both usage and impact. Additionally, research by Fabian (2013:212) and Okoye and Ejikeme (2011:1) on open access publishing and citation impact established that open access publishing increases research impact, evidenced by increased citations and downloads of open access articles versus non-open access articles. Their findings also showed a significant difference in the mean citation rates of open access articles and those not freely available online in various disciplines. The relative increase in citations for open access articles ranged from 45% in philosophy, and 51% in electrical and electronic engineering, to 86% in political science, and 91% in mathematics.

Similarly, Shuva and Taisir (2016:36) found that most faculty members at Bangladesh universities strongly agreed that open access increases citations and opens doors for collaborative research, which could be advantageous to researchers in the developing world. The researchers also felt that open access provides faster publishing possibilities. SOAP (2011:7) agrees that there is clear evidence that open access increases the number of article downloads. The study, however, claims that the impact of open access on article citations is not clear because it has not been evaluated thoroughly (SOAP 2011:7; Ukwoma & Onyebinama 2021:488)

Correspondingly, Harnad and Brody (2004:3) contend that the effect of open access on the impact of a publication cannot be realistically estimated when a small number of open access journals are compared to a larger number of non-open access journals. Thus, the number of both types of publications should be equal or close for realistic findings.

Terras (2015:733) carried out a literature and scope review of open access and the digitisation of cultural heritage content. The review aimed at highlighting opportunities and barriers to the creation and use of digital heritage content from galleries, libraries, archives and museums. The study revealed that open licensing of digital cultural heritage content created opportunities for researchers in the arts and humanities for access and analysis. It also increased access to cultural and heritage content, thereby allowing the sharing and re-use of digital data while encouraging

new research. The study recommended further research to help understand the dissemination and encourage the uptake of open cultural data. Terras (2015:733) suggested that institutions should be persuaded to disseminate their data as open access resources to allow resource discovery and establish the best ways of using high-performance computing facilities to analyse and process large amounts of data.

Terras (2015:734) also found that the benefits of making material openly available encourage other researchers and institutions to have their research findings or collections openly available for re-use and re-purposing. This increases the number of high-quality open access resources available and enhances understanding of history, culture and society. Meanwhile, a lack of openly accessible information resources leads to poor quality research and knowledge of developmental issues.

Similarly, Ivwighreghweta and Onoriode (2012:7-11) contend that Nigerian researchers overwhelmingly used open access research because they believed that open access literature is necessary for research development. The authors discovered that the most significant benefit derived from using open access journals is access to free high-quality online scholarly literature necessary for research, which helps in career development and increases research impact.

Ukwoma & Onyebinama (2021:489) argue that open access resources give libraries, especially in developing countries, an opportunity to satisfy the information needs of their clients, who are often struggling financially. They add that open access has the potential to bridge the research gap between Nigerian researchers and their counterparts in the developed world, while enabling librarians to serve their users better. Consequently, Ivwighreghweta and Onoriode (2012:7-9) found that the low profile of scientists in Africa and their marginalisation is partly due to poor access to scientific publications. They argued that African scientists need initiatives to provide them with free access to scientific publications, irrespective of where the sources were developed.

Therefore, it is abundantly clear that open access has been and will remain an essential component of scientific publishing. The results of scientific research should, as much as possible, be openly and freely accessible (Bethesda Statement on Open Access Publishing 2003; The Right to Research Coalition 2012). The Right to Research Coalition asserts that, in the absence of price barriers and restricted access to research, open access research makes a significant positive impact on education, the practice of any profession, and entrepreneurs' ability to innovate. Even the best research is ineffectual if others cannot read and build on it.

The Right to Research Coalition (2012) further argues that open access helps to avoid duplication while allowing research findings to be shared among researchers. Open access has also facilitated text mining, which accords researchers an over-arching view of a particular field and uncover trends and connections within their fields and between seemingly unrelated fields (Suber 2015). Society as a whole would benefit from an expanded and accelerated research cycle in which research advances because researchers have immediate access to all the research findings they need (Jain 2012:4). Therefore, to ensure that open access research reaches and benefits every information user, the application of current awareness services in open access promotion becomes inevitable.

2.5 Challenges students and researchers face in accessing open access resources

Moller (2004:1), who examined the growth in and challenges to open access in developing countries, argues that African countries are yet to utilise such privileges to internalise their research sources despite the many opportunities provided by open access. A study by Velichkovsky (2009:158) on open access publishing among Russian researchers in psychology found that researchers were faced with three challenges, and these were related to language, background and funding. Velichkovsky stated that even though open access publishing technology clearly benefits researchers, the Russian researchers were experiencing issues with language. The use of English and not Russian as a medium of communication in publishing negatively affected Russian researchers' participation in open access, hence their failure to fully accept open access. Velichkovsky further reported that the Russian researchers were not used to the Western style of writing research papers. This made it more difficult for them to participate in research at a global level. The study added that Russian universities also faced funding problems, which was affecting their ability to support publishing in scholarly open access journals.

In examining the factors affecting the adoption of open access in research activities within Tanzanian public universities, Dulle (2010:167-168) cited poor research conditions and researchers' low Internet self-efficacy (inadequate information search and online publishing skills) as challenges in using open access in scholarly communication. Similarly, Mutwiri (2014: 88-89,154) carried out a study in selected Kenyan universities to establish the challenges that academic staff experienced with the dissemination, awareness, skills or training, attitude towards, and use of open access outlets. The study established that academics preferred traditional publishing outlets for research output dissemination because they considered open access outlets

to be of low quality. Researchers were skeptical of the rigor of the review process and apprehensive over the discord between open access principles and researchers' concerns on copyright.

From these findings, one would deduce that the low awareness and poor usage of open access among academics were because academics neither accessed important research findings by other scholars nor disseminated their research output through available open access outlets. Hence there is a high likelihood that as long as researchers remain unaware, the adoption of open access content will continue to lag. Additionally, the reviewed literature revealed that researchers need training on accessing open access. Similar to the current research, Mutwiri's (2014:88,89) study, among others, recommended implementing deliberate awareness programmes on available open access outlets and content.

Ivwichreghweta and Onoriode (2012:9) examined the extent of researchers' appreciation of open access scholarly publishing. The results indicate that a lack of Internet facilities significantly constrained the use of open access scholarly publications. Meanwhile, a 2015 United Nations report showed that the broadband Internet failed to reach billions of people living in developing countries, where only 35% accessed the Internet (United Nations News Report 2015). The situation was worse in the 48 countries designated as the least developed by the UN, where more than 90% of the people had without Internet connections (Ivwichreghweta & Onoriode 2012:9). Similarly, Miyanda (2010:52) identified poor Internet connectivity, inadequate bandwidth, and a lack of online information search skills as factors that affected the effective use of online resources at UNZA.

The levels of advancements in science and technology between the developed and the developing countries tend to widen further with the rapid expansion of the Internet and the speedy transition to electronic publishing in the West (Ivwichreghweta & Onoriode 2012:9; United Nations News Report 2015). The United Nations report pointed out that the digital divide keeps billions of people, including millions of scholars, offline due to the unavailability of Internet services to facilitate the use of open access scholarly publications. Additionally, the World Bank (2021) reported that only 35% of people in developing countries had access to the Internet compared to 80% in advanced countries. Correspondingly, Petri (2017) rightly states that although open access offers free access to information, funding is needed to facilitate Internet access in a more meaningful way that goes beyond just providing hardware to bridge the digital divide. He suggests that funding should go towards establishing reliable Internet connectivity and training of librarians

on technology around open access. Therefore, Internet connectivity, especially in developing countries, must be improved to enhance access and use of open access research.

A case study by Salaam and Aderibigbe (2010:6) on the awareness and use of The Essential Electronic Agricultural Library (TEEAL) by academic staff at Nigeria's University of Agriculture ascertained unstable electricity supply as a significant challenge towards accessing online resources. The study further revealed that the poor electricity supply resulted in interrupted Internet connections, affecting access and use of the resources.

Furthermore, a comparative study by Njobvu (2002:30-31) on the impact of the digital divide between the University of Zambia and the University of Strathclyde, showed a significant difference in how these two universities' academic staff and students use ICTs. The digital divide was apparent, ranging from ICT infrastructure, and running costs for ICT networks to the training of library staff and users to effectively use ICT services. For example, the study established that an Internet subscription cost a lecturer at UNZA 7% of his or her monthly income, compared to the 0,07% spent by a colleague at Strathclyde University. Njobvu (2002:54-56) argued that there was a perpetual affliction of information famine in Zambia. Students and lecturers at UNZA had little to no access to the latest information due to reduced funding to acquire current information resources.

However, since access to information at UNZA has improved tremendously, with the availability of open access and subscription-based resources, the challenge has now shifted to low usage of available online resources, including open access content. Therefore, the current study aimed at establishing appropriate current awareness services to be used to promote these resources. The researcher intended to establish measures that could contribute towards reducing the reported digital divide and the information famine indicated in Njobvu's study. Unlike Njobvu's study that used a small sample, the current study employed a more significant sample and used various data collection techniques to comprehensively establish challenges and measures to improve the situation.

The provision of information, including open access content, has no value if not used and appreciated by the users. Therefore, the available information resources, whether print or digital, need appropriate marketing to be accessed, used and appreciated by the target users. Users need to use the available resources to help them make informed decisions in their everyday academic

commitments. One way of promoting such resources is by applying current awareness services suitable to UNZA's current situation.

Anunobi and Ape (2018:34) suggest that academic librarians need to increase the promotion of open access resources to ensure that produced knowledge adds value to the community of researchers and expedite further knowledge production through strategic promotion and marketing. Yi (as cited in Anunobi and Ape 2018:34) identifies library websites, list-serves, blogs, printed materials (flyers, posters, hand-outs, and other publications), training and induction programmes (such as orientations), personal contact, workshops, library tours, memos and meetings as tools that promote library resources and services.

2.6 Current awareness services

The majority of peer-reviewed journals are now available electronically. According to Peng, Xu and Huang (2021:1), when the amount of information exceeds the information processing capacities of the consumers, it leads to worse decision quality and experience, causing an "information overload effect." Chatterjee (2017:107) describes this information overload as a time of rapid multiplication of information documents which become complex to satisfy using existing tools. Users do not have time to scan through large volumes of current information, thus the need for current awareness services. Chatterjee (2017:107) suggests that current awareness services assist in filtering the ceaseless flow of information to capture only information relevant to one's information need. In this electronic era, users can access various web-based alerting applications directly from the service providers.

Similarly, in his study on journal-based current awareness services for systems librarianship, Xu (2012:153) articulates that users and professionals need to monitor publications that interest them through suitable alerting services to survive the electronic age's information explosion. Xu (2012:153) and McKee, Koltutsky and Vaska (2009:3) further believe that current awareness services provide professionals with opportunities to secure their career development. Researchers rely on current awareness tools to stay informed about new sources of information and developments in their topics of interest. Xu (2012:153) explains that current awareness services can be tailored to the information needs of any group of users. For example, current awareness services can address the information needs of an individual user, user group or organisation. Current awareness services as an ongoing service also enable users to monitor new information on a specific subject of interest regularly.

Chatterjee (2017:109) identifies the following as characteristics of current awareness services:

- i. They deliver results speedily or timely.
- ii. They are designed to meet the users' current approach to information.
- iii. They give an overview of the latest development in any field.
- iv. They usually cover a broad subject to enable users to get updates on developments in their own areas and relevant related subjects.

Additionally, Chatterjee (2017:108) argues that current awareness services keep specialists and professionals better informed in their respective fields of interest by speedily providing relevant information, thus saving them time, input and money. Therefore, current awareness services support and sustain research, education and business.

2.7 Impact, use and availability of current awareness services in promoting online resources at UNZA and globally

Librarians in academic libraries need to direct students and academia towards open access resources using appropriate current awareness services. Namugera (2014:752) and Saikia and Gohain (2013:174) state that the marketing of library resources, in whichever form, generally raises their profile amongst users in teaching and research. Therefore, the application of current awareness services raises the awareness of the library's ability to support colleges, schools and departments through its services and resources.

Higher learning institutions, universities and certain professions use various current awareness services involving different user groups. These include Table of Contents (TOC) services, monitoring agents (Google alerts), email notifications/alerts, rooting of periodicals, forthcoming meetings, research in progress, Selective Dissemination of Information (SDI) services, compiling agencies, news clipping services, scholarly article research alerts, mobile alerting services, SMS alerts, RSS, and bibliotech reviews (Chatterjee 2017:110-114; Naqvi 2013:108; Ukwoma & Onyebinama 2021:489; Uzohue & Yaya 2016:14; Xu 2012:155).

Anbu and Mavuso (2012: 310,319) investigated how short message services (SMS)-based alert services technology can be used in library and information services to create a prototype for SMS-

based library alert services and the marketing of library services. Their findings revealed that SMS could successfully motivate and engage library users to use the resources and potentially market all other library services such as open access resources. The authors recommended using SMS because it is practical, timely and can cater for the basic information needs of the users.

Uzohue and Yaya (2016:14) examined the provision of current awareness services by medical librarians in Nigeria. The results affirmed the availability and use of current awareness services in providing educational resources to support health professionals and researchers. Health professionals and researchers used SDI services to stay abreast of new developments in their areas of interest, especially research on patient care and teaching. The authors argued that current awareness services are indispensable in any field of study where access to current information is concerned. Likewise, the findings of Mondschein's (1990:137) study on SDI emphasised that scientists who showed high use of current awareness services kept abreast with current developments to a greater degree than their colleagues who were not regular users of the same service. This implies that researchers use current awareness services to keep abreast with new developments.

Schlembach (2008:121) examined the implementation and use of email notices of current publications, TOCs with links to full-text, and lists of newly received publications by faculty at the University of Illinois Urbana-Champaign. She explains that faculty members of the university's engineering department benefited from TOC services in their research and teaching. User appreciation of awareness services prompted librarians to develop more services that could best meet their information needs.

Naqvi (2013:108) conducted research on the awareness and use of current awareness services by staff and students at the College of Business, Hospitality and Tourism Studies (CBHTS) at Fiji National University. The study found that the most popular current awareness services included the website of the university's Nasinu library, email notifications, and displays of recently published books and periodicals. However, the study did suggest the need to improve the introduction and application of current awareness services to achieve more publicity of the available services to users. Naqvi (2013:108) recommended bulletin board services, a calendar of events, a summary of recent events, annotated lists of new books, TOC services, and abstracts of newly acquired library materials as other awareness services to be introduced. The study also recommended training on the functions and importance of using current awareness services for user information satisfaction.

Mishra's (2011:2,5-13) investigation of current awareness services in the digital era found that current awareness services were used to automate searching publications and retrieve relevant information in preferred formats at an affordable cost, thus saving users' time and money. The author proposed that in order to function effectively, current awareness services should be based on four main factors, namely: (1) the knowledge of topics to cover, (2) the information needs for each user, (3) sources for the latest information and (4) a regular and reliable supply of information (Mishra 2011:2,5-13).

Xu (2012:159) explored the effective use of current awareness services by library and information science professionals. The study identified three effective utilisation of current awareness services: the Really Simple Syndication (RSS) feed aggregator, Informed Librarian Online (ILO) and Academia.edu.

The RSS feed aggregator is a web application used to organise syndicated web content such as online newspapers, blogs, podcasts and video blogs in one location for easy viewing and reading (RSS 2018). RSS simplifies the distribution of notices or content to a wide group of people. As such, McKee, Koltutsky and Vaska (2009:1) posit that researchers could set up email or RSS alerts to receive new publications automatically as they become available.

ILO is a subscription-based current awareness service that updates librarians monthly on trending issues in the profession through email notifications and links to current periodical contents (ILO 2018). ILO can also be used to share research papers among researchers. The service's mission is to accelerate the world's research (IOE libGuide 2018). Academia.edu, on the other hand, is a social networking website launched in 2008 for academics.

From the above discussion, it is evident that despite the wide variety of current awareness services, most function in an almost similar manner. The current study concentrated on just six types of current awareness services, which the researcher deemed appropriate for promoting open access resources at UNZA. The six services are publisher/vendor alerting services and email notifications, TOC services, Selective Dissemination of Information, monitoring through intelligent agents, customising information delivery and JournalTOC. These are discussed in detail in the paragraphs below.

2.7.1 Publisher/vendor alerting services and email notifications

Publisher and vendor alerting services and email notifications are web-based services used by publishers and vendors to inform their users of new publications (Martin & Metcalfe 2001:269). These email alerts can be sent to individual users or a group of users based on their information interest profiles. For example, EBSCOhost enables users to create a search alert and set up a journal alert. Fourie (2003:189) and Xu (2012:155) point out that IngentaConnect provides TOCs and search alerts, creating a retrospective citation database of many journals. The Web of Science offers email alerts or RSS feeds that include users' saved searches, journal lists and cited articles lists. The "My Saved Searches" service delivers alerts to users from their saved search histories, while the "My Journal List" service provides the latest tables of contents for users' selected journals. The "My Cited Articles List" notifies users when others have cited an article on their list (Fourie 2003:189; Xu 2012:155).

Publisher/vendor alerting services and email notifications services would not only be valuable to users at UNZA, but also to the library by helping librarians monitor new titles to purchase based on users' profiles/interests and search history. Publisher/vendor alerting services and email notifications services will also update librarians on the trending information needs of various users based on interest. Since most databases that UNZA subscribes to offer this service already, it can be applied to reach out to users to persuade them to use open access resources. Once users have been persuaded and taught how to create their user profiles, the database systems will automatically select their search activities and send alerts based on their search history. This will promote awareness of available open access resources among students and researchers of the University of Zambia, resulting in improved uptake of the resources.

Furthermore, it is logical to argue that alerting services can also be used as a broader term for all other current awareness services, making the combination of these services more effective in promoting the use of open access resources.

2.7.2 Table of Contents services

According to Chatterjee (2017:112), a TOC service, which mainly originates from aggregators and publishers, is the quickest and simplest way of providing regular updates to users. The aggregators and publishers regularly reproduce the journal content pages of all current issues received and send them to users. Usually, the content can be arranged in any order that best suits the information provider and users. This service exists in both conventional and electronic

formats. According to Fourie (2003:187), TOC services help users keep track of new publications and acquisitions on various topics.

The advantage of this aggregator service is that users have access to diverse titles from various publishers for free or at a minimal fee. Subscribers have the privilege to select the journal titles they are interested in, and as soon as a new issue is available, they receive an email message with the table of contents. Xu (2012:155) affirms that obtaining TOC alerts is an efficient way of keeping track of the latest developments in one's field of interest, thus, increasing the open access uptake at UNZA and elsewhere in the world. However, Chatterjee (2017:112) indicates that a weakness of using this service is that it may psychologically prompt users to consult only those journals they are accustomed to using.

The researcher chose this awareness service because of its existence in both conventional and electronic formats, hence catering a wider audience. Furthermore, alerts directly from the aggregators or publishers guarantee that users will receive the updates even if the librarian cannot do so. Once an alert has been set, using this service is reliable and straightforward. Compiling Table of Content pages to send to users is also simple. Chatterjee (2017:112) affirms that preparing Tables of Content can be done almost automatically because it requires very little intellectual activity.

2.7.3 Selective Dissemination of Information services

Fourie (2003:188) and Kamarov (2019) explain that SDIs involve both physical and automatic notifications to users of new or relevant records in a collection. SDI services are useful for monitoring the literature and the latest editions of journal issues. Records are matched against a search strategy reflecting the user's interest profile or physically selected based on users' information needs and sent to respective user groups (Chatterjee 2017:113; Fourie 2003:188). Fourie (2003:188) explains the various SDI services available through specific aggregator services such as Emerald, Dialog, SilverPlatter, ScienceDirect or EBSCOhost. She also notes that SDI services delivered by aggregators or publishers are expensive, hence libraries should take up this role to reduce expenses.

Even though these services are available to UNZA via the e-resource databases that the institution subscribes to, the researcher argues that services such as SDIs have not been fully exploited, particularly the automatic alerting service via email or RSS. Currently, SDIs are

used to send manually compiled lists of selected journal titles based on subject/interest areas to Schools. The challenge is that most Deans and Heads of Departments fail to share the lists with faculty members and students. It is envisaged that automatic alerts will reach all users quickly and simultaneously, raising awareness of open access resources in the University.

2.7.4 Monitoring through intelligent agents

According to Fourie (2003:189), intelligent agents are programmes that learn someone's areas of interest from what they do on the Internet. Unlike publisher or aggregator alerting services, intelligent agents create interest profiles of users without their prompts. The system records searches and preferences, organises them, and sends alerts to users each time a new website complying with the user search strategy is accessed (Fourie 2003:189). Google alerts are a notable example of an intelligent agent. Google alerts monitor professional interests by tracking the entire web for personalised topics, notifying users of new results via email or RSS feed (Xu 2012:155). Martin and Metcalfe (2001:271) observe that intelligent information agents are designed to act autonomously or socially in the performance of the otherwise laborious tasks of gathering, filtering and organising information on the Internet and corporate intranets.

Intelligent agents may be useful for monitoring new relevant information on and for users, their affiliations, their businesses and projects they are involved in (Xu 2012:155). This service allows librarians to ascertain specific information to provide to their users. Further, it is worth noting that, similar to publisher/vendor alerting services and email notifications, monitoring through intelligent agents base information needs on user information searches and interest (search profiles). This implies that librarians will have to sensitise users to look for updates through email alerts to keep abreast of the latest developments and related information in their interest areas.

2.7.5 Customising information delivery

The researcher considered customising information delivery as another current awareness service worth exploring. Martin and Metcalfe (2001:269) argue that delivering relevant information to end-users is expedited by implementing effective delivery methods, which can be customised to the local information environment. Such delivery methods can be applied through customisation of contact points such as the library website, libGuide, enhancing intranet functions into a portal, use of websites as subject gateways or virtual libraries by creating

links to web-based resources (MyLibrary, citation databases, electronic journals, search engines, discipline-specific Internet resources and library catalogues).

Although UNZA's library has applied customising information delivery to some extent via the University website, many other services, including the application of mobile alerting services to reach users, the 'ask the reference librarian' service, and social media tools, have not been exploited yet. Furthermore, additional plug-ins, such as MyLibrary, libGuide, social media networks, and the student portal, must still be explored for easy and comprehensive resource linkages towards promoting awareness and use of open access resources in the University.

The researcher selected customising information delivery because it would enable UNZA's library to customise certain alerting services to suit user information needs and their environment. Customising information delivery would further allow incorporating all feasible strategies, methods and services towards effective awareness and use of open access resources in the University. For instance, customised information delivery would effectively use social media tools networks like Facebook, Twitter, WhatsApp, LinkedIn, academia.edu and ResearchGate to reach users where they are actively involved or engaged. The application of a combination of all these is likely to transform the usage experiences of open access resources at UNZA in a positive way.

Xu (2012:165) recommends using free social networking and collaborative tools like academia.edu because it covers many journals (Xu 2012:165). Customising information delivery also allows researchers to share their research with others while tracking the latest research activities and journal publications in their fields of interest. If the required journals are not in academia.edu, users can request them using the "suggest a journal" feature on the journals' page or via email. However, a noted limitation of the "suggest a journal" feature is allowing only one title search at a time (Xu 2012:165).

2.7.6 JournalTOC

JournalTOC is another alerting service that UNZA may consider employing to promote open access resources. JournalTOC allows users to add and save their favorite journals to MyTOCs. The Table of Contents feeds can easily be exported to popular feed readers. Heriot-Watt University (2017) adds that academic researchers and companies need a "real-time awareness service" like JournalTOC to remain up-to-date with cutting-edge research and developments in

their fields of interest. Like the customising information delivery services, JournalTOC is customisable, hence it can be personalised to institutional or individual needs. JournalTOC creates alerts on new research matching specified needs, searches millions of articles from the current journal issues, and tracks journals relevant to specified fields of interest. It may also be useful to integrate JournalTOC with other library systems to get the best results.

However, it is important to note that JournalTOC does not include all scholarly journals. If a publisher does not produce RSS feeds for their journals, JournalTOC cannot provide tables of contents of those journals (Xu 2012:154). Ultimately, the researcher envisaged that using JournalTOC features such as customising the existing and popular systems would promote access to and use of open access resources at UNZA.

2.8 Summary

This chapter reviewed literature relevant to the current study. User perception of open access content by different user groups worldwide was discussed. The chapter also examined how the application of current awareness services can promote the uptake of open access resources at UNZA. The literature review identified related studies to the research topic and identified knowledge gaps that the current research could address. Consequently, the literature review put the current study into perspective by relating it to similar studies on the usage of open access resources and how the application of current awareness services could promote the uptake of these resources. The current study compared existing knowledge and built on other related studies to establish new solutions and discoveries. In doing so, the study contributed to the knowledge in the field of information science.

Most of the reviewed studies addressed awareness, perceptions and use of open access content, e-resources and institutional repositories by different user groups. Most of these user groups were researchers, faculty/academics, scientists and healthcare professionals in higher learning institutions and universities in Africa and outside the continent. The researcher also noted that most of the research reviewed adopted survey research methods and questionnaires (both online and print) for data collection. Even though several of the studies reviewed found low awareness of open access resources among study groups, especially in African universities, most of the findings revealed a positive perception and high use of open access content. Most researchers agree that open access provides free online content required for their research and increases research impact and citations.

However, it was interesting to note that no research had been conducted on applying current awareness services to promote open access resources. Furthermore, despite most of the studies focusing on developing countries and, in particular African countries, there was an inadequate representation of the views of researchers and a reflection of the existing situation in Zambia. One study investigated the use of open access among agriculturalists in Zambia, but none covered public universities in Zambia, including UNZA. This revealed a need to conduct a localised research to deal with specific and unique differences across different user groups in a specific location to establish appropriate measures to improve open access awareness and use. It, therefore, necessitates research on how and where possible current awareness services can be used to improve open access usage at UNZA.

The next chapter covers the theoretical framework of this study. The Unified Theory of Acceptance and Use of Technology (UTAUT) was chosen to guide this study.

CHAPTER THREE: THEORETICAL FRAMEWORK

2.1 Introduction

Chapter Three covers the Unified Theory of Acceptance and Use of Technology (UTAUT) theory, which is the theoretical framework the researcher adopted to help explain and analyse the problem of low usage of open access resources and how the application of current awareness services could help improve the usage of open resources at the University of Zambia. The chapter starts with a general discussion of the fundamental role of research models and theories in the research process. This is followed by a discussion of commonly used research models and theories in the study of technology acceptance and use and how they relate and compare to the UTAUT model. The chapter also details the key determinants or constructs of UTAUT. The final section covers how each component of UTAUT was applied to the present study to help understand factors influencing the usage behaviour and behavioural intention of the students and researchers at UNZA to use the open access resources.

2.2 Models and theories

Burch (2003:266-8) and Samaradiwakara and Gunawardena (2014:23) define a model as a set of variables with logical relationships aimed at helping to understand, explain, predict or control a subject or phenomenon under investigation. A theory is a set of accepted beliefs, principles or interrelated constructs (variables) and propositions that presents a systematic view of phenomena by specifying relations among variables (typically in terms of magnitude or direction) to explain natural phenomena (Corley & Gioia 2011:12; Creswell 2014:86; Kivunja 2018:45; Moustafa 2014).

Venkatesh, *et al.* (2003) reveal that due to theories and models being closely related, most technology acceptance studies use the two terms interchangeably. Similarly, this study used the terms to refer to the systematic application of related constructs at different levels of analysis, complexity, explanation, prediction and generalised statements or hypotheses that have been tested and verified to explain and predict specific facts or phenomena.

2.3 The role of theories in research: theoretical framework

Mehta (2017) explains that theories play an important role in guiding the study process, from planning and data collection to presenting and explaining the emerging findings. A theoretical

framework gives research a scholarly foundation to make sense of the research data. It also helps the researcher to discuss the findings more clearly, connecting the abstract and the actual elements observed (Kivunja 2018:47). Adom, Hussein and Agyem (2018:438) postulate that a theoretical framework explains the path of a research study and grounds it firmly in theoretical constructs to make research findings more meaningful and suitable to the theoretical constructs in the related research field. Because theories consist of interrelated and coherent ideas and models, it makes the prediction, explanation or analysis of phenomena such as relationships, events or behaviour possible. It also enables the generalisation of the research findings.

Mehta (2017) likens a theoretical framework to the frame of a house. Just as the foundation supports a house, a theoretical framework supports a study by providing a rationale for predictions about the relationships among the study variables. Therefore, a theoretical framework provides a context for examining a problem through a theoretical rationale for developing hypotheses or a frame of reference, observations, definitions of concepts and research designs. A theoretical framework also serves as a guide to the systematic identification of logical, precisely defined relationships among variables.

Neuman (2014:70) contends that conducting quality research without a theoretical framework would be challenging, because a theory gives direction to a study. Consequently, theory direction, level of analysis, theory focus and forms of explaining important aspects of the research need to be appropriately defined and specified at an early stage of the study to provide clear guidelines for the research process. These four elements and how they were used in the context of this research are discussed in the following sections.

2.3.1 Theory direction

A theory direction may be either deductive or inductive. Neuman (2014:70) states that the deductive approach begins with abstract concepts, ideas or a theoretical proposition towards concrete evidence or observable empirical evidence. The deductive approach is most applicable to quantitative research or studies that utilise more quantitative than qualitative methods.

On the other hand, the inductive approach begins with the collection of concrete empirical evidence, followed by the development of more abstract concepts, propositions and theoretical relationships (Al-Qeisi 2009:202; Neuman 2014:70). The theory is applied towards the end of the research.

Since this study involved a mixed-methods approach, the researcher applied elements of both deductive and inductive approaches. The decision to combine the two theory directions is justified by Al-Qeisi's (2009:202) argument that any mixed-method research involving the qualitative and quantitative approaches has elements of both deductive and inductive approaches. The deductive approach supplied the basis for the argument and the development of constructs, while the inductive approach helped establish agreements between arguments and developments and verified relationships between or among constructs.

The deductive approach at the data collection level helped the researcher concentrate on collecting relevant data based on the study variables and research objectives, hence helped the researcher save time and effort. Meanwhile, inductive approach helped validate the research propositions/hypotheses and relationships between and among study constructs.

2.3.2 Level of analysis

The level of analysis, also known as the level of inquiry, is the basis of social scientific investigations. It helps to demonstrate that while researchers share common beliefs about the value of investigating and understanding human interaction, their levels of investigations usually differ. The three main levels of analysis in the social inquiry are micro, meso and macro levels. DeCarlo (2018) and Neuman (2014:71) explain that micro-level analysis focuses on short-term or daily actions, one-on-one interactions or those between individuals in a small-scale setting such as a family, school or a community. Micro-level analysis deals with the smallest unit of analysis, which is an individual in their social setting or a small group of individuals in a particular social context.

Meso-level analysis deals with relationships, processes and structures at middle level of social life. This analysis involves a population size that falls between the micro and macro-levels, such as groups of people or communities, movements, schools or organisations that have more structured expectations and norms (DeCarlo 2018). The meso-level analysis may also deal with divisions within societies, such as people's roles, income, location and ethnicity. Actions may occur over several months or years.

Lastly, the macro-level analysis focuses on the macro-levels of social life, such as social institutions, major sectors of societies or regions at national and global levels and processes that occur over long durations. This means that macro-level analysis explains events, processes,

patterns and structures that operate among large-scale social units over a longer period of time. Units of study may, for example, include the entire criminal justice system of a particular country, institutions and policies (Neuman 2014:69). However, macro-level analysis can be much more complex and exhibit bureaucratic tendencies because it focuses on large social units.

This study took the micro-level approach because the study focused on individual students and researchers for the data collection and units of analysis towards assessing their usage behaviour and intention to use the open access resources at UNZA.

2.3.3 Theory focus

There are two types of theory focus, substantive and formal (Dulle 2010:84). On the one hand, substantive theory focuses on particular content or subjects in social reality, such as family relationships, delinquent behaviour or racial-ethnic relations. On the other hand, formal theory is general and applies across many disciplines (Neuman 2014:72). While a substantive theory offers definitive explanations for a topic area because it is tailored to it and incorporates rich detail, it is often difficult to generalise to different topic areas from specific settings, processes or events (Neuman 2014:72,73). On the other hand, formal theories help researchers to recognise and explain similar features that operate across several different topics.

The researcher adopted the substantive theory focus because the study dealt with a specific topic (open access resources promotion and use) in a specific setting (UNZA) and sought to get a deeper understanding of the students' and researchers' behavioural intention to use open access technology.

2.3.4 Forms of explanation

Neuman (2014:73) asserts that the primary purpose of a theory is to explain how something takes a specific form and why it occurs. The three primary forms of theoretical explanation used in the social sciences to explain research findings are causal, structural, and interpretative explanations. According to Neuman (2014:74), a causal explanation explains why events occur and how things work in terms of causes and effects. The structural explanation looks at why events occur and how things work by outlining an overall structure and emphasising locations, interdependences, distances, or relations among positions in the structure (Neuman 2014:69). The interpretative explanation looks at why events occur and how things work. This is expressed in terms of socially

constructed meanings and subjective worldviews.

The current research identified itself with the causal and structural explanations. The researcher believed that a causal explanation makes it simple to understand the causes of the low use of open access resources and the effects of applying current awareness services to promote open access on its usage. Furthermore, the use of technology acceptance and model diagrams to show causal relations should provide a simplified picture of the existing relationships between and among variables of a theory or model as they relate to the study constructs.

2.4 Models and theories of technology acceptance and use

Momani and Mamoun (2017:51) argue that technology acceptance has become one of the most significant subjects in the software engineering field. The interest in the subject has led to the emergence of various theories and models to help explain individuals' usage behaviour of particular technologies. Louho, Kallioja and Oittinen (2006:15) define technology acceptance as the manner in which people accept and adopt the use of a particular technology, information technology (IT) systems or innovation. Therefore, models and theories of technology acceptance and use are designed to facilitate the examination, prediction, understanding of factors that influence users' usage behaviour and intention to accept, adopt, and use of new technologies in different disciplines and parts of the world (Alshammari & Rosli 2020:12). Venkatesh, Thong and Xu (2016:329) claim that research on individual acceptance and use of IT is one of the most established and mature streams of information systems research.

There are several models and theories of technology acceptance and use that have been proposed, tested, established, documented and used by researchers to study technology adoption, acceptance and use. Some of the more prominent theories are: Innovation Diffusion Theory (IDT), Theory of Reasoned Action (TRA), Social Cognitive Theory (SCT), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), Combined Technology Acceptance Model and Theory of Planned Behaviour (C-TAM-TPB), Model of PC Utilisation (MPCU), Motivational Model (MM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Ali & Arshad 2018:255-258; Dulle 2010:86; Hutabarat *et al.* 2021:127-130; Kripanont 2007:3,7; Mensah 2019:4; Samaradiwakara & Gunawardena 2014:23-27; Taiwo & Downe 2013:48; Venkatesh *et al.* 2003:428-232; Venkatesh, Thong & Xu 2016:330).

These theories are discussed in detail below.

2.4.1 Innovation Diffusion Theory

The IDT was established in 1962 by Everett Rogers. IDT is based on synthesised research findings of over 508 diffusion studies to lay a foundation for conducting research on innovation acceptance and adoption among individuals and organisations (Lai 2017:2). The theory seeks to explain the innovation-decision process in terms of how, why and at what rate new ideas and technology spread. It expounds on the process by which an innovation is communicated through specific channels over time among the members of a social system or society (Rogers 1995:206-208).

Rogers (1995:207,208) proposes a process that heavily relies on human capital, with four main elements influencing the spread or rate of adoption of a new idea or technology. These elements are innovation itself, communication channels, time and a social system. The categories of adopters are innovators, early adopters, early majority, late majority and laggards. The criterion for the adopter categorisation is innovativeness, defined as the degree to which an individual adopts a new idea or innovation.

According to Samaradiwakara and Gunawardena (2014:23), IDT is perhaps the first principal theoretical perspective on technology acceptance, which has been applied at both individual and organisational levels of analysis. The authors affirm that IDT's primary intention is to explain how any technological innovation moves from the stage of invention to widespread use (or not).

IDT identifies five attributes or constructs that persuade an individual to adopt the innovation. These are relative advantage, compatibility, complexity or ease of use, trialability or result demonstrability and observability or visibility (Kripanont 2007:46-47; Rogers 1995:208; Venkatesh *et al.* 2003:431). Relative advantage is defined as the degree to which an innovation is perceived to be better than the idea it supersedes and is often expressed in economic profitability or other social measurements. Compatibility is the degree to which an innovation is perceived to be consistent with the users' existing values, past experiences, and their needs. Complexity or ease of use is the degree to which an innovation is perceived to be relatively difficult to understand and use and is negatively related to an innovation's rate of adoption. Trialability is the degree to which users can experiment on an innovation. Observability, also known as visibility, is the degree to which one can observe other people using a system or an innovation.

Additionally, Venkatesh *et al.* (2003:431) revealed two more constructs: image and voluntariness. Image refers to the degree to which the use of an innovation (technology/system) is perceived to

enhance one's image they may not always be the most important perceived characteristics for a particular set of respondents. For a status in society, while voluntariness is the degree to which the use of an innovation is perceived as being non-mandatory or out of free will.

However, Rodgers (1995:209) argued that measuring the five attributes of innovations could be problematic in that solution, Rodgers suggested to begin with eliciting the main attributes of innovations from the respondents to measure them as predictors of the rate of adoption.

2.4.2 Theory of Reasoned Action

Fishbein developed TRA in 1967 and subsequently elaborated on by Fishbein and Ajzen in 1972 and 1975, respectively (Ajzen, Albarracin & Hornik 2007:4). According to Samaradiwakara and Gunawardena (2014:24), TRA is believed to be the first theoretical perspective to gain widespread acceptance in technology acceptance research. TRA is a versatile behavioural theory and models the attitude-behaviour relationships and subjective norms to behaviour performance (Samaradiwakara & Gunawardena 2014:24).

The theory describes behaviour as a function of behavioural intentions, which are also influenced by other factors to explain an individual's attitude towards the behaviour and subjective norms surrounding the acquisition and maintenance of the behaviour (Davis 2003:18). Individuals' attitudes include behavioural beliefs and evaluations of behavioural outcomes. Subjective norms include narrative beliefs and motivation to comply. The theory argues that individuals would use a technology if they see positive benefits (outcomes) associated with its usage (Davis 2003:18).

As such, Ajzen and Fishbein (1980) and Han (as cited in Kripanont 2007:49) posit that TRA is a generally well-researched intention model and has been applied extensively across domains to predict and explain human behaviour. This is why other modern technology acceptance models, such as TPB, TAM and TAM2 have their roots in TRA.

2.4.3 Social Cognitive Theory

According to Venkatesh *et al.* (2003:432), the SCT is one of the most authoritative and influential, though generic, theories of human behaviour. Erlich and Russ-Eft (2011:7) define Albert Bandura's SCT as being based on the assumption that people are purposeful, goal-directed, primarily motivated by their beliefs of self-efficacy and outcome expectations resulting from their

actions within specific social contexts. SCT postulates that learning occurs in a social context with a dynamic and reciprocal interaction between individual or personal factors (P), the environment (E), and behaviour (B). This can be summarised as $E+B=P$. Personal factors include observational learning/cognitive, affective, and biological events (Bandura 1989:2-4; Erlich & Russ-Eft 2011:7; Lamorte 2018).

Performance expectations deal with job-related outcomes, taking into account a person's past experiences. Past experiences influence reinforcements, expectations, and expectancies, which determine whether a person will engage in a specific behaviour or not and why. Similarly, Kripanont (2007:47) explains that SCT views human performance as a product of a dynamic interplay of personal behaviour and environmental influences. This means that the way people interpret the results of their behaviour informs and alters their environments and the personal factors they possess, which, in turn, inform and alter subsequent behaviour.

Lamorte (2018) adds that SCT identifies six constructs, namely: outcome performance or expectation-performance, self-efficacy, affect and anxiety - summarised as follows:

- i. Reciprocal determinism: This is the central concept of SCT. It refers to the dynamic and reciprocal interaction between a person (individual with a set of learned experiences), environment (external social context), and behaviour (responses to stimuli to achieve goals).
- ii. Behavioural capability: This refers to a person's actual ability to perform through essential knowledge and skills. Behaviour can only be acquired or maintained successfully if one knows what to do and how to do it. People learn from the consequences of their behaviour, which also affects their environment.
- iii. Observational learning: This concept asserts that people can witness and observe other people's behavior and then reproduce the actions. This is often exhibited through "modeling" of behaviour. If individuals see a successful demonstration of behaviour, they can also successfully behave in similar manner.
- iv. Reinforcements: This refers to the internal or external responses to a person's behaviour that affect the likelihood of continuing or discontinuing the behaviour. Reinforcements can be self-initiated or in an environment, and can be positive or negative. Lamorte (2018) adds that reinforcements as a construct tie most closely to the reciprocal relationship between behaviour and environment.

- v. Expectations: This refers to the anticipated consequences of a person's behaviour, primarily derived from previous experience(s). Anticipated consequences can influence successful completion of the behaviour and people anticipate the consequences of their actions before engaging in the behaviour. While expectancies also derive from previous experiences, they focus on the value that is placed on the outcome and are subjective to the individual.
- vi. Self-efficacy: This refers to the level of a person's confidence in his or her ability to acquire or maintain behaviour successfully. Self-efficacy is influenced by a person's specific capabilities, other individual factors and environmental factors (barriers and facilitators).

Lamorte (2018) adds that SCT considers many levels of the social-ecological model in addressing behavioural change of individuals and has been widely used in health promotions due to its emphasis on the individual and the environment.

Lamorte (2018) does, however, identify several limitations of SCT, which researchers should consider if they intend to use it in their research. He argues that the theory's assumption that the changes in the environment will automatically lead to changes in the person may not always be true or accurate. He adds that the theory is loosely organised, without a clear explanation of the extent to which each factor influences an individual's behaviour. The theory heavily focuses on learning processes, while disregarding biological and hormonal predispositions that may influence behaviour, regardless of experience and expectations. Hence, the theory lacks a focus on emotion or motivation, apart from referring to the past experiences. Furthermore, like many other theories, SCT can be broad-reaching, so much that it becomes challenging to operationalise all its constructs into concepts depicting empirical reality. The applicability of all its constructs to a single research problem may be difficult, especially where the development of focused programmes is concerned (Course Hero 2016).

Correspondingly, Samaradiwakara and Gunawardena (2014:25) revealed that more variables such as gender, age and experience have been researched in relation to SCT to establish their relevance in explaining technology acceptance and use (Colley & Comber 2003; Losh 2004; Venkatesh *et al.* 2003:469).

2.4.4 Theory of Planned Behaviour

The TPB (Ajzen 1985,1991) is a modified model of the Theory of Reasoned Action. It introduces a third and new independent determinant (construct) of intention, perceived behavioural control (PBC) to the already existing two variables, namely attitude-behaviour and subjective norms (Lai 2017:5). This theory reflects a person's ability to perform (skills, resources) to achieve outcomes (Davis 2003:19). The theory asserts that behaviour is a direct function of behavioural intention and perceived behavioural control. Therefore, Kripanont (2007:50) argues that changing the three predictors, namely attitude, subject norm and perceived behavioural control, increases the chances of a person's intention to do the desired action, thus increasing that person's chances to actually perform the activity. While the TPB model is influenced by the effects of facilitating constructs and self-efficacy, Ajzen (as cited in Kripanont 2007:50) asserts that human behaviour is guided by three kinds of beliefs explained as follows:

- i. Behavioural beliefs: These are beliefs on the potential outcomes of the behaviour and their evaluations. Such beliefs can produce either a favourable or unfavourable attitude towards behaviour.
- ii. Normative beliefs: These are the perceived behavioural expectations of different individuals or groups as the person's spouse, family, friends, teachers, doctors, supervisor and co-workers, depending on the population and the behaviour being studied. These beliefs result in perceived social pressures or subjective norms.
- iii. Control beliefs: These are beliefs about factors that may facilitate the manifestation of the behaviour and their perceived power. These beliefs may indicate whether or not the person feels in control of the action in question and give rise to perceived behavioural control.

Therefore, behaviour (B) is a weighted function or result of intention (BI) and perceived behavioural control (PBC). It is further argued that behavioural intention (BI) is the weighted sum of the attitudes (A), objective norms (SN) and perceived behavioural control (PBC) components. This is summarised in the following formula: $B=BI+PBC$ and $BI=A+SN+PBC$.

However, some scholars have alleged that TPB lacks sufficient scale development and an empirical baseline for IT studies (Mathieson 1991:185). Ajzen (2011:1113-1114) reports that, although most critics accept the theory's basic reasoned action assumptions, they question its sufficiency or inquiry into its limiting conditions. Ajzen argues that all TPB constructs contain

random measurement errors when carefully assessed. Well-designed measures of attitude towards behaviour of interest, subjective norm, perceived behavioural control, intention and behaviour, rarely exhibit reliabilities or acceptable internal consistency of 0.75 or 0.80. It follows that, even with suitable measures, the most one can reasonably expect in terms of correlations among the theory's constructs are coefficients of about 0.60. This means that the likelihood of future results falling within the predicted outcomes is high or in the acceptable range. Arguably, this means that there is no perfect measurement in research since any particular observation has a certain amount of errors associated with that measurement. Therefore, any measurement with a coefficient value of 0.60 is acceptable due to some expected unknown errors.

2.4.5 Technology Acceptance Model

The TAM developed by Davis (1989) was the first model to mention psychological factors affecting technology acceptance. Like the Theory of Planned Behaviour, the TAM was founded on the Theory of Reasoned Action, tailored to fit the information system context. According to Hillmer (2009:19), TAM developed and validated better measures for predicting and explaining technology use and has since remained an influential theory.

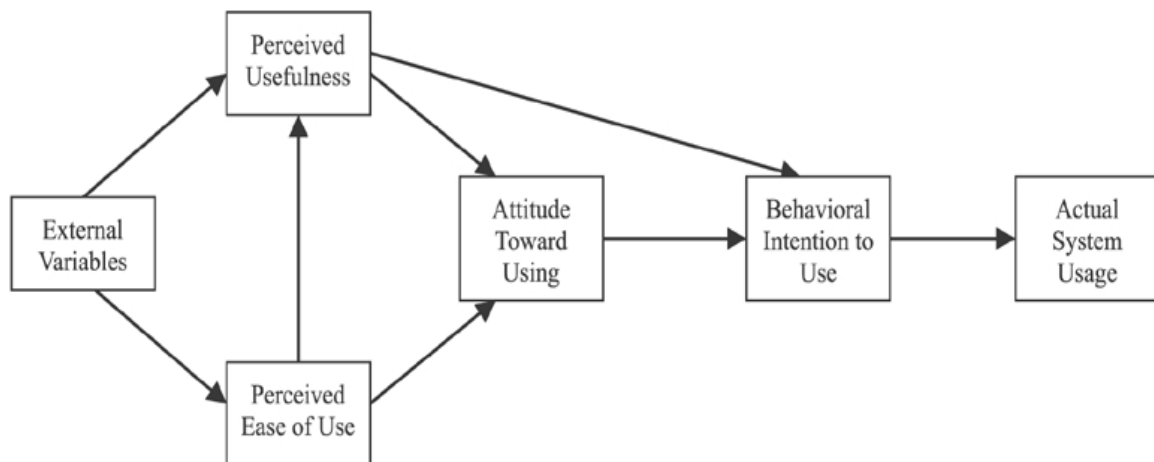


Figure 3.1: TAM structure (Davis et al. 1989:985)

As shown in Figure 3.1, TAM posits that perceived usefulness and perceived ease of use determine an individual's intention to use a system or technology. Perceived ease of use also directly impacts perceived usefulness. Davis (1989:320) defines perceived usefulness as the degree to which the person believes that using a particular technology or system would enhance their job performance. Perceived ease of use is also linked to a person's belief that using a particular technology would be effortless. Samaradiwakara and Gunawardena (2014:25) assert that

the underlying links between the two key constructs (perceived usefulness and perceived ease of use) and users' attitudes, intentions and actual technology usage behaviour, are specified using the theoretical underpinning the Theory of Reasoned Action. The attitude and perceived usefulness jointly determine the behavioural intention, while attitude is determined by perceived usefulness and ease of use.

However, Kripanont (2007:66) argues that the lack of moderating variables is a weakness of TAM. According Kripanont (2007:66), Sekaran contends that moderating variables can be very important in moderating the original relationship between the independent and the dependent variables. Their presence affects the predictive validity of the models, the explanatory power and the inconsistencies of models. As such, Kripanont (2007:66) reports that several studies have suggested the incorporation of moderators such as experience, voluntariness, gender and age into the original TAM. These additions are meant to assist researchers make better predictions and explanations associated with user behaviour to use a particular technology. Lai (2017:8-9) postulates that this probably contributed to the development of TAM2 by Venkatesh and Davis (2000) and TAM3 by Venkatesh and Bala (2008).

The development of TAM2 was meant to address two issues. Firstly, to include additional key determinants of TAM that explain that perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes. Secondly, to understand how the effects of these determinants change with increasing user experience over time with the involved technology (Kripanont 2007:56). Research further shows that both social influence processes (subjective norm, voluntariness and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability and perceived ease of use) play a significant role in influencing user acceptance and use of technology (Samaradiwakara & Gunawardena 2014:27; Venkatesh & Davis 2000).

In addition, Venkatesh and Davis (2000) theorised voluntariness as an important moderator and control variable influencing a user's internal beliefs, attitude and intentions to use a technology. The results indicated that experience and voluntariness significantly moderated the effects of social norms on behavioural intention (Kripanont 2009:66).

2.4.6 Combined Technology Acceptance Model and Theory of Planned Behaviour

The Combined Technology Acceptance Model and Theory of Planned Behaviour (C-TAM-TPB) was developed by Taylor and Todd in 1995. As the name suggests, C-TAM-TPB is a combination of the key determinants of TPB; the influence of social and control factors (attitude toward behaviour, perceived behavioural control and subjective norm) - and TAM's concept of perceived usefulness (Samaradiwakara & Gunawardena 2014:26; Venkatesh *et al.* 2003:429,434).

Taylor and Todd also added two factors to TAM: subjective norm and perceived behavioural control (Samaradiwakara & Gunawardena 2014:26). These additions were meant to provide a more complete test of the important determinants of IT usage based on their predictive utility in IT usage research and their wide use in social psychology. To this effect, Samaradiwakara and Gunawardena (2014:26) argued that the C-TAM-TPB model is an adequate model of IT usage for users who are both experienced and inexperienced with a technology system.

In an analysis of the eight models of UTAUT, Venkatesh *et al.* (2003:434) revealed that perceived usefulness, attitude toward behaviour and perceived behavioural control were all more prominent with increasing experience while subjective norm became less significant with increasing experience.

2.4.7 Model of PC Utilisation

The Model of PC Utilisation was developed in 1991 by Thompson, Higgins and Howell (Alomary & Woollard 2015:2; Samaradiwakara & Gunawardena 2014:25-26). This theory presents a competing perspective to the Theory of Reasoned Action and the Theory of Planned Behaviour (Alomary & Woollard 2015:2). MPCU identifies the following six key constructs: job-fit, complexity, long-term consequences, societal/social factors, facilitating conditions and affect towards use (Alomary & Woollard 2015:2; Thompson, Higgins & Howell 1991:126-129; Venkatesh *et al.* 2003:430).

Job-fit relates to an individual's belief that using a technology can enhance their job performance. On the other hand, complexity, like in other theories (UTAUT, TAM, TAM2), is the degree to which an innovation is perceived as relatively difficult to understand and use. Long-term consequences are the outcomes that have a pay-off in the future. Affect towards use are an individual's feelings (either positive or negative) associated with an activity. Feelings include joy,

elation, pleasure, depression, disgust, displeasure or hate. Social factors refer to an individual's internalisation of the reference group's subjective culture and specific interpersonal agreements that an individual makes. Finally, facilitating conditions are objective factors in the environment agreed on to make it easy to accomplish an activity (Thompson, Higgins & Howell 1991:126-129; Venkatesh *et al.* 2003:430).

Venkatesh *et al.* (2003:435) established that complexity, affect towards use, social factors, and the facilitating conditions were more salient with less experience. However, the concern over long-term consequences became increasingly important as levels of experience increased. Even though MPCU was first intended to predict the PC utilisation behaviour, its nature makes it particularly suited to predict both individual acceptance and use of a range of information technologies (Thompson, Higgins & Howell 1991:140; Venkatesh *et al.* 2003:25-26).

2.4.8 Motivational Model

Vallerand established the Motivational Model in 1997. MM is one of the models that have been examined and adopted by several researchers to explain behaviour in specific contexts (Alomary & Woollard 2015:2; Venkatesh *et al.* 2003:428). Venkatesh *et al.* (2003:428) add that MM has generally been supported by a significant body of research in psychology as an explanation for behaviour, while several other studies have examined and adapted it for different contexts. Within the information systems domain, Davis, Bagozzi and Warshaw (1992) and Venkatesh and Speier (1999) applied MM to study and understand the adoption and use of new technology. Abduljalil and Zainuddin (2015) integrated MM and TAM to investigate mediating effects of attitude for information system adoption studies. In unrelated research, Spittle, Jackson and Casey (2009) explored why people chose physical education teaching as a profession and investigated how these choices were related to motivation.

The Motivational Model identifies extrinsic motivation and intrinsic motivation as key constructs towards explaining the behavioural intention to use a technology (Alomary & Woollard 2015:2). Extrinsic motivation is the perception that users will want to perform an activity based on the understanding that the activity is instrumental towards achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay rise or promotions (Davis, Bagozzi & Warsha 1992:1112; Liao, To & Liu 2013:624; Spittle, Jackson & Casey 2009; Venkatesh *et al.* 2003:428).

Liao, To and Liu (2013:624) looked at a motivational model of blog usage and concluded that perceived usefulness focuses on utilitarian motivation, making it a key factor influencing intention to use a blog. In a blogging context, perceived usefulness refers to the extent user believe using a blog would enhance their work, learning or life performance (Liao, To & Liu 2013:624). On the other hand, intrinsic motivation is the perception that users will simply want to perform an activity without reinforcements (Davis, Bagozzi & Warsha 1992:1112; Venkatesh *et al.* 2003:428).

However, the MM has no moderators, which may play an important role in regulating relationships between independent and dependent variables.

2.4.9 The Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology was developed in 2003 and is a product of the integration of eight models of technology acceptance and use discussed in the preceding sections (Venkatesh *et al.* 2003:446-447).

In their research, Venkatesh *et al.* (2003:457) revealed that out of the eight models tested, only four studies reported empirically-based comparisons of two or more models. Their study used data from four organisations collected over a six months period with three points of measurement. The eight models explained a variance of between 17 and 53% in user intentions to use information technology (Venkatesh *et al.* 2003:425). Meanwhile, attitude towards using technology, self-efficacy and anxiety were found not to determine intention (Kripanont 2007:86-89; Venkatesh *et al.* 2003:455).

The purpose of UTAUT is to capture the eight models' essential elements, such as the use of conceptual and empirical similarities across models and to determine their ability to explain behavioural intention based on empirical studies conducted at different times. The first test (T1) was done immediately following training but prior the introduction of the new technology. The second test (T2) followed one month after the introduction of the new technology, while the third test (T3) took place three months after the introduction of the new technology (Venkatesh *et al.* 2003:455; Dulle 2010:87).

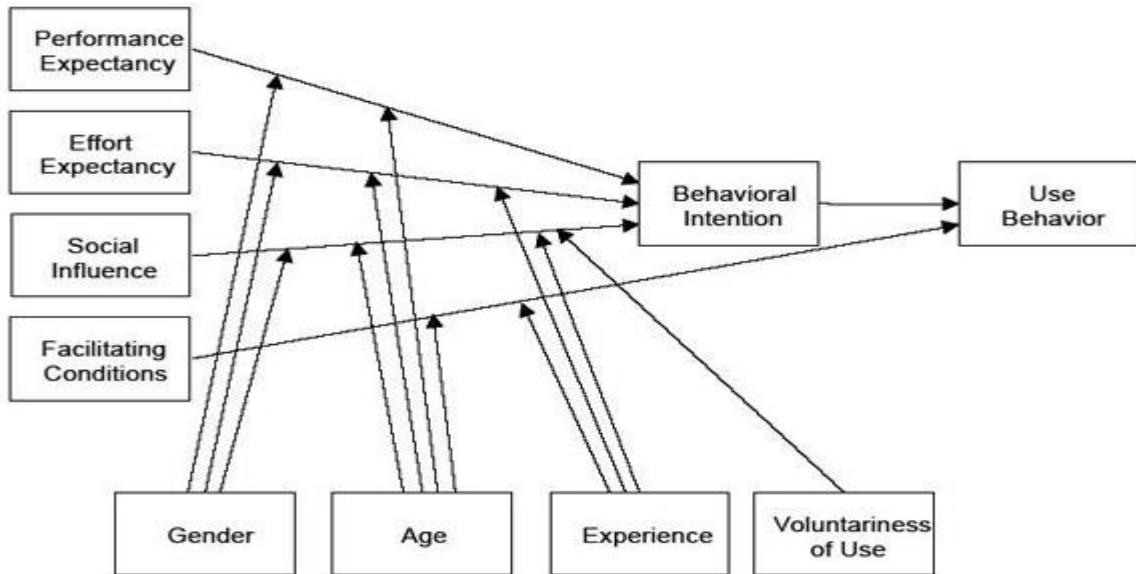


Figure 3.2: UTAUT structure (Venkatesh *et al.* 2003:447)

The UTAUT model’s structure, as depicted in Figure 3.2, recognises four core determinants of user’s behavioural intention to use a technology, namely performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh *et al.* 2003:329). The model also identifies four moderators, namely gender, age, experience and voluntariness. These moderating variables are assumed to influence the four key variables on usage intention and behaviour, primarily in organisational contexts. According to Venkatesh, Thong and Xu (2016:329), performance expectancy, effort expectancy and social influence were tested and found to influence behavioural intention to use a technology. They also revealed that behavioural intention and facilitating conditions determined the technology use.

Performance expectancy is defined as the degree to which an individual believes that using a particular technology will help them achieve better job performance. On the other hand, effort expectancy is the degree of ease of use associated with the application of a technology. Social influence refers to whether an individual believes that others should use the technology while facilitating conditions refer to the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of a system or technology (Davis 1989:320; Hillmer 2009:22; Venkatesh *et al.* 2003:428,447,450,451,453).

Table 3.1: Summary of UTAUT Findings (Venkatesh *et al.* 2003:468)

Hypothesis no.	Dependent	Independent	Moderators	Explanation
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	variables	variables		
H1	Behavioural intention	Performance expectancy	Gender, Age	Effect is stronger for men and younger workers
H2	Behavioural intention	Effort expectancy	Gender, Age, Experience	Effect is stronger for women, older workers, and those with limited experience
H3	Behavioural intention	Social influence	Gender, Age, Voluntariness, Experience	Effect is stronger for women, older workers, under conditions of mandatory use, and with limited experience
H4a	Behavioural intention	Facilitating conditions	None	Non-significant due to the effect captured by effort expectancy
H4b	Usage	Facilitating conditions	Age, Experience	Effect is stronger for older workers with increasing experience
H5a	Behavioural intention	Computer self-efficacy	None	Non-significant due to the effect captured by effort expectancy
H5b	Behavioural intention	Computer anxiety	None	Non-significant due to the effect captured by effort

				expectancy
H5c	Behavioural intention	Attitude toward using a technology	None	Non-significant to the effect captured by performance expectancy and effort expectancy
H6	Usage	Behavioural intention	None	Direct effect

From a theoretical perspective, Venkatesh *et al.* (2003:468) claim that UTAUT provides a refined view of how the determinants of intention and behaviour evolve over time. It is also worthy to note that most of the key relationships in the UTAUT model are moderated (Kripanont 2007). As such, Venkatesh *et al.* (2003:467) advance that UTAUT is a definitive model that synthesises what is known and provides a foundation to guide future research in technology acceptance and use. Its power in explaining technology acceptance and use comes from the combined explanatory power of the eight individual models and their key moderating influences. UTAUT advances a cumulative theory while retaining a tight structure. However, Venkatesh *et al.* (2003:471) suggest that future research should focus on identifying constructs that can add to the prediction of intention and behaviour over and above what is already known and understood.

While several researchers have identified many merits of UTAUT, some have recorded flaws that might have hampered progress for further theoretical development in research into technology acceptance and use (Venkatesh, Thong & Xu 2016:329). Taiwo and Dawne (2013:48) indicate that although UTAUT has been widely used, tested and validated, the outcome of empirical studies has been inconclusive with respect to the magnitude, direction and significance of the relationships among the models/theories involved. Taiwo and Dawne (2013:48) explain that variety in statistical significance in social sciences is a common issue because of the complexity of human behaviour. The mixed outcomes in different studies are expected, which undermines the accuracy of the models, including UTAUT. This complicated the identification of users' history on technology acceptance.

Additionally, Bagozzi (as cited in Alomary & Woollard 2015:3) has criticised UTAUT for having

too many independent variables to predict intentions and behaviour. Correspondingly, despite the report of the explanatory power of UTAUT, Venkatesh *et al.* (2003:471) explains that the fact that UTAUT explains about 70 percent of the variance in intention, it is possible that the theory has reached its practical limits to explain individual acceptance and usage decisions in organisations.

2.5 Choice of the study model for the present study

Kivunja (2018:46) and Mehta (2017:18-19) explain that the choice of a theory to use in a study should be based on the following three questions:

- i. Is the theory identified consistent with the subject being studied?
- ii. Is the literature reviewed sufficient to support and explain relationships?
- iii. Are constructs or hypotheses clearly defined, articulated and logical?

Thompson (2017) adds that the choice of a theoretical framework should be based on how well it fits the present research's purpose, questions and scope. Based on Mehta's analysis, the researcher was convinced that UTAUT was consistent with the subject of study on use of open access as a technology to provide access to research information globally.

Firstly, the UTAUT model has been widely applied, integrated and extended to study individual technology acceptance and use. This proves that the model can be used in the current research to study the use of open access. Since its inception, UTAUT has been applied across various settings such as different organisations, types of technologies, tasks, times, locations and user groups. User groups have included researchers, scientists, students, employees, medical personnel, consumers and academics (Al-Qeisi 2009; Dulle 2010:86; Hamzat & Mabawonku 2018:3; Kripanont 2007:5; Samaradiwakara & Gunawardena 2014:27-32; Sarfaraz 2017; Sejane 2017; Taiwo & Downe 2013:48; Venkatesh, Thong & Xu 2016:157-158).

Additionally, Samaradiwakara and Gunawardena (2014:29) affirm that UTAUT has been applied expansively in an array of research studies in technology contexts and various other areas of academic interest. Therefore, it is evident that the model is suitable for studies on the acceptance and use of technology, including open access. Dulle (2010:86) also found that UTAUT has been applied to analyse variables like gender, information search skills, experience and open access use. This supports the choice of UTAUT for use in the current study.

Secondly, the researcher looked at whether the literature reviewed was sufficient to explain

relationships and support the logical formulation of hypotheses. This was done by analysing UTAUT’s explanatory power and its comprehensiveness in coverage to correlate with Thompson’s (2017) assertion that the choice of a theoretical framework should be based on the explanatory power of its research findings. It is understood that a theory that combines two or more theories or models provides better explanations of phenomena than one involving a single theory. As such, researchers have proposed and tested several competing models in order to investigate and identify models and theories that best explain, predict and promote user acceptance and use of technology (Momani & Mamoun 2017:51; Samaradiwakara & Gunawardena 2014:22; Venkatesh *et al.* 2003; Venkatesh, Thong & Xu 2016:329). With this in mind, the current study aimed at identifying and adopting a theory that was pragmatic in nature.

Hence, UTAUT seemed to provide a better explanation, coverage and comprehensive understanding of the drivers of behavioural intention of acceptance and use of new technologies than the other theories and models discussed earlier (Dulle 2010:90; Samaradiwakara & Gunawardena 2014:29; Sejane 2017:24; Venkatesh *et al.* 2003:425). The UTAUT’s high explanatory power of behavioural intention to use a technology emanates from its integration of the key constructs and moderators from across all the eight technology acceptance theories and models reviewed for its development (Venkatesh *et al.* 2003:471). Samaradiwakara and Gunawardena (2014:22) also revealed that among the fourteen theories and models of technology acceptance and use they reviewed to establish an improved model, they found UTAUT to be the one theory that best explored the technology acceptance behaviour.

Table 3.2 below compares UTAUT’s explanatory power with other models/theories based on their key constructs, moderators and the explained variance.

Table 3.2: Technology acceptance models comparison

(Dulle 2010:87; Samaradiwakara & Gunawardena 2014:30; Venkatesh *et al.* 2003:436)

Theory/Model	Constructs (Independent variables)	Moderators	Explained variance (R^2)
Theory of Reasoned Action	1. Attitude towards behaviour 2. Subjective norm	1. Experience 2. Voluntariness	0.36
Technology Acceptance Model	1. Perceived usefulness	1. Experience	0.53

- a (TAM2)	2. Perceived ease of use 3. Subjective norm	2. Voluntariness	
- b (TAM- including gender)	1. Perceived usefulness 2. Perceived ease of use 3. Subjective norm	1. Gender 2. Experience	0.52
Motivation Model	1. Extrinsic motivation 2. Intrinsic motivation	None	0.38
Decomposed Theory of Planned Behaviour (DTPB) - a TPB (including voluntariness)	1. Attitude towards behaviour 2. Subjective norm 3. Perceived behavioural control	1. Experience 2. Voluntariness	0.36
- b TPB (including gender)	1. Attitude towards behaviour 2. Subjective norms 3. Perceived behavioural control	1. Gender 2. Experience	0.46
- c TPB (including age)	1. Attitude towards behaviour 2. Subjective norm 3. Perceived behavioural control	1. Age 2. Experience	0.47
Combined Technology Acceptance Model and Theory of Planned Behaviour (C-TAM-TPB)	1. Attitude towards behaviour 2. Subjective norm 3. Perceived behavioural control 4. Perceived usefulness	1. Experience	0.39
Model of PC Utilisation (MPCU)	1. Job fit 2. Complexity 3. Long-term consequences 4. Affect toward use 5. Social factors 6. Facilitating conditions	1. Experience	0.47

Innovation Diffusion Theory (IDT)	<ol style="list-style-type: none"> 1. Relative advantage 2. Ease of use 3. Result demonstrability 4. Triability 5. Visibility 6. Image 7. Compatibility 8. Voluntariness of use 	1. Experience	0.40
Social Cognitive Theory (SCT)	<ol style="list-style-type: none"> 1. Outcome expectation 2. Self-efficacy 3. Affect 4. Anxiety 	None	0.36
Unified Theory of Acceptance and Use of Technology (UTAUT)	<ol style="list-style-type: none"> 1. Performance expectancy 2. Effort expectancy 3. Social Influence 4. Facilitating conditions 	<ol style="list-style-type: none"> 1. Gender 2. Age 3. Experience 4. Voluntariness 	0.69

In summary, Venkatesh *et al.* (2003:436) identified the following notable similarities and differences among the eight technology acceptance models in terms of constructs used moderators and explanatory abilities:

- i. Constructs (dependent variables) ranged from two (TRA and MM) to eight (IDT).
- ii. Moderators ranged from zero (MM and SCT) to four (UTAUT), while experience was the most commonly used moderator among all theories/models that applied moderators.
- iii. There is evidence that moderators can play a significant role in the explanatory ability of models even under situations of similar constructs. For example, when employing different moderators, TPB changed the explanatory ability of different versions of the model in question from 0.36, 0.46 and 0.47 variances, respectively.
- iv. UTAUT integrates constructs and moderators from across other eight technology acceptance theories/models
- v. The explanatory ability of technology usage intention in terms of variance ranged from 0.36 (TRA, SCT) to 0.69 (UTAUT). The above evidence demonstrates that UTAUT has the most

power to explain behavioural intention and technology usage.

According to Venkatesh, Thong and Xu (2016:329), various combinations of the four moderators in UTAUT were tested and found to influence various relationships. UTAUT also explained 77% of the variance in behavioural intention to use a technology and 52 % of the variance in technology use.

From the above discussion, it is abundantly evident that UTAUT is applicable to the current study. The UTAUT also provides a useful tool to assess the likelihood of success in accepting and using open access resources and how current awareness services could be applied to promote the usage of open access resources at UNZA.

2.6 Theory application

This study applied UTAUT with three additional constructs (one direct construct and two moderators) to explain and understand problems associated with the use of open access content at UNZA and how current awareness services could be used to improve the uptake. This section discusses the applicability of both the main and moderating constructs of UTAUT to the current study and the level to which each construct influences users' decisions/behaviour to use open access resources. The study further aimed at identifying strengths and weaknesses of UTAUT and recommending improvements to possibly develop a more robust future technology acceptance model (Venkatesh *et al.* 2003:471).

Firstly, UTAUT was operationalised by mapping its constructs in relation to the current study's objectives, questions and concepts or variables. This process shows the study's specific objectives, questions and concepts that were used to measure each of the UTAUT constructs. These details are presented in Table 3.3 below.

Table 3.3: Study variables as they relate to UTAUT

Research objective	Research questions	UTAUT constructs	Current study constructs
To examine user perception of open access resources in their academic and professional work.	<ol style="list-style-type: none"> 1. To what extent does the open access content meet user information needs? 2. How useful do users find open access content in their academic and research work? 	<ol style="list-style-type: none"> a. Performance expectancy b. Moderators 	<ol style="list-style-type: none"> 1. Usefulness of open access 2. User perception of open access 3. Age 4. Gender 5. Level of education
To determine challenges students and researchers face in accessing open access resources.	<ol style="list-style-type: none"> 1. What influences user decision to use open access resources? 2. What challenges do users face when accessing open access resources? 3. How easy or difficult do users find it when accessing open access resources? 	<ol style="list-style-type: none"> a. Effort expectancy b. Social Influence c. Facilitating Conditions d. Moderators 	<ol style="list-style-type: none"> 1. Ease of use of open access 2. Ease of use of awareness services 3. Search skills 4. Research funds 5. Role models 6. Academic promotions tool 7. Internet facilities
To assess possible opportunities of using open access resources.	<ol style="list-style-type: none"> 1. What benefits would open access content provide UNZA if fully utilised? 	<ol style="list-style-type: none"> a. Performance expectancy b. Moderators 	<ol style="list-style-type: none"> 1. Research visibility 2. Research impact 3. Quality research
To explore availability and use of current awareness services in promoting open access resources in the University	<ol style="list-style-type: none"> 1. What type of current awareness services does UNZA use to promote open access and other resources? 2. To what extent has UNZA's library applied current awareness services towards improving the use of open access resources? 3. How useful are current awareness services in promoting open access 	<ol style="list-style-type: none"> a. Performance Expectancy b. Moderators 	<ol style="list-style-type: none"> 1. Current awareness services 2. Open access resource promotion 3. Search options 4. Search skills 5. Age 6. Level of education

	content?		
To identify current awareness services that UNZA's library could use to promote open access resources and other e-resources in the University.	<ol style="list-style-type: none"> 1. What types of current awareness services are more likely to help promote the use of open access resources in the University? 2. What other factors would help improve the usage of open access resources? 	<ol style="list-style-type: none"> a. Performance expectancy b. Effort expectancy c. Social influence d. Facilitating conditions e. Moderators 	<ol style="list-style-type: none"> 1. Open access resources promotion 2. Current awareness application 3. Search skills 4. Search options 5. Training

An in-depth discussion of each UTAUT construct follows in the next sections to explain how these constructs were applied in the study, which research questions they would provide answers to and the specific relationships they were intended to assess or measure.

2.6.1 Performance expectancy

Several studies have revealed that performance expectancy as a construct is the strongest predictor of behavioural intention to use technology and that it remains significant at all points of measurement in both voluntary and mandatory settings (Ali & Arshad 2018:264; Chao 2019:4; Farah, Hasni & Abbas 2018; Hamzat & Mabawonku 2018.1,9; Hutabarat 2021:13; Kampookaew 2020:56-58; Ko 2019:5-6; Marriott & McLean 2019:19; Nurkhin & Nurkhin 2019:1012; Venkatesh *et al.* 2003:447). Further, Kripanont (2007:86) postulates that performance expectancy is both a determinant of behavioural intention and the use of a technology.

While some researchers have argued that performance expectancy is the prime driver of behavioural intention to use a technology, others have established drivers such as hedonistic motivation as a critical determinant of behavioural intention compared to performance expectancy, especially in non-organisational contexts (Venkatesh, Thong & Xu 2016:229). Explaining such differences in research findings, Hamzat and Mabawonku (2018:3) suggest that performance expectancy may represent a critical factor in enhancing or hindering the use of a digital library among engineering lecturers in universities in Southwest Nigeria.

Venkatesh *et al.* (2003:447) further reveal that performance expectancy is referred to under different terms in different technology acceptance models and theories. For example, TAM/TAM2

and C-TAM-TPB use perceived usefulness, MM uses extrinsic motivation, MPCU uses job-fit, IDT uses relative advantage, and SCT uses outcome expectations.

In this study, the construct performance expectancy relates to the persuasion or belief that using open access would enhance academic and research performance. Performance expectancy relates to interrogations on the usefulness of open access in enabling students and researchers to achieve their daily academic commitments and goals. Therefore, performance expectancy was assessed to determine whether or not it influenced researchers'/students' behavioural intention and usage behaviour of open access content for both school and research work. Performance expectancy was also used to assess acceptability and use of current awareness services as a technology by students and researchers in promoting open access resources usage to increase the uptake.

2.6.2 Effort expectancy

Effort expectancy is the degree of ease of use associated with the application of a technology. Effort expectancy also has different names in different theories/models, such as perceived ease of use in TAM/TAM2, complexity in MPCU, and ease of use in IDT. According to Teo and Ursavas (2012:198) and Venkatesh *et al.* (2003:450), the effort expectancy construct is significant in both voluntary and mandatory usage contexts. Its effect is strong during early stages of technology adoption but becomes non-significant over extended and sustained usage periods. Once users become familiar with a technology due to extended and sustained use, issues of ease of use or complexity become non-significant.

Additionally, Binyamin, Rutter and Smith (2020:50) and Venkatesh *et al.* (2003:447) argue that gender plays an important role in technology acceptance, considering the differences between male and female capabilities. Venkatesh *et al.* (2003:450) suggest that effort expectancy is more prevalent in women who have been in employment longer and have relatively little experience with the technology. Consequently, the influence of effort expectancy on behavioural intention is moderated by gender, age and experience, in such a way that the effect will be more substantial for older women at early stages of experience with the technology. According to Lynott and McCandless (2000) and Venkatesh and Morris (as cited in Venkatesh *et al.* 2003:449,450), the differences between men and women stem from gender roles and socialisation processes reinforced from birth and are not based on biological sex. Men are believed to be strong-willed and highly task-oriented compared to women, who are perceived to be timid.

Contrary to the above, Afonso *et al.* (2012:7) and Binyamin, Rutter and Smith (2020:50) argue that being female has a more statistically significant effect on effort expectancy to use a technology than being male. Women tend to be more confident about their judgments (Afonso *et al.* 2012:7)

Venkatesh *et al.* (2003:450) also argue that increased age is associated with difficulty in processing complex issues, paying attention to information on the job or using technology. Experience is another aspect that affects effort expectancy. More experience with a system leads to less effort expectancy. Hence, gender should be considered in relation to age and experience to avoid misleading conclusions.

Since the use and availability of open access content at UNZA is a technology that is moderately known to students and researchers, this research assessed the effort expectancy construct as it relates to gender, age, experience and skills on user behavioural intention to use open access in academic work. The study assessed how easy or difficult students and researchers at UNZA find accessing and using open access content. It also explored the applicability of current awareness services in information updates to students and researchers.

2.6.3 Social influence

Social influence is one other key determinant in UTAUT believed to exhibit direct influence on both the intention and use of technology. Social influence is referred to as subjective norm in other theories such as TRA, TPB, DTPB, TAM2, and C-TAM-TPB (Venkatesh *et al.* 2003). In this study, social influence relates to how an individual is influenced by others in deciding whether or not to use open access resources. Several studies have examined the effect of social influence, but with conflicting results (Dulle 2010:101). For example, Chiu and Ku (2015:7), Kripanont (2007:87), Louho, Kallioja and Oittinen (2006:18) and Nurkhin and Nurkhin (2019:1018) report that social influence has a direct influence on behavioural intention, while Al-Qeisi (2009:3) and (Venkatesh *et al.* 2003:451) report no effect. Venkatesh *et al.* (2003:451) report that none of the social influence constructs are significant in a voluntary context but become significant when use is mandated. As such, Kripanont (2007:87) argues that such inconsistencies experienced in research findings on technology acceptance and the effects of social influence on usage or behaviour intention have led to an increase in studies to help understand the actual effect on usage behaviour.

The social influence construct was chosen for this study to assist in establishing whether or not it had a significant influence on behavioural intention to use open access resources in a voluntary setting. Social influence, in this case, is the extent to which the students and researchers are being influenced by fellow students/researchers, as well as student-lecturer influence to use open access resources.

2.6.4 Facilitating conditions

Facilitating conditions encompass concepts embodied in three different constructs of other theories: perceived behavioural control in TPB/DTPB and CTAM, facilitating conditions in MPCU, and compatibility in IDT. These constructs are operationalised to include aspects of the technological and/or organisational environment designed to remove barriers to use.

However, it has been observed that issues relating to support infrastructure, a core concept within the facilitating conditions construct, are largely captured within the effort expectancy construct, which refers to the ease with which a tool/technology can be applied (Venkatesh *et al.* 2003:453). Subsequently, if effort expectancy is not present in a model, facilitating conditions become a predictor of intention. Similarly, when performance expectancy and effort expectancy constructs are present, facilitating conditions become non-significant in predicting intention (Venkatesh *et al.* 2003:454).

Under facilitating conditions, the current research assessed the technical support available at UNZA, such as the availability of the Internet facilities (Internet access points and laboratories, computers, bandwidth), training to improve user information search skills, research/scholarly funding and scholarships towards staff skill upgrading, existing research promotion policies and criteria, and the availability of research literature for researchers. All these conditions aim to remove barriers to technology use (Venkatesh *et al.* 2003:454).

2.6.5 Moderators

Kripanont (2007:91), MacKinnon (2011:681) and Yol, Serenko and Turel (2006:1961) define moderators (also referred to as moderating variables) as variables that modify or influence the form, strength or direction of relationships between the independent and dependent variables. Moderators can potentially increase the predictive validity of models. As such, the low explanatory powers and inconsistencies of (most) models can be linked to the absence of key

moderating variables reflecting individual differences.

Individual differences may include gender, age, level of education, geographical location and experience. For example, Venkatesh *et al.* (2003:447) found that the effect of performance expectancy on behavioural intention is moderated by age and gender. The effect of effort expectancy and social influence are moderated by age, gender and experience, while the influence of facilitating conditions on usage behaviour is influenced by age.

Although the original UTAUT model outlines four moderating variables, namely age, gender experience and voluntariness, researchers can choose to adopt all four as presented or select those that are appropriate to their study based on the context (Venkatesh *et al.* 2003). Researchers can also decide to add their own moderators and or drop some existing ones. In the current study, all the four original moderators were adopted, while two (profession and awareness) were added. The Information search skills was also added as a key constructs.

2.6.6 Behavioural intention

Research has proved that behavioural intention significantly influences usage behaviour towards a particular technology or system (Dulle 2010:103; Kripanont 2007:90; Venkatesh & Davis 2000:195-196; Venkatesh *et al.* 2003:196). The current study was conducted in the context of voluntary use, as the use of open access resources at UNZA was non-mandatory.

The UTAUT model presents three direct determinants of behavioural intention (performance expectancy, effort expectancy and social influence) and two direct determinants of usage behaviour (intention and facilitating conditions). However, social influence is believed to determine both intention and usage behaviour, while facilitating conditions are considered to directly affect technology usage only.

This study considered performance expectancy, effort expectancy, social influence, facilitating condition and Internets skills to determine usage behaviour and intention of students and researchers at UNZA to use open access resources and application of current awareness services as a technology.

2.7 Summary

This chapter discussed issues related to theoretical models and theories on technology acceptance and use, open access resources and current awareness service technologies. The role of research theories in explaining occurrences using established constructs. Various models and theories were considered and compared to select a theory that best explained the study's research problem. The theories and models discussed include the Innovation Diffusion Theory, Theory of Reasoned Action, Social Cognitive Theory, Theory of Planned Behaviour, Technology Acceptance Model, Combined Technology Acceptance Model and Theory of Planned Behaviour, Model of PC Utilisation, Motivational Model and Unified Theory of Acceptance and Use of Technology.

The UTAUT model was adopted for this research because it was considered the most appropriate for the study. Unlike other models and theories considered, the strength in UTAUT lies in its ability to combine elements of different technology acceptance models, thereby making it more comprehensive, offering a powerful explanation of variable relationships hence reliable. The last part of the chapter discussed the key constructs of UTAUT and how they were applied in the current study.

The next chapter presents the research methodology applied to investigate the low usage of open access resources with the aim to establish current awareness services that can help improve the uptake.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

A research methodology is a research component that describes the actions taken to investigate a research problem (USC 2017:1). It includes the rationale for applying specific procedures or techniques used to identify, select, process and analyse information to understand the problem. Creswell (2014:45) adds that a research methodology involves the methods of data collection, analysis and interpretation that researchers propose for their studies. The methodology answers two main questions: 1) How will the data be collected or generated?; and 2) How will the data be analysed, presented and interpreted? (USC 2017:1). The methodology should allow the reader to critically evaluate the study's overall validity and reliability. Therefore, it is important for a researcher to always provide sufficient information to allow other researchers to evaluate, adopt or replicate a methodology.

This chapter presents the systematic processes or methods conducted in investigating the problem of low uptake of open access resources and how the application of current awareness services can help to improve the uptake. The chapter covers activities before, during and after the data collection, data analysis and interpretation of the results. It explains the progression of the research activities. The chapter also includes discussions on assumptions made, limitations encountered, and how these were mitigated to understand factors affecting the usage of open access resources.

In doing this, the chapter is divided into the following subsections: the research paradigm, research approach, research design, data collection instruments, testing of the instruments, reliability and validity of the study, study population, sampling and sampling techniques, data collection, data analysis and a summary of the chapter.

4.2 Research paradigm

The word paradigm was first used by Thomas Kuhn to mean a philosophical way of thinking, a school of thought or a set of shared beliefs among scientists that inform the meaning or interpretation of research data (Kivunja & Kuyini 2017:26; Kuhn 1996). According to Žukauskas, Vveinhardt and Andriukaitienė (2018:123), the term paradigm refers to a researcher's worldview, perception, set of basic beliefs and attitudes related to his/her perception of reality. A paradigm allows scientists to transform ideas and perceptions into knowledge in the form of research. Although the appropriate

meaning of the concept, research paradigm, has been widely debated on, most scholars base their views on Kuhn's concept of a paradigm and Guba's characterisation of a research paradigm (Creswell 2014:47,48; Kivunja & Kuyini 2017:26,27; Makombe 2017:3367; Morgan 2007:55; Neuman 2014:94,95).

Kuhn (as cited in Kivunja & Kuyini 2017:26,27) asserts that a paradigm is a way to summarise the researchers' beliefs about their efforts to create knowledge. Meanwhile, Guba (1990) claims that a research paradigm is a "set of common beliefs and agreements shared between or among scientists on how problems should be understood and addressed." Guba distinguishes between three research paradigms characteristics: ontology, epistemology and methodology. Ontology looks at what people know or the form and nature of their reality. Epistemology considers how people know the existence of something, while methodology looks at how people investigate or find out what exists (Creswell 2014:35-37; Guba 1990; Kivunja & Kuyini 2017:26-27; Makombe 2017:3365; Morgan 2007:50; Neuman 2014:93-94). This is why most researchers feel that these characteristics bring about a holistic view of how researchers perceive knowledge in terms of how they see themselves in relation to the knowledge and methodological strategies used to uncover or discover that knowledge.

In this study, the term paradigm refers to a set of basic ideas or beliefs among a community of scholars/researchers on how problems should be investigated and addressed while following standard procedures. The four most commonly known and widely used and discussed research paradigms are positivism, interpretivism/constructivism, critical/transformative paradigm and pragmatism (Creswell 2014:35-37; Guba 1990; Kivunja & Kuyini 2017:26,27; Morgan 2007:48-55; Neuman 2014:93,94).

Kivunja and Kuyini (2017:30) and Makombe (2017:3368) reveal that the positivist worldview is generally associated with quantitative research and holds a philosophical view that causes or determines the effects or outcomes. Positivism regards all knowledge as tied to observational forms of verification and is methodologically founded on scientific experimentation. Therefore, the positivist view is suitable for studying problems that need to identify and assess the causes that influence outcomes, such as those found in experiments. Interpretivism, also known as constructivism, is generally used in qualitative research. This approach is participant-centred or subjective. The participants construct the meaning of a situation, typically forged in discussions or interactions in their life settings through open-ended questioning.

The transformative paradigm was developed in the 1980s and 1990s by scholars and critical theorists who felt that the postpositivist and constructivist assumptions imposed structural laws and theories

that did not address marginalised people in society. This paradigm allows for issues of power and social justice, discrimination, and oppression to be addressed. Pragmatism arises from actions, situations and consequences rather than antecedent conditions, as with postpositivism (Kivunja & Kuyini 2017:36). In pragmatism, the focus is on the research problem rather than methods. Pragmatists believe that reality is constantly renegotiated, debated and reinterpreted in light of its usefulness in different and new situations. Therefore, the best method to use at any given time and situation is the one that is most likely going to solve the experienced problem (Mawlood 2017:2).

This study adopted the pragmatic paradigm, and its choice was necessitated by the following factors:

- i. The researcher believed that using a single scientific method as advocated by the positivist paradigm or using the interpretivist paradigm to determine social reality would not bring out the whole ‘truth’ surrounding the low usage of open access resources at UNZA (Kivunja & Kuyini 2017:35).
- ii. The pragmatic paradigm is flexible, allowing the researcher to apply methods, techniques and procedures deemed to be most appropriate at each given time. This helped identify appropriate alerting services that could be used to promote open access resources at UNZA.
- iii. The researcher also recognised that no single reality could satisfy everyone because individuals have different and unique interpretations of reality based on experiences. Therefore, choosing a pragmatic approach, which offers limitless methods in investigation and interpretation of research problems became necessary (Kivunja & Kuyini 2017:35).

4.3 Research approach

Creswell (2014:31-32) defines a research approach as a plan and procedure for research that spans the process from broad assumptions to detailed data collection, analysis and interpretation methods. The three most commonly used research approaches are quantitative (positivist worldview), qualitative (constructivist/transformational worldview) and mixed-methods (pragmatic worldview).

The qualitative approach involves exploring and understanding the meaning of individuals’ or groups’ words, feelings, opinions and understanding of a social problem. With the qualitative approach, data collection is done in the participants’ setting while data analysis inductively builds from specific to general themes. On the other hand, the quantitative approach involves testing objective theories deductively by examining the relationship among variables. This approach derives meaning from quantification of figures to explain phenomena. In the mixed-methods approach the

researcher collects, analyses and mixes (integrates or connects) both quantitative (experiments, surveys, *etcetera*) and qualitative (focus groups, interviews, observations, *etcetera*) data in a single study or a multi-phased programme of inquiry (Creswell 2014:43; FoodRisc Resource Centre 2016). The purpose of applying mixed methods is to address a research problem in a more complete manner (Guetterman & Fetters 2018:903; Plano Clark & Ivankova 2016).

The current researcher applied a mixed-methods approach, involving the integration of quantitative and qualitative research approaches in the collection, analysis and interpretation of the data done sequentially or concurrently. The choice of this approach is based on the assumption that applying one or two approaches alone would not adequately bring to light the major challenges linked to the on-going low use of open access resources at UNZA (Creswell 2014:40,50). The mixed-methods approach helped in collecting diverse types of data to provide a more complete understanding of why open access resources were less used.

The researcher also believed that the mixed methods approach would provide a broader perspective of the overall research problem of by capturing comprehensive and unique evidence/data at different levels using different data collection tools. For instance, based on the previous knowledge that UNZA researchers rarely participate in most research involving library services, the researcher felt that applying a mixed-methods approach would help determine the researchers' most common-used information sources for academic work. This motivated the application of different appropriate methods, such as content analysis and citation analysis, which did not require the physical participation of the lecturers and students.

Another reason for using the mixed-methods approach include the fact that it allows for the results from one data collection instrument to be corroborated with another. This enabled the researcher to clarify contradictory or unexpected results and generalise findings to the study population. In this regard, the database usage statistics from the content analysis were also compared with the interviews and the citation analysis results. These processes guaranteed the validity of the research results and identified specific and unique challenges that users faced when accessing the databases, which in the long run could have affected the use of open access resources.

The mixed-methods approach also facilitated the application of more than one approach to collect data on the same research areas to get comprehensive and more accurate results. In this case, certain information would be collected using different tools, which were developed based on the noted

weaknesses of others, this time with a clear intention, phrasing and understanding of what data to get from the study.

Finally, the mixed-methods approach allowed for the concurrent or sequential use of qualitative and quantitative methods. Each approach was employed to investigate aspects of the problem for which it was best suited to elicit additional and unique information the other approach could not capture (Creswell & Plano Clark 2018:116; Guetterman & Fetters 2018:913). One approach provided strengths that compensated for the weaknesses of the other. As such, FoodRisc Resource Centre (2016) and Makin (2014) state that applying the mixed-methods research approach is most meaningful when the integration provides a better understanding of the research problem than using either method alone. The mixed-methods approach is designed to minimise errors and strengthen the confidence of the research findings.

Based on the above, it is evident that the adoption of the mixed-methods approach was done for more than mere cross-verification of the purpose of the research findings. The approach provided a more comprehensive understanding of why open access resources were poorly used and how current awareness services could be applied to improve the uptake. Similarly, Nechkoska (2015) argues that triangulation should not only mean cross-checking data from different sources or methods to confirm their correctness. Instead, it should focus on increasing knowledge and strengthening the researcher's standpoint on various aspects.

4.4 Research design

A research design is a systematic plan of action the researcher takes to achieve the research objectives. According to the (USC 2017:1), a research design involves the overall strategy that the researcher uses to coherently and logically integrate the different components of the study. Creswell (2014:6) explains that a research design is a type of inquiry within a qualitative, quantitative or mixed-methods approach that provides a specific direction for research procedures. There should be consistency from the data collection stage to the measurement, data analysis and reporting of the findings. As a structure of inquiry, the role of a research design is to minimise the chances of drawing incorrect causal inferences from the data and to ensure that the evidence collected enables the researcher to answer the research questions or test theories as unambiguously as possible (De Vaus 2001:16). Therefore, the research design constitutes the blueprint for the collection, measurement and analysis of data. Dulle (2010:112) and Makombe (2017:3377) add that a research design should essentially determine the location of the data, the amount of the material or the number

of cases needed, and the methods for data collection and analysis. Furthermore, a research design provides an instrument or a combination of instruments with which to conduct the research (Makombe 2017:3377).

An increasing number of researchers are combining case studies and mixed-methods designs to yield a more comprehensive understanding of research problems (Creswell & Plano Clark, as cited in Guetterman & Fetters 2018:902). They have argued that broader or more complicated research problems can be addressed by combining case studies and mixed-methods designs, and this combination makes an integration of qualitative data and quantitative data possible to help understand the research problem.

The two most commonly used designs that integrate mixed-methods and case study designs are the mixed-methods-case study design (MM-CS) and the case study-mixed methods design (CS-MM). Guetterman (2018:906) defines MM-CS as a research design that employs a parent mixed-methods design while using a case study for the qualitative data collection component. On the other hand, CS-MM is a research design that employs a parent case study design and uses mixed-methods design to collect, analyse and integrate qualitative and quantitative data.

Based on this study's research approach, the research design had to be suited to a mixed-methods research approach. While Stake (2005) has noted that a case study is not tied to particular methods but rather determined by the choice to explore a case, there was no literature to motivate that a case study design could be used by itself in a mixed-methods approach.

Consequently, this study applied a case study-mixed methods design that comfortably combines the two designs. Researchers conducting a case study that uses qualitative and quantitative methods can benefit from recent innovations in MM-CS to achieve a meaningful integration of the two forms of data that yields new inferences and a better understanding of the research problem (Guetterman & Fetters 2018:902). Schoonenboom (2017:110-111) adds that a combination of the two designs enhances the integrity and credibility of the findings.

The chosen research design for this study comprised a multiple-case study, sequential explanatory and concurrent triangulation designs. The multiple-case design involved collecting data from multiple levels and various units of analysis. Firstly, a case of UNZA was identified. This was followed by selecting several other cases, including the section of 23 interview respondents, six databases for the content analysis, and 20 publications for the citation analysis (Guetterman

2018:906). In an advanced design, concurrent or sequential strategies are used in tandem to best understand a long-term research goal (Creswell 2014:7). Consequently, the sequential explanatory and concurrent triangulation designs clarified the case study methods in this study. They specified how the data was collected from different sources using different tools and how it was analysed and integrated to better understand the low uptake of open access resources in the University.

There are four commonly known mixed-methods designs: sequential explanatory, sequential exploratory, concurrent triangulation and the concurrent nested design (Creswell 2014; FoodRisc Resource Centre 2016).

The sequential explanatory design involves collecting and analysing quantitative data, followed by qualitative data collection and analysis, which builds on the initial quantitative results in the second phase (Creswell 2009:211; FoodRisc Resource Centre 2016; Guetterman & Fetters 2018:903). Quantitative data is usually prioritised over qualitative data and the data are integrated during the results interpretation phase. Creswell (2009:211) explains that while the sequential explanatory design may be easy to implement and reporting the results, it takes longer to complete the phased data collection. In the current study, this was mitigated by the application of the concurrent triangulation design too.

The concurrent triangulation design prioritises both quantitative and qualitative data collection. The researcher collects the quantitative and qualitative data separately yet concurrently. Data integration occurs at the results interpretation or discussion stage, either by transforming one data type to another or by comparing the results of the two datasets side by side (Cook & Kamalodeen 2019:23; Creswell 2009:213; FoodRisc Resource Centre 2016; Guetterman & Fetters 2018:903). The concurrent triangulation design is more time-efficient and can provide well-validated and substantiated findings. Its combination with the sequential explanatory design assisted in expediting data collection while providing reliable conclusions.

The adoption of the sequential explanatory and concurrent triangulation design was motivated by the ability to collect certain data sequentially, starting with a survey questionnaire, which mainly captured quantitative data. The questionnaire survey was followed by the qualitative open-ended interviews and a citation analysis. Meanwhile, the content analysis and observations were done concurrently with the rest of the data collection tools and brought out both quantitative and qualitative data. While the questionnaire enabled the researcher to collect data from a population large enough to generalise the results and correlate the study variables to establish relationships, the

second phase of the data collection (interviews and citation analysis) built on the initial results of the questionnaire to gain broader and in-depth perspectives on the low usage of open access resources.

Ultimately, this case study-mixed methods design adhered to the following procedure:

- i. Choosing data collection instruments.
- ii. Identifying the study population.
- iii. Determining the sample size.
- iv. Selecting sampling techniques.
- v. Selecting data analysis techniques.

These processes are discussed in detail in the following sections.

4.5 Data collection instruments

According to Nalzaró (2012:2), data collection is the process of collecting information from identified sources such as people, files, documents and databases to investigate the research problem. During data collection, the researcher decides what kind of data to collect, from whom and by whom, when and how the data should be collected. The ‘how’ aspect looks at the tools used to collect the required data. Data collection instruments are devices used to collect data from the field (Nalzaró 2012:7). The choice of reliable and valid instruments depends on the data collection methods the researcher is using. Therefore, the research instruments for this research were selected carefully to ensure that relevant data is collected.

Questionnaires, interviews, focus group discussions and observation are the most commonly used data collection instruments in research (KENPRO 2012; Nalzaró 2012:17). This study adopted five different data collection instruments: the questionnaire, in-depth interviews, researcher observation, content analysis and citation analysis. The main reason for choosing these research instruments was based on their ability to produce both quantitative and/or qualitative data. The research objectives and questions also guided their choice to help understand the research problem. The chosen research tools are discussed below.

4.5.1 Questionnaire

A self-administered questionnaire was used to collect qualitative and quantitative data from a sample population of 577 students, researchers and librarians at UNZA. Nalzaró (2012:18) defines a

questionnaire as a series of questions designed to elicit information from participants in the sample. He also explains that a questionnaire can be completed orally or in print. A good questionnaire should correspond with the overall study objectives. Questions should have clarity and coherence in both grammar and sentence construction and should deal with one item at a time. Questions should be tailored to the level of understanding of the respondents to ensure appropriate responses. Similarly, respondents must be guaranteed of the confidentiality of their responses.

4.5.1.2 Questionnaire designing

The researcher used a printed questionnaire, comprising a combination of standardised or close-ended and open-ended questions. The reason for this combination was to enable the researcher to capture both quantitative and qualitative data. Open-ended questions brought out qualitative data by allowing the participants to respond in their own words about the usage of open access resources and how current awareness services could help improve the uptake. Closed-ended questions, also known as fixed alternative questions, elicited quantitative data by allowing the participants to choose from the available alternative responses (Nalzaró 2012:25). Providing these responses helped those that needed guidance or did not understand the topic of the study very well to have something they could relate to. Consequently, the researcher followed the accepted research practices. The respondents were given a reasonable range of answers to choose from using a multiple-choice arrangement. The respondents were also provided with an open text box to fill out their own answers if their opinions were not adequately catered for in the options provided. While open-ended and the open text box questions brought out qualitative data, the closed-ended questions elicited quantitative data.

Furthermore, the cover letter distributed with the questionnaire explained the study's main objectives and defined key terms such as open access resources and current awareness services to help the participants to fully understand the research topic and respond accordingly.

The questionnaire addressed key components of the research objectives and questions. It also addressed the five identified research constructs and moderators under the UTAUT model that was used to guide the research. The research constructs were performance expectancy, effort expectancy, social influence, facilitating conditions and information search skills, while the moderators were gender, age, experience, voluntariness, awareness and profession.

The questions on performance expectancy focused on understanding the extent to which users believed that the use of open access would enhance their academic and research performance. These

questions also assessed the effectiveness of current awareness services in promoting and improving the usage of open access information resources at UNZA. Questions on effort expectancy focused on the amount of effort (ease of use) required or how easy or difficult users found using open access resources and the application of current awareness services in their day-to-day engagements. Questions on social influence investigated the influence or effect of peers and leading researchers on the users' motivation to use or not use open access resources and current awareness services. Interrogations on the facilitating conditions assessed the effect of the availability of institutional technical support and the organisational environment towards influencing one's usage behaviour and behavioural intention to use open access resources. The technical support and organisational environment include Internet facilities and access points, the use of H-index for promotion, availability of training, research funding and scholarships, and online research literature. Meanwhile, questions on information search skills focused on the effects of the knowledge on how to access and use the available online resources and the current awareness services (Sarfraz 2017:8; Venkatesh *et al.* 2003:447-454).

However, it must be noted that, although the questionnaire addressed all the research objectives, it could not bring to light specific detailed data to assist the researcher fully explain and provide a complete understanding of the research problem. This motivated the application of other data collection tools discussed in sections 4.5.2 to 4.5.5 (Creswell 2014:43,48). As such, the questionnaire assisted in understanding the research problem by bringing to light basic information on which other data collection tools were based to help elicit detailed explanations of the problem.

The researcher chose a questionnaire because it is simple to administer, relatively fast in collecting data and less subjective due to less interaction between the researcher and respondents. Furthermore, questionnaires are not costly to use, and allowed the researcher to collect data from a widely scattered sample, which other instruments could not have managed within a specified timeframe and using meagre resources (Nalzar 2012:19). This made the generalisation of the results to the larger population possible. The data collected from the questionnaire's closed-ended questions were also easily analysed using the Statistical Package for Social Sciences (SPSS) and Microsoft Excel software.

Despite the above advantages of using a questionnaire, the researcher was also aware of its weaknesses, which include a lack of in-depth responses because respondents can easily choose to omit or disregard certain questions. Furthermore, closed-ended questions could limit the choice of responses and force respondents to make choices that may not entirely represent their actual

opinions. Therefore, the data might be limited to the information that respondents supplied voluntarily (Nalzaró 2012:20). To address these concerns, the researcher used other research instruments to strengthen the overall results. These are discussed in the following sections.

4.5.2 Open-ended interview guide

An interview is a systematic way of talking and listening to people to obtain qualitative data for a study. The interviewees or respondents are the primary data sources. Their perceptions and interpretation of the problem is based on their experiences and knowledge (Kajornboon 2005; Nalzaró 2012:35). Nalzaró (2012:35-36) adds that the advantages of interviews include their detailed responses and flexibility, which allows clarification on ambiguous issues. However, they can, be time-consuming, costly and biased towards the researchers' opinions.

Interviews can be structured, semi-structured or unstructured. Structured interviews follow a formal written guide known as an interview schedule or guide with a set of logically constructed questions developed by the researcher. The questions are asked orally, either face-to-face or telephonically (Wilson 2012:96). The strengths of structured interviews are that the researcher controls the interview and can easily record non-verbal cues such as facial expressions and gestures. Its challenges include the problem of interviewer intervention, which can influence the results.

Semi-structured interviews are non-standardised and use a semi-structured question schedule. They allow the interviewer to probe the interviewee for more profound views and opinions. As much as interviews have the potential to elicit more data, inexperienced interviewers may fail to delve deeper into a question to get more detailed data (Wilson 2012:96). Finally, unstructured interviews are non-directed flexible methods of interviews. They have no guide to follow; hence, the conversation is informal. Although unstructured interviews can bring out detail due to their flexibility and less restrictions on questions, they can also be inappropriate for inexperienced interviewers. It may also be difficult to code and analyse the unordered data.

This study used a semi-structured interview guide to collect the qualitative data from a smaller group of 23 purposively selected students, researchers and librarians. The choice of semi-structured interviews was driven by the fact that it allowed more flexibility in questioning and created an environment where both the researcher and the participant felt comfortable talking about the problem in a more relaxed and natural way. The interviews resembled a conversation rather than a calculated interrogation. This encouraged the researcher to naturally ask follow-up questions to seek

clarifications where responses were unclear or where the respondent misunderstood the question and gave off-topic responses. In this way, the interviews brought out detailed responses based on the respondents' experiences with open access resources. This information was used to triangulate and validate the results from the questionnaire and other data collection instruments used in the study (Nalzaró 2012:36).

Although interviews are time-consuming and costly, they help the researcher discover detailed information on how people think and feel about the problem and why they hold certain opinions (Alshenqeeti 2014:42). The semi-structured interview schedule mainly included open-ended questions based on all the five study objectives, specific study constructs and moderators.

The researcher was also aware of the weaknesses of an interview, which, if not handled well, could affect the research results. The researcher ensured that the interviews were allocated enough time and were not rushed. Where physical interviews could not be conducted, the researcher organised telephonic interviews at times convenient to both the interviewer and interviewee. The researcher also avoided direct influence on respondents by allowing and encouraging them to speak freely and guaranteeing that their responses would be treated with confidence.

4.5.3 Participant observation

Another qualitative data collection technique used in this study was participant observation. Observation helped with the collection of qualitative data. According to Kabir (2016:240), participant observation is a systematic process of data collection that enables researchers to learn and examine people's activities in a natural setting. Participant observation involves observing and participating in the activities of those being studied. It entails careful planning of what must be observed. Observations are recorded for data analysis and interpretation.

The observation can be structured or unstructured. Structured observation uses record-keeping forms or checklists to guide the observation activities on issues of interest. On the other hand, unstructured observation does not involve a specified way of observation or checklist (Kabir 2016:241; Nalzaró 2012:38).

This research utilised a structured type of observation. A data collection schedule or guide was prepared to record the findings each time issues of interest were observed. Each time they occurred, the observations were recorded to eliminate bias and prevent forgetting the observed events during

transcribing (Nalzaró 2012:39). DeWalt and DeWalt (2002) explain that observation as a data collection method requires the researcher to have an attitude of openness, even to unexpected outcomes in the study. This openness entails being non-judgmental, having an interest in learning more about others, having an awareness and ability to handle cultural shock and a willingness to make mistakes, and being a careful observer and a good listener.

Participant observation was adopted because it was relatively inexpensive and simplified the collection of large quantities of data through interactions with all the available respondents. It was easy to begin and stop collecting data anytime. The data collection was done when convenient to the researcher and continued throughout the research period (Kabir 2016:244; Nalzaró 2012:39). Its flexibility allowed the researcher to take advantage of the training on information search skills conducted by the library with different students and researchers to learn about their experiences with the e-resources. This assisted the students and researchers to open up and share their trials as well as their expectations at the point of learning.

The observations provided an in-depth understanding of the user information skills, their primary information sources and the challenges they faced in using open access resources. The observations further provided the context for the development of sampling guidelines on the eligibility of participants for the study, the level of participation and the selection of appropriate data collection instruments. The participant observation covered research objectives 1, 3, 4 and 5.

While using participant observation, the researcher was fully aware of some key disadvantages, such as its inaccuracy in predicting events and a possible biased attitude. To deal with these, the researcher endeavoured to involve multiple observations at different times with different users before drawing a conclusion on issues of interest.

The observation looked at the types of updates or prompts that users had experience with, the primary sources of information researchers and students used, online resources awareness levels of users, user perception of open access content, existing promotional strategies, and the information access challenges faced.

4.5.4 Content analysis

According to Bowen (2009:27), content analysis, also known as document analysis, is a systematic qualitative procedure for reviewing or evaluating documents, both in print and electronic formats.

Content analysis involves the examination and interpretation of data in order to elicit meaning and gain understanding and empirical knowledge.

Content analysis was used to collect both quantitative and qualitative data. It was conducted on six databases that UNZA's library had access to at the time of the research. Purposively selected databases included three subscription-based databases: ScienceDirect, EBSCOhost, and Emerald, while the other three were gratis and or libre open access databases UNZA Library, being a member of EIFL had access to, which included JSTOR, Oxford Journals Online and Royal Society Journals.

Using this technique helped the researcher evaluate and establish the usage levels and patterns of online resources through the quantification of the usage statistics. The selection criteria used were that the database should be among the top ten most used databases in the institution and one that the researcher had administrator privileges to, to be able to run usage statistics reports. The content analysis helped assess the databases' user-friendliness, effectiveness and availability of alerting services to ascertain the possibility of applying them in promoting open access at UNZA. The researcher also examined the difference in usage between subscription-based e-resources and open access resources available through EIFL by comparing usage levels between the two resource types. As such, the content analysis addressed the research objectives 1, 3, 4 and 5.

The data collected from database analysis was recorded onto Excel Sheet for easy quantification as well as making conclusions.

4.5.5 Citation analysis

Citation analysis is an indirect method of identifying the usage patterns of documents or sources used by various user categories (Bowen 2009:27; Gadhvi, Chavda & Pandya 2020:1-2). The assumption is that researchers cite relevant earlier studies in their works. The bibliographical references reveal several facts about a particular author, such as authorship pattern, age of documents used, most used resources, geographical coverage, impact, format and the type of publication. As one of the main areas of bibliometrics research, citation analysis helps to evaluate and interpret citations received by articles, authors and other indications of scientific activities to establish relationships between authors or their work (Gadhvi, Chavda & Pandya 2020:1-2). Analysing references at the end of a publication is one of the few significant indicators of the extent of usage of such works.

In this study, the citation analysis involved the analysis of twenty publications, where the twenty researchers, among the most prolific UNZA authors/researchers of 2018 research output, featured as the main authors. This analysis resulted in more quantitative data and qualitative data on user perceptions of open access resources based on the references cited. Consequently, it helped to establish the information sources UNZA researchers use in their research. It also assisted in establishing whether or not the researchers used the open access resources UNZA provided. This data collection tool gave supplementary detail to the questionnaire results on research objectives 1 and 2. This tool also brought out unique discoveries, such as publishing avenues that researchers commonly used.

Citation analysis was chosen as it does not take much time to conduct, research documents were easily accessible online and could be obtained without the authors' permission. Additionally, citation analysis is objective, cheap to conduct produces exact information recorded since the data required was already recorded (Bowen 2009:31; Gadhvi, Chavda & Pandya 2020:1-2).

However, the researcher was aware of the citation analysis' weaknesses, one of them being the irretrievability of the publications locked behind a paywall. To this effect, the researcher included publications openly available online on academic social networks/platforms such as semanticscholar.org, Google Scholar, researchgate.net and academia.edu, and not only on publisher websites, which required an active subscription.

4.6 Testing of the data collection instruments

A pilot study is a small study conducted to assess research protocols, data collection instruments, sample selection strategies, and other research techniques in preparation for a more extensive study (In 2017). A pilot study identifies potential problem areas and deficiencies in the research instruments prior to implementation during the complete study. It also helps to select the most suitable research method to answer the research questions in the main trial. Malmqvist *et al.* (2019:2) add that a feasibility study assesses the practicalities of the main study in terms of implementation and utility, which includes the assessment of resources, such as time and costs.

Testing the research instruments for this study was only necessary for the questionnaire and the interview guide. The pilot test involved fewer respondents randomly selected from the study population. Firstly, the instruments were circulated to three colleagues (two librarians and one researcher) for peer-review on suitability, quality and coverage based on the research objectives,

questions and study constructs. Later, the instruments were pilot-tested on a small sample of respondents from the study population. The questionnaire was tested on 18 respondents (ten students, five researchers and three librarians), while the interview guide was tested on three respondents (two lecturers and one student), all randomly selected from the study population

The main reason for piloting the two data collection instruments on groups different from the actual sample was to avoid straining the respondents. The University of South Africa's Policy on Research Ethics warns against burdening participants with repeated participation. It is not encouraged to repeat studies on the same people, as doing so makes them bear an unfair share of the burden of participation in the study (UNISA 2013:11).

Furthermore, Wilkinson and Birmingham (2003:19) explain that piloting research instruments with colleagues or a small group of respondents with similar characteristics helps identify mistakes and ambiguity in question construction and logical sequence. The piloting exercise allows a fresh mind to review the suitability and clarity of the research instruments.

The purpose of the pilot study for this research was to ascertain the adequacy of the research instruments. The pilot testing also helped to assess the validity of the data collected in relation to the study objectives, questions and study constructs, logical sequence and appropriateness of the questions and wording befitting the educational level of the respondents. The questionnaire and interview guide questions were simplified to the students and researchers' level of understanding of the study topic. The data collection points were dealt with one at a time to help the respondents give appropriate responses. The pilot study further helped to uncover and work on potential problems at data analysis and reporting stages, such as the realignment of the study questions to specific objectives.

Based on the pilot study and peer review of the questionnaire, the following changes were effected:

- i. The pilot study revealed that most of the respondents did not understand the context in which the term "open access resources" was used. It appeared that the respondents regarded the open access content that UNZA's library provided as being not peer-reviewed. This prompted the researcher to provide a simplified and contextualised definition of the term "open access" while taking into account the Budapest Open Access Initiative (2002) and the Berlin Declaration of Open Access (2003) definitions (See Appendices 1,2 and 3). This helped the respondents to understand the context in which the term was being used.

- ii. The sequence and numbering of questions in the questionnaire for all the three groups of respondents (students, researchers and librarians) were standardised to make the coding of the responses and data analysis in SPSS easy, uniform and manageable.
- iii. Some questions or sub-questions were either removed or merged, while others were added as follows:
 - a. Under the bio-data section, a question on academic rank was added.
 - b. In question 1a in the questionnaire, “department” was changed to “specialisation” because it was considered to be a more appropriate term.
 - c. A question was added on awareness of open access resources among students and researchers to establish the current status of the awareness levels of e-resources at UNZA.
 - d. Another question was added at the end of the questionnaire seeking respondents’ willingness to participate in follow-up interviews.
 - e. Since the bio-data questions were similar in both instruments and could therefore be analysed together in SPSS, a question on type of instrument was added to distinguish the interview respondents from questionnaire respondents.
- iv. The reference points just after the bio-data questions were added to help respondents who would have not read the instructions and definitions of terms on the cover letter to understand the questions and hence, provide appropriate responses.

Furthermore, statistical tests were conducted on the questionnaire and its questions to determine its reliability, validity and usefulness as a research instrument. These are discussed in the subsections below.

4.7 Reliability and validity

Reliability and validity tests were conducted on the questionnaire, since it was the instrument used to collect the largest amount of data. Reliability and validity are two distinct but essential criteria to evaluate measurement instruments for quality research. Indicating the importance of reliability and validity in research, for both the design and the measurement of research, Powell and Connaway (2004:43) submitted that research is valid when its conclusions are accurate and reliable when the research findings are repeated. Forza (as cited in Mohajan 2017:58) also stresses that it is difficult to describe the effects of measurement errors on the theoretical relationships being measured in the absence of reliability and validity assessment. Mohajan (2017:59) further asserts that a detailed

assessment of reliability and validity increases transparency, reduces researcher biases, and enhances the accuracy of the assessment and evaluation of the research work.

Price, Jhangiani and Chiang (2015:1,10) define reliability as consistency in the findings or measurements across time (test-retest reliability), items (internal consistency) and researchers (inter-rater reliability). Reliability is concerned with the ability of an instrument to measure consistently and always bringing out the same results. Hence, the reliability of a measurement is its stability or consistency or the ability for a test or research findings to be repeatable. Reliability relates to the dependability of the findings (Mohajan 2017:58; Neuman 2014:241; Sejane 2017:131).

On the other hand, validity is the extent to which the scores represent the variable they are intended to measure. Validity occurs when a test or instrument accurately measures what it is supposed to, or if it can reveal the data of the variables studied, hence, its faithfulness (Mohajan 2017:14; Neuman 2014: 241). Validity is concerned with what an instrument measures, and how well it does so.

Therefore, from the above discussion about reliability and validity, it can be asserted that reliability concerns the consistency of the results while validity concerns the accuracy or credibility of the results.

4.7.1 Reliability tests

In addition to pre-testing the questionnaire and using more than one data collection method to obtain “true” information and enhance the validity and reliability of the results, the researcher conducted reliability and validity tests on the questionnaire. This was done to ensure that the instrument was as adequately reliable as possible. The test was also conducted to determine the usefulness of the questionnaire as a measurement instrument. A Cronbach’s alpha test using SPSS statistics was done. The reliability test results showed an overall Cronbach’s alpha value of 0.874, which indicated the acceptance of the scale and the relevance of each question in the questionnaire. The results revealed a high level of internal consistency for the scale used on the current sample. Table 4.1 shows the overall Cronbach’s alpha value. Individual alpha values “if item is deleted” are displayed in Appendix 11. The table could not be displayed here because of its bulkness.

Table 4.1: Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardised items	Number of items
0.873	0.884	49

Kripanont (2007:128), Montshiwa and Moroke (2014:355) and Tavakol and Dennick (2011:54) assert that the acceptable value for Cronbach's alpha ranges between 0.7 and 0.95, where the 0.7 range is acceptable, 0.8 is good and 0.9 is excellent. Kripanont (2007:128) further explains that the closer the reliability coefficient gets to 1.0, the better. However, Tavakol and Dennick (2011:54) caution that an alpha higher than 0.95 may suggest that some items are redundant because they are testing the same question in a different guise.

If an 'item is deleted' the acceptable alpha value should not be greater than the overall alpha value of the construct, variable or item. This implies that an item whose alpha value, 'if item is deleted' greater than the overall alpha, improves reliability when deleted (Montshiwa & Moroke 2014:355; Tavakol & Dennick 2011:54). Meanwhile, an item whose alpha value 'if item is deleted' is less than the overall alpha value reveals its positive effect towards increasing the reliability of the measurement instrument.

Out of the 49 items considered in the test, seven items had an alpha value less than 0.873 "if item is deleted." This reveals the significance of the majority items on internal reliability in the measurement. However, the seven items with alpha values 'if item is deleted' more than the overall alpha were not deleted. Instead, the researcher worked on them in readiness for the data analysis. For instance, Question 6 was merged with Question 8 to enhance reliability, while Question 7 had its rating scale enhanced from Likert 4 to Likert 5-point scale.

4.7.2 Validity tests

Mohajan (2017:14,15) indicates two essential parts of validity that can be measured: internal (credibility of findings) and external (transferability of study results). Internal validity considers the sampling procedure, data recording and data analysis processes. To address the aspect of internal validity, the researcher used more than one data collection method and instrument for triangulation and data validation. This helped to test the consistency in the findings obtained through different

instruments, thereby increasing the accuracy of the measurements. The researcher also tested and peer-reviewed the research instruments before actual data collection.

The researcher used proportionate random sampling to choose the most representative sample to increase external validity. The researcher also attempted to use the correct concepts and a clear description of all the research activities undertaken to make it easy for others to replicate the study across different populations of similar characteristics, settings and times (Creswell 2014:251; Mohajan 2017:14-15).

Furthermore, a validity test was conducted using Pearson Product Moment correlations using SPSS. The sig. (2-tailed) was at a significant level of 5%, while N, the total number of survey respondents was 40 people. The test results showed a strong correlation between and among variables intended to measure the same attribute or construct. Out of 269 correlations measured, 224 had a correlation significant at the 0.01 (1%) level (2-tailed), while 45 had a correlation significant at the 0.05 (5%) level (2-tailed).

Therefore, this proves that the questionnaire, as a research instrument that collected the largest amount of data, measured what it was expected to measure. The instrument can be considered trustworthy and the data collected both reliable and valid.

4.8 Study population

Banerjee and Chaudhury (2010) assert that a study population is the subset of the target population available for study. A target population is a complete set of people with a specialised set of characteristics, to which the results of the study could be generalised. Neuman (2014:147) adds that the concept, population, is an abstract idea of a large group of many cases from which a researcher draws a sample. The study population for this research for the questionnaire, interviews and observation was all full-time returning students, researchers (academic staff) and librarians of UNZA at both Ridgeway and Great East Road campuses. The study population for the databases was all the databases the UNZA library was providing access to, while the study population for the citation analysis was all the 2018 publications of the 20 selected UNZA researchers.

At the time of data collection for this research, the academic year 2018/2019, UNZA had a total population of 14,033 students, 833 researchers and fifty librarians. The University had a total

population of 14,916 people (UNZA Academic Staff 2019 and UNZA Student Academic Register 2018/2019).

Additionally, respondents could be drawn from the university's thirteen schools that included the Graduate School of Business, School of Agricultural Sciences, School of Education, School of Engineering, School of Health Sciences, School of Humanities and Social Sciences, School of Law, School of Medicine, School of Mines, School of Natural Sciences, School of Nursing Sciences, School of Public Health and the School of Veterinary Medicine. Out of the 13 schools, 12 were considered for inclusion. The Graduate School of Business was not considered because it was operating on a part-time/distance basis, making it difficult to follow up students.

4.9 Sampling

Sampling is a fundamental aspect of research. It allows researchers to select some cases to examine in detail and then use the results to understand a much larger set of cases, the population. Neuman (2014:246) contends that the primary use of sampling in quantitative studies is to create a representative sample, where a sample closely reproduces or represents features of interest in a larger population.

4.9.1 Study sample size determination

A study sample is a subset of the study population (Banerjee & Chaudhury 2010). A sample that is too big would lead to wastage of resources such as time and money, while a sample that is too small would not allow the researcher to gain reliable insights or generalise the results to the larger population.

In this study, the researcher used a sample size calculator to select the required sample size for the questionnaire, which was the only instrument that needed sample calculation due to the numbers involved (The Survey System 2016). In order to select a sample that was as representative as possible of the study population, the researcher used a margin error of 4% and a confidence level of 95% on a total population of 14,916. This population comprised students, researchers and librarians. The calculated sample size equalled 577 respondents, representing 4% of the total population.

The study analysis plan for the sample size determination was based on the subgroups of the research population. The population was stratified according to schools to ensure that specific characteristics such as gender, specialisation and the level of study/education were represented in the sample. The

stratification was also meant to select a sample that was reflective of the actual proportion of all subgroups in the study population (Creswell 2014:204).

Meanwhile, the other data collection techniques used purposive and convenient sampling. The researcher purposively selected the 23 units of analysis for the interviews, the six databases for the citation analysis and 20 publications for the content analyses, while the observations were conveniently and randomly done.

4.9.2 Sampling frames

A sampling frame is a list that closely approximates all elements or units of the target population (Neuman 2014:252). Examples of sampling frames include telephone directories, tax records, driver's license records, school or employees registers, and other frames. Researchers need to ensure accuracy in sampling to avoid any mismatch between a sampling frame and the conceptually defined population that can cause errors and weaken measurement validity (Neuman 2014:252).

The researcher used the 2018/2019 student academic register obtained from UNZA Academic Office to sample the student respondents for the questionnaire and interview. The researchers and librarians were sampled using the academic staff records list from the Personnel Data Office. To avoid errors or mismatch between the sampling frame and the conceptually defined population, the researcher used updated registers for 2019. The researcher also had to physically identify and delete incomplete and repeated units from the frames before using them for sampling. The e-journal page on the UNZA library website was used as a sampling frame for the content analysis.

Meanwhile, the sampling frame for the citation analysis was the 2018 UNZA research output report.

4.9.3 Sampling techniques

There are two types of sampling: probability/random and non-probability sampling (Banerjee & Chaudhury 2010). According to Taherdoost (2016:21), random/probability sampling is where every case or unit of the population has an equal chance of inclusion in the sample. On the other hand, Etikan and Bala (2017:215) and McCombes (2019:5) indicate that non-probability sampling involves selecting individuals based on non-random criteria and not every individual has a chance of being included in the sample. However, the selection follows a clear rationale for including certain cases or individuals and not others.

The most common examples of probability sampling are simple random sampling, stratified random sampling, systematic sampling and cluster sampling. Non-probability sampling techniques include quota sampling, snowball sampling, judgment or purposive sampling and convenience sampling (Etikan & Bala 2017:215; McCombes 2019:5; Taherdoost 2016:21).

The researcher applied two probability-sampling methods and two non-probability sampling methods in this study. The two probability-sampling methods were simple random sampling and stratified random sampling, while the two non-probability sampling methods were judgement or purposive sampling and convenience sampling. These are discussed in detail below.

4.9.3.1 Simple random sampling

In simple random sampling, every case or unit of the population has equal chances of inclusion in the sample and hence, requires a sampling frame that includes the whole population (Creswell 2014:204; Etikan & Bala 2017:215; McCombes 2019:5; Taherdoost 2016:21). Each case is assigned a number and a random number generator is used to select the sample. Sampling is entirely based on chance. Creswell (2014:204) and Taherdoost (2016:20) affirm that randomisation gives each individual in the population an equal chance of being selected. This achieves a representative population sample and makes it possible to generalise to a population.

The notable advantages of simple random sampling are that it is easy to understand, conduct and project results. Its disadvantages include the difficulty to construct the required sampling frame, costly to conduct, lower precision and the results may not be representative due to bias (Taherdoost 2016:7).

4.9.3.2 Stratified random sampling

Stratified sampling involves the division of the population into subgroups (strata) based on the relevant characteristics of the population such as gender, age range, income, specialisation, education level, and many others. According to Wilkinson and Birmingham (2003:19), stratified random sampling involves establishing one's population and randomly taking a sample from that population that represents the whole. Stratified random sampling is usually applicable to a population with substantial variations or mixed characteristics. This ensures that every stratum or characteristic is proportionally and adequately represented in the sample (Creswell 2014:204).

The researcher then proportionally calculates the number of cases to be drawn from each subgroup and randomly or systematically selects a sample from each subgroup. The advantages of stratified sampling include its precision and the inclusion of all the important subgroups or characteristics. Its disadvantages include the difficulty in selecting relevant stratification variables, associated expenses, and the possibility of not being feasible to stratify certain variables (Taherdoost 2016:7).

4.9.3.3 Purposive or judgmental sampling

Purposive sampling, also known as judgmental sampling, is a sampling method in which particular settings, persons or events are selected deliberately to gain relevant information on a specific phenomenon rather than making statistical inferences (McCombes 2019:7; Taherdoost 2016:23). The researcher uses his/her judgment based on a clear rationale and criteria to select a sample that is most useful to the research purposes.

The notable advantages of purposive sampling are that it is low-cost, convenient, less time-consuming, and may lead to further studies. Its disadvantages are that it is subjective and does not allow generalisation (Taherdoost 2016:7).

4.9.3.4 Convenience sampling

Creswell (2014:204) reveals that convenience sampling deals with selecting respondents based on their convenience and availability. McCombes (2019:6) adds that convenience sampling simply includes the individuals who happen to be the most accessible to the researcher. Some of the advantages of convenience sampling are that it is an easy and inexpensive way to gather initial data. Its disadvantage is that it is difficult to tell if the sample is representative of the population; hence, it cannot produce generalisable results. Similarly, Taherdoost (2016:7) argues that while convenience sampling may be the least expensive, least time-consuming and most convenient, its sample selection process can be biased and not representative of the larger population.

4.9.4 Justification for the selection of the above sampling techniques

Simple random sampling and stratified random sampling were used to select the questionnaire participants. The choice of simple random sampling was meant to give each unit or individual in the population an equal chance of being selected. This yielded a representative sample of the population, which made it possible to generalise the results to the study population. The choice of stratified

sampling was necessitated because the twelve schools of UNZA had substantial variations in student and staff population, the number of programmes offered and gender ratios. Therefore, stratified random sampling allowed for the inclusion of all important subgroups and characteristics to ensure that every stratum or characteristic was proportionately and adequately represented in the sample.

Since Taherdoost (2016:7) records difficulty selecting relevant stratification variables as one of the disadvantages of stratified random sampling, a specific procedure was followed to mitigate this challenge. Firstly, the population was stratified according to schools, specialisations and study programmes. Secondly, the sample size required from each school and study programme was proportionately calculated while taking into account the ratio of males to females. The total number of students and researchers from each school was calculated by dividing the study population into the school population, multiplied by the total study sample. This is represented by the formula ‘stratum size/study population x total sample’ (Hayes 2020). The male to female ratio was then calculated to cater for any bias based on gender. This helped to determine the proportionate sample sizes to be drawn from each school, specialisation, programme and gender.

Finally, the total sample required was randomly drawn from each stratum according to established numbers and ratios, as illustrated in Table 4.2 below.

Below is the table of samples established and drawn from each school.

Table 4.2: Questionnaire sample distribution summary

School	Total population	Samples
School of Agricultural Sciences	376	15 (3 PG & 12 UG)
School of Education	4,740	183 (11 PG & 173)
School of Engineering	648	25 (3 PG & 22 UG)
School of Health Sciences	628	24 (1 PG & 23 UG)
School of Humanities and Social Sciences	3,783	147 (14 PG & 133 UG)
School of Law	266	10 (1 PG & 9 UG)
School of Medicine	889	34 (6 PG & 29 UG)
School of Mines	182	7 (2 PG & 5 UG)
School of Natural Sciences	1,711	66 (6 PG & 61 UG)

School of Nursing Sciences	341	13 (3 PG & 10 UG)
School of Public Health	202	8 (5 PG & 3 UG)
School of Veterinary Medicine	267	10 (4 PG & 6 UG)
Researchers	833	32
Librarians	50	3
Total	14,916	577

Key

PG - Postgraduate students

UG - Undergraduate students

The results in Table 4.2 show that the School of Education had the highest number of student respondents proportional to its population, followed by the School of Humanities and Social Sciences. The remaining schools had less than 100 respondents each. From the category perspective, librarians were the least represented as can be seen in Table 4.3 below.

Table 4.3: Researcher and librarian sample distribution by school

School	Total population	Sample
School of Agricultural Sciences	64	2
School of Education	123	5
School of Engineering	50	2
School of Health Sciences	50	2
School of Humanities and Social Sciences	130	5
School of Law	18	1
School of Medicine	81	4
School of Mines	28	2
School of Natural Sciences	107	4
School of Nursing Sciences	51	2
School of Public Health	26	1
School of Veterinary	16	1

Medicine		
IDE	7	1
Library	50	3
Total		35

Besides stratified random sampling, the researcher applied purposive and simple random sampling for the interviews, content analysis and citation analysis. This choice was motivated by the need to select the most useful samples for the research purposes. This further helped to get detailed information on the problem of low usage of open access content and how alerting services could be used to improve the uptake. For instance, the citation analysis only involved publications for 2018 that were freely accessible either in print or electronic format and then randomly selected from the eligible publications.

Purposive sampling was also less costly to conduct, more convenient and less time-consuming compared to stratified sampling. The lack of generalisation due to the lack of randomisation in purposive sampling was covered by stratified random sampling on the main data collection tool, the questionnaire.

Meanwhile, the convenience sampling technique was used to select participants for the observations. This technique assisted in including individuals who were the most accessible to the researcher, such as students and researchers who attended training on how to access and use e-resources. This helped the researcher save time looking for participants, considering that the research was time-bound. Taherdoost (2016:7) argues that, while convenience sampling may not produce generalisable results, it is the least time-consuming and most inexpensive, straightforward, convenient, and reliable type of sampling when properly conducted.

4.10 Data collection

4.10.1 Data collection by questionnaire

Data collection can begin once the sampling frame, sampling techniques, and sample size are established (Taherdoost 2016:10). The most common ways to administer questionnaires to respondents include self-administration, email, online (via SurveyMonkey) or by phone (Kripanont 2007:116). In this research, the questionnaire was self-administered. Because the questionnaire survey involved a relatively large sample size, the researcher contracted two research assistants to

help distribute the questionnaire and collect answered questionnaires from respondents in different schools and departments.

The twelve schools were shared among the researcher and the two assistant researchers. The researcher handled the distribution of the questionnaires to researchers and librarians, while the two assistant researchers handled the student population. Each research assistant collected data from six schools. The sharing of schools took into account the different school’s sample sizes to avoid burdening either of them with too much questionnaire distribution and collection. One research assistant collected data from the Schools of Agricultural Sciences, Engineering, Humanities and Social Sciences, Law, Natural Sciences and Veterinary Medicine. The other research assistant handled the Schools of Education, Health Sciences, Medicine, Mines, Nursing and Public Health. Sharing the work significantly reduced the time and effort spent on data collection.

The choice of self-administration for the questionnaire was guided by the need to increase the response rate that would result from constant follow-ups with respondents to return answered questionnaires. Correspondingly, the study reported a reasonable response rate. Kripanont (2007:116) affirms that self-administered questionnaires are more likely to yield a higher return than email distribution. Self-administration of questionnaires is also reliable, inexpensive and fast due to the constant follow-ups made by the researchers.

Out of the 577 questionnaires distributed, 509 were returned. After scrutinising the 509 returned questionnaires for information gaps, 501 were found to be complete for the data analysis purposes. This translated into an 87% response rate. The distribution of questionnaires was followed by interviews. More information on the respondents’ biographical data is covered in Section 5.2 of Chapter Five.

4.10.2 Interview administration and data collection

Ten postgraduate students, ten researchers and three librarians who were purposively selected from the target population were interviewed. The interviewees included active and inactive users of open access content, as shown in Table 4.4 below.

Table 4.4: Interviewee distribution by school (N=23)

SCHOOL	Number of researchers & librarians	Number of students
---------------	---	---------------------------

Agricultural Sciences	1	
Education	2	3
Engineering	1	1
Humanities and Social Sciences	1	2
Law	1	1
Medicine	1	1
Natural Sciences	2	1
Veterinary Medicine	1	1
Librarians	3	
Total	13	10

Nalzar (2012:35) indicates that interview questions can be asked orally in either face-to-face or telephonic format. Due to the Covid-19 pandemic at the time of conducting the interviews, the researcher used both methods for convenience to both the interviewee and the interviewer. Of the 23 interviews conducted, 12 were face-to-face, while 11 were completed telephonically. To secure the data from the interviews and for the purpose of transcribing, the researcher took short notes during the interview and recorded all the interviews.

The interviews were followed by the citation analysis involving 20 publications of UNZA researchers.

4.10.3 Citation analysis data collection

The citation analysis involved evaluating 20 publications by UNZA authors/researchers published in 2018. The selected publications were downloaded from various academic social networks and publishing platforms with free access such as BioMed Central, LinkedIn, ResaerchGate, Hiv Medicine Association, MEDLINE and PubMed. The citation analysis collected data regarding the type of publication (open access or subscription), publisher, journal title, article citations, total number of references cited, number of print references, and number of electronic references as elaborated in Tables 5.11 & 5.12 of Chapter Five. The extracted data was entered into an Excel spreadsheet according to the identified fields and later transferred onto SPSS for the analysis.

4.10.4 Content analysis data collection

The content analysis data collection was done alongside other data collection. The content analysis involved studying six databases that UNZA had access to at the time of the research. Of the six databases, three were UNZA's subscription-based, while the other three were EIFL Gratis and or libre open access databases as explained in Section 4.5.4.

A data collection schedule or guide was used to guide the data collection from each database based on its features such as database type, subject mix or coverage, search options made available (user-friendliness of database), provision of publisher alerting services, and the annual usage statistics from 2015 to 2019. More data collection points included the usage analysis of open access databases versus closed access databases and the quality and relevance of the open access content in relation to the University's subject mix. Microsoft Excel was used to capture the collected data for easy analysis.

As with the citation analysis, the data collected from the content analysis were recorded in an Excel sheet and later transferred onto SPSS for the analysis.

4.11 Data analysis

Data analysis is a process of making meaningful and valuable conclusions from bulky and raw pieces of information obtained from the investigations on the problem. According to Ugwu (2017:2-4), data analysis helps describe and summarise data, identify relationships between variables, compare variables and identify trends. Data analysis helps answer research questions or test hypotheses the researcher set out to prove.

The data analysis for this study involved the analysis of quantitative and qualitative data. The quantitative data mainly involved the data generated from the questionnaire's closed-ended questions, content analysis and citation analysis, while the qualitative data mainly involved data generated from the questionnaire's open-ended questions, the interviews and observation. Citation and content analyses also generated some qualitative data.

Additionally, the quantitative data analysis involved two types of data analysis: descriptive analysis and multivariate analysis. According to Trochim (2020), descriptive analysis transforms raw data into a form that makes it easy to understand and interpret. It also involves re-arranging, ordering and manipulating the data to generate descriptive information summaries about the sample and the

measures. The information generated may be in tables, figures and graphs of frequencies and percentages of answers to the research questions. Additionally, descriptive analysis describes the basic features of the data in a study (Trochim 2020).

The benefits of using descriptive statistics include its ability to describe the characteristics of the sample, check variables for any violation of the assumptions underlying the statistical techniques used and address specific objectives (Kripanont 2007). According to Bartholomew (2010:12) and Grimnes and Martinsen (2015:329), multivariate analysis is a set of techniques used to analyse data sets that contain more than one variable. It involves a statistical study of data where multiple measurements are made on each experimental unit. The relationships among multivariate measurements and their structure are important. This kind of analysis is concerned with the interrelationships or correlations among several variables. A multivariate analysis is most applicable to a study that involves analysing a large amount of information in an integrated manner. Despite multivariate analysis's requirement for large samples with seemingly more complex results to interpret than those from univariate analysis, multivariate statistics allow rich and realistic research designs, which enable researchers to understand complex relations among the variables under investigation (Harlow 2006:1).

Multivariate analysis was adopted for this study to address the theory validation component. It assisted in identifying variables that influence open access and current awareness usage behaviour and the behavioural intention of the UNZA researchers and students. The detailed results of both the descriptive analysis and multivariate analysis are presented in Chapter Five and discussed in Chapter Six.

In this study, the quantitative data analysis helped to establish relationships between and among variables (correlation coefficient, Cronbach's alpha test, Chi-square tests, factor analysis, binary logistic regression, *etcetera*). It also helped to determine the extent to which each variable contributed towards the low usage of open access content in the University. Therefore, the quantitative data helped the researcher to quantify the research problem and determine how current awareness services can be used to improve the open access uptake.

The research used SPSS version 22 and Microsoft Excel 2010 for quantitative data analysis. The choice of these tools was based on both being user-friendly and their ability to perform various data analysis and presentation functions. Both provided accurate and reliable results to predict trends, even on a small sample (Paura & Arhipova 2012:10). Furthermore, SPSS is known for its high

descriptive and multivariate statistical power for analysing quantitative data. Excel, on the other hand, is adept at generating graphs and charts (Trochim 2020).

Content/thematic analysis was used to analyse the qualitative data. Wilkinson and Birmingham (2003:68) assert that content analysis is a process of making meaning to the content or responses of the open-ended questions of a research instrument such as the questionnaires, interview transcripts or focus group notes. This process involved the sorting and grouping of responses or data collected according to related subjects/themes to form headings and subheadings based on the study objectives. The themes or headings and subheadings were later used as sections and sub-sections in Chapters Five and Six, presenting and discussing the research findings, respectively.

The choice of content analysis for the qualitative data analysis was based on the researcher's judgment and conviction that it was the most appropriate way of analysing that kind of data to make meaning. Content analysis is also user-friendly and can give results that are as close-to-accurate and reliable as possible.

4.12 Summary

Chapter Four covered the entire process of the research, from the review of secondary literature, through data collection to data analysis and interpretation of the results. The chapter explains the research process in terms of the applied research paradigm, research approach, research design, study population and sampling, data collection, data analysis and the reporting of the research findings.

The research is embedded in the pragmatic paradigm and, therefore, uses the mixed-methods approach and case study-mixed methods design, involving a multiple case study, sequential explanatory and concurrent triangulation designs. A questionnaire, open-ended interviews, citation analysis, content analysis and researcher observation were used for the data collection. Simple random sampling, stratified random sampling and purposive sampling techniques were used to select the study sample for the questionnaire, interviews, content analysis and citation analysis. Convenience sampling was used for the observations. At the data analysis level, descriptive and multivariate analyses were employed to analyse the quantitative data using SPSS version 22 and Microsoft Excel 2010. Thematic analysis was applied for the analysis of the qualitative data.

The detailed presentation and discussion of the study findings are covered in the following two chapters.

CHAPTER FIVE: PRESENTATION OF THE STUDY RESULTS

5.1 Introduction

This chapter presents the study's research findings as captured by the five research instruments used to collect the data: a questionnaire, interview guide, observation, content analysis and citation analysis. The results are presented according to the research objectives and their corresponding research questions and hypotheses in sections and subsections. Where more than one data collection instrument was used to investigate an objective or variable, the results are presented concurrently (as explained in Section 4.4 in Chapter Four) to build on, complement or substantiate the findings of another instrument. This helped in the discussion and presentation of the research results conveniently.

In cases where the presentation of the results could not be done concurrently, the quantitative data (standardised interrogations), mainly from the questionnaire, is presented first, followed by the qualitative data (open-ended interrogations) to back the quantitative results.

5.1.1 Research presentation outline

The first part of the chapter (Section 5.2) introduces the order of the presentation of the results and other aspects considered during the data analysis. This section is by a discussion of the general information of the research units such as the questionnaire and interview respondents, databases and author publications. The general information in the questionnaire, the interviews and citation analysis covers the respondents' profile: category, gender, age, level of education or year of study, academic ranking or degree pursued, and their school or field of specialisation. The general information for the content analysis includes the name of the database, type of database (subscription-based or open access based) and access type.

Section 5.3 presents the results of objective one, which set out to examine the students' and researchers' perceptions of the relevance of open access resources in their academic and professional work. This section sought to answer research questions relating to the quality of open access publications provided by UNZA's library in terms of their relevance to the academic and professional work of the students and researchers.

In Section 5.4, the results of the second objective are discussed. The section draws its research data from questions on the possible opportunities open access resources provides to higher learning

institutions like UNZA when utilised fully. The questions that underpin this research objective are: What is the value of open access content in academia? Do open access resources widen the range of scholarly content that UNZA's library provides to its users? Does open access give UNZA students and researchers equal opportunity to access global research content? Does open access content help supplement a declining budget for resource subscriptions?

The results of the third objective, which determined the challenges students and researchers face in accessing open access resources and other online resources, are presented in Section 5.5. This section answers the following research questions: What are the main challenges that students and researchers face when accessing and using open access content at an individual and institutional level? Are the students and lecturers aware of the availability of open access content in the University? To what extent does awareness of the availability of open access resources affect usage? What information search skills do students and researchers need to access and use open access resources and other e-resources, and do they possess these skills? Is the physical and ICT infrastructure sufficient to support the University's access and use of open access resources?

Section 5.6 presents the results for objective four on the existence and use of current awareness services in promoting open access resources and other resources at UNZA and elsewhere. The questions that informed the data analysis in this section were: What current awareness services exist in the University towards promoting open access and other resources? How were students and researchers got informed about the available resources? What type of information updates do students and researchers receive? How effective are the information updates that users receive?

Having explored the existing current awareness services at UNZA and globally and their use, the researcher sought to identify appropriate current awareness services that UNZA could adopt in promoting access and use of open access and other e-resources in Section 5.7, as the fifth objective stipulates. This information was gathered from the following questions: What types of current awareness services are more likely to help promote access to and use of open access and other online resources at the University? To what level would the application of alerting services help promote access to and use of open access and other online resources at UNZA? How can social media tools promote the use of open access at UNZA? What other factors would facilitate and improve the usage of open access resources in the University?

Section 5.8 examines the applicability of the research theory to the current study data based on the results with underpinning research questions such as: To what extent is UTAUT applicable to the

research results? What are the determinants of behavioural intention and behaviour to use open access resources and current awareness services as a technology by UNZA's students and researchers? What influence do the moderating variables have on the model key factors on students' and researchers' intention and behavioural usage of open access resources and use of current awareness services for information updates?

The final part of the chapter summarises the presentation of the results in Section 5.9. It also introduces Chapter Six, which covers the interpretation and discussion of the research findings.

5.2 General information

5.2.1 Response rate

The response rate is the ratio of respondents who complete the questionnaire compared to the total number of questionnaires distributed. According to Fincham (2008:2) and Frey (2018), a response rate is the number of returned usable responses divided by the total number eligible in the sample selected. The response rate was calculated on the questionnaire only because the other instruments did not require the research units' consent to be included in the study. Although the interviews required respondents to consent to participate, the researcher still had many units to choose from to achieve the required number of 23 respondents to achieve any required response rate.

As indicated in Section 4.5.1 of Chapter Four under, the questionnaire was distributed to 577 respondents, out of which 509 were returned. The researcher scrutinised the returned questionnaires for completeness and established that eight had critical information gaps due to inappropriate and missing responses. These could not be used for the data analysis, leaving the researcher with 501 complete questionnaires usable for the data analysis. This represents an 87% (figure rounded off) response rate.

It should also be noted that the valid responses for each question for the questionnaire do not equal 501 as depicted by the total response rate because questions that had "No response" or "Not applicable" values were recoded to missing values. The missing values did not count towards the final analysis. However, this is not the case with other instruments as there were no missing values.

5.2.2 Respondents' demographic characteristics

Under demographic data, the researcher examined six variables for the questionnaire, the interviews

and the citation analysis. These were the respondent's category, gender, age, level of education or year of study, academic ranking or degree pursued, school or field of specialisation. For an easy and convenient presentation of the bio-data results from all the three research instruments, each variable was cross-tabulated with the research instrument to present the results of the three research instruments under each variable in one table. Consequently, a separate dataset for the demographic data was created in SPSS, which is elaborated on in the following sections

5.2.2.1 Distribution of respondents by research instrument

The three research instruments for which demographic data was computed were the questionnaire, interview and citation analysis. The questionnaire had a total of 501 respondents; the interview had 23 respondents, while the citation analysis involved 20 researchers, for a total of 544 respondents, as shown in Table 5.1 below.

Table 5.1: Respondents by research instrument [N=544]

Research instrument	Responses			
	Frequency	Percent	Valid Percent	Cumulative Percent
Questionnaire	501	92.1	92.1	92.1
Interviews	23	4.2	4.2	96.3
Citation analysis	20	3.7	3.7	100.0
Total	544	100.0	100.0	

5.2.2.2 Distribution of respondents by category

The overall results in Table 5.2 below indicate that most of the respondents were students, with an 89.2% representation, while librarians were the least represented (1.1%). Of the 485 student respondents, 475 were questionnaire participants, while ten participated in the interviews and none were included in the citation analysis. This is because the citation analysis only involved researchers who had published in 2018. Table 5.2 below shows the detail.

Table 5.2: Respondent categories [N=544]

Respondent category * Research instrument cross-tabulation					
		Research instrument			Total
		Questionnaire (Percent)	Interview guide	Citation analysis	
Respondent category	Student	475 (87.3%)	10 (1.9%)	0 (0%)	485 (89.2%)
	Researcher	23 (4.2%)	10 (1.8%)	20 (3.7%)	53 (9.7%)
	Librarian	3 (0.55%)	3 (0.55%)	0 (0%)	6 (1.1%)
Total		501 (92.1%)	23 (4.2%)	20 (3.7%)	544 (100%)

5.2.2.3 Distribution of respondents by gender

The distribution of respondents by gender recorded 543 total respondents instead of 544 respondents, as one questionnaire respondent did not answer this question. The missing response was recoded to missing value and was not considered in the analysis. The results show 58.2% male respondents compared to 41.8% female respondents. Of the 316 male respondents, 289 were questionnaire participants, 13 were interviewees and 14 were included in the citation analysis. The trend of having more male than female participants is noted across all the three research instruments, although it is higher for the citation analysis, as illustrated in Table 5.3 below.

Table 5.3: Distribution of respondents by gender [N=543]

Sex of respondent * Research instrument cross-tabulation					
		Research instrument			Total
		Questionnaire	Interview guide	Citation analysis	
Gender of Respondent	Female	211 (38.9%)	10 (1.8%)	6 (1.1%)	227(41.8%)
	Male	289 (53.2%)	13(2.4%)	14 (2.6%)	316 (58.2%)
Total		500 (92.1%)	23 (4.2%)	20 (3.7%)	543 (100%)

Further analysis was conducted to determine the relationship between the gender of the respondents and their category by cross-tabulating the two variables. The results show that, out of the 484 students, 208 were female and 276 male. Among the students and researcher participants, the majority were male, while there were more female librarians. It is also noteworthy that the total figure for students in Table 5.4 indicates 484 instead of 485, as recorded in Table 5.2, due to one respondent who did not answer. Table 5.4 below shows the distribution of respondents by gender with regard to respondent category.

Table 5.4: Cross-tabulation of respondent categories and gender [N=543]

		Gender of respondents		Total
		Female	Male	
Respondent category	Student	208 (38.3%)	276 (50.8%)	484 (89.1%)
	Researcher	15 (2.8%)	38 (7.0%)	53 (9.8%)
	Librarian	4 (0.7%)	2 (0.4%)	6 (1.1%)
Total		227 (41.8%)	316 (58.2%)	543 (100%)

5.2.2.4 Age of respondents

The ages of the respondents ranged as follows: 396 were aged 25 years and below, 61 were in the range of 26-35 years, 46 ranged from 36-45 years, 27 ranged from 46-55 years, while 14 were in age range 56 years and above. The results are presented in Table 5.5 below.

Table 5.5: The age group of respondents [N=544]

Age group of respondents * Research instrument cross-tabulation					
		Research instrument			Total
		Questionnaire	Interview guide	Citation analysis	
Age group of respondents	25 years and below	393 (72.2%)	3 (0.6%)	0(0%)	396 (72.8%)
	26-35 years	57 (10.5%)	4 (0.7%)	0 (0%)	61 (11.2%)
	36-45 years	27 (5.0%)	11 (2.0%)	8 (1.5%)	46 (8.5%)
	46-55 years	21 (3.9%)	3 (0.5%)	3 (0.5%)	27 (4.9%)
	56 years	3 (0.5%)	2 (0.4%)	9 (1.7%)	14 (2.6%)

	and above				
Total		501(92.1%)	23 (4.2%)	20 (3.7%)	544 (100%)

The results in Table 5.5 above suggest that the majority of the respondents captured by all the three research instruments fell within the age range of 25 years and below, representing 72.8%. This age range is followed by 26-35 years (11.2%), while the 56 years and above were the least represented with 2.6%. The number of respondents declined as the age progressed.

5.2.2.5 Respondents' level of education or year of study

Upon assessing the respondents' level of education, the results revealed that the sample for the three instruments comprised five undergraduate degree holders, 30 with Master's degree, and 30 PhD holders, while the rest (457) were still pursuing their first or a postgraduate degree. Meanwhile, 22 respondents did not answer this question and were not included in the analysis; hence, 522 valid responses were recorded in Table 5.6.

Of the 457 respondents who were in school, the majority were in second year (154), followed by those in fourth year (107) and then third year (101) and only one respondent in the sixth year of study. The distribution of respondents by level of education and/or year of study is shown in Table 5.6 below.

Table 5.6: The respondent's level of education/year of study [N=522]

Level of education/year of study * Research instrument cross-tabulation					
		Research instrument			Total
		Questionnaire	Interview guide	Citation analysis	
Level of education or year of study	Undergraduate degree	4 (0.8%)	1 (0.2%)	0 (0%)	5 (1.0%)
	Masters Degree	19 (3.6%)	6 (1.2%)	5(1.0%)	30 (5.7%)
	Doctorate Degree	9 (1.7%)	6 (1.2%)	15 (2.8%)	30 (5.7%)
	1st year	67 (12.8%)	2 (0.4%)	0 (0%)	69 (13.2%)

	2nd Year	148 (28.3%)	6 (1.2%)	0 (0%)	154 (29.5%)
	3rd Year	99 (19.0%)	2 (0.4%)	0 (0%)	101(19.4%)
	4th Year	107 (20.5%)	0 (0%)	0 (0%)	107 (20.5%)
	5th Year	15 (2.9%)	0 (0%)	0 (0%)	15 (2.9%)
	6th year	1 (0.2%)	0 (0%)	0 (0%)	1 (0.2%)
	7th year	10 (1.9%)	0 (0%)	0 (0%)	10 (1.9%)
Total		479 (91.8%)	23 (4.4%)	20 (3.8%)	522 (100%)

5.2.2.6 The distribution of respondents by academic rank/degree being pursued

Out of the 485 total students shown in Table 5.2, 449 were pursuing an undergraduate degree, while 36 were enrolled for postgraduate studies. The details are presented in Table 5.7 below. The results also show that, of the 53 researchers recorded in Table 5.2, 33 were in academic ranking III-I (beginner-to-medium career), 14 were senior academics and six were professors. As far as the librarians are concerned, three were assistant librarians, while the other three were academic librarians. Table 5.7 below presents the detail of the analysis.

Table 5.7: The rank or degree pursued by respondents [N=544]

Rank or degree pursued * Research instrument cross-tabulation					
		Research instrument			Total
		Questionnaire	Interview guide	Citation analysis	
Rank or degree pursued	Undergraduate	445 (81.8%)	4(0.6%)	0 (0%)	449 (82.4%)
	Postgraduate	30 (5.5%)	6 (1.1%)	0 (0%)	36 (6.6%)
	Lecturer III-I	17 (3.1%)	8 (1.5%)	8 (1.5%)	33 (6.1%)
	Senior Lecturer	6 (1.1%)	2 (0.4%)	6 (1.1%)	14 (2.6%)
	Assistant Librarian	1(0.2%)	2 (0.4%)	0 (0%)	3 (0.6%)
	Academic Librarian	2 (0.4%)	1 (0.2%)	0 (0%)	3 (0.6%)
	Professor	0 (0%)	0 (0%)	6 (1.1%)	6 (1.1%)

Total	501 (92.1%)	23 (4.2%)	20 (3.7%)	544 (100%)
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5.2.2.7 The distribution of respondents by school

The distribution of respondents according to schools recorded 533 valid responses. Eleven questionnaire respondents did not answer and were not counted in the analysis. The results reveal that the School of Education had the highest number of respondents with a 30.4% representation, followed by the School of Humanities and Social Sciences with 30%, and then the School of Natural Sciences with 10.9%. The University's library and the School of Agricultural Sciences had the least participants with 1.2% and 1.3%, respectively. These figures are detailed in Table 5.8 below.

Table 5.8: The distribution of respondents according to School [N=533]

School * Research instrument cross-tabulation					
		Research instrument			Total
		Questionnaire	Interview guide	Citation analysis	
School	Agricultural Sciences	6 (1.1%)	1 (0.2%)	0 (0%)	7 (1.3%)
	Nursing	16 (3.0%)	0 (0%)	0 (0%)	16 (3.0%)
	Public Health	5 (0.9%)	0 (0%)	3(0.6%)	8 (1.5%)
	Health Sciences	19 (3.6%)	1 (0.2%)	0 (0%)	20 (3.8%)
	Human Medicine	27 (5.0%)	1 (0.2%)	1 (0.2%)	29 (5.4%)
	Education	152 (28.5%)	6 (1.1%)	4 (0.8%)	162 (30.4%)
	Engineering	29 (5.4%)	2 (0.4%)	2 (0.4%)	33 (6.2%)
	Law	12 (2.2%)	1 (0.2%)	0 (0%)	13 (2.4%)
	Humanities and Social Sciences	152 (28.5%)	4 (0.8%)	4 (0.7%)	160 (30.0%)
	Mines	8 (1.5%)	0 (0%)	0 (0%)	8 (1.5%)

	Natural Sciences	53 (9.9%)	3 (0.6%)	2 (0.4%)	58 (10.9%)
	Veterinary Medicine	8 (1.5%)	1 (0.2%)	4 (0.7%)	13 (2.4%)
	University library	3 (0.6%)	3 (0.6%)	0 (0%)	6 (1.2%)
Total		490 (91.9%)	23 (4.3%)	20 (3.8%)	533 (100%)

5.2.2.8 Content analysis general information

Table 5.9: General information for the databases [N=6]

Database name	Access type	Type of OA provided	Access Channel/provider
ScienceDirect	Subscription	Hybrid	Publisher
Ebscohost	Subscription	Hybrid	Publisher
Emerald	Subscription	Hybrid	Publisher
Oxford University	Open access	Gratis	EIFL
JSTOR	Open access	Libre	EIFL/Open access
Royal Society	Open access	Gratis	EIFL

Table 5.9 above indicates that despite being subscription-based, ScienceDirect, Ebscohost and Emerald service providers also offered hybrid open access, while the other three databases provided gratis and libre type of open access. Permission licenses were provided through EIFL.

5.3 User perception of the relevance of open access resources in academic engagement and profession

This section presents the findings on students' and researchers' perceptions of the relevance of open access resources in their academic and professional work. Therefore, the results are based on the students' and researchers' awareness and usage levels of open access resources, their general perception of open access content (in terms of quality) provided by UNZA's library and the extent to which open access content meets their information needs. All the identified research instruments

were used to assess this objective, albeit at different stages of the analysis.

The results of the assessment are presented in the following subsections.

5.3.1 Awareness of open access resources

The researcher assessed the awareness and usage levels of open access resources in the University to understand the current status of open access usage and users' attitude towards open access in academia. The questionnaire and interviews were used to assess this variable.

The results show 523 valid responses as one questionnaire respondent did not answer and was, hence, recoded to missing value. The results show that slightly more than half (52.6%) of the respondents from both the questionnaire and interviews were aware of open access resources in the University. Table 5.10 below shows the analysis.

Table 5.10: Awareness levels of open access resources in the University [N=523]

Respondent's awareness of OA resources * Research instrument cross-tabulation				
		Research instrument		Total
		Questionnaire	Interview guide	
Is respondent aware of OA resources?	Yes	259 (49.5%)	16 (3.1%)	275 (52.6%)
	No	241 (46.1%)	7 (1.3%)	248 (47.4%)
Total		500 (95.6%)	23 (4.4%)	523 (100%)

During the interviews, three researchers further explained that they were fully aware of the resources the library provided via its website because they interacted with librarians very often. Other responses from the interviews were as follows:

- i. I access e-resources via UNZA website, where I find a number of databases (Interviews, R6).
- ii. I am personally doing well. I have contacted the library to show us online resources on several occasions (Interviews, R4).

- iii. I have been using HINARI, PubMed since 2008 as a student. The more I get to use them, the better I become in terms of information retrieval skills. For instance, if I fail to access articles I need from PubMed, I go through e-resources link to get them and these are good journals (Interviews, R1).
- iv. Not aware, I use Google instead (Interviews, R8).

5.3.2 Usage of open access resources

The questionnaire, interview, content analysis and citation analysis tools were used to assess the usage of open access resources. The questionnaire and interview results show that less than half (46%) of the respondents indicated that they used online resources, including open access content, while more than half (54%) did not use them. This question recorded 511 valid responses out of 524 (total number of questionnaire and interview respondents) as 13 questionnaire respondents did not respond and were recoded to missing value and were subsequently not included in the final analysis. Figure 5.1 below shows the questionnaire results of the usage levels of open access resources in the University.

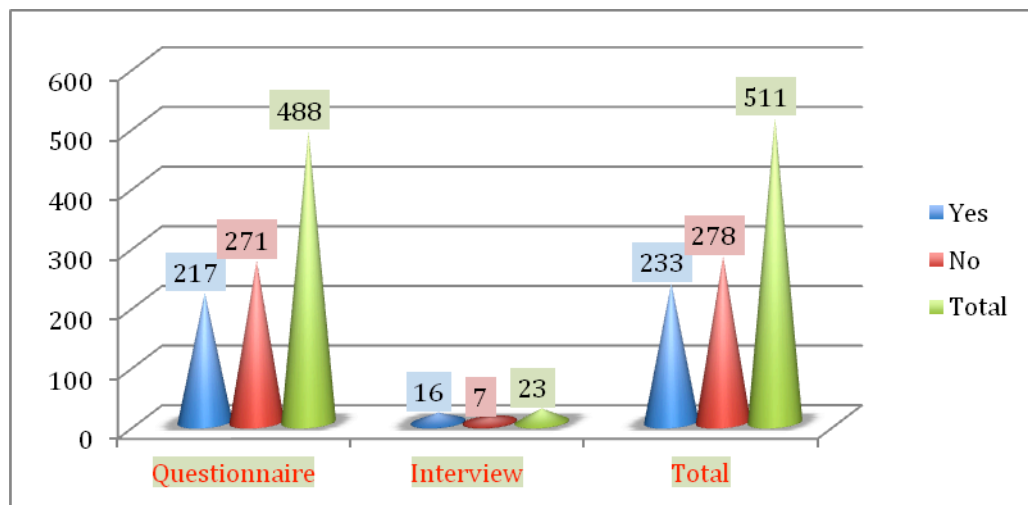


Figure 5.1: Open access usage (N=511)

Based on these results, we can deduce that using online resources is still a challenge at UNZA.

Meanwhile, the 2018 usage statistics, as revealed by the content analysis, show ScienceDirect with the highest usage, followed by JSTOR, while Royal Society was used the least (see Figure 5.2). The fact that JSTOR, an open access database, recorded a higher usage than some subscription-based databases such as Emerald and EBSCOhost may indicate the relevance of open access content to students and researchers. Users can use any resource, whether open access or subscription-based, as

long as they find it useful.

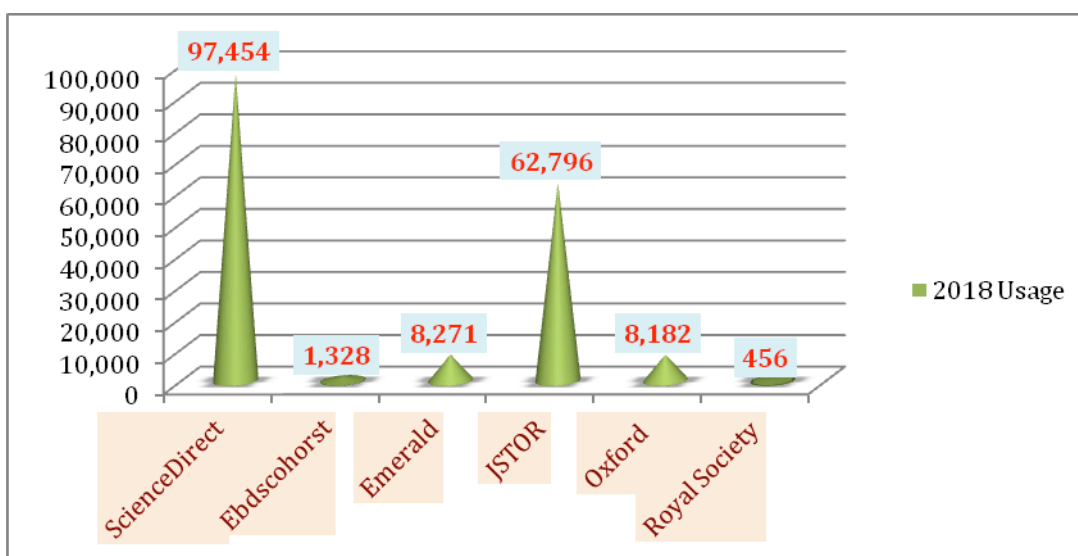


Figure 5.2: 2018 usage statistics of the six databases

Further analysis was done to ascertain the usage of open access resources by researchers in their research by analysing the references or citations in their publications. The results from the citation analysis reveal a generally high usage of openly accessible resources. More than fifty percent of the total online references of each publication analysed were openly accessible. Furthermore, the observation results reveal that some of these resources were not fully open access but had been made openly available by the authors through other academic social networks or platforms such as Academia.edu, LinkedIn, PubMed, Biomed Central, Research Gate and Google Scholar (probably with the permission of the publishers). This means that these resources could still be accessed outside the publishers’ channels.

The results of the citation analysis showing the usage level of “openly accessed resources” in the 20 publications are presented in Table 5.11 below.

Table 5.11: Open access citation

Article no.	OA citation range for each article	Number of OA resources cited	Total references
1.	11 to 20	11	14
2.	11 to 20	14	25

3.	31 and above	31	51
4.	31 and above	55	68
5.	31 and above	33	53
6.	11 to 20	19	23
7.	Below 5	1	1
8.	31 and above	45	47
9.	21-30	21	28
10.	21-30	29	34
11.	11 to 20	14	15
12.	21-30	24	31
13.	31 and above	48	54
14.	21-30	29	35
15.	11 to 20	19	27
16.	11 to 20	17	25
17.	11 to 20	14	29
18.	21-30	24	37
19.	21-30	25	30
20.	31 and above	35	39

Further, the Citation analysis shows that although the researchers used both print and online resources in their scholarly output, print resources were used slightly more than the online resources, as seen in Table 5.12 below.

Table 5.12: Information sources for researchers in publishing (N=20)

Citations	Number of print resources cited by each article	Number of online resources cited
Below 5	3	5
6-10	1	2
11-20	5	2
21-30	2	2
31 and above	2	1
Not clearly indicated	7	8
Total	20	20

These findings are affirmed by the observations that shows that the main sources of information that students and researchers use in their daily academic work include lecture notes and recommended readings mostly in printed form. Meanwhile, some lecturers encouraged their students to replicate lecture notes and discouraged them from using additional resources. It was also revealed that older lecturers mostly used print information resources, while younger academics are interested in exploring online resources. These younger academics were the most active users of e-resources.

5.3.3 Does awareness (current awareness services) facilitate usage?

The questionnaire data were used to determine whether current awareness services (represented by awareness variable) facilitate usage. Firstly, the researcher cross-tabulated awareness and use of open access resources variables to determine whether awareness or current awareness services resulted in the use of open access resources. The results of the cross-tabulation are recorded in Tables 5.13 below.

Table 5.13: Cross-tabulation of the awareness and use of open access resources (N=488)

		Does respondent use OA resources?		Total
		Yes	No	
Is respondent aware of OA resources?	Yes	178 (36.5%)	74 (15.1%)	252 (51.6%)
	No	39 (8.0%)	197 (40.4%)	236 (48.4%)
Total		217 (44.5%)	271 (55.5%)	488 (100%)

The results of the cross-tabulation in Table 5.13 show that, of the initial 259 questionnaire respondents who indicated that they were aware of the availability of open access resources (as indicated in Table 5.10), only 178 used open access resources. Meanwhile, seven respondents did not respond and did not count in the analysis. This explains why Table 5.13 records a total of 252 respondents on awareness, instead of 259. The recoding of the "no responses" also helped to validate the Pearson Chi-square test by ensuring that there are no cells with an expected count of less than 5.

Secondly, the researcher carried out a statistical analysis using the Pearson Chi-square test to prove a relationship between current awareness services (represented by the variable awareness) and use of open access resources. In this analysis, two hypotheses were formulated as follows:

1. H_0 = There is no relationship between current awareness services (awareness) and use of open access resources
2. H_2 = There is a relationship between current awareness (awareness) and use of open access resources

A plan of analysis was formulated with 0.05 as a significance level (P-value). With this analysis, if the test statistic probability is less than the formulated significance level (0.05), the null hypothesis would be rejected. However, if the P-value is greater than 0.05, then the null hypothesis would be accepted or we simply fail to reject the null hypothesis, in which case the alternative hypothesis would be accepted.

The results of the Chi-square test are presented in Table 5.14 below.

Table 5.14: Pearson Chi-square test results (N=488)

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	144.494 ^a	1	0.000		
Continuity Correction	142.311	1	0.000		
Likelihood Ratio	153.820	1	0.000		
Fisher's Exact Test				0.000	0.000
Linear-by-Linear Association	144.198	1	0.000		
Number of Valid Cases	488				
a. 0 cells (0.0%) have an expected count less than 5. The minimum expected count is 104.94.					
b. Computed only for a 2x2 table					

The results in Table 5.14 show that $\chi^2 = 144.494$, $DF = 1$, p -value = 0.000. With the p -value (0.00) less than the formulated significance level of 0.05, it signifies that the null hypothesis is rejected while the alternative hypothesis is accepted. The interpretation is that there is a relationship between current awareness services (awareness) and the use of open access resources.

The introduction or increased use of alerting services among UNZA's students and researchers is likely to positively impact on the uptake levels of open access resources at the University of Zambia.

5.3.4 Students' and researchers' perceptions of open access content

To assess user perception, the researcher used the questionnaire and interview data. In the questionnaire, the respondents were asked to rate four statements on the quality of open access content based on experience using the Likert five-point scale of 1=Strongly agree, 2=Agree, 3=Not sure, 4=Disagree, 5=Strongly disagree. The results are presented in Table 5.15 below.

Table 5.15: User perception of open access resources

	1	2	3	4	5	Total valid responses
OA is original and presents high quality research content	89 (18.3%)	208 (42.7%)	169 (34.7%)	16 (3.3%)	5 (1.0%)	487 (100%)

UNZA's library provides high quality scholarly open access resources	44 (9.0%)	175 (35.9%)	179 (36.8%)	80 (16.4%)	9 (1.9%)	487 (100%)
Open access resources are easily accessible due to less access restrictions	59 (12.2%)	143 (29.5%)	178 (36.8%)	89 (18.4%)	15 (3.1%)	484 (100%)
I find open access resources relevant in my academic and professional work	101 (20.8%)	211 (43.5%)	119 (24.5%)	45 (9.3%)	9 (1.9%)	485 (100%)

The results indicated in Table 5.15 highlight that all the four statements recorded less than 501 valid responses due to non-responses. The results also show many respondents who were "not sure" what to answer, probably due to a lack of knowledge of the subject under study.

Regarding the originality and quality of open access content, more than half (61%) of the respondents felt that open access resources are original and present high-quality research content. Additionally, more than half (64.3%) of the respondents indicated that open access resources were relevant to their academic and professional work. However, less than half (44.9% and 41.7%, respectively) of the respondents agreed that the University's library provides high-quality scholarly open access resources and that open access is easily accessible due to fewer access restrictions

Regarding the interviews, the 16 interviewees that had earlier indicated that they use open access resources further revealed that they found these resources to be very useful, relevant in their academic work and of good quality. Most of the researchers indicated that they had introduced their students (both at undergraduate and postgraduate level) to online resources, including open access content, because of their value. Below are some extracted statements from the interviews:

I have told my students a number of times about online resources and I arrange for their training with the library staff every year I have a new class. (Interviews, R2).

I refer my students to articles. I find them to be very relevant and provide peer reviewed literature on what I teach and research. They are good for postgraduates doing research too. (Interviews, R2).

I found HINARI, AGORA useful and of quality resources when I was using them, but due to access problems at some point, I learnt to get what I want through friends abroad with access to those articles I need. (Interviews, R4).

I have also taught colleagues who come to my office library about online resources. (Interviews, R2).

The motivation to use online resources started during my PhD studies since I was studying at a purely distance learning university. I cannot imagine how I would have pulled through without online resources. (Interviews, R2).

My literature review for my PhD is made of e-resources, up-to-date as can be evidenced from the list of references I used. (Interviews, R1).

Among the databases users had accessed were JSTOR, ScienceDirect OA resources, Oxford, Cambridge, HINARI, OARE and AGORA. The two librarians who were interviewed suggested the need for librarians to correct the notion that open access content is of lower quality due to a lack of peer reviews and predatory issues. They emphasised that users and scholars needed to be encouraged and made to understand that open access publications are of equal quality to subscription-based resources. This sentiment was affirmed in observations that revealed that users who attended training and had experience with online resources held a positive attitude. They appreciated the quality of these resources and recommended them to their students. These users would call the librarians whenever they experienced access challenges, an indication of their reliance on online resources. This also shows the value they placed on the use of e-resources in their day-to-day activities. Interestingly, some of the students who attended training introduced their friends and lecturers to online resources. One student said this:

I use them all the time. We are required to use latest information in our assignments and I have introduced my course mates and my professor/lecturer to e-resources. (Interviews, R5)

Content analysis results further show that all the six databases studied provided literature relevant to the University’s subject-mix as follows:

Table 5.16: The relevance of databases made available to UNZA users (N=6)

Database Name	Relevance	Subject mix provided
ScienceDirect	Yes	Physical sciences and engineering, life sciences, health sciences, social sciences and humanities

Ebscohost	Yes	Arts, humanities, sciences, education, law medicine, mines, agriculture, veterinary
Emerald	Yes	Accounting & finance, economics, humanities and social sciences, education, engineering, health, human resources, library science, marketing, tourism & transport, research methods
Oxford Online	Yes	Humanities and social sciences, law, education, engineering, health, leadership management, sciences, environmental sciences and transport
JSTOR	Yes	Humanities and social sciences, law, education, sciences, engineering, agriculture, medicine, area studies, arts, business & economics, history, medicine & allied health, science & mathematics
Royal Society	Yes	HSS, environment, engineering, medicine

Using the questionnaire data, the researcher further assessed the relationship between the relevance of open access resources and their use to establish if perception influenced use. Table 5.17 presents the findings.

Table 5.17: The cross-tabulation of open access use and if one found them relevant in their academic and professional work (N=475)

		Are OA resources relevant to my academic and professional work					Total
		Strongly agree	Agree	Not sure	Disagree	Strongly disagree	
Does respondent use OA resources	Yes	59 (12.4%)	121 (25.5%)	23 (4.8%)	9 (1.9%)	2 (0.4%)	214 (45%)
	No	41 (8.6%)	88 (18.5%)	91 (19.2%)	34 (7.2%)	7 (1.5%)	261 (55%)
Total		100 (21.1%)	209 (44.0%)	114 (24.0%)	43 (9.0%)	9 (1.9%)	475 (100%)

The results in Table 5.17 show that, of the 475 questionnaire respondents that answered the question

on how relevant they found open access resources, less than half (45%) said that they used open access content. Of these 214, the majority (84%) found open access resources relevant in their academic and professional work. This confirms the results of the content analysis in Table 5.16 that the databases provide relevant literature to satisfy the students' and researchers' sundry information needs.

The variable “relevance of open access in academic and professional work” was further cross-tabulated with the gender of questionnaire respondents to assess any relationship (see Table 5.18).

Table 5.18: Cross-tabulation of the relevance of open access in academic and professional work and gender of respondent (N=484)

		OA resources are relevant to my academic and professional work					Total
		Strongly agree	Agree	Not sure	Disagree	Strongly disagree	
Gender of respondent	Female	43 (9.0%)	97 (20.0%)	50 (10.3%)	14 (2.9%)	2 (0.4%)	206 (42.6%)
	Male	58 (11.9%)	113 (23.3%)	69 (14.2%)	31(6.4%)	7 (1.6%)	278 (57.4%)
Total		101 (20.8%)	210 (43.4%)	119(24.6%)	45 (9.3%)	9 (1.9%)	484(100%)

Table 5.18 shows that of the 311 (101+210) questionnaire respondents that said they found open access resources relevant in their academic and professional work, 140 (43+97) were female while 171 (58+113) were male. One did not answer and was left out in the analysis.

5.4 Perceived benefits of open access resources to higher learning institutions like the University of Zambia

5.4.1. Perceived benefits of using open access resources

This objective was assessed using four data collection tools: the questionnaire, the interview, citation analysis and researcher observation. As far as the questionnaire is concerned, respondents were asked to rate each statement on the perceived benefits of open access resources using the Likert five-point scale of 1=Strongly agree, 2=Agree, 3=Not sure, 4=Disagree, 5=Strongly disagree. The statements were:

1. Open access resources offer university students and researchers in developing countries equal opportunity to access global research content more easily. The statement was abbreviated as

"Equal opp" in Figure 5.3.

2. Open access resources help supplement the budget decline for resource subscriptions, abbreviated as "Supp bdt" in Figure 5.3.
3. Open access resources widen the range of scholarly content made available to users in the academic environment, abbreviated as "Wide range" in Figure 5.3.
4. Others

"Others" was included to allow respondents to share their views and experiences on the perceived benefits of open access resources, other than what was provided. The details of the results are presented in Figure 5.3 below.

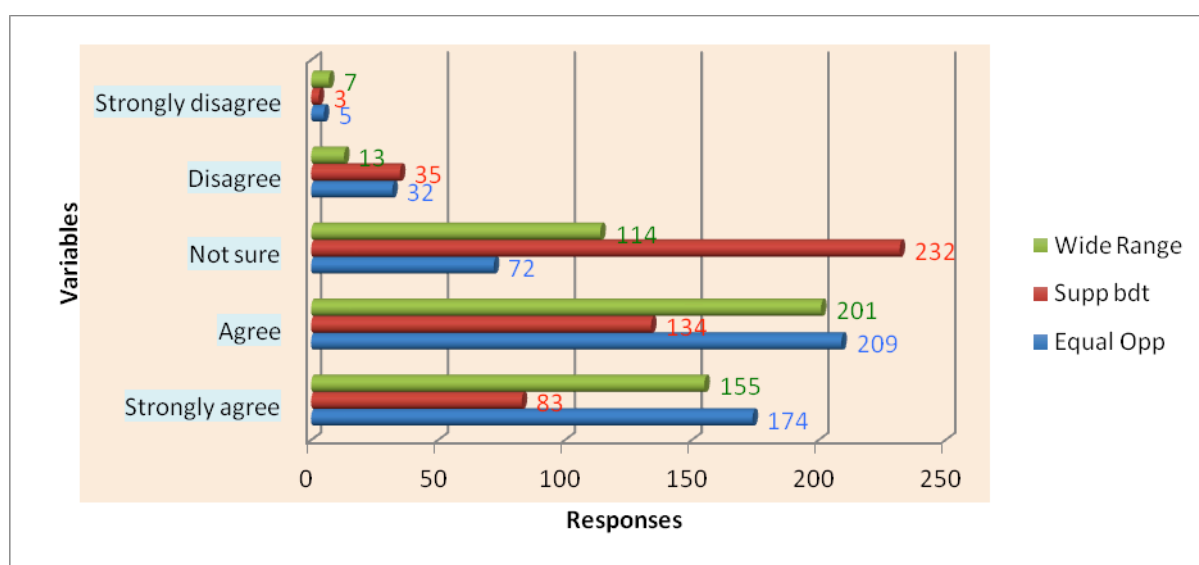


Figure 5.3: Assumed benefits of using open access resources [N=492, 490 & 487]

The results in Figure 5.3 indicate a high rating on the perceived benefits of open access by the respondents. The majority (383 out of 492 valid responses) of the respondents revealed that open access provides university students and researchers in developing countries an equal opportunity to access global research content. Most respondents (356 out of 490 valid responses) also agreed that open access content widens the range of scholarly content made available to users. Almost half (232 out of 487 valid responses) of the respondents were, however, not sure whether open access helps supplement the budget decline for resource subscriptions or not.

5.4.2 Other benefits of open access application

For the convenience of presenting the results, the qualitative data collected through the questionnaire's open-ended questions, the interviews, citation analysis and researcher observation

were combined and presented in this section.

The findings reveal that open access content provides quicker, easier and more effective access to a wide range of current and reliable academic and research information. This is believed to lessen pressure on the scholars, be time-saving and lead to better academic and research output. Current online resources also complement the old print collection in the physical library.

Open access content is free, open to all, giving researchers in universities in developing countries access to content they would not have otherwise had. Besides being accessible concurrently, platforms like JSTOR, Oxford online products and ScienceDirect were cited to be user-friendly on searching and providing different referencing styles.

The respondents further explained that open access content increases the students' knowledge and understanding of academic issues by making available comprehensive scholarly research from credible publishers, thereby improving learning and making it more interesting. As such, scholars are able to produce work of high quality that can compete at an international level and is publishable in highly rated journals. In explaining the benefits of using open access resources in academia, one student said: “I am able to explore new discoveries and write good assignments with the availability of open access.” (Interviews, R5)

The respondents also suggested that open access content leads to improved research visibility and increased citations; hence, it is valuable to scholars. Open access also provides users ideas of what research they can do and allows them to compare what others have done in their areas of interest. These perceived benefits could lead to more research and publishing at an individual level and improved visibility and reputation of the affiliated university at an institutional level.

Lastly, the citation analysis results revealed that open access allows the researchers to publish in reputable journals, which they would have been unable to access under a pay wall. These include Elsevier, Plos, BioMed Central (BMC), Taylor & Francis, Oxford University Press, Horizon, and others. See Figure 5.4 for more detail.

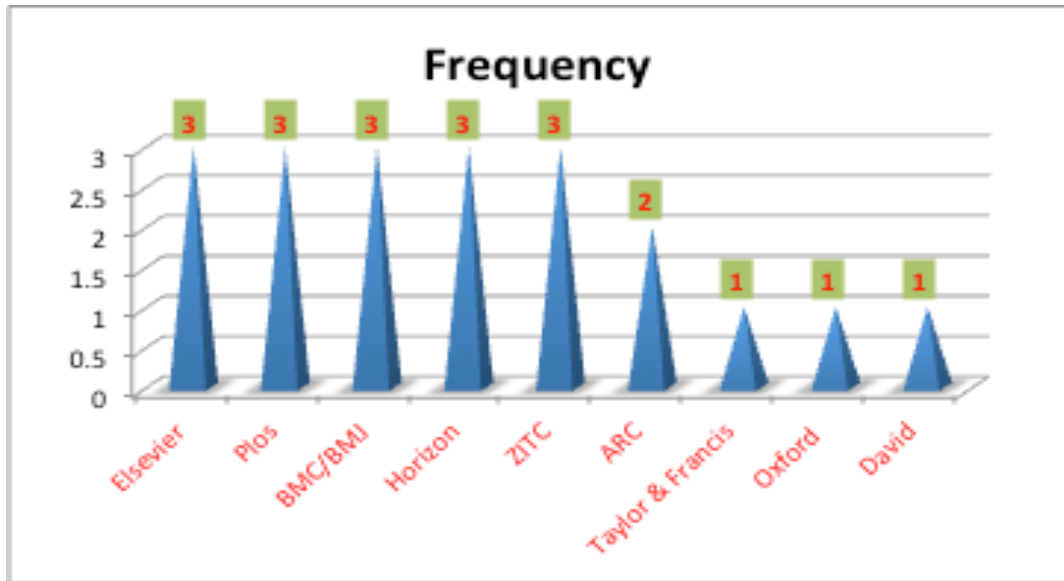


Figure 5.4: Publishers of the 20 publications for the citation analysis (N=20)

5.5 Challenges students and researchers face in accessing open access resources

This section presents the results of the research questions on the extent to which individual or general, institutional and social factors influence the use of open access in the University. To assess these challenges, the researcher used the data from the questionnaire, interviews, researcher observation and content analysis.

5.5.1 Individual/general challenges

In the questionnaire, the respondents were requested to relate their experience to the five challenges on the list. The results are presented in Table 5.19 below.

Table 5.19: Individual/general challenges associated with open access use

Challenge	Yes	No	Total valid responses
Marketing of open access resources at the University is adequate	110 (34.2%)	212 (65.8%)	322 (100%)
I have the necessary Internet search skills to access and use open access resources	351 (72.8%)	131 (27.2%)	482 (100%)
I find it easy to access open access resources online	284 (59.3%)	195 (40.7%)	479 (100%)
I know how to evaluate online resources, including	183 (38.9%)	287 (61.1%)	470 (100%)

open access resources for quality			
There is need to train researchers and students on how to access and use open access resources	422 (87.9%)	58 (12.1%)	480 (100%)

The majority (72.8%) of questionnaire respondents indicated that they had the necessary search skills to access and use open access resources, supporting the subsequent finding that 59.3% found it relatively easy to access open access resources. On the contrary, the interview results revealed that most users lacked search skills to access and download the online information resources they needed. The use of complicated Boolean operators was cited as one of the challenges experienced, particularly by older researchers (digital immigrants). The content analysis also revealed that some databases like Royal Society were not user-friendly, complicating searching and information retrieval. Correspondingly, 61% of the questionnaire respondents indicated that researchers did not know how to evaluate online resources, including open access resources for academic quality. This further explains why more than two-thirds of the questionnaire respondents felt it was necessary to train the students and researchers how to access the open access resources.

The results shown in Table 5.19 further suggest that most (65.8%) of the questionnaire respondents felt that the marketing of open access resources in the University was inadequate. The lack of marketing was also mentioned in the interviews and became apparent during the observations as one of the major challenges users faced in accessing open access resources.

5.5.1.1 Do search skills lead to ease of use of open access?

Additionally, the researcher used the questionnaire data to establish whether or not there was a relationship between user search skills and ease of use of online resources. The two variables were cross-tabulated. The proof of a relationship was sought to help understand and prove whether students' and researchers' purported information search skills were good enough to help them access online resources without much difficulty. Table 5.20 provides the detail.

Table 5.20: User search skills and ease of use cross-tabulation (N=473)

		I have information search skills		Total
		Yes	No	
I find it easy to access open access resources	Yes	245 (51.8%)	35 (7.4%)	280 (59.2%)
	No	100 (21.1%)	93 (19.7%)	193 (40.8%)

Total	345 (72.9%)	128 (27.1%)	473 (100%)
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The total valid responses for this question were 473, while 28 were recoded to missing value and did not count in the analysis. The cross-tabulation results in Table 5.20 reveal that, out of the initial 351 respondents that had indicated that they possess search skills to access online resources (as shown in Table 5.19), a lower number of 245 said that they found it easy to access and use these resources. This indicates that having search skills does not necessarily equate to having access. Despite the claim by the majority of the respondents that they possessed the necessary search skills, some could still be experiencing access challenges.

5.5.2 Challenges at the institutional level

The questionnaire assessed the six challenges at the institutional level. The responses are recorded in Table 5.21 below.

Table 5.21: Challenges with open access use at institutional level

Institutional challenges	Yes	No	Total valid responses
The use of open access at the University is voluntary	272 (88.0%)	37 (12.0%)	309 (100%)
Use of open access at the University should be mandatory	228 (61.0%)	146 (39.0%)	374 (100%)
Librarians are helpful in accessing open access resources	233 (49.1%)	242 (50.9%)	475 (100%)
Guidance is available to effectively use open access resources	187 (39.5%)	287 (60.5%)	474 (100%)
Institutional infrastructure for accessing online resources at the University is good	179 (37.8%)	294 (62.2%)	473 (100%)
The University recognises the use of open access resources for career development (promotion criteria)	294 (61.8%)	182 (38.2%)	476 (100%)

As indicated in Table 5.21, the results reveal that despite the University's recognition of the use of open access resources for career development (promotion criteria) among its academics, the use of open access remains voluntary. When asked if users supported making open access use in the

University mandatory, most respondents (61%) supported the idea, while 39% did not. The results also show that most (62.2%) of the respondents felt that the University's institutional infrastructure for accessing online resources was not adequate. Equally, most respondents (60.5% and 50.9%, respectively) felt that the guidance given to the users and the help from librarians on how to access online resources were not adequate.

5.5.3 Social challenges

To identify the influence of certain social factors on open access usage, the researcher assessed several variables using the questionnaire, interviews and observations. The results from the questionnaire are presented in Table 5.22 below.

Table 5.22: Social challenges associated with open access use

Social challenges	Yes	No	Total valid responses
Lecturers encourage students to use open access resources	306 (80.1%)	76 (19.9%)	382 (100%)
Researchers and students encourage (motivate) each other to use open access resources	172 (36.1%)	305 (63.9%)	477 (100%)
Lecturers are motivated by students to use open access resources	266 (56.0%)	209 (44.0%)	475 (100%)

The results in Table 5.22 indicate that a high number (80.1%) of the respondents believed that lecturers encourage students to use open access resources, while more than half (56%) also revealed that lecturers were motivated by students who used open access resources in their academic work. However, only a small number of researchers are motivated by their fellow researchers, while very few students are motivated by their fellow students to use open access resources.

The results of the interviews and observation further suggest that students could easily emulate their lecturers in using open access resources because students view their lecturers as role models.

5.5.4 Other challenges

The researcher further sought to get other views from the questionnaire respondents, independent of the suggested challenges on the list. These responses are combined with those from the interviews and the observation and discussed below.

The results revealed slow or poor Internet connectivity, which affected the speed of article downloads and search results. Another challenge that the respondents mentioned was the lack of or low awareness of open access resources. One student indicated that "the acceptance letters to first year students did not mention the availability of open access resources in the University. This could further explain why most of the respondents in Subsection 5.5.1 felt that the University's marketing of open access resources was inadequate. The lack of awareness was associated with low publicity, lack of sensitisation and poor communication from the library to schools on the available information resources.

The results further indicated the following challenges as revealed by the content analysis and the interviews:

- i. A generally poor library physical infrastructure.
- ii. A negative attitude towards or a lack of knowledge of the importance of open access resources.
- iii. The incorrect notion that the library offers outdated resources.
- iv. Some users are slow to embrace change, while most students are stuck with print textbooks, grey literature and Google.
- v. Some lecturers did not encourage students to use open access resources, while some recommended old books to students to use.
- vi. Researchers lack the motivation to write and publish other than for promotions.
- vii. Most articles in specific open access databases like JSTOR are old, despite being quality resources.
- viii. Inadequate or limited Internet facilities (Internet access points, limited and weak hotspots and a lack of computers) to cater for the entire student population
- ix. Poor funding to support subscriptions to scholarly open access content
- x. Lack of adequate time to access the Internet due to busy schedules
- xi. Username/password restrictions and IP-based access restrictions on some databases which discouraged the usage of open access resources
- xii. Lack of simple user guidelines on downloading articles from different sources and inadequate support staff in the library to offer help to all users.

5.6 The existing current awareness services at UNZA

The fourth objective focused on identifying the existing current awareness services at UNZA. To achieve this objective the researcher focused on two aspects: firstly, the awareness services used by

the library to provide updates to users, and secondly, the awareness services used by students and researchers to get updates on available information resources from any academic network/platform or database. For this purpose, the questionnaire, the interview, observation and content analysis data were used to provide information on related questions.

5.6.1 Experiences with current awareness services at UNZA

Table 5.23 and Figure 5.5 below show the results from the questionnaire.

Table 5.23: User experiences with current awareness services

	Yes	No	Total
Journal alerts	40 (8.1%)	456 (91.9%)	496 (100%)
Lib website	147 (29.5%)	352 (70.5%)	499 (100%)
Email/RSS	48 (9.7%)	448 (90.3%)	496 (100%)
SDI	83 (16.7%)	413 (83.3%)	496 (100%)
Mobile phones	55 (11.0%)	443 (89.0%)	498 (100%)
Social media	126 (25.3%)	373 (74.7%)	499 (100%)
TOCs	80 (16.2%)	414 (83.8%)	494 (100%)
Vendor/pub alerts	86 (17.3%)	410 (82.7%)	496 (100%)
Others	23 (4.6%)	474 (95.4%)	497 (100%)

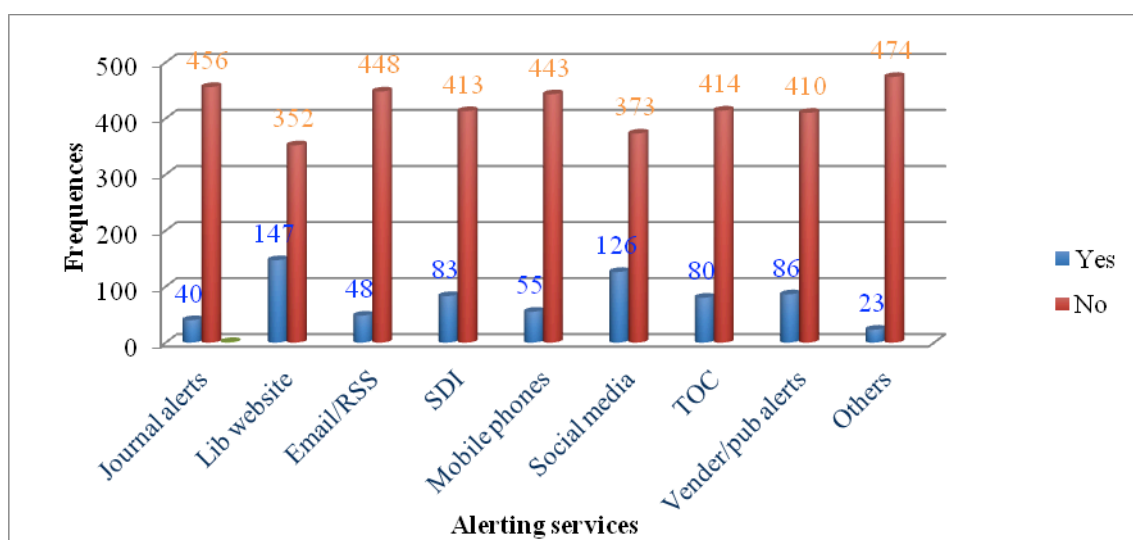


Figure 5.5: Existing current awareness services at UNZA

As observed from the questionnaire data results shown in Table 5.23 and Figure 5.5, a generally

small number of respondents had an experience with current awareness services. The library website was the most known by the respondents recording 29.5% of the valid total responses. The least known among the respondents was journal alerts, representing 8.1% of the valid total responses. It should be noted that each item had a different valid total response based on the number of respondents that answered that particular question.

Meanwhile, the questionnaire and interviews identified other alerting services that were not on the list. These include Facebook, the library's Online Public Access Catalogue (OPAC), posters and notices on notice boards and the library entrance, students' WhatsApp study groups, and direct interaction with librarians and fellow students. One librarian interviewed indicated that they verbally sensitised users on current publications when they visit the library, during library orientation, and at any other educational tours conducted.

The interviews and observation also revealed that the library sends fliers to sensitise users on the use of e-resources and lists of selected journal articles to respective schools. They also indicated the availability of email alerts, social media platforms (Academia.edu, Research Gate and LinkedIn), Google Scholar alerts and the University website.

5.6.2 Other experiences with current awareness services

The researcher sought to understand any other updates students and researchers were unknowingly exposed to. The researcher asked the questionnaire respondents who had earlier indicated that they were aware of the available open access at the University, how they became aware of these sources. Their responses are recorded in Figure 5.6 below.

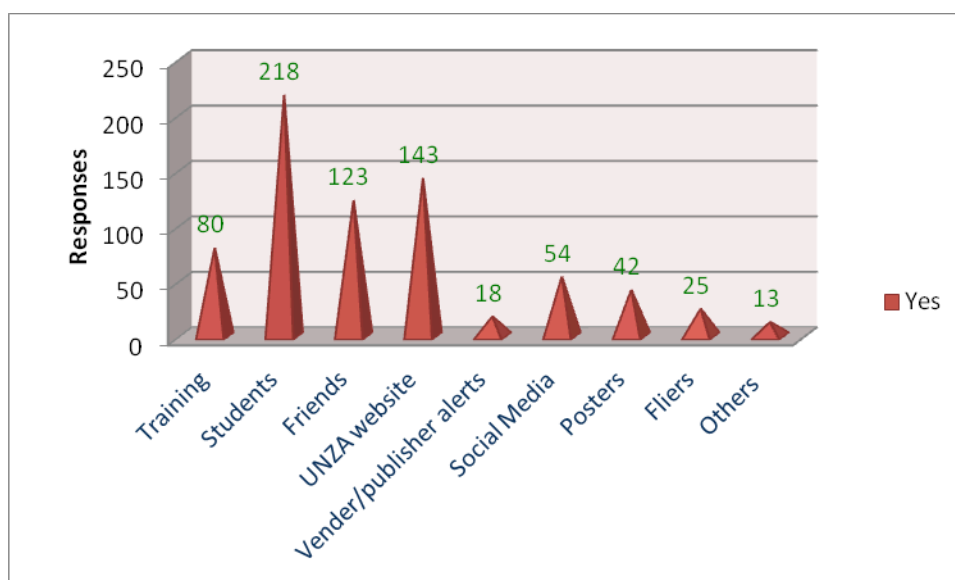


Figure 5.6: How respondents became aware of open access availability

The results show that most respondents learnt about open access resources through their fellow students, followed by the UNZA website. The results also indicate their interaction with commonly known current awareness services such as social media (Facebook, Twitter, LinkedIn, YouTube, *et cetera*), posters/fliers and vendor/publisher alerts.

The interviews, observation and content analysis suggest that most users of online resources had experiences with certain current awareness services such as vendor/publisher alerts, Google alerts, email alerts, publisher catalogues, newsletters, academic research cites (LinkedIn, Academia.edu, Mendeley, ResearchGate), Social media (Facebook, WhatsApp research/discussion groups, professional groups) and personal visits to the databases and the library. However, these users were not aware of this experience. The findings from the content analysis also clearly showed that all the seven databases assessed offered various alerting services such as live chats, vendor/publisher alerts in the form of email alerts and RSS. The databases also use social medial tools like Facebook, Twitter, Instagram, YouTube and LinkedIn. Table 5.24 shows the alerts available under each database analysed in the content analysis.

Table 5.24: Alerts offered by the six databases

	TOC	Email alerts	Social media (Facebook, Twitter, YouTube, blog, Instagram, etc.)	Live chat	RSS feed	Search alerts	New issue or article alerts	Newsletter
EbscoHost	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Emerald		Yes	Yes			Yes		
JSTOR		Yes	Yes	Yes	Yes			Yes
Oxford	Yes	Yes	Yes	Yes	Yes	Yes		Yes
Royal Society	Yes	Yes	Yes		Yes	Yes	Yes	Yes
ScienceDirect	Yes	Yes	Yes		Yes	Yes		

The users who used these databases must have received an email to alert them of related articles

based on their search history. As suspected, some respondents interviewed confirmed that while they received email alerts, they mostly ignored or deleted them. Those that opened the alerts attested that the alerts were very useful because they pointed them to research related to their areas of interest.

5.6.3 Usefulness and impact of the updates received

The usefulness of the alerts was assessed using the questionnaire data. The researcher asked the respondents to rate the usefulness of the updates they had received using the Likert five-point scale of 1=Very useful, 2=Useful, 3= Fairly useful, 4=Not useful and 5= Not sure. The "No response" and "Not sure" values were recoded to missing value. This brought the valid responses to 240. Of the 240 responses, the majority (45.8%) found the updates fairly useful. The results are recorded in Figure 5.7 below.

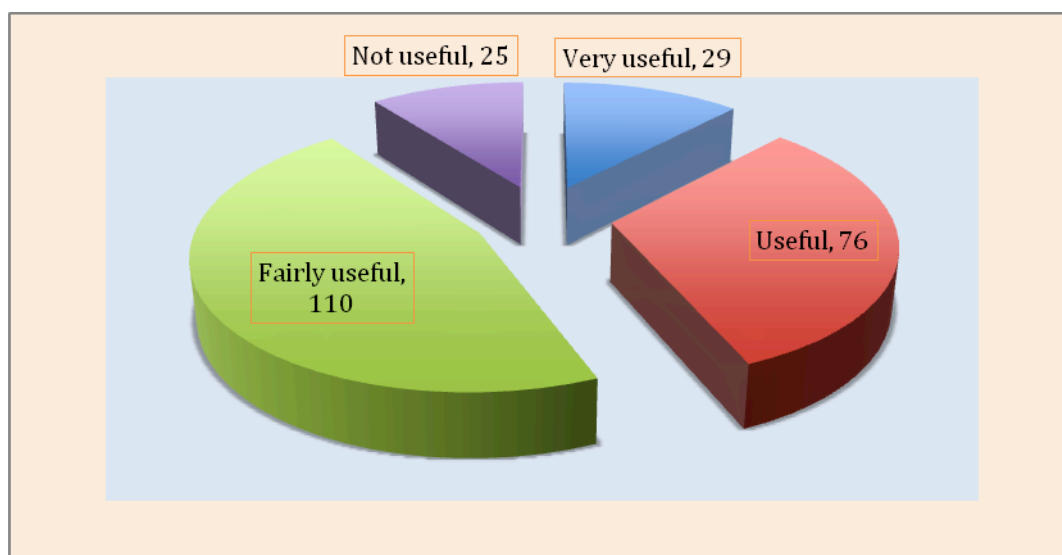


Figure 5.7: How useful are open access resources [N=240]

5.7 Appropriate current awareness services and other measures to promote open access resources and other e-resources at the University of Zambia

5.7.1 Recommended current awareness services and their impact on open access use

Since the results in Section 5.6.1 indicate that most respondents had limited experience with current awareness services, in this section, the researcher sought to identify appropriate awareness services and other measures that could be used or applied to promote open access resources in order to improve the uptake.

For this purpose, the data from the questionnaire, interviews, observation and content analysis were used. In the questionnaire, the researcher asked the respondents to indicate information update methods they felt would help to easily and effectively reach students and researchers. Each sub-question had a different total because the respondents were allowed to choose several options. Non-responses were recoded to missing value and were not included in the analysis. The details of the results are presented in Table 5.25 below.

Table 5.25: Recommended current awareness services by respondents

	Yes	No	Total valid responses
Social media	397 (90.9%)	40(9.1%)	437 (100%)
Email & RSS	397 (90.0%)	44(10.0%)	441 (100%)
Google alerts	304(77.6%)	88(22.4%)	392 (100%)
SDI	257(69.1%)	115(30.9%)	372 (100%)
Vendor/pub alerts	172(48.9%)	180(51.1%)	352 (100%)
TOCs	152(45.0%)	186(55.0%)	338 (100%)
Others	41(8.2%)	460(91.8%)	501 (100%)

The results in Table 5.25 above show that social media and email/RSS alerts were the most recommended current awareness services adopted by the University. Each recorded 90% of the responses. Using social media where students and researchers are already engaged would easily help to promote open access resources. Researchers also depend on emails for communication, hence emails would make a good marketing tool as long as the users realise the benefits of using these services. The third alerting service recommended was Google alerts with 304 (78%) and SDI with 257 (69%) responses. Google scholar would promote open access use though email alerts while SDI would provide selected lists directly to students and researchers. The other services received less than 50% responses. These included WhatsApp, mobile phone text messages, UNZA radio, notice boards and the online student portal.

Meanwhile, other unique awareness services recommended in the interviews include phone/SMS alerts, flashcards on Moodle, libGuide and the library website.

5.7.2 Other strategies recommended towards improving open access uptake

The researcher further sought to establish what else the respondents felt would help improve the usage of open access resources and all other e-resources in the University. These may not necessarily be awareness services. At this level, the qualitative data from the questionnaire, interview and observation were merged thematically. The following suggestions were made (in the respondents' order of preference):

Most respondents suggested increased and regular open access awareness, promotions and sensitisation programmes to educate users (students and researchers) of the academic value of open access resources. Promotions could include weekly alerts based on user profiles and subject interests, an open access week advocacy, UNZA radio, peer-to-peer training and providing posters and fliers in strategic areas. Other respondents suggested that awareness could be done through various forms of media such as social media platforms to engage all users, seminars and workshops, online discussion groups, brochures, first-year students' orientation, physical visits to schools and participation in school board meetings. The library could circulate small booklets/guides or short videos on how to access open access resources with a provision for feedback and the formation of school-based committees through liaison librarians to promote open access resources in schools.

The respondents also emphasised that awareness programmes should not be left entirely to the library to undertake. It should involve all schools and departments in the University, the student body and the University Management. The need for all stakeholders to participate in open access awareness was strongly emphasised. One respondent said that "open access must be promoted and everyone must take part," while another said, "I have no idea what open access is all about; hence, it should be promoted among us, students." (Interviews, R4 & R10 respectively)

The second strategy suggested was improving the information search skills of the students and researchers. Continuous training of users on how to access, use and appreciate the open access resources is necessary, starting with the first-year students. Publishers of specific resources should also be encouraged to conduct regular training to help market their products since they understand them better than anyone else. Training should also involve skills transfer on evaluating the quality of open access resources in academia. The respondents added that the training could be integrated into the school curriculum and offered as a full course. Such a course should have a continuous assessment and be examinable to stimulate students' seriousness. Other than training, the library

should provide manuals or simplified guides on downloading journal articles in both print and digital formats.

The third suggested strategy was to make open access resources easily accessible to all users 24/7. As such, the respondents recommended removing subscriptions and username/passwords restrictions, improved Internet and Wi-Fi connections and access points, an increased number of computers and Internet laboratories (Internet infrastructure) and adequate funding.

Other suggestions were to make open access resources use mandatory, especially for students. The e-resources page should be linked to all student platforms such as the e-learning platforms (Moodle and Astria) and other social media hubs, the student information system (SIS) and the University portal for easy reach and awareness. There should be an establishment of explicit open access policies to govern the use of open access resources, increased opening hours of computer laboratories, employment of more information specialists exclusively for open access resources promotion. Meanwhile, lecturers should encourage or motivate students to use open access resources.

Furthermore, the research observation showed that, while all the above are required, much more is needed to change the negative perception of researchers and students on the quality, vastness, timeliness and easy access of open access content in academia.

5.8 Theory validation

The theory validation is based on the results of the inferential statistics of the study, involving the validation of the UTAUT constructs and the level to which the constructs explain the results of the current study. More detail on the theory itself and its constructs has already been discussed in Chapter Three. While the previous sections of this chapter presented the results of the descriptive statistics, the following sections report on the results of the inferential statistics using the measurement model and structural model analysis. The analysis and its results apply to the adoption and use of both open access resources and current awareness services because they are both regarded as a technology.

5.8.1 Measurement model assessment results

The measurement model assessment was conducted to establish variables relevant to measuring each factor/construct (as established in Chapter Three's discussion of the UTAUT model) using factor analysis and binary logistic regression analysis. This process helped the researcher to identify

relevant variables to maintain for further analysis while deleting those found to have a negligible effect on the respective constructs. According to Hair, Black, Babin, and Anderson (2009:617,618), the size of the factor loading is an important aspect to consider when determining variables to maintain. At a minimum, all factor loadings should be statistically significant, whereas standardised loadings should be at least 0.5 and ideally 0.7 or higher. Non-significant estimates or lower loadings suggest that an item or variable is a candidate for deletion. Such a variable should be dropped.

The researcher applied discriminate validity for this purpose, where 0.5 value was used in determining variables for either retention or elimination in the factor analysis and ultimately for the construct validity.

5.8.2 Factor analysis

According to UCLA (2021), factor analysis is a method of data reduction using underlying unobservable variables (latent variables not measured in the dataset) as reflected in observed (manifest) variables to achieve a simple structure (pattern of results). Factor analysis also helps researchers to understand the possibility of grouping variables meant to measure a single construct. Before conducting the factor analysis, certain requirements must be met. These include a large sample size since factor analysis is based on the correlation matrix of the variables, all values/responses examined should be numeric or metric while the sample size to variables ratio should be at least 5:1 and above (Tabachnick & Fidell 2001:588). Osborne and Costello (2004) contend that a sample size of 200 is fair or acceptable, 300 is good, 500 is very good, while 1000 and above is excellent.

Additionally, a minimum of 10 observations per variable is recommended to avoid computational challenges. The current study used a sample size of 577. All 61 variables identified to measure the five constructs were numeric, while the sample size to variable ratio was 9:1. These results supported the preliminary possibility of running a factor analysis on the study data.

Having met the preliminary requirements stated above, the researcher conducted the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test to further establish if the current data supported factor analysis. The test results revealed the KMO measure of sampling adequacy of 0.694, the Bartlett's Test of sphericity (approx. Chi-square) 1709.786 at 0.001, $df = 595$, significance (sig.) level. The results are presented in Table 5.26 below.

Table 5.26: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.694
Approx. Chi-Square		1709.786
Bartlett's Test of Sphericity	Df	595.00
	Sig.	0.000

The Kaiser-Meyer-Olkin measure and Bartlett's Test results suggest that the data could support factor analysis, hence, more tests.

The results of the factor analysis for each construct are presented in Table 5.27 below.

**Table 5.27: Factor analysis results as extracted from the rotated component Matrix table
Rotated Component Matrix**

Survey variables	Constructs				
	1(FC)	2(PE)	3(SI)	4(IS)	5(EF)
Librarians are helpful in accessing open access resources and/or application of alerting services	0.718	0.027	0.137	0.057	0.024
The University recognises the use of open access resources and alerting services for career development (promotions)	0.594	0.008	-0.228	0.058	0.146
Fellow researchers and students motivate me to use open access resources and/or alerting services	0.566	0.254	0.178	-0.263	-0.103
The institutional infrastructure for accessing open access resources and/or alerting services is good	0.547	-0.154	0.011	0.020	0.053
Marketing for open access resources in the University is adequate	0.546	0.163	0.054	0.079	-0.150
Guidance is available to effectively use access open access resources	0.533	-0.018	0.318	0.230	-0.081

I know how to evaluate the quality of e-resources, including open access resources	0.514	0.143	-	-	0.010
			0.098	0.221	
Open access resources widen the range of scholarly content available to users	0.162	0.714	-	-	0.189
			0.033	0.158	
Open access resources help to supplement the budget decline for resource subscriptions	-0.119	0.650	0.313	0.030	0.001
Open access gives equal opportunity to university students and academic staff in developing countries to access global research content more easily and immediate	0.007	0.648	-	0.189	0.061
			0.035		
Scholarly open access resources are easily accessible for use due to less access restrictions	0.110	0.630	0.238	-	0.176
				0.241	
Scholarly open access publications are original and present high quality research content	0.327	0.539	0.047	0.070	0.086
I encourage students to use open access resources provided by the University's library	0.213	0.527	-	0.260	-0.310
			0.091		
I learnt about the availability of open access resources through fliers	0.094	0.066	0.795	-	0.007
				.0064	
I learnt about the availability of open access resources through posters	-0.062	-0.031	0.720	0.049	-0.011
I am aware of the available open access resources and/or alerting services in the University	0.123	-0.113	-	0.038	0.014
			0.569		
I learnt about the availability of open access resources through social media	0.005	0.053	0.510	0.474	-0.300
I receive updates through social media	0.045	0.136	-	0.804	0.132
			.0070		

I receive updates through mobile phones	-0.154	-0.021	0.286	0.639	-0.037
I receive updates through vendor/publisher alert	-0.027	0.211	0.000	0.575	0.296
I would like to receive updates through email and RSS alerts	-0.033	0.086	0.142	-	0.126
				0.522	
I would like to receive updates through TOCs	0.228	0.050	-	-	0.673
			0.064	0.004	
I receive updates through TOCs	-0.032	0.243	0.021	0.290	0.558
I learnt about the availability of open access resources through the UNZA website	0.113	0.369	0.186	-	-0.521
				0.084	
I learnt about the availability of open access resources through vendor/publisher alerts	0.073	-0.052	-	0.307	-0.514
			.0142		

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.

a. Rotation converged in 7 iterations.

Key to understanding the constructs measured in Table 5.27

FC – Facilitating Conditions

PE – Performance Expectancy

SI – Social Influence

IS – Internet Skills

EE – Effort Expectancy

Table 5.27 indicates a factor analysis yielding five constructs with 25 variables as extracted from the survey questionnaire. With a minimum coefficient set at 0.5, the factor loadings of the items ranged between 0.5 and 0.8. Discriminate validity was applied to ensure that all the items included in the factor analysis had no cross-loading exceeding 0.5. This way, all items belonging to the same construct loaded highly in their constructs compared to their loadings in other constructs. Table 5.27 above reveals these loadings where items of one construct are in bold while those from other

constructs are not bold.

With these results of the factor analysis, the structural model assessment test was then performed.

5.8.3 Structural model assessment results

The structural model assessment was done using the binary logistic regression in two separate phases. The first phase involved determining the factors likely to influence UNZA researchers' and students' behavioural intention to use open access resources and/or current awareness service as a technology. The second phase assessed the factors that influenced the researchers' and students' actual usage of the open access resources and application of current awareness services at the University. Since open access resources and current awareness services are both a technology, the analysis applies to both as presented earlier and in the subsequent sections.

5.8.3.1 Determinants of students' and researchers' behavioural intention to use open access resources or current awareness services as a technology

Having established the fitness and appropriateness of the model to the research data, the researcher assessed the students' and researchers' behavioural intention to use open access resources and/or current awareness services using the Omnibus Test of Model Coefficients, Model Summary, Hosmer and Lemeshow Test, the classification table and the variables in the equation table outputs. The test involved the establishment of the causal relationships among the various model factors believed to shape the behavioural intention to use open access resources and current awareness services as a technology.

The results show the Omnibus Test of Model Coefficient statistically significant at $X^2 = 53.913$, 5 degree of freedom and $p < 0.001$). The model summary results revealed a -2 Log Likelihood of 147.801 with 0.309 Cox & Snell R Square and 0.412 Nagelkerke R Square. The Hosmer and Lemeshow test results were found insignificant at $X^2 = 6.152$, 8 degree of freedom and p -value of 0.630. With the p -value more than the set 0.05 (5%) significance level is an indication that the model does fit the data and, therefore, should be interpreted further.

The model summary shows that the model correctly explains or estimates 75.3% of the predictions on the open access usage as revealed by the classification table.

Below is Table 5.28 presenting the results of the various causal relationships between and among different factors that influence the students' and researchers' behavioural intention to use open access resources and the application of current awareness services.

Table 5.28: Determinants of students and researchers' behavioural intention to use open access and current awareness service technologies [N = 148]

Variables in the Equation

Factors	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
							FC	0.609
PE	-0.834	0.212	15.488	1	0.000	0.434	0.287	0.658
SI	-0.027	0.210	0.016	1	0.899	0.974	0.646	1.469
IS	-0.681	0.215	10.035	1	0.002	0.506	0.332	0.771
EE	-0.954	0.248	14.761	1	0.000	0.385	0.237	0.627
Age	0.934	0.462	4.087	1	0.043	2.545	1.029	6.296
Rank/Degree	-1.922	1.148	2.803	1	0.094	0.146	0.015	1.388
Voluntary	0.006	0.238	0.001	1	0.980	1.006	0.631	1.605
Education	-0.121	0.175	0.475	1	0.491	0.886	0.629	1.249
Internet skills	-0.579	0.225	6.638	1	0.010	0.560	0.361	0.871
Specialisation	-0.033	0.013	6.737	1	0.009	0.968	0.944	0.992
Awareness	0.384	1.246	0.095	1	0.758	1.468	0.128	16.882
PE by Specialisation	-0.008	0.021	0.131	1	0.717	0.992	0.952	1.035
PE by Education	0.031	0.192	0.025	1	0.873	1.031	0.708	1.502
PE by Age	0.706	0.466	2.296	1	0.130	2.027	0.813	5.053

PE by Awareness	-0.656	3.005	0.048	1	0.827	0.519	0.001	187.501
FC by Education	0.022	0.072	0.095	1	0.758	1.022	0.888	1.177
FC by Age	0.335	0.295	1.286	1	0.257	1.398	0.783	2.495
EE by Specialisation	-0.029	0.026	1.206	1	0.272	0.972	0.923	1.023
EE by Age	-0.270	0.679	0.158	1	0.691	0.763	0.202	2.889
EE by IS	0.348	0.311	1.257	1	0.262	1.417	0.771	2.605
SI by Age	-0.058	0.296	0.038	1	0.845	0.944	0.528	1.687
SI by Voluntariness	0.043	0.253	0.029	1	0.865	1.044	0.635	1.716
IS by Specialisation	-0.031	0.021	2.260	1	0.133	0.970	0.931	1.009
IS by Education	0.062	0.279	0.049	1	0.824	1.064	0.615	1.839
IS by Age	0.302	0.531	0.323	1	0.570	1.352	0.477	3.830

Key:

B: Unstandardised regression coefficient (Odds ratio)

SE: Standard error

df: Degree of freedom

Sig: P-value or significance

Exp(B) : Exponentiated odds ratio

The results in Table 5.28 reveal that other than social influence, the rest of the main constructs had a significant effect on the students' and researchers' behavioural intention to use open access resources and application of current awareness services as a technology. These are facilitating conditions, performance expectancy, Internet skills and effort expectancy. Facilitating conditions recorded B=0.609, *p*-value of 0.004 with the Exponentiated odds ratio of 1.839. Performance expectancy was significant at 0.001, by B=-0.834, with the Exponentiated odds ratio of 0.434. Similarly, Internet

skills significantly determined the behavioural intention of open access resources use and application current awareness services by the students and researchers where $B=-0.681$, p -value of 0.002 and Exponentiated odds ratio of 0.506 were recorded. Lastly, Effort expectancy recorded $B=0.954$, p -value of 0.001 with the Exponentiated odds ratio of 0.385

It is further noted that some moderators and independent variables such as age, Internet skills, and specialisation were found to directly influence the students' and researchers' behavioural intention to use either open access resources or current awareness services as a technology. Age recorded $B=0.934$, p -value of 0.043 with Exponentiated odds ratio of 2.545, Internet skills had $B=-0.579$, p -value of 0.010 and the Exponentiated odds ratio of 0.560, while specialisation recorded $B=-0.033$, p -value of 0.009 and the Exponentiated odds ratio of 0.968

Meanwhile, the results show no influence of the moderators (age, gender, specialisation, level of education, awareness and voluntariness) on the constructs towards the students' and researchers' behavioural intention to use open access resources and application of current awareness services in the University.

5.8.3.2 Determinants of the students' and researchers' open access resources and/or current awareness services usage behaviour

To establish the determinants of the usage behaviour of the students and researchers, the researcher repeated the tests done in the previous analysis of behavioural intention to use open access content and current awareness services as a technology. The results of the Omnibus Test of Model Coefficients were found to be statistically significant at $X^2=63.909$, 5 degree of freedom and p -value of 0.001. The Model summary results revealed a -2 Log Likelihood of 109.459, Cox & Snell R Square of 0.355 and Nagelkerke R Square of 0.510. The Hosmer-Lemeshow Test was also found significant at $X^2 = 5.526$, 8 degree of freedom and p -value of 0.700. Meanwhile, the model correctly predicted 84.2% of the predictions on open access usage as revealed by the classification table.

Table 5.29 below presents the results of the various causal relationships between and among different factors believed to contribute to the uptake of open access content and the application of current awareness services by the students and researchers at UNZA.

Table 5.29: Determinants of the students' and researchers' usage behaviour of open access resources and/or current awareness service technologies

Variables in the Equation

Factor	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for	
							EXP(B)	
							Lower	Upper
FC	-1.544	0.324	22.764	1	0.000	0.213	0.113	0.403
PE	-0.789	0.254	9.610	1	0.002	0.454	0.276	0.748
SI	0.701	0.248	7.964	1	0.005	2.015	1.239	3.279
IS	0.790	0.234	11.345	1	0.001	2.202	1.391	3.487
EE	0.754	0.265	8.114	1	0.004	2.126	1.265	3.573
Age	0.890	0.604	2.169	1	0.141	2.435	0.745	7.955
Gender	-0.019	0.509	.001	1	0.970	0.981	0.362	2.663
BI	-0.725	0.540	1.807	1	0.179	0.484	0.168	1.394
Rank/degree type	-2.151	1.297	2.753	1	0.097	0.116	0.009	1.477
Voluntariness	-1.014	0.309	10.794	1	0.001	0.363	0.198	0.664
Education	0.032	0.226	.019	1	0.889	1.032	0.662	1.608
Internet skills	0.675	0.244	7.678	1	0.006	1.964	1.218	3.165
Specialisation	0.016	0.015	1.126	1	0.289	1.017	0.986	1.048
Awareness	1.212	1.594	0.578	1	0.447	3.359	0.148	76.438
PE by Specialisation	-0.004	0.030	0.020	1	0.887	0.996	0.940	1.055
PE by Education	-0.832	0.310	7.200	1	0.007	0.435	0.237	0.799
PE by Gender	0.794	0.756	1.104	1	0.293	2.213	0.503	9.732
PE by Age	0.426	0.481	.786	1	0.375	1.531	0.597	3.927
PE by Awareness	1.095	1.858	.347	1	0.556	2.988	0.078	114.034
FC by Education	-0.388	0.133	8.492	1	0.004	0.679	0.523	0.881
FC by Age	0.064	0.331	.037	1	0.848	1.066	0.557	2.040
FC by BI	-0.913	0.784	1.354	1	0.245	0.401	0.086	1.868
EE by Specialisation	-0.071	0.031	5.344	1	0.021	0.931	0.877	0.989
EE by Gender	1.348	0.603	4.999	1	0.025	3.849	1.181	12.544

EE by Age	0.620	0.579	1.148	1	0.284	1.860	0.598	5.785
EE by IS	0.041	0.314	0.017	1	0.897	1.042	0.563	1.928
SI by Gender	-0.008	0.649	0.000	1	0.990	0.992	0.278	3.537
SI by Age	-0.159	0.255	0.387	1	0.534	0.853	0.517	1.407
SI by Voluntariness	0.416	0.472	0.778	1	0.378	1.516	0.601	3.826
IS by Specialisation	-0.005	0.021	0.062	1	0.803	0.995	0.955	1.036
IS by Education	-0.044	0.232	0.036	1	0.849	0.957	0.607	1.508
IS by Gender	1.527	0.840	3.299	1	0.069	4.602	0.886	23.896
IS by Age	-0.815	0.551	2.185	1	0.139	0.443	0.150	1.304

The results in Table 5.29 above suggest that all the main constructs had a significant influence on the students' and researchers' usage behaviour of a technology, in this case, open access resources and current awareness services. Facilitating conditions recorded $B=-1.544$, p -value of 0.001 and $\text{Exp}(B)=0.213$, performance expectancy recorded $B=-0.789$, p -value of 0.002 and $\text{Exp}(B)=0.454$. Social influence recorded $B=0.701$, p -value of 0.005 and $\text{Exp}(B)=2.015$. Internet skills was also found to be significant at $B=0.790$, p -value of 0.001 with $\text{Exp}(B)=2.202$ while effort expectancy was significant at $B=0.754$, p -value of 0.004 with the $\text{Exp}(B)=2.126$.

The results also suggest that voluntariness directly and significantly determined the usage behaviour of the students and researchers to use open access resources and current awareness services for updates, where $B=-1.014$, p -value of 0.001 with $\text{Exp}(B)=0.363$.

Furthermore, the influence of performance expectancy and facilitating conditions on the students and researchers to use both open access resources and/or current awareness services was significantly moderated by the level of education/year of study (experience). Performance expectancy was significant at p -value 0.007 and Exponentiated odds ratio of 0.435, while facilitating conditions were significant at p -value 0.004 and Exponentiated odds ratio of 0.679. Effort expectancy's influence was also moderated by specialisation and gender, both at p -value less than 0.05.

5.9 Summary

This chapter presented the findings of the research on factors likely to influence the students' and researchers' behavioural intention and usage behaviour to use a technology, in this case, the open access resources and current awareness services at UNZA. The study's overall results revealed low

to average awareness and usage levels of these resources and services by most students and researchers. In terms of using open access resources, most students depend on lecture notes and recommended readings, while researchers mostly used print resources. For current awareness services application, very few students and researchers were aware or used these services, while some used them without knowing. Other challenges identified include a lack of adequate user search skills and help from librarians, limited Internet facilities (Internet access points, limited and weak hotspots and a lack of computers) to cater for the entire student population, a negative attitude or little knowledge of the importance of using open access resources, an incorrect belief that the library only offers outdated resources and that users are slow to embrace change, replacing open access content with print content and lecture notes.

Despite the problems users faced, they strongly agreed that open access resources provided by the University are original and present high-quality research content while current awareness services would keep students and researchers updated with the new research in their fields of specialisation. Therefore, those who used open access resources or applied current awareness services found them relevant and informative in their academic and professional work. The respondents also added that open access resources, on one hand, provide university students and researchers in developing countries with an equal opportunity to access global research content while widening the range of scholarly content available to the user community. Current awareness services, on the other hand, keep researchers updated with new developments in their subject areas.

While the study established that some users had experience with current awareness services such as email alerts, live chats and RSS without knowing, most had no experience at all with these services. As such, the study recommends applying the following awareness services to help improve the uptake of open access resources: social media platforms (WhatsApp groups, Facebook, Twitter), email alerts, RSS, Google alerts and SDIs.

Additionally, the research suggests that the research model used in the study correctly explains or estimates 75.3% and 84.2% of the predictions on the students' and researchers' behavioural intention and usage behaviour to use open access resources and apply current awareness services, respectively. The results further reveal that performance expectancy, Internet skills and effort expectancy significantly influenced the students' and researchers' behavioural intention to use open access and/or current awareness services as a technology, while social influence had no effect. Meanwhile, all the main factors significantly influenced students' and researchers' usage behaviour of open access resources, other online resources and alerting services.

Having presented the study results in this chapter, Chapter Six follows with interpretation and discussion of the study results.

CHAPTER SIX: INTERPRETATION AND DISCUSSION OF THE RESEARCH RESULTS

6.1 Introduction

This chapter interprets and discusses the research results that were presented in Chapter Five. These results were captured by the five research instruments used in the study, namely: the questionnaire, the interviews, researcher observation, content analysis and citation analysis. The discussion of these results is arranged in sections and subsections in the order presented in Chapter Five, based on the study's objectives and corresponding research questions and hypothesis. At this level, the data collected from all the research instruments investigating one objective or variable are fully integrated in the discussion of the results. As already stated in Chapters Four and Five, the results are discussed concurrently in order to build on, complement, or substantiate the findings of the other data collection tool(s). The discussion also brings out new discoveries from the study.

Chapter One covered the objectives of the study, whose main aim was to understand the challenges associated with the low uptake of open access resources at UNZA. Consequently, the researcher also endeavoured to identify specific current awareness services and other strategies that UNZA's library could use to promote and improve the uptake of e-resources at the University. The main aim is broken down into five specific objectives as follows:

- i. To examine the user perceptions of the relevance of open access resources in academic and professional work.
- ii. To assess possible opportunities that open access resources could provide to higher learning institutions like UNZA.
- iii. To determine challenges that UNZA students and researchers face in accessing open access resources.
- iv. To explore the existence and use of current awareness services in promoting open access resources at UNZA and globally.
- v. To identify current awareness services that UNZA's library could use to promote the use of open access resources and all other e-resources at the University.

The research questions underpinning each of these research objectives were as follows:

- i. What are the users' perceptions of the relevance of open access resources in their academic work and profession?
- ii. What possible opportunities do open access resources provide to higher learning institutions like UNZA?
- iii. What challenges do students and researchers face in accessing open access resources?
- iv. What current awareness services exist and used to promote open access resources and other resources at the University of Zambia and elsewhere?
- vi. What alerting services are appropriate for promoting access and use of open access and all other online resources at UNZA?

The study also discusses how the UTAUT model explains and predicts the students' and researchers' behavioural intention and usage behaviour of open access resources and current awareness services as a technology. To this effect, the following hypotheses were tested and discussed:

- i. Current awareness services or awareness facilitates use of open access resources.
- ii. Performance expectancy determines the researchers' and students' behavioural intention and use of open access content resources and/or current awareness services as a technology.
- iii. Effort expectancy determines the researchers' and students' behavioural intention and use of open access content and/or current awareness services as a technology.
- iv. Social influence significantly influences or determines the behavioural intention and use of open access resources and/or current awareness services as a technology.
- v. Facilitating conditions determines UNZA's researchers and students' behavioural intention and use of open access resources and/or current awareness services as a technology.
- vi. Gender, age, experience and know-how (skill) influence behavioural intention and use of open access resources and/or current awareness services of UNZA's students and researchers.

In essence, this chapter brings together the research objectives, research questions, hypotheses, related literature and the findings of the study. This is meant to facilitate meaningful explanation of the research problem, while offering a solution to the low uptake of open access resources at UNZA.

Therefore, the findings are discussed in relation to the previous studies that have been done as covered in the literature review. This put the current study into perspective. The theoretical framework also helped to understand factors affecting open access usage and or application of current awareness services for updates and how these challenges can be mitigated.

6.2 Response rate

A response rate is an important tool used to measure the quality of research, in terms of the validity of estimates, analysis and inferences made (Fincham 2008:2; Frey 2018). Based on the questionnaire data, the response rate for this study was 87% (501 valid and usable questionnaire responses out of a total sample size of 577).

6.3 Respondents' profile

This section elaborates on the general information of the research units involved, which include the questionnaire and interview respondents and authors of the selected publications used for the citation analysis. The general information covers the researchers, librarians' and students' profiles such as gender, age, level of education or year of study, academic ranking or degree pursued, and the school or field of specialisation. Although this part of the research instrument was not among the study's objectives, it was necessary to investigate them because of the moderating role these variables play in influencing the behavioural intention and usage of a technology (Venkatesh *et al.* 2003:447).

Bhandari (2021) explains that moderators can influence the strength or direction of relationships between the independent and dependent variables. Moderators can potentially increase the predictive validity of models, without which most models exhibit low explanatory powers. Additionally, the absence of key moderating variables may result in inconsistencies, reflecting individual differences such as gender, age, level of education, geographical location and experience.

The results of this study revealed that the majority of the respondents were students (91%), mainly at second year level (30%). This could explain why the majority (74%) of the respondents fall in the age range of 25 years and below. Further analysis shows that 84% of the respondents were either following an undergraduate degree programme or had already attained an undergraduate degree. Students are not expected to use open access resources much at an undergraduate level due to less involvement in serious scholarly writing, research, and publishing. This group of respondents will likely have less experience with open access resources due to their minimal exposure to scholarly

activities.

These results differ from the findings of Dulle's (2010:188) study, in which the majority (70.4%) of the study population was aged 40 years and above, with 75.1% being PhD holders and 88.4% having more than five years of experience using the Internet. This difference could be explained by the fact that in the current study, the participation of students without much knowledge of open access was as important as that of the students and researchers who were actively using open access resources to get the views of both user groups. The students, researchers and librarians are all potential beneficiaries of open access resources; hence, the views of all the three categories were regarded as important. Additionally, Dulle's study dealt with scholarly communication participation, which only involves experienced researchers.

In terms of specialisation, the School of Education was leading with 30.6% of the respondents, followed by the School of Humanities and Social Sciences with 30.2%. This distribution was expected because the respondents for the questionnaire were proportionately selected from a study population where these two schools were the largest. The distribution of the respondents according to gender shows more male than female respondents. This indicates a gender-balanced study sample considering the existing male-to-female ratio staffing at the University. It further indicates low female representation compared to the representation of males at every level in the institution. More female involvement at the University can be achieved by encouraging and engaging more female employees and increasing female student enrollments.

Therefore, it can be postulated that the respondents' profile data was useful for the attainment of valid research results, especially in the applicability of the theoretical model to the results of the study. This aspect of the data brought out critical information about the study units, which helped explain why specific results were observed and not others.

6.4 Awareness, use and perception of open access resources

6.4.1 Awareness of open access resources

In terms of the awareness levels of open access resources among students and researchers at UNZA, as indicated in Chapter Five (Section 5.3.1, Table 5.10), the results show that 52% of the questionnaire respondents were aware of the availability of open access resources. Additionally, several interviewees were aware of the available open access resources. One researcher interviewed

explained that he was fully aware of the library's resources because of his frequent interaction with librarians. The respondent further explained that due to his close working relationship with library staff, he felt like an insider or part of the library system (Interviews, R1).

These results are similar to those of Rodriguez (2014:606-7), which indicated that the majority of the academic research faculty members studying for their PhD at universities and colleges in the United States of America had a general knowledge of open access resources, despite low usage. Awareness was predominantly among respondents between the ages of 31 and 60 years. Similarly, a study by Kakana *et al.* (2016:7) on open access services at UNZA disclosed that more than half (56%) of the respondents were familiar with open access services, in particular, the institutional repository. Although Kakana *et al.*'s (2016:7) study had a different focus; its findings pointed to an average awareness level of open access services at UNZA, and thus, revealed the need to focus on finding a solution to this problem.

Furthermore, since the results of the current study indicate that the majority of the respondents had knowledge of open access, they should have been able to give relevant insights on how best the use of open access content could be promoted. Meanwhile, the deliberate inclusion of respondents that had not used open access resources helped the researcher to get the opinions of all the intended users of open access resources at the University. Amongst others, their lack of awareness implies the need for more awareness programmes to reach out to as many users as possible and deepen their understanding and use of open access resources. Equally, the choice of participants that were actively using open access resources helped to bring out information based on experiences and knowledge on the challenges of open access use and how to resolve these issues.

6.4.2 Usage of open access resources

It was necessary to assess the current usage levels of open access resources to establish the current usage levels of e-resources and compare the results with earlier research findings. Assessing the current usage levels also ascertained whether usage had recently improved. Based on the results presented in Figure 5.1, Chapter Five, the usage of online resources, including open access resources available at UNZA, remains a challenge. The results show that less than half (46%) of the respondents used open access resources, while more than half (54%) did not use these resources.

These results, therefore, confirm the findings of earlier research that revealed low usage of online resources by students and faculty at UNZA (Akakandelwa 2007:76; Kakana *et al.* 2016:7; Miyanda

2010:52). Given that the study at hand reports low usage of online resources may point to other unresolved problems. As such, the current researcher believes that a different approach, such as using alerting services could help promote awareness and improve open access usage.

Other studies outside Zambia have also shown low usage of open access resources and other online resources. This may suggest that the low usage experienced at UNZA is a more widespread problem. Tlakula and Fombad (2017:35) revealed low levels of basic usage of online resources with usage limited to EBSCOhost by undergraduate students at the University of Venda in South Africa. Meanwhile, a study by Hahn and Wyatt (2014:93) revealed poor usage of open access journals and institutional repositories in the University of Oklahoma, USA. Correspondingly, Anunobi and Ape (2018:21) argued that many universities in African countries and developing countries, in general, are yet to utilise the privileges that open access offers, as they appear to be tapping less from it. However, some studies did reveal frequent use and perception of open access resources by faculty members of different universities for both research and teaching (Kaba & Said 2015:101; Shuva & Taisir 2016:40).

If other universities have found value in using open access resources in teaching, learning and research, UNZA should also be made aware of the value of open access content that the library provides. Despite the lack of funds to run many other library operations effectively, subscriptions to online resources is prioritised over all other services. The library believes that online resources are key to an acclaimed academic higher learning institution like UNZA. As such, the provision of open, current, scholarly information is recommended and should be made available in the simplest and effective manner for the users to realise its value.

Based on the above findings, one would argue that open access resources should be as important sources of information to students and researchers in academia as are subscription-based resources due to the many advantages of using open access. The advantages associated with open access content are detailed in Section 6.5.

6.4.3 Does awareness (current awareness services) facilitate usage?

The researcher conducted two analyses on the questionnaire data. The first analysis was to determine whether current awareness services, represented by a variable “awareness” resulted in the use of open access resources by cross-tabulating awareness and usage variables. The second analysis was to run a Chi-square test to prove a relationship between awareness (current awareness services) and

usage of open access resources, as recorded in Tables 5.13 and 5.14 of Chapter Five.

The results of the cross-tabulation in Table 5.13 show that, of the initial 259 questionnaire respondents who said that they were aware of the available open access resources, 178 used open access resources. Meanwhile, the Chi-square test with $\chi^2 = 144.494$, $DF = 1$, $P\text{-value} = 0.000$ proves a relationship between the current awareness services (awareness) and use of open access resources. These results are not surprising considering the results presented in Table 5.19 in Chapter Five, that show that most (65.8%) of the respondents attributed the low usage levels of open access resources in the University to inadequate marketing and lack of appropriate alerting services. This resulted in a lack of awareness. These results correspond with the findings of Anunobi and Ape (2018:21), Hahn and Wyatt (2014:93), and Tlakula and Fombad (2017:35), which revealed poor usage of open access resources in African universities such as the University of Venda in South Africa and Nigerian Universities due to a lack of awareness.

Therefore, the researcher concludes that it is impossible to use open access resources without awareness, which can be boosted by the application of current awareness services. In this case, awareness becomes an enabler to using open access resources. Further, it must be noted that awareness can take place without use. This research and the literature have revealed other studies that found low usage of resources despite respondents showing high levels of awareness (Akakandelwa 2007:76; Dulle 2010:190; Kakana *et al.* 2016:7; Miyanda 2010:71-72; Tlakula & Fombad 2017:35). As such, Dulle (2010:190) suggested that awareness does not automatically translate into use. Instead, awareness creates usage opportunity and not vice versa. Therefore, the application of current awareness services is likely to increase the usage opportunities for open access resources at UNZA.

6.4.4 User perception of the relevance of open access content in academic and professional engagements

In this section, the researcher discusses the results of objective one (see Sections 1.4 and 5.3.4). This objective aimed to examine the students' and researchers' general perception of open access content provided by UNZA's library and the extent to which open access resources meets both their academic and professional information needs.

To assess this objective, the questionnaire respondents rated four statements on open access content using a 5-point Likert scale of 1=Strongly agree, 2=Agree, 3=Not sure, 4=Disagree, 5=Strongly disagree as presented in Table 5.15 of Chapter Five. The statements were as follows:

- i. Open access is original and presents high quality research content;
- ii. UNZA's library provides high quality scholarly open access resources;
- iii. Open access resources are easily accessible due to less access restrictions; and
- iv. Users find open access resources relevant to their academic and professional work.

The assessment revealed a high number of respondents who were “not sure” of what to say, probably due to a lack of knowledge of the subject at hand. The results further show that more than half (61%) of the respondents agreed that open access is original and presents high-quality research content. Similarly, more than half (64.3%) of the respondents revealed that they found open access resources relevant in their academic and professional work. However, a lower number of the respondents (44.9% and 41.7%) felt that UNZA's library provides high-quality scholarly open access resources and that open access resources are easily accessible due to fewer access restrictions, respectively.

The interview results further indicate that 16 (69.6%) of the interviewees who used open access resources also found them very useful and relevant in their academic chores. The fact that more than half of the respondents agreed that the quality of open access resources provided by UNZA's library is good indicates that UNZA students and researchers have a positive perception of open access resources. Accordingly, most of the researchers interviewed indicated that they had introduced their students (both undergraduates and postgraduates) to online resources, which include open access resources because of the value they found in using these resources. Below are some extracted statements from the interviews:

I find the articles to be relevant and they provide peer-reviewed literature to what I teach and research. They are also good for postgraduate students doing their research part (Interviews, R3).

Knowing the benefits of using open access content such as access to free, reliable and scholarly literature is an opportunity. Students should be taught the importance of open access resources so that they can educate their fellow students (Interviews, R4).

These resources provide current information. My literature review for my PhD is made up of up-to-date e-resources, as can be evidenced from the list of references I used (Interviews, R1).

Similarly, one postgraduate student, who had previously worked in the library as a volunteer said:

I use online resources all the time, as we are required to use current information in our assignments. We pay for these resources and so use should be mandatory. Lecturers should also point students to these resources (Interviews, R5).

The above results attest that the open access content provided by UNZA's library is scholarly and relevant to those who use it. Furthermore, this may imply that users of online resources will use all available resources, whether open access or subscription-based, once they find them useful in their academic activities. These results are similar to those of other studies on user perception of open access resources in various fields and places. The results show a positive user perception of open access resources due to the value users find once they use them (Akanni 2017:53; Kaba & Said 2015:101; Mammo & Ngulube 2015:1; Shuva & Taisir 2016:40).

These results concerning the acceptability of open access resources among the students and faculty should be encouraging to UNZA's information managers. It may give them hope that the use of open access resources will improve one day, and its impact will be experienced in learning, teaching, research and publishing. This will ultimately positively impact the University's academic reputation at national and global levels.

Notwithstanding these positive results, certain previous studies have indicated low user perception of open access content (Hahn & Wyatt 2014:93; Serrano-Vicente, Melero & Abadal 2016:595; Rodriguez 2014:606-7; Tlakula & Fombad 2017:35; Uddin, Koehlmoos & Hossain 2014:13). Hahn and Wyatt (2014:93), Rodriguez (2014:606-7), and Shuva and Taisir (2016:36) have revealed that open access journals were not fully accepted in Economic and Business Sciences because of poor perception and a lack of well-renowned journal publishers and peer-reviewing, and unqualified editorial boards. Hahn and Wyatt (2014:93) added that most researchers at the University of Oklahoma in the USA also believed that they would suffer academic reputational loss if they published in open access journals.

As a result, these and several other critiques on the quality of the peer-review process of most predatory open access journals have led to many universities questioning articles published solely in open access journals. The rise in predatory open access journals has also made it hard for many users across the globe to single out quality open access journals in their areas of research (Elmore & Weston 2020:607; Forero *et al.* 2018:585; Shrestha 2021:1-4). Researchers need to be encouraged

and guided on how to use and publish in reputable open access platforms. For this reason, the researcher contends that the question of the quality of open access resources is debatable based on one's experiences. Davis and Walters (2011:209) concur with this contention, as they assert that free access status was not as significant as the quality of the journal in researchers' decisions to submit their work to a particular journal. Researchers still considered other factors such as the quality of the journal rather than free article processing charges when deciding where to publish their research. This signifies that open access content is not only free but also found in high quality, reputable, prestigious and high-impact factor journals. This fact can be used to change the perspective of many researchers who doubt the quality of the scholarly open access research content provided by UNZA's library.

Correspondingly, two of the librarians interviewed suggested that librarians need to correct the user perception of UNZA's open access content being low quality and lacking peer review. Users associate open access to predatory practices and publishing. The negative user perception of the quality of open access resources needs to change through user education to ensure that users are as appreciative of the open access collection as they are of subscription-based resources (Interviews, R6 & R7).

6.4.5 Does perception lead to usage of open access resources?

The researcher further assessed the relationship between user perception and the use of open access resources. Relevance of open access resources in one's academic and professional work was used as a variable for perception (see Table 5.17). The results show that of the 309 questionnaire respondents who found open access resources relevant in their academic work, the majority (180) actively used open access resources. These results advocate that perception influences the use of technology (open access resources) in academic and research work. The respondents positively perceived open access resources because they found them useful or valuable in their everyday chores. The results of the logistics regression in Sections 6.9.3 and 6.9.4 further confirm the effect of performance expectancy on both intention and usage behaviour of the open access resources by students and researchers, where performance expectancy was found to determine both behavioural intention and usage behaviour of open access resources and application of alerting services.

The above-mentioned findings concur with Davis' (1989:320) revelation that 'perceived usefulness' and 'perceived ease of use' are key determinants of system/technology use. According to Davis (1989:320), people's decision to use an application depends on the extent to which they believe it

will help them perform their job better. Additionally, even if potential users believe that a given application is useful, they may not use it if they believe that the effort of using the application outweighs the performance benefits of usage (Davis 1989:320). Hamida, Razakb, Bakarc and Abdullah (2016:648) revealed that perceived usefulness and perceived ease of use predicted the continuance intention to use e-government resources in Malaysia, as users believed that their continued use of these publications was free of effort. If a system is relatively easy to use, individuals will be more willing to learn about its features and eventually continue to use it (Hamida *et al.* 2016:648).

The relevance of open access in academic and professional work was further cross-tabulated as a variable with the gender of the respondents using the questionnaire data to assess any relationship between the two (see Table 5.18 of Chapter Five). The results show that of the 311 questionnaire respondents, who found open access resources relevant in their academic and professional work, 140 were female and 171 were male. Comparing the ratio of female to male participants in this study to this finding, there is a slight change from 1:1.4 to 1:1.2. This suggests that more female participants positively perceived open access resources than their male counterparts.

These results are consistent with the logistic regression analysis results discussed in Section 6.9.4.7, which revealed a gender moderating effect on the relationship between effort expectancy and usage. The results also agree with Kaba and Said's (2015:101) finding that female faculty members at Al Ain University of Science and Technology (AAU) in the Gulf Council Countries were more likely to use open access resources than male faculty. Similarly, Binyamin, Rutter and Smith (2020:50) and Venkatesh *et al.* (2003:447) argued that gender plays an important role in technology acceptance based on the differences between male and female capabilities. Binyamin, Rutter and Smith have indicated that females have a more statistically significant effect on the relationship between effort expectancy and usage behaviour than males. Afonso *et al.* (2012:7) add that women tend to be more confident about their technology use judgments, which mitigates certain difficulty of use and complexity.

6.5 Perceived benefits of open access resources to higher learning institutions

6.5.1 Perceived benefits of open access content

As indicated in Chapter Five (Section 5.4), the assessment of this objective draws its discussion from questions on issues around the possible opportunities that open access resources provide to

higher learning institutions such as UNZA, if fully utilised. This objective used the data from the questionnaire, the interviews, observation, content analysis and citation analysis.

The questionnaire respondents were asked to rate the three statements on the perceived benefits of open access resources using the 5-point Likert scale of 1= Strongly agree, 2=Agree, 3=Not sure, 4=Disagree, 5=Strongly disagree (see Figure 5.3 of Chapter Five). The three statements were as follows:

- i. Open access resources offer university students and researchers in developing countries equal opportunity to access global research content more easily.
- ii. Open access resources help supplement the budget decline for resource subscriptions.
- iii. Open access resources widen the range of scholarly content available to users in the academic environment.

Additionally, the respondents were allowed to share their views and experience on the perceived benefits of open access resources under the option “Others.”

The results show that the majority (77.9%) of the respondents agreed that open access resources offer equal opportunity to university students and researchers in developing countries to access global research content more easily. This aspect was further emphasised in the interviews and observations that, as it is free, open access resources gives researchers in universities in developing countries opportunities to access content they would not have otherwise accessed.

Meanwhile, less than half (44.6%) of the respondents agreed that open access resources help supplement the budget decline for resource subscriptions, while 72.7% said that open access content widens the range of scholarly content available to users. These aspects were also mentioned in the interviews and content analysis. The participants stated that open access content provides quicker, easier, and more effective access to a wide range of current and reliable academic and research information.

Likewise, Akanni (2017:5) found that researchers in a university system are taking full advantage of the promising avenue presented by the advent of open access resources, made available to them free of charge. Providing such literature necessary for research helps career development and provides high-quality scholarly work. Furthermore, Dulle (2010:167) argues that open access makes research

content from both developing and developed countries more visible and accessible without restriction, provided there is adequate infrastructure to facilitate the access.

The content analysis results show that the online resources collection is adequate to satisfy all the learning and teaching needs of the University users as revealed in Table 5.16. The collection covers all relevant subject areas offered by the University such as the arts, humanities and social sciences, environmental studies, physical/life/health sciences, education, mining, law, engineering, human medicine, information science, computer science, technology, agriculture and veterinary medicine. A wide range of resources is believed to lessen pressure on scholars' time, leading to better academic and research output.

Other than the low number in agreement that open access resources help supplement the budget decline for resource subscriptions, the results indicate a high rating on the perceived benefits of open access by UNZA students and researchers. The enormity of the problem of funding for library resources may not be acknowledged by most of the respondents (students and researchers) because they do not work in the library; hence they do not fully understand the challenges the library faces in the provision of online information resources to the University community. Responding to the inadequate funding of the library and its poor infrastructure, one researcher interviewed expressed disappointment with the state of the library and its infrastructure. He indicated a need for immediate intervention through funding from UNZA's Central Administration to improve the state of library and provision of quality information resources to the users (Interviews, R3).

The researcher construes that the respondents knew and appreciated the value of using open access resources, despite the prevailing access and awareness challenges that affected the uptake. This result, to some extent, agrees with the findings of Ivwighrehweta and Onoriode (2012:7-9), which show that Nigerian researchers overwhelmingly used open access resources because they believed that open access literature is beneficial and, therefore, necessary for research development. Similarly, Mckay (2011:252) and Nwagwu (2013:4) affirm that there are many potential benefits from open access use for researchers, educators and institutions in developing countries such Zambia. Open access resources are crucial in enhancing students' research and learning activities due to their quality and easy access (Akuffo & Budu 2019:10; Kowalsky 2015:949).

Considering the limited financial resources available due to the shrinking library budget at UNZA, open access content provides unrestricted access to the much-needed learning, teaching and research information resources. Additionally, the results of the content and citation analyses reveal that

researchers have the opportunity to publish in top reputable journals under open access provisions. This is why Suber (2015) argues that open access has been and will remain an essential component of scientific publishing because it enables scholarly communication and publishing. Anunobi and Ape (2018:33) and Jain (2012) have stated that open access provides enormous benefits to faculty, students and researchers, including equal access opportunities to resources despite their backgrounds.

6.5.2 Other perceived benefits of using open access resources

The results of the questionnaire, interviews, observation, content and citation analyses also suggest other perceived benefits of using open access resources based on the respondents' independent views and experiences. The respondents explained that open access content increases the students' knowledge and understanding of academic issues as it makes available comprehensive scholarly research from credible publishers. Subsequently, this improves learning and makes it more interesting. To this effect, scholars produce work of high quality that can compete at an international level and that is publishable in high-impact factor journals, as evidenced in the citation analysis. The citation analysis also shows that openly accessible resources had a high impact through the number of citations they received as indicated in Table 5.12 of Chapter Five. With regard to the benefits of using open access resources in academia, the student respondents disclosed that the availability of open access content enables them to explore new research findings and use the information in their assignments. Correspondingly, Terras (2015:734) advocated that open access increases the number of available high-quality resources and enhances the understanding of history, culture and society.

Apart from being accessible concurrently, certain platforms that offer open access content, such as JSTOR, Oxford Online products and ScienceDirect were cited as user-friendly, while providing different referencing styles such as Mendeley. Current online resources also complement the old print collection.

The results further advocate that open access content leads to improved research visibility and increased citations and, therefore, is useful for scholars. Relatedly, previous research has revealed that open access creates opportunities for collaborative research among researchers globally. This results in a wider research visibility, increased usage and high research impact (Anunobi & Ape 2018:33; Beaubien, Garrison & Way 2016:8; Fabian 2013:212; Iwighrehweta & Onoriode 2012:3; Jain 2012:3; Okoye & Ejikeme 2011:1; Shuva & Taisir 2016:36; Suber 2015). The increased downloads and citations of open access articles versus non-open access articles confirm that open access increases research impact.

For example, the content analysis results show that JSTOR usage statistics (62,796 pdf downloads) were higher than most subscription-based databases such as Emerald, EBSCOhost and Cambridge. Additionally, the citation analysis results reveal a generally high usage (95%) of openly accessible resources among the selected researchers' publications. This indicates the relevance of the free open access content to the users. Therefore, the usage of subscription-based resources may not be very different from open access resources once academic quality is guaranteed and the users find them useful in their academic activities.

The study has also revealed that open access gives users opportunities for further research in their areas of interest. This may lead to more research and publishing while improving the academic reputation of individual researchers as well as the affiliate institutions. Accordingly, Okoye and Ejikeme (2011:2) allege that open access helps career development while providing high-quality scholarly work. Therefore, society as a whole should be encouraged to experience the benefits of an expanded and accelerated research cycle for effective advancement of research (Jain 2012:4).

6.6 Challenges students and researchers face in accessing open access resources

In this section, the researcher discusses the results related on the third research objective, to determine the challenges students and researchers face in accessing open access resources. The discussion is based on the results of the questionnaire, interview, observation and content analysis. As indicated in Section 5.5, the discussion uncovers the extent to which general, individual, institutional and social factors influence the use of open access at UNZA.

6.6.1 Individual or general challenges associated with open access use

The questionnaire respondents were requested to relate their experiences with the five challenges indicated in Table 5.19. The statements were as follows:

- i. Marketing of open access resources in the University is adequate;
- ii. I have the necessary Internet search skills to access and use open access resources;
- iii. I find it easy to access open access resources;
- iv. I know how to evaluate online resources including open access resources for quality; and
- v. There is a need to train researchers and students on how to access and use open access resources.

The results suggest that most (65.8%) of the respondents felt that the University's marketing strategies of open access resources was inadequate. The lack of adequate marketing of open access resources was also implied by the interviewees, among whom the awareness level of open access resources was low. This justifies the need to introduce more and more effective awareness services to improve the uptake of open access resources at UNZA.

Below are some of the statements shared by the respondents that revealed the lack of awareness of the available open access resources due to inadequate marketing strategies:

We rarely receive emails from the library on what resources are available for us users, while not much emphasis is made on the use of open access resources at first year orientation (Questionnaire, R1).

The reference librarian's desk is inactive and there is less publicity. Most of the users are not aware (Questionnaire, R2).

Some are aware of the existing open access resources while the majority is not aware (Observation, 1).

Some users know but are just not bothered to try using these resources (Observation, 2).

Meanwhile, the results show that the majority (72.8%) of the respondents had the necessary Internet search skills to enable them access and use open access resources. Just over half (59.3%) of the respondents said that they did not experience difficulties with accessing open access and other online resources. However, the interview results suggest that several students and researchers lacked adequate search skills to access or download the online resources they needed. For instance, the application of Boolean operators in advanced searches was a challenge, particularly to the older researchers (also known as “digital immigrants”). Moreover, the low usage statistics from the content analysis revealed that most users were not conversant with online databases due to a lack of search skills. These results correspond with the findings of Akakandelwa (2007:76) and Dulle (2010:167-8), who cited researchers' low Internet self-efficacy as one of the factors affecting the use of open access resources in UNZA and Tanzanian public universities, respectively.

Lack of Internet skills should be looked into seriously as this is likely to affect the level at which students and researchers will adopt and use current awareness services for their information updates. The binary logistic regression analysis results in Sections 5.8.3.1. and 5.8.3.2 of Chapter Five have shown a significant effect of Internet skills on the students' and researchers' behavioural intention to

use a technology such as current awareness services. As we talk of introducing more current awareness services to help promote open access resources, UNZA should ensure both students and researchers have relevant Internet skills to enable them use these services effectively. This also suggests that awareness services to be adopted should be less complicated to use to encourage users to use them.

The content and citation analyses and observation further confirm that some databases like Research4Life databases, Royal Society and EBSCOhost were not user-friendly. Users have to engage the platform to access available search options. As such, users may not have the patience to become acquainted with seemingly complicated databases and might simply quit searching and use other information sources. Therefore, it is not surprising that more than two-thirds (87.9%) of the questionnaire respondents felt it was necessary to train both students and researchers on how to access and use the open access resources.

Training users to access and use open access resources was also recommended in the interviews (see Section 6.8.2). With this disclosure, it is not surprising that most (61.1%) of the respondents indicated that they did not know how to evaluate online resources for academic quality. Similarly, the study by Mutwiri (2014:88, 89,154) revealed that researchers needed training on how to access open access resources. In line with the present research, Mutwiri's study, among others, recommended implementing deliberate awareness programmes on the available open access content, besides training.

Furthermore, the researcher aimed to prove whether there was a relationship between user search skills and ease of use of online resources using the questionnaire data by cross-tabulating the two variables. The proof of this relationship would assist in understanding and providing evidence of whether the purported information search skills by students and researchers were sufficient for them to access online resources with ease. The results of the cross-tabulation presented in Table 5.20 reveal a lower number of 245 (71%) respondents who found it easy to access and use open access resources, out of the initial 351 respondents that said that they possessed the necessary search skills to access online resources as reported in Table 5.19.

This indicates that having search skills may not mean a complete lack of access challenges. Despite the claim by most of the respondents that they possessed the necessary search skills, some could still be experiencing access challenges, leading to low usage of open access resources (Weissgerber 2021:3). Such users require training to help them experience the full benefits of open access

resources.

6.6.2 Challenges at the institutional level

The researcher assessed the challenges at the institutional level using the following six statements (see Table 5.21):

- i. The use of open access in the University is voluntary;
- ii. The use of open access in the University should be mandatory;
- iii. Librarians are helpful in accessing open access resources;
- iv. Guidance is available to use open access resources effectively;
- v. Institutional infrastructure for accessing online resources at UNZA is good;
- vi. UNZA recognises that open access resources are necessary for career development through the promotion criteria.

The results reveal that, despite the University's recognition of the need for open access resources for career development (promotion criteria) among its academic staff, the use of open access remained voluntary. Going forward, the respondents (61%) recommended that using open access resources in the University should be mandatory. In addition, the results of the questionnaire, interviews and observation reveal inadequate guidance from librarians to assist users in accessing open access resources. The results also showed a lack of or inadequate infrastructure meant to facilitate the use of open access resources and current awareness services. Issues with infrastructure in the library included poor IT infrastructure in terms of slow or inadequate Internet connectivity due to limited bandwidth. These in turn affect the download of articles. There was also not enough Internet access points and computers to cater for the entire student populace.

Similarly, the literature review reported a lack of or poor IT infrastructure (poor Internet connectivity and few access points, limited bandwidth), which are crucial in handling open access, in many African countries. IT infrastructure includes Internet connectivity and bandwidth allocation (Bauer, Brooks & Hampton 2020; Ivwighrehweta & Onoriode 2012:9; Suber 2015; The World Bank 2021). Consequently, Bauer, Brooks and Hampton (2020) have argued that the problem of poor Internet availability and connectivity keeps most rural and socioeconomically disadvantaged students from using online resources. Additionally, The World Bank (2021) reported that only 35% of the people in developing countries had access to the Internet compared to 80% in developed countries. As a result,

Petri (2017) calls for funding in developing countries to facilitate reliable Internet access and librarian training on open access promotion and use to bridge this digital divide. It is estimated that increasing Internet connectivity to 75% of the population in all developing countries (from the current level of approximately 35%) would add about US\$2 trillion to their collective gross domestic product (GDP) and would help create over 140 million jobs around the world (The World Bank 2021).

Furthermore, the respondents indicated a lack of simple guidelines for users when downloading articles from different key information sources. Relatedly, Anunobi and Ape (2018:21,34) contend that librarians as champions of open access are not only expected to collaborate in its development through repository implementation but should also ensure discoverability and accessibility of open access resources.

However, the results also reveal a lack of adequate human resources in terms of information support staff in the library to adequately offer help to all users. This could explain why the respondents said that they did not get enough help from librarians. The observation data confirmed that the library had been operating under difficult working conditions for a long time, with limited staff, while serving a constantly growing user population.

6.6.3 Social challenges

The researcher assessed the influence of social factors on open access usage using the questionnaire, the interviews and observation data. The questionnaire results presented in Table 5.22 show that more than half (56%) of the respondents felt that lecturers are motivated by students who use open access resources in their academic work. The study further indicates that researchers were not motivated by their fellow researchers, and likewise, students were not motivated by their fellow students to use open access resources.

Meanwhile, although most of the respondents agreed that lecturers encouraged students to use open access resources, the interviews revealed that some lecturers did not do so. It was also noted that other lecturers continued to recommend old print books to their students and demanded that the students replicated these notes in the exams. Commenting on the use of print resources and lecture notes, one student interviewed complained that the issue of handouts of lecture notes made the students lazy to look for more information online on their own. The respondent added that students

and lecturers should be encouraged to shift from print materials and lecture note handouts to current online resources (Questionnaire, R4).

Additionally, the observation revealed that students usually refer to use lecture notes first before anything else because these are precise and readily available. The heavy dependency on lecture notes could further suggest two issues: first that the students only read to pass their examinations. Secondly, it may be indicating the teaching methods at UNZA that students are merely taught to pass their examinations and not to become life-long learners. These results confirm earlier research findings by Miyanda (2010:66) and Sakala (2016:33), who reported that UNZA students mainly used print resources and lecture notes, which contributed to the low usage of electronic resources at the University.

Looking at the high number of questionnaire and interview respondents that indicated that they used and found open access resources relevant in their academic work (58% and 69% respectively) (see Section 6.4.4), it may imply that lecturers that used and found open access resources relevant also pointed their students to the same resources. In the same vein, those that did not use the open access resources did not refer their students to open access resources simply because they did not have a positive experience with the resources.

Kaba and Said (2015:10) have revealed a strong positive correlation between awareness, level of use and perception of open access resources. They explain that faculty members with a high level of awareness and use of open access resources have a high level of interest in and regard for open access resources. Likewise, Mutwiri (2014:88-89,154) established that the poor usage of open access among academics in selected Kenyan universities was because they neither accessed important research findings by other scholars nor used open access outlets for research dissemination. As such, it cannot be expected that lecturers and their students will use and recommend resources of which they are not aware. To this effect, Mutwiri (2014:88-89,154) claims that there is a high likelihood that the adoption of open access content will continue lagging behind as long as researchers will remain ignorant of their existence.

The results of the interviews and observation also suggest that lecturers have a more significant influence on students than the librarians who do not teach or assess them. If lecturers direct their students to use open access resources in their assignments, they will do so naturally, believing it is the best information to use. Consequently, some students interviewed argued that lecturers should be willing to use open access resources first and then encourage their students to use them

(Questionnaire, R5). This means that lecturers need to know latest resources in the library and recommend them to their students. Lecturers should also organise training for their students with librarians. They can then demand that students use the latest information in the assignments.

6.6.4 Other challenges

The study highlighted and identified other challenges from the research data based on the respondents' own opinions. The results from both the questionnaire and interviews revealed a lack of awareness of open access resources as the top constraint to using open access resources. The questionnaire respondents narrated that the acceptance letters to first-year students did not mention the availability of open access resources in the University. Others said they did not know where to find these resources and therefore did not use them (Questionnaire, R4 and Interviews R9 & R10). This explains why most respondents felt that the marketing of open access resources at the University was inadequate as already indicated in Sections 5.5.1 and 6.6.1. The lack of awareness was associated with low publicity, lack of regular sensitisation and poor communication from the library to schools on what is available.

Another challenge brought out by the study is the inadequate time for students and researchers to access online resources due to their busy schedules. This exposes a typical characteristic of an ignorant user of online resources. Time should not be a challenge to seasoned researchers and users of online resources because open access resources are freely accessible to users all the time, simply at the click of a button. Hence, the use of open access resources should instead help users save time. As Chatterjee (2017:108) argues, the speedy provision of relevant information online keeps specialists and professionals better informed in their respective fields of interest while saving time and money.

Another challenge identified was access restrictions on certain databases based on usernames, passwords or IP addresses. These restrictions curb access to open access resources at the most crucial times. These restrictions discourage the use of open access resources, resulting in low usage levels, as observed in this study. Similarly, Bauer, Brooks and Hampton (2020), Okoye and Ejikeme (2011) and Suber (2015) have argued that restricted access to knowledge inhibits the development of science and severely affects the general well-being of people.

Therefore, this reveals a critical need to make research findings freely available to as many academics as possible. Researchers in the developing world, particularly in Africa, need to utilise the

free scientific research provided through the open access initiative to advance knowledge (Bauer, Brooks and Hampton 2020; Iwighreghweta & Onoriode 2012:1; Okoye & Ejikeme 2010:2).

Additionally, the results have also revealed a negative attitude among users towards the importance of using open access resources. This is due to the incorrect conception that the library only offers outdated resources. The responses from the questionnaire's open-ended questions, interviews and observation also revealed that some users felt that certain open access databases like JSTOR provided outdated literature that is only suitable to those in the humanities, despite the database offering quality academic resources relevant to various fields. Meanwhile, some users are slow to accept change and end up continuing using print textbooks, grey literature and Google for their academic information. Other researchers indicated that they are not motivated to publish unless it will enable their promotion. JSTOR is, however, not the only database that UNZA's library provides to its users. The library is aware that there is no single database that would adequately meet the numerous information needs of all users in the University. For this reason, the library provides many databases that cater to the subject mix presented at UNZA. Therefore, users should not be restricted to a single database but should explore more databases relevant to their subject areas and information needs.

6.7 The existence of current awareness services at UNZA and elsewhere

This section concentrates on the results of objective four, which focuses on identifying the existing awareness services in promoting open access resources at UNZA and elsewhere. These include both the awareness services used by the library to provide updates to users and any other awareness services used by students and researchers to get updates on research information. The discussion is based on the data from the questionnaires, interviews, observation, content analysis and related questions as presented in Section 5.6.

6.7.1 Experiences with current awareness services at UNZA and elsewhere

As illustrated in Figure 5.4, a relatively small number (less than 50%) of the respondents had experiences with the listed current awareness services. The library website had the highest (29.5%) number of respondents users, followed by social media (25.3%), vendor/publication alerts (17.3%), SDI (16.7%), TOCs (16.2%), while the rest of the awareness services had less than 15% users.

These results suggest some level of usage of current awareness services at UNZA. From the

observation and interviews, it was noted that the Serials Department used certain awareness services to market and share the available online resources with students and lecturers in various schools and departments. These included the selective dissemination of information, fliers, posters and displays of the latest issues of journals and books. The results reveal that the Serials Department shared key selected journal article lists to respective schools through SDI. The Department also sends more than one thousand fliers annually to sensitise users of e-resources and offered training.

Other awareness services identified were Google alerts, students' learning portals (Moodle and Astria), social media platforms (Facebook and Twitter), academic social networks (LinkedIn, Academia.edu and researchgate), the library's Online Public Access Catalogue, email alerts, notices on noticeboards, WhatsApp study groups and direct interaction with librarians and fellow students.

Despite the results indicating the existence and use of current awareness services at UNZA, it should be noted that the reported usage of these alerting services was on a small scale. This could explain why most respondents, including some librarians, expressed ignorance of current awareness services in use in the University. Since the application of these alerting services is not exhaustive, there is need to apply them on a large scale and in an effective manner to experience a huge impact on the awareness and usage of open access resources at the University. Further, the literature review exposed the general availability and use of various unique current awareness services in different forms, involving different user groups and locations at global level (Chatterjee 2017:110-114; Naqvi 2013:108; Uzohue & Yaya 2016:14; Xu 2012:155). These studies identified SDI services, displays of latest books and periodicals, bulletin board services, calendars of events, summaries of recent events, annotated lists of new books and abstracts of newly acquired library materials, and Google alerts.

Therefore, it is necessary to improve the application of current awareness services to achieve more publicity of the available services and open access resources. Current awareness services are meant to support and sustain research, education and science. Therefore, their effective use would improve research, education and science.

6.7.2 Other unique experiences with current awareness services

The researcher sought to investigate any other updates students and researchers were exposed to without knowing. For this purpose, the researcher asked the questionnaire respondents who had shown awareness of open access resources to indicate how they became aware of the resources. The results, as recorded in Figure 5.6, show that most respondents were made aware of open access

resources through their fellow students, friends, during training and school/class WhatsApp groups.

The interviews, observations and content analysis further suggest that most online resources users had experiences with certain awareness services, but they were not aware of it. The findings from the content analysis (see Table 5.24) clearly show that all the six databases studied offered various alerting services. These included live chats, vendor/publisher alerts, search alerts, TOCs, new issue or article alerts, newsletters and social media tools.

Those that used these databases are likely to have received emails based on their search history to alert them of related articles available. During the interviews, the researcher probed further to get more detail from the respondents concerning this aspect. Some respondents confirmed that they received email alerts, but mostly ignored or deleted them. However, those that opened them indicated that they found them very useful because they were directed to more research data related to their areas of interest.

Correspondingly, Xu (2012:155) contends that the likelihood of the users' lack of knowledge of such alerts is very high because publisher/vendor alerting services base their information needs on user information searches and interests without their knowledge. Consequently, librarians should actively sensitise users to look for vendor alerts to keep themselves abreast of the latest developments and related information in their areas of interest (Xu 2012:155).

6.7.3 Usefulness and impact of the updates received

The usefulness of the alerts received was assessed using the questionnaire and interview data. The researcher asked the respondents to rate the usefulness of the updates they had received. The results recorded in Figure 5.7, indicate that, on average, the majority of the respondents (89.6%) found the updates useful. These results advocate that vendor/publisher alerting services are important services in helping researchers remain up-to-date.

The results further confirm that vendor/publisher alerts are among the awareness services available at UNZA. Various web-based alerting tools can be accessible to users directly from the service providers in this electronic era. Therefore, the library should be encouraged to introduce more such awareness services to promote the use of open access resources and strengthen those already in use. This echoes the literature reviewed that showed that the application of suitable alerting services helps professionals to filter and monitor the ceaseless flow of information on their areas of

interest to only capture information that is relevant to their information needs (Chatterjee 2017:107; Xu 2012:153). Therefore, the researcher is convinced that it is of utmost importance that the University strategically applies the current awareness services identified to promote awareness, access and use of open access resources.

6.8 Appropriate alerting services and other measures to promote open access resources

6.8.1 Recommended current awareness services and their impact on the use of open access resources

In this section, the identified awareness services and other measures, which the University could adopt to promote and improve open access resources uptake, are discussed. This discussion covers research objective five. The research questions investigated the types of current awareness services and other strategies that are more likely to help promote access to and use open access and other online resources at UNZA. For this purpose, the data from the questionnaires, interviews, observation and content analysis were used.

Whether in print or digital format, the provision of information has no value if it is not used and appreciated by the intended users. Therefore, the availability of open access resources requires appropriate awareness strategies to help the users make an informed decision in their everyday commitments.

The questionnaire results presented in Table 5.25 show that social media and email alerts/RSS alerting services were highly recommended for adoption with 90.9% and 90% support, respectively. These were followed by Google alerts with 77.6%, SDI with 69.1%, while TOCs and vendor/publisher alerts are the least recommended, rating below 50%. The recommended use of social media and emails for updates should have been anticipated, because most respondents were students, who are frequent users of social media platforms. It is believed that they would readily adopt services made available through these familiar channels. This would help promote the use of open access resources in the University, resulting in increased uptake. This perspective is similar to that of Venkatesh *et al.* (2003:329) who argued that the ease of use (effort expectancy) of a technology is one of the major factors that affect an individual's technology acceptance. It is believed that users are likely to accept and use a technology if they find it readily available and easy to use.

In the so-called "Google era" the younger generation uses Google searches for almost everything, including academic information. Considering these results, UNZA's library may want to explore the

use of a combination of awareness services to cater for all types of user information needs in the University. More recent and seemingly complicated alerting services such as social media tools, emails and Google alerts could be used to serve the younger generation that are keen to learn through new technologies, while older and seemingly easy to use awareness services such as SDI, TOCs, displays of new resources and physical meetings could advantage and serve the older users. A mix of awareness services is recommended to cater for all the user information needs, expectations and abilities based on their Internet skills and exposure. Consequently, this would improve access and use of open access resources at UNZA.

While the study at hand recommends mostly similar awareness services as those identified by Naqvi (2013:101,108), there are additional unique awareness services Naqvi identified. These include the bulletin board services, calendar of events, news clipping service, contents page service, summary of recent events, document delivery service, annotated lists of new books and abstracts of newly acquired library materials, which UNZA's library may wish to consider in promoting the use of open access resources.

Additionally, this study has brought to light other current awareness services in use at UNZA. These include mobile phone text/Short Message Services (SMS) alerts, UNZA radio, electronic billboards, flashcards on Moodle, customised online student portals (Student Information System, Moodle and Astria) and other social media hubs with open access resources for easy user engagement, awareness and communication. Supporting the use of SMS-based alerting services, Anbu and Mavuso (2012:319) revealed that SMS-services could successfully motivate and engage library users to use e-resources. SMS-services are also cost-effective, timely, effective and can cater for the basic information needs of users. Applying such services is likely to raise awareness of open access resources and subsequently, their use by UNZA students and researchers.

6.8.2 Other strategies recommended towards improving open access usage

The researcher further sought to get the respondents' thoughts on what else would help improve the usage of open access resources and other e-resources in the University, apart from awareness services. The following suggestions were made and are presented in order of preference.

The first recommendation was for the library to increase and regularise open access promotions to inform students and researchers of their academic value. Promotions could take the form of weekly alerts based on user profiles and subject interests, a library information desk, open access week

advocacy, peer-to-peer training, posters, banners and fliers in strategic areas and sensitisation at top management level (for example, meetings). Similarly, Anunobi (2018:34), Naqvi (2013:108) and Yi (2016) suggest that academic librarians should be more active and dedicated to the promotion of open access resources through strategic publicity. This would ensure that the knowledge produced adds value to the community of researchers and expedite further knowledge invention.

Additionally, the study results suggest using seminars and workshops, online discussion groups, first-year student orientations, physical visits to schools and presentations at school board meetings, simplified booklets and guides to open access journal articles. These could be made available both online and in print, with a provision for feedback from users so that all access challenges or related issues can be quickly resolved. One of the interviewed librarians revealed the need to form school-based committees through liaison librarians with a view to promote open access resources in the schools (Interviews, R6). Another respondent emphasised that awareness programmes should not be left to the library to undertake alone but should involve all schools and departments, the student body and University the Management (Interviews, R7).

The second suggested strategy was to improve the information search skills of the students and researchers (as evidenced in Section 6.6.1). The results of the binary logistic regression analysis further reveal a significant influence of Internet skills on user intention and usage behaviour of a technology. This indicates the need for continuous training of users on how to access and use open access resources, starting from first-year level. Occasionally, publishers should also conduct training and marketing of their online resources to motivate users. Training should also involve imparting skills on how to evaluate the quality of open access resources in academia because most of the respondents in Section 6.6.1 indicated that they did not know how to evaluate online resources for academic quality. The respondents added that training could be integrated into the curriculum and offered as a full, examinable course with continuous assessment. This would emphasise the importance of using open access resources.

Training to improve the search skills of users was also recommended by Akakandelwa (2007:76), Kaba and Said (2015), Miyanda (2010:52) and Naqvi (2013:108). In addition to training, Naqvi (2013:108) suggested a comprehensive orientation of library users on using various types of awareness services, their functions and their significance to learning, research and other fields of interest.

The third suggested strategy was to make open access resources easily accessible to all users, all the time. As such, the respondents recommended the removal of subscriptions and username/passwords restrictions where they exist. They also suggested improved Internet and Wi-Fi connections, increased access points, more computers and Internet laboratories (Internet infrastructure) and adequate funding to facilitate easy and immediate access and use of open access resources in the University.

Other suggestions included making the use of open access resources mandatory, especially for students. In which case there should be an establishment of an explicit open access policy to govern the use of open access resources, increased operating hours of computer laboratories, and the employment of more information specialists exclusively for the use of open access resources. Meanwhile, the employment of more librarians should boost the low staffing levels currently experienced in the library. Further, lecturers should encourage or motivate students to use open access resources. As discovered in the interviews, students look up to their lecturers as role models and mentors.

Additionally, the researcher observations showed that, while all the above are considered necessary, much more is needed to change students' and researchers' negative attitude towards the quality and usefulness of open access content in academia.

6.9 Theory validation

Following the earlier discussion of the results of the descriptive statistics, in this section, the results of the inferential statistics are discussed. The section aims to understand the level to which the UTAUT research theory was applicable to the research findings in reference to factors that influence open access use as well as the application of current awareness services as a technology. UTAUT model was discussed in Chapter Three in detail. For validation purposes, the measurement model and structural model analysis were used.

Fitzhugh (2009:2-3) indicates that theory testing requires a researcher to know and observe the causal conditions under which a particular theory is claimed to provide understanding. Theory testing determines whether or not the causal relationships between or among constructs stated in a theory manifest themselves and the effects subsequently observed. If the observed effects are as predicted, it then confirms the theory's validity. Alternatively, if the effects observed from testing the causal conditions of two or more variables are different from those predicted by the theory or do not appear

to provide relevant causal understanding, this becomes potential evidence to disconfirm the theory. This also, potentially, leads to the consideration of other theories, the data used or the revision of the theory.

6.9.1 Measurement model assessment results

The measurement model assessment was conducted to establish variables relevant to measuring each factor or construct using the factor analysis and binary logistic regression analysis. The researcher used a 0.5 minimum factor loading as recommended by Amora (2021:3). The researcher also applied discriminant and construct validity to determine variables for retention or elimination in the factor analysis until the desired Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was attained.

6.9.2 Factor analysis and logistic regression analysis results

Before conducting the factor analysis, the researcher ensured that the preliminary requirements were met. The sample size was large enough (falls in the “very good” range) to generate a correlation matrix of five constructs. The sample size to variable ratio was 9:1, which was more than the recommended ratio of 5:1, and all the 61 values/responses examined were numeric or metric in nature (Watkins 2018:223). These results, therefore, supported the preliminary possibility of running the factor analysis on the study data.

The factor analysis results, using the KMO measure and Bartlett’s test, yielded five constructs, KMO measure of sampling adequacy of 0.694, the Bartlett’s test of sphericity (approx. Chi-square) of 1709.786, degree of freedom (df) of 595 and 0.001 significance (sig.) level. The KMO measure and Bartlett's Test results are presented in Table 5.26, while the construct loadings are presented in Table 5.24. The five constructs that were measured were Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), Social Influence (SI) and Internet Skills (IS).

The logistic regression analysis test results revealed several factors that significantly influenced the students’ and researchers’ behavioural intention and usage behaviour of both open access content and current awareness services as a technology. For the purposes of correct interpretation of the logistic regression-based results, the researcher adopted the two commonly accepted measures, the Exponentiated odds ratio (Exp(B) for factors and the significant unstandardised regression coefficients (B) (Fernandes, Filho, Rocha & Nascimento 2021:9; Hernandez & Mazzon 2007; Seperandei 2014:12-18).

The logistic regression analysis results were interpreted as follows:

$\text{Exp}(B) > 1$ against a specific factor means that the modelled event occurrence increases;

$\text{Exp}(B) < 1$ implies decreasing chances of the modelled event occurrence;

$\text{Exp}(B) = 1$ means lack of change in chances for the modelled event to occur.

The percentages were calculated by subtracting 1.0 from the $\text{Exp}(B)$ value of the construct in question, multiplied by 100. For example, on facilitating conditions whose $\text{Exp}(B)$ is 1.839, as indicated in Table 5.28, would be $1.839 - 1 = 0.839 * 100 = 83.9\%$. This implies an 83.9% higher probability of open access usage and/or current awareness services by individuals who believed that facilitating conditions significantly influenced the behavioural intention of the students and researchers to use open access resources and awareness services than those who did not believe so. Similarly, the $\text{Exp}(B)$ 0.434 against the performance expectancy factor in Table 5.25 is an indication that the respondents who considered performance expectancy to have less influence on user intention to use open access resources and/or current awareness services were 43.4% less likely to use the resources and services compared to those that had a positive perception.

While most observations confirmed the predicted causal conditions of the UTAUT model, other observed relationships did not show relevant causal understanding of the predicted relationships, as will be highlighted in the subsequent discussion. The causal relationships are considered in two parts. The first part covers the determinants of the students' and researchers' behavioural intention to use open access content and current awareness services as a technology. The second part discusses the determinants of students' and researchers' open access/current awareness services usage behaviour.

6.9.3 Key determinants of the students' and researchers' open access resources and/or current awareness services' usage behavioural intention

The logistic regression analysis results in Table 5.28 show facilitating conditions, performance expectancy, Internet skills and effort expectancy as direct predictors of the students' and researchers' intention to use open access resources and current awareness services as a technology. At the same time, social influence had no significant effect.

The lack of significant effect of social influence on students' and researchers' behavioural intention to use open access resources or current awareness services, as observed in the current study, corroborates the study findings of Chiu and Ku (2015:7) and Dulle (2010:213), which show that

social influence had no significant influence on the behavioural intention to use a technology. Similarly, Venkatesh and Davis (2000) and Venkatesh *et al.* (2003:451-452) suggest that social influence is not significant in voluntary contexts. They attribute its non-effect to compliance in mandatory contexts, making it directly affect intention.

This means that social influence only becomes significant when use is mandated and in the early stages of individual experiences with a technology. Its role attenuates over time and eventually becomes non-significant with sustained usage. This could explain why the social influence construct in the current study had no effect on students' and researchers' behavioural intention of open access resources and alerting services use since their use in the University is voluntary. Venkatesh and Davis (2000) and Venkatesh *et al.* (2003:451-452) further revealed that social influence in voluntary contexts operates by influencing perceptions about the technology based on internalisation and identification. Correspondingly, the research findings of Chiu and Ku (2015:7) on the role of voluntariness in the use of electronic health records suggested that factors affecting actual usage were different in mandatory and voluntary environments.

At the same time, other studies have reported a significant effect of social influence in predicting intention to use a technology (Ali & Arshad 2018:263; Magni, Angst & Agarwal 2012:34; Mensah 2019:11; Nurkhin & Nurkhin 2019:1018). The four established determinants of students' and researchers' behavioural intention of open access resources and/or current awareness services' usage in this study are discussed in the following sections.

6.9.3.1 The effects of facilitating conditions on behavioural intention to use of open access resources and/or current awareness services

The facilitating conditions construct was found to significantly ($p=0.004$) influence students' and researchers' behavioural intention of open access use and alerting services as a technology (see Table 5.25). The Exponentiated odds ratio results ($\text{Exp}(B) = 1.839 - 1*100$) suggest that the respondents who agreed that facilitating conditions positively influenced open access resources and/or current awareness services usage intention were 83.9% more likely to use these resources and services than those that did not agree.

This result should be encouraging to UNZA's library, as it indicates that improved facilities for open access in the University would significantly influence the students' and researchers' intention to use the available open access resources. This also implies that good facilities would ease the use of

alerting services by students and researchers. Ultimately, this positively predicts the future uptake of open access resources in the University.

While this study's results are contrary to those of Venkatesh *et al.*'s (2003:453,461) study, which showed that facilitating conditions had a direct influence on technology usage, other studies have also revealed facilitating conditions as a strong predictor of intention to use a technology (Afonso *et al.* 2012:7; Ali & Arshad 2018:263; Ambarwati, Harja & Thamrin 2020:484,486,487; Chang 2013:488; Kampookaew 2020:55; Mensah 2019:11; Nurkhin & Nurkhin 2019:1012-1013; Teo & Ursavas 2012:198; Turel, Serenko & Giles 2011:1055). These support the findings of the current study.

Ambarwati, Harja and Thamrin (2020:486) report that the significant impact of facilitating conditions on the behavioural intention to use an online learning platform was primarily associated with the availability of the resources required to use the platform. The resources included supporting infrastructure such as widespread Internet access, easy access to mobile devices and file sizes that affect access speed. It is, therefore, important for the open access proponents to work on strengthening all relevant institutional infrastructure and resources meant to enhance the uptake of open access resources and all other e-resources in the University.

6.9.3.2 Performance expectancy as a direct determinant of open access and/or current awareness services usage behavioural intention

Like facilitating conditions, performance was found to significantly ($p=0.001$) influence students' and researchers' behavioural intention of open access use and/or current awareness services as indicated in Table 5.25. The Exponentiated odds ratio results of 0.434 (<1) suggest that respondents who did not believe that performance expectancy influences user intention were 43.4% less likely to use open access content or alerting services than those that believed so. This result implies that more should be done to convince individuals to appreciate and eventually use open access resources and alerting services.

These results agree with Venkatesh *et al.*'s (2003:447) view that performance expectancy has a significant and direct influence on user intention to use a technology. Several other researchers have further argued that the performance expectancy construct is one of the strongest predictors of intention and remains significant at all points of measurement in both voluntary and mandatory settings (Chang 2013:488; Fakhoury & Baker 2016:48; Farah, Hasni & Abbas 2018; Marriott &

McLean 2019:19; Nurkhin & Nurkhin 2019:1012; Tan & Lau 2016:24).

Other researchers that have revealed performance expectancy having a significant effect on behavioural intention to use a technology include Afonso *et al.* (2012:7), Ali and Arshad (2018:264), Chao (2019:4), Hutabarat (2021:13), Kampookaew (2020:56-58), Ko (2019:5-6), Lien *et al.* (2015:6) and Teo and Ursavas (2012:198).

These results indicate how influential performance expectancy is on students' and researchers' decisions to use open access resources. The interviewed researchers indicated that open access provided them with an opportunity to write good quality research papers that could compete internationally and, therefore, strengthened their abilities to publish in prestigious journals such as Lancet, Plos One, and others. The students added that they were able to write well-articulated assignments with the use of open access resources.

Meanwhile, Mensah (2019:11) revealed that performance expectancy does not affect behavioural intention to use a technology. This finding could mean that in the context of the sample studied; the aspect of performance expectancy related to the use of a technology was not influential enough to trigger user intentions to use a resource or technology. This could be due to a lack of a conducive environment for users to experience and appreciate the benefits thereof.

6.9.3.3 Effort expectancy as a direct determinant of open access resources and/or current awareness services usage behavioural intention

Effort expectancy as a construct was also found to significantly ($p=0.001$) influence the students' and researchers' intention to use open access resources and alerting services technologies, as revealed in Table 5.28. Like performance expectancy, effort expectancy recorded an Exponentiated odds ratio of less than 1 (0.385). This signifies that respondents with a negative perception of effort expectancy's influence on user behavioural intention of open access resources or awareness services usage were 38.5% less likely to use them than those with a positive perception. This finding calls for more effort to convince individuals that accessing open access resources does not require complex skills as it involves a simple step-by-step process.

These results are supported by the research conducted by Teo and Ursavas (2012:198), Turel, Serenko and Giles (2011:1055) and Venkatesh *et al.* (2003:467). They found that continued use of a specific technology increases its ease of use, especially for IT-proficient individuals or simple

technologies. This observation offers a good explanation to why some studies have reported a lack of significant relationship between effort expectancy and intention to use a technology (Ali & Arshad 2018:263; Al-Ruz & Khasawneh 2011:84; Chao 2019:4; Mensah 2019:11). The understanding is that investigating the use of a technology that has been in existence for some time is likely to show decreasing effect of effort expectancy to no significant effect on the intention to use the technology. This is because users become adept at using the technology over time. This is the same reasoning Venkatesh *et al.* (2003:469) applied in suggesting that experience moderates the effect of effort expectancy on technology use. In the present study, effort expectancy was found to be significant despite the existence of these resources and services in the University for years, simply because most of the respondents were not aware. As a result, open access resources and current awareness services could still be considered a new technology.

6.9.3.4 Internet skills as a determining factor of open access resources and or current awareness services usage behavioural intention

The Internet skills is the fourth construct found to significantly affecting the students' and researchers' usage behavioural intention of open access resources and current awareness services (see Table 5.28). Internet skills was found significant at $p=0.002$, with the Exponentiated odds ratio of 0.506 (also <1). Respondents who did not agree that Internet skills influenced user intention to use open access content and/or current awareness services were 50.6% less likely to use them than those who agreed. This explains why most of the respondents in Table 5.19 of Chapter Five and Section 6.6 suggested training of both students and researchers on how to access open access resources and other resources, despite indicating earlier that they had necessary search skills. Similarly, users that were receiving Google alerts did not know these alerting services due to lack of effective Internet skills.

Additionally, the interview results show that users lacked search skills to access and download online resources and, therefore, did not use them. Commenting on the importance of training in upgrading user search skills, Akanni (2017:56) argues that users have to make a conscious effort to further develop and enhance their ICT skills to benefit from certain technology products like open access resources. Technology is not static, so users must keep abreast of the changes in technology.

Similarly, Chao (2019:5), Pan (2020:2) and Teo and Ursavas (2012:198) showed self-efficacy as one of the strong predictors of behavioural intention of technology use despite Venkatesh *et al.* (2003:55) showing self-efficacy having an indirect influence on intention of technology usage. Dulle

(2010:214) adds that the effect of Internet self-efficacy towards researchers' behavioural intention is eclipsed by effort expectancy. This contradicts the present study's findings.

6.9.3.5 Moderating variables as direct predictors of open access resources and/or current awareness services usage intention

Although no moderating variables were found to significantly influence any construct relationship on the intention to use the open access resources, age and specialisation were found to directly predict intention to use open access resources and/or alerting services (see Table 5.25). Age was significant at 0.043, with Exp(B) of 2.545, while experience was found significant at 0.009 with Exp(B) of 0.968. In essence, these results indicate a high likelihood of age influence on behavioural intention to use open access resources and alerting services. The results also indicate the need for a highly strategic approach towards open access promotions to encourage inexperienced students and researchers to appreciate and use open access resources.

6.9.4 Key determinants of open access usage behaviour

The logistic regression analysis results as reported in Table 5.26 reveal six direct determinants of usage behaviour of open access resources and current awareness services among students and researchers at UNZA. These were facilitating conditions, performance expectancy, social influence, Internet skills, effort expectancy and voluntariness. Detail in the following sections.

6.9.4.1 Facilitating conditions as a determinant of open access and/or current awareness services usage behaviour

The facilitating conditions at UNZA towards enabling access to and use of open access resources and/or alerting services was found significant at $p=0.001$ with an Exponentiated odds ratio of 0.213. Based on the interpretation given in Section 6.9.2 of this chapter, this result suggests that the respondents who did not agree that facilitating conditions had a positive influence on open access and/or alerting services usage behaviour were 21.3% less likely to use open access resources than those that agreed.

The respondents conclusively indicated that the institutional infrastructure for accessing online resources at UNZA was not good enough (see Section 5.2.2). They further recommended more Internet access points, improved bandwidth, more staff dedicated to open access promotions and

appropriate awareness programmes. Inadequate technical support required to enhance the uptake of open access resources need to be addressed. The provision of necessary technical support such as the required ICT infrastructure (Internet access points and laboratories, computers, bandwidth), affordable Internet facilities, research/scholarly funding and scholarships towards staff skills upgrading, and availability of online research literature for researchers would encourage the adoption of technology use, including alerting services (Mensah 2019:8-9). Consequently, the absence of these facilities would hinder the effective use of open access resources by the students, lecturers and researchers. It would also affect the application of current awareness services in promoting open access resources usage.

Other studies that have shown a significant relationship between facilitating conditions and usage of open access resources and/or current awareness services include Akanni (2017: 56), Attuquayefio and Addo (2014:79), Chiu and Ku (2015:8), Mensah (2019:8-9) and Torto (2019:155).

6.9.4.2 Performance expectancy as a determinant of open access and or alerting services usage behaviour

Performance expectancy is another construct that directly affected students' and researchers' use of open access resources and/or current awareness services at UNZA. The construct recorded $p=0.002$, with an Exponentiated odds ratio of 0.454. This suggests that the respondents who did not believe that performance expectancy influenced open access resources or alerting services usage were 45.4% less likely to use them than their counterparts who believed so. The results shown in Table 5.15 confirm that the majority of the respondents had a positive perception of open access resources. Over 60% of the respondents revealed that open access resources were relevant in their academic and professional work. The respondents added that open access resources were original and presented high-quality research content; hence were beneficial. Likewise, users that agreed that they had received alerting services such as email alerts and RSS indicated that they found them useful as they pointed them to more related scholarly research for both their academic and professional work.

These results uphold the findings of Hamzat and Manawonku (2018:10), which show that performance expectancy is a critical factor in determining engineering students' use of digital libraries in Nigerian universities. Torto (2019:121,149) adds that faculty members in higher educational institutions in Ghana strongly believed that applying open access resources would help them access current information concerning the courses they taught. Using these resources made them perform their jobs more efficiently while increasing the learning outcomes of their students.

These results are slightly different from the findings of Anouze and Alamro (2019:101), Nikolopoulou, Gialamas and Lavida (2021:7) and Venkatesh *et al.* (2003:450), which indicated an indirect influence of performance expectancy on technology use. These scholars argued that performance expectancy influences user intention, which, in turn, triggers actual usage behaviour.

6.9.4.3 Social influence as a determinant of open access resources and/or alerting services usage behaviour

Social influence as a construct was also found to significantly ($p=0.005$) influence usage behaviour with an Exponentiated odds ratio of 2.015. Respondents with a positive perception of open access resources and/or alerting services were 10.2% more likely to use them than those with a negative perception. This difference in technology acceptability points to a need to involve students and lecturers in influencing their fellow students or lecturers to use open access resources in their academic work as well as applying alerting services for information updates to improve open access uptake. Students and lecturers could also act as role models or champions for using both open access resources and alerting services as the respondents revealed that only a few lecturers encourage and motivate students to use open access resources and vice versa (see Table 5.22). Therefore, more students and lecturers should take up this responsibility.

Therefore, the researcher assumes that the users' social influence significantly impacts the usage behaviour of other users to use either open access resources and/or alerting services. When important people such as lecturers and top researchers recommend using open access resources or alerting services to students and fellow researchers, the likelihood of them complying and adopting these resources and services becomes very high (Afonso *et al.* 2012:6). As such, identifying individuals with high social impact and early adopters of the technology to model and champion the usage behaviour to others is recommended. Their successes may also be publicised to cultivate a positive reaction from their colleagues.

However, as discussed in Section 6.9.3, it is worth noting that social influence takes different forms of effects in voluntary and mandatory contexts reliant on factors at play. Social influence has been found insignificant in voluntary environments but becomes significant once use is mandated. Still, in mandatory contexts, the effect of social influence is stronger at the beginning of the use of the technology and diminishes over time as users get familiar and begin to appreciate the technology (Chiu & Ku 2015:7; Nurkhin and Nurkhin 2019:1018; Venkatesh & Davis 2000:198-9; Venkatesh *et al.* 2003:451-452).

6.9.4.4 Internet skills as a determinant of open access resources and/or alerting services usage behaviour

Internet skills as a construct was found to significantly influence behavioural usage of open access resources and/or alerting services by $p=0.001$ with an Exponentiated odds ratio of 2.202. The interpretation is that the respondents who agreed that Internet skills positively affected usage behaviour of open access resources and/or current awareness services were 12% more likely to use them than those who did not agree. The results show that fewer respondents believed that Internet skills significantly influenced usage behaviour than those who believed it did not. This confirms the results in Table 5.19, which show that, although the majority (72.8%) of the respondents said that they possessed the necessary Internet search skills to access and use open access resources, most of them (61.1%) did not know how to evaluate online resources, including open access resources, for academic quality. Similarly, most respondents indicated that they had no experience with current awareness services for updates.

Correspondingly, studies by Al-Ruz and Khasawneh (2011:84) and Pan (2020:7-9) confirm that technology modeling was positively associated with technology self-efficacy, technology proficiency and technology usefulness. Internet skills affected the students' confidence to interact with the technology via the discussion board, digital dropbox and e-mails. This shows the development and role of Internet skills as a contributor to the direction, intensity and persistence of efforts regarding open access use. Mota and Cilento (2021:6) explain that Internet knowledge is necessary for improved Internet use, hence, predicts Internet use. The implication is that learning about and becoming familiar with a technology (open access resources and/or current awareness services) should be a part of the competencies-building process to broaden the students' and researchers' ability to engage in a broader range of online resource activities.

6.9.4.5 Effort expectancy as a determinant of open access resources and/or alerting services usage behaviour

Effort expectancy is another construct that significantly ($p=0.004$) influenced students' and researchers' open access resources and/or alerting services usage behaviour as indicated in Table 5.29 in Chapter Five. The Exponentiated odds ratio results of 2.126 (<1) suggest an 11.3% more likelihood of the respondents that believed that effort expectancy influences open access content and or alerting services usage than those who did not believe so. This means that more search skills training should be offered to students and researchers. Furthermore, training programmes should be

structured so that the users with little or no experience in using either open access resources or alerting services are introduced to easy-to-use platforms or services that involve little effort at the start and allow them to progress gradually to more complex ones as they get familiar with their use.

Similarly, Chaouali *et al.* (2016:216-7), Mensah (2019:7), Nikolopoulou, Gialamas and Lavidas (2021:7), Pan (2020:8) and Rahi (2018:413) argue that users have high chances of adopting open educational resources that are effortless to use. Individuals and faculty will actively utilise resources and services that are relatively easy to locate and apply in their everyday activities (Torto 2019:153).

6.9.4.6 Voluntariness as a determinant of open access resources and/or alerting services resources usage

The fourth factor that predicted usage behaviour of open access resources and alerting services was voluntariness. Despite other studies, including one by the developers of UTAUT (Venkatesh *et al.* 2003:447), showing voluntariness as a moderator, the study at hand shows that voluntariness directly influenced usage behaviour. Voluntariness was found significant at $p=0.001$ with an Exponentiated odds ratio of 0.363. However, the factor recorded a negative odds ratio (B) -1.014, suggesting its negative effect on actual usage.

This may explain why most of the respondents supported the idea of making the use of open access in the University mandatory as revealed in Section 5.5.2. They explained that users, especially students, must be obliged to use current online resources in their assignments to help them produce quality work. Nurkhin and Nurkhin (2019:1018) have also argued that when using a system is voluntary, its adoption is less likely because users will not be penalised for not using it. As such, UNZA should develop an open access policy that should compel both students and researchers to use the open access resources. The same can be said about current awareness services, that users should be encouraged to use alerting services to remain updated with new research.

From the moderating point of view, Chiu and Ku (2015:7,8) have indicated a strong moderating effect of voluntariness on technology use in a voluntary environment. Voluntariness can be a highly relevant and important moderating factor that requires more attention when designing and evaluating open access resources. However, Chiu and Ku (2015:7,8) add that open access implementers must understand that a strategy that works in a mandatory environment may not work in a voluntary environment. Thus, different strategies might be required to promote usage behaviour in voluntary and mandatory environments (Chiu & Ku 2015:7,8).

6.9.4.7 The effects of moderating variables on the use of open access content and/or alerting services

For the influence of moderating variables, performance expectancy and facilitation conditions were found to be moderated by experience (education attained or year of study). Effort expectancy was moderated by specialisation and gender. The relationship between performance expectancy and experience was found to be significant at $p=0.007$ with $\text{Exp}(B)$ of 0.435, while the relationship between facilitating conditions and experience was found to be significant at $p=0.004$ with $\text{Exp}(B)$ of 0.679. The relationship between effort expectancy and usage behaviour, moderated by experience was found significant at $p=0.021$ with $\text{Exp}(B)$ of 0.931, while gender was significant at $p=0.025$ with an $\text{Exp}(B)$ of 3.849.

Despite Venkatesh *et al.* (2003:447) not revealing any moderating effect of experience on performance expectancy, the present study shows that experience (level of education) influences user perception and use of either open access resources or alerting services as a technology. The researcher argues that experience increases self-confidence to use a technology. Consistent with the current study findings, Afonso *et al.* (2012:7) indicated a moderation effect of experience on facilitating conditions on technology use. Once users are provided with the necessary support according to their expertise to help them exploit the technology confidently, the likelihood of using the technology becomes high.

In reference to the effect of gender on the relationship between effort expectancy and technology use, Binyamin, Rutter and Smith (2020:50) and Venkatesh *et al.* (2003:447) have argued that gender plays an important role in technology acceptance, taking into account the differences between male and female capabilities. They have revealed that females had a more statistically significant effect on effort expectancy to use a technology than males. This corresponds with Shuva and Taisir's (2015) findings that female faculty members were more likely to use open access resources than their male counterparts. Afonso *et al.* (2012:7) added that women tend to be more confident about their judgments in using technology. These assertions necessitate that the training programmes proposed in this study should consider the different capabilities of the students and researchers based on gender.

Specialisation is another variable found to moderate the effect of effort expectancy to use open access resources or alerting services as technology. Users in the technology field are more likely to use technology than their counterparts in the arts, because they have the necessary search skills.

Relatedly, Buabeng-Andoh (2012:139) and Pan (2020:8) comment that self-efficacy, also known as computer confidence or competence, is key in effective technology acceptance and use. Among the many barriers associated with technology adoption, Buabeng-Andoh (2012:139) identifies poor IT skills, lack of confidence resulting from poor skills and limited Internet and access points. He suggests that effective adoption and use of technology will only be realised if the extent to which these barriers affect individuals and institutions are known and worked on.

6.10 Summary

This chapter discussed the research findings presented in Chapter Five on the usage of open access resources at UNZA. It focused on the factors affecting usage and how the uptake can be improved by applying the identified alerting services and other strategies. Despite the study revealing low usage of open access resources in the University, the majority of the respondents that used open access resources found them relevant in their academic works. Furthermore, most of the respondents had a positive perception for open access resources. To this effect, the binary logistic regression analysis results in Sections 6.9.3.2 and 6.9.4.2, showed the significant influence of performance expectancy on both intention and usage behaviour of the students and researchers to use open access resources. As such, the results advocate that perception influences technology use.

Several factors that affect the usage of open access resources were identified. These include lack of awareness of open access resources due to poor marketing strategies, lack of search skills, access restrictions, poor institutional infrastructure (technical support), lack of motivation to use the resources, and the continued use of print resources and lecture notes/handouts. As such, the study brings to the fore specific mitigating factors such as a robust marketing of the available open access resources through various alerting services to increase awareness and ultimately improve the uptake of open access resources and all other e-resources in the University. The recommended alerting services were social media, email/RSS alerts, SMS prompts, Google alerts, vendor alerts, student portals such as the Moodle e-learning platform and student information systems. Other strategies include increased user training programmes, improved institutional infrastructure meant to ease access to and use of open access, use of school board meetings to disseminate the information and encouraging lecturers to model open access use to their students.

Meanwhile, the modified UTAUT model (addition of one direct construct and two moderators) was used to help explain, interpret and discuss the research findings on the use of open access content and alerting services based on the identified predictors of intention and usage behaviour. From this

model's analysis, the researcher identified performance expectancy, facilitating conditions, effort expectancy, Internet skills, age and field of specialisation as key factors that influenced students' and researchers' intention to use open access resources or current awareness services. The results also show performance expectancy, facilitating conditions, effort expectancy, social influence, Internet skills and voluntrariness as determiners of usage behaviour. Performance expectancy and facilitating conditions on usage behaviour were moderated by experience, while effort gender and field of specialisation moderated expectancy. Furthermore, the results indicate that the model correctly explained or predicted 75.3% behavioural intention and 84.2% usage behaviour.

These results may be very important in pointing out factors that play a significant role in the acceptance and usage of open access resources which UNZA may need to improve on as well as application of alerting services meant to promote open access resources usage. Venkatesh and Davis (2000:200) conclude that user acceptance of information technology remains a complex, elusive, yet extremely important phenomenon. Therefore, the development, testing and modification of the UTAUT model advance theory and research on open access usage.

CHAPTER SEVEN: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter summarises and concludes the study on the problem of low usage of open access resources at the University of Zambia. The researcher aimed to identify and suggest appropriate current awareness services and other strategies that the UNZA library could use to promote and enhance the uptake of open access resources and all other e-resources in the University. The recommendations of the study and the suggestions for future research are also discussed in the chapter.

The thesis comprises seven chapters. Chapter One covered a general introduction and background to the study. It also defined the research problem and aim of the study. Chapter Two reviewed the literature relevant to the study, while Chapter Three presented the theoretical model used to guide the study. In Chapter Four, the research methodology, focusing on the approach, design, data collection methods and tools, study population, sample and sampling procedures and the data analysis were discussed. Chapter Five focused on the presentation of the study findings, while Chapter Six addressed the discussion and interpretation of the study results. Finally, this chapter (Chapter Seven) summarises, concludes and makes recommendations of the study. The chapter also provides suggestions for further research.

7.2 The overall study summary

Ari (2017:61) and Opaleke (2002:100) rationalise that any library's main purpose is to serve society by making the record of human thoughts, ideas and expressions available to users. Therefore, the level of success of any library depends on its ability to meet the information needs of its users. This makes the availability and accessibility of information resources an essential aspect of any library. As such, similar to many other academic libraries, UNZA's library has not only prioritised expenditure towards electronic resources instead of print but has also strategically included open access resources to its collection. Open access is an essential component of higher learning education and scientific research as it makes current scientific research available and accessible to everyone. Therefore, open access content may help to satisfy the sundry information needs of the UNZA library user community.

7.2.1 Study aims and objectives

The purpose of this study was to identify and adopt appropriate current awareness services that UNZA's library could use to promote awareness and improve the use of open access resources and all other e-resources in the University.

The study's main aim was broken down into five objectives, their related research questions and hypotheses as outlined in Sections 1.4, 1.5 and 1.6 of Chapter One. These included examining user perception on the relevance of open access resources in their academic work and profession, assessing the possible opportunities that open access resources provide to higher learning institutions like UNZA, determining the challenges UNZA students and researchers face in accessing open access resources, exploring the existence and use of current awareness services in promoting open access resources at UNZA and elsewhere, and identifying appropriate current awareness services that UNZA's library could use to enhance the uptake of open access resources and all other e-resources at the University.

The study was motivated by the notable problems of low uptake of open access resources by UNZA students and researchers. According to the literature review, although various studies have investigated the use of open access resources by faculty members, no known study focusing on using current awareness services to promote the availability, access and use of open access resources at UNZA has been done. The extent to which current awareness services have been used to promote open resources at UNZA is also not known.

Therefore, the findings of this study may be useful to librarians and information specialists looking at ways in which the awareness and usage levels of open access resources through the application of awareness services can be increased.

7.2.2 The theoretical model

The researcher applied the Unified Theory of Acceptance and Use of Technology (UTAUT) to provide the context for examining and explaining the study problem. The UTAUT model played an important role in guiding the process of this study, from planning, data collection instrument designing, to presentation and explanation of the findings (Mehta 2017:1-4).

The adoption of the UTAUT model was motivated by the fact that it has been widely applied across various settings, on different users and technologies. The model has also been tested, validated, integrated and extended to study specific technology acceptance and use; hence, it can be regarded as comprehensive and reliable. Furthermore, the UTAUT model provides a firm explanatory power of the relationships and the logical formulation of its advanced hypothesis. Additionally, it provides a better understanding of the drivers of behavioural intention of acceptance and use of new technologies than other theories and models as discussed in Chapter Three (Dulle 2010:90; Samaradiwakara & Gunawardena 2014:29; Sejane 2017:24; Venkatesh *et al.* 2003:425).

However, it should be noted that the researcher did not overlook the recorded flaws of UTAUT, such as the fact that the model explains about 70 per cent of the variance in intention, which could indicate the model reaching its practical limits in its ability to explain individual acceptance and usage decisions in organisations. This aspect was normalised by the addition of one main variable (information search skills) and two moderators (profession and awareness) to the original UTAUT model, which the researcher found appropriate based on the context of the current study.

The original UTAUT model suggests five core constructs, of which three (performance expectancy, effort expectancy and social influence) were found to determine user behavioural intention and two (behavioural intention and facilitating conditions), were found to directly determine the usage behaviour of a technology (Venkatesh *et al* 2003; Venkatesh, Thong & Xu 2016:329). Additionally, the model developers identified four moderators, namely, gender, age, experience and voluntariness.

This study applied the original UTAUT with the addition of three constructs (information search skills as core construct, and profession and awareness as moderators) to help explain and understand problems associated with the use of open access resources at UNZA and how current awareness services could be used to improve the uptake.

7.2.3 Scholarly review of the relevant literature on open access resources and use of alerting services

The literature review was conducted to put the study into perspective. It addressed awareness, use and user perception of open access content, and the challenges and benefits of open access to different user groups in higher learning institutions.

The literature review also helped the researcher to establish and understand the application of alerting services elsewhere and how they could improve the uptake of open access resources at UNZA. Consequently, the researcher was able to identify gaps in the existing knowledge and establish new solutions and discoveries to contribute to the body of knowledge on open access resources.

The review established that most of the users of open access resources were students, researchers, faculty/academics, mobile users, scientists and healthcare professionals. These were mostly in higher learning institutions and universities. It was further found that most of the studies reviewed adopted survey research methods, using a questionnaire and interview (both online and print) for data collection.

Regarding user awareness, use and perception of open access resources, the literature review showed both the lack of awareness, use and negative perception, and awareness, positive use and perception. Where use had been effected, there was a positive perception reported. This indicates a strong positive correlation between and among awareness, level of use and perception of open access resources. Users with a high level of awareness and use of open access resources have also shown a high level of interest in and regard for open access resources. The same applies to current awareness services.

Similarly, the literature review brought to light several benefits of using open access resources by faculty, students and researchers. These include equal access opportunities to high-quality scholarly content for teaching, learning and research, provision and availability of free online access to research information, increased research citations and impact at a global level due to a wider visibility to a significantly large and more diverse audience. Open access helps researchers to develop their careers while providing them with increased opportunities for collaborative

research.

The literature review also identified various challenges associated with open access use such as poor Internet facilities and connectivity, language barrier, attitude or resistance to change among users, low Internet self-efficacy, preference of print materials, negative perceptions of the quality of open access resources, lack of awareness, unstable supply of electricity, poor funding to higher learning institutions and lack of or poor marketing strategies.

In addition, the literature review has revealed some awareness services in the use of open access resources globally. Some of them include the Table of Contents (TOCs), monitoring agents (Google alerts), email notifications/alerts, routing of periodicals, calendar of events, websites, selective dissemination of information, news clipping services, mobile alerting services, short message services (SMS), RSS feeds/alerts, bibliotech review, forthcoming meetings, research in progress, compiling agencies, scholarly article research alerting, display of latest acquisitions, vendor/pub alerts and live chats (Chatterjee 2017:110-114; Naqvi 2013:108; Uzohue & Yaya 2016:14; Xu 2012:155).

Interestingly, no studies investigated the use of awareness services in promoting open access resources uptake in Zambia. Although most of the studies were inclined towards developing countries, particularly African countries, there was an inadequate representation of the views of students and researchers from Zambia to reflect the existing Zambian scenario. Therefore, the present research was needed to deal with the unique differences across the specific user groups (students and researchers) in a different geographical location (UNZA).

7.2.4 Study methodology

This research identified itself in the pragmatic paradigm and used the mixed-methods approach to help collect diverse data via different data collection tools. The researcher utilised this approach to comprehensively understand why open access resources are less used. The study adopted a case study-mixed methods design, incorporating a case study design, sequential explanatory design and a concurrent triangulation design. A self-administered questionnaire, which mostly captured quantitative data, was the primary data collection tool. Other data collection tools included interviews, citation analysis, content analysis and researcher

observation, which mainly captured qualitative data for validation, corroboration and in-depth insights.

The study population for the questionnaire and interviews was all the full-time returning students, researchers and librarians of UNZA at both Ridgeway and Great East Road campuses (14,033 students, 833 researchers and 50 librarians). The study population for the databases was all the databases UNZA's library provided access to, while the study population for the citation analysis was all the 2018 publications of the 20 selected UNZA researchers.

The survey questionnaire sample involved 577 respondents, who were selected using proportionate stratified random sampling. Out of the 577 questionnaires distributed, 501 questionnaires were returned, correctly completed and used for data analysis. This represents an 87% response rate. The interviews targeted 23 respondents who were purposively sampled. The citation analysis targeted 20 researchers selected through purposive sampling and convenience sampling, while the content analysis applied purposive sampling to select its six targeted databases.

The choice of simple random sampling was meant to give each unit or individual in the population an equal chance of being selected to yield a representative sample while allowing the generalisation of the results to the study population. Proportionate stratified random sampling allowed for the inclusion of all the important subgroups and characteristics of the population. Purposive sampling helped to select samples that were most useful to the research purposes, while the convenience sampling technique helped the researcher to select the most accessible participants. This process was also chosen because it is less time-consuming, considering that the research was time-bound.

Regarding the reliability of the instruments on the questionnaire data, the Cronbach's alpha test revealed a high level of internal consistency, with the overall Cronbach's alpha value of 0.874 as indicated in Table 4.1 of Chapter Four. This shows the acceptance of the scale and the relevance of the questionnaire as the main data collection tool.

For the validity, the test results of the Pearson Product Moment correlations revealed a strong correlation between and among variables intended to measure the same attribute or construct,

where significance (2-tailed) was at 5%. Out of 269 correlations measured, 224 had a correlation significant at 0.01 (1%) (2-tailed), while 45 had a correlation significant at the 0.05 (5%) (2-tailed). These results show that the questionnaire measured what it was expected to measure as a research instrument used to collect the largest amount of data. Thus, it was trustworthy, and the data collected was reliable and valid.

The data analysis involved descriptive and multivariate analysis to analyse quantitative data using the SPSS and Microsoft Excel software, while content analysis was used to analyse the qualitative data.

7.2.5 The study results: respondents' profiles

The distribution of the respondents by category indicated that the majority (485) of the respondents were students, with an 89.2% representation, followed by 53 researchers (9.7%), while the least respondents (1.1%) were librarians (6). Of the 485 student respondents, 475 (87.3%) participated in the questionnaire, while 10 (1.9%) participated in the interviews.

The results further showed that 449 (91.8%) of the student participants were pursuing an undergraduate degree, while 36 were at postgraduate level. Meanwhile, the results also show that more males (58.2%) than females (41.8%) participated in the study.

With respect to age, the majority (72.8%) of the respondents were aged 25 years and below, indicating that the young participants dominated the sample. This age group is followed by those aged between 26-35 years (11.2%). The number of respondents declined as the age progressed. As a result, those in the age range of 56 years and above recorded the least number of respondents (2.6%).

Regarding the highest level of education attained, the results revealed that five participants were undergraduate degree holders, 30 were master's degree holders, 30 held a PhD, while the majority (457) were pursuing either their first degree or a postgraduate degree. Most of the student participants (154) were in their second year, followed by those in fourth year (107, or 20.5%), third year at 101 (19.4%), while the other years had less than 100 respondents, with the least number of respondents in their sixth year.

The results further showed that 33 (6.1%) of the researchers were in junior-to-mid-level career positions, 14 (2.6%) were in senior academic positions and six (1.1%) were professors. Three librarians (0.6%) held the position of an assistant librarian, while the other three (0.6%) were academic librarians.

The results of the distribution by school revealed that the School of Education had the highest number of respondents with a 30.4% representation, followed by the School of Humanities and Social Sciences with 30%, and the School of Natural Sciences with 10.9%. The rest of the schools had less than 10% each. The School of Agricultural Sciences and the University's library had the least participants with 1.3% and 1.2%, respectively.

7.2.6 Study results on awareness and usage of open access resources among students and researchers

The assessment of the awareness and usage levels of open access resources at UNZA was necessary to help understand the current status of the open access usage and user attitude towards open access resources.

The overall results revealed an average (52.6%) level of awareness and low (46%) usage levels of the open access resources. While these results confirm the low usage of online resources at UNZA reported by earlier studies, they also reveal a slight improvement concerning open access awareness compared to what has been reported by the earlier studies (Akakandelwa 2007:76; Kakana *et al.* 2016:7; Miyanda 2010:52).

However, the results of the content analysis show ScienceDirect (97,454 downloads) and JSTOR (62,796) with sustained usage levels while Emerald (8,721), Oxford (8,182), EBSCOhost (1,328) and Royal Society (456) were poorly used.

The Pearson Chi-square test to ascertain whether current awareness services (awareness) facilitate usage suggested a relationship between the two variables, where the p -value = 0.001. This result confirms that students and researchers can only use the available open access resources if they are aware of them. Further that awareness can be improved through the application of appropriate current awareness services. Hence, it was concluded that current

awareness services or awareness facilitates use and should therefore be promoted.

7.2.7 Study results on the students' and researchers' perceptions of open access resources in academic and professional engagements

Despite a high number of respondents indicating a response of “not sure” on the perception of the variables assessed, the results showed that the majority regarded open access resources to be very useful, relevant (64.3%) and of good quality (61.0%) in their academic and professional work. Consequently, some researchers have introduced their students (both undergraduate and postgraduate students) to online resources. Meanwhile, most of the respondents (58.3%) disagreed that open access is easily accessible due to fewer access restrictions.

The interview results further showed a need to correct the users' notion that open access content lacks peer-review and is of lower quality than subscription-based content by convincing them that the open access resources that UNZA's library provides are quality scholarly content. This will encourage students and researchers to use open access resources. Similarly, the content analysis results showing JSTOR's (62,796) sustained usage indicates the scholarly quality and relevance of open access content to students and researchers in academia.

7.2.8 Study results on perceived benefits of open access resources to higher learning institutions

Sixty-three per cent of the respondents believed that open access resources are original and present high-quality research content. Those who have used them have found them relevant in their academic and professional work. Another 77.9% agreed that open access resources avail university students and researchers in developing countries with an equal opportunity to access global research content freely, while 72.7% indicated that open access provides quick and easy access to a wide range of current, reliable and scholarly content from credible publishers. As a result, scholars' research output is of high quality, competitive at an international level and publishable in highly rated journals. Open access resources also increase the students' knowledge and understanding of academic issues, while making learning more interesting.

The current online resources complement the old print collection in a physical library

environment. Open access content leads to improved research visibility and increased citations. It also opens avenues for researchers to collaborate with other researchers. This could lead to more research and publishing at an individual level and improved visibility and reputation of the affiliate universities at an institutional level. Similarly, the citation analysis results revealed a generally high usage of open access resources by researchers. Out of the total references analysed, more than fifty per cent were openly accessible.

7.2.9 Study results on the challenges of open access resources use

The challenges associated with open access use were grouped into four categories: individual/general challenges, institutional challenges, social challenges and others.

Regarding individual/general challenges, 65.8% of respondents said that the marketing of open access resources at UNZA was inadequate. Although the majority (72.8%) of the questionnaire respondents indicated that they had the necessary search skills to enable them access and use open access resources, 61.1% still said that they did not know how to evaluate online resources, including open access resources for academic quality. Consequently, 87.9% suggested the need to train researchers and students to access, use and evaluate open access resources for academic quality. This suggestion indicates that most users still lacked effective search skills to retrieve the open access resources they needed. Others, particularly the older researchers (digital immigrants), cited the application of Boolean operators as one of the challenges they experienced. User skill upgrading should be resolved to enable students and researchers to easily use current awareness services for updates on available open access content.

Given this uncertainty, the researcher sought to establish whether or not there was a relationship between user search skills and ease of use of online resources by cross-tabulating the two variables. The results revealed that 245 (51.8%) out of the 345 respondents who had earlier indicated that they possessed search skills to access online resources, found it easy to access and use open access resources. This result confirms that having search skills may not mean a complete lack of access problems. Despite the claim by the majority of the respondents that they possessed the necessary search skills, some were still experiencing access challenges.

For the challenges at the institutional level, the results revealed that despite the University's

recognition of the use of open access resources for career development in academic promotion criteria for its academic staff, the majority (60.5%) of the respondents suggested that there was inadequate help and guidance from librarians to help them access these resources. Sixty-two per cent (62.2%) suggested poor institutional infrastructure for accessing online resources, while 88.0% felt that the voluntary use of open access in the University was another challenge.

The results on social challenges indicated that, in as much as a high number of the respondents (80.1%) believed that lecturers encouraged students to use open access resources, 56.0% indicated that lecturers also got motivated by students who used open access resources. Meanwhile, 36.1% indicated a low level of influence of researcher-to-researcher and student-to-student on the use of open access resources.

Other challenges identified were slow and poor Internet connectivity, lack of or low awareness levels of open access resources associated with low publicity, and poor communication from the library to the schools on the available information resources. Inadequate Internet facilities (Internet access points, limited and weak hotspots and limited computers) to cater for the whole student populace, poor funding to support subscriptions to scholarly open access content, and username/passwords and IP-based access restrictions on some databases were among other challenges which discouraged users from using open access resources. Additionally, a generally poor library infrastructure, negative attitude or knowledge levels on the importance of open access resources among users, the incorrect notion that the library offers out-dated resources, and students preferring lecture notes and recommended print textbooks over e-resources also contributed to the low use of open access resources. Finally, some lecturers recommended old books to students, while some researchers lacked the motivation to write and publish other than writing for promotions.

7.2.10 Study results on existing current awareness services at UNZA

While the study established that some users had interactions with specific current awareness services, it was noted that the majority had less-to-no experience with alerting services.

The awareness services that users had experiences with included the library website (29.5%), social media and academic social platforms (Facebook, Twitter, YouTube, Academia.edu,

ResearchGate, LinkedIn (25.3%), vendor/publisher alerts (17.3%), SDI (16.7%), TOCs (16.2%), mobile phones and SMS (11.0%), email/RSS (9.7%) and journal alerts (8.1%). Other services included the library's Online Public Access Catalogue (OPAC), posters, fliers and notice boards, students' WhatsApp study groups and Google Scholar alerts.

The respondents that had experiences with certain alerting services testified that the alerts were very useful as they pointed them to more research related to their areas of interest.

7.2.11 Theory validation

The purpose of theory validation was to establish the extent to which the UTAUT model explained the results of the current study and how useful it was in guiding the study.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.694, the Bartlett's test of sphericity was 1709.786, Degree of freedom of 595, significant at 0.001. These results suggested that the data could support factor analysis. The factor analysis results yielded a total of 25 variables, forming the five constructs (facilitating conditions, performance expectancy, effort expectancy, social influence and information search skills).

A minimum coefficient was set at 0.5, while the factor loadings of the items ranged between 0.5 and 0.8. Discriminant and convergent validity were applied to ensure that all the items included in the factor analysis had no cross-loading exceeding 0.5. This way, all items belonging to the same construct loaded highly in their constructs compared to their loadings in other constructs.

7.2.12 The determinants of students' and researchers' behavioural intention to use open access resources and/or alerting services technologies

The binary logistic regression analysis results showed the Omnibus Test of Model Coefficient statistically significant at $p < 0.001$, while the model summary results revealed a -2 Log Likelihood of 147.801 with 0.309 Cox & Snell R Square and 0.412 Nagelkerke R Square. The model correctly explained or estimated 75.3% of the predictions on the behavioural intention of the students and researchers to use either open access resources or alerting services. The Hosmer and Lemeshow test results were recorded 0.630, indicating that the model fitted the data and

should, therefore, be interpreted further.

The results established four determinants of behavioural intention of open access use and/or alerting services, the facilitating conditions ($p=0.004$), performance expectancy ($p=0.001$), Internet skills ($p=0.002$) and effort expectancy ($p=0.001$), while social influence had no influence.

While this study did not find any significant moderating variable, unlike the portrayal of age and specialisation as moderators in the original UTAUT model, the current study found that age ($p=0.043$) and specialisation ($p=0.009$) had a direct influence on the intention to use open access resources and/or alerting services as a technology.

7.2.13 Determinants of students' and researchers' open access and/or alerting services usage behaviour

The Omnibus Test of Model Coefficients results were found statistically significant at $p= 0.001$. The Model summary results revealed a -2 Log Likelihood of 109.459, Cox & Snell R Square 0.355, Nagelkerke R Square 0.510, while Hosmer-Lemeshow Test was significant at $p=0.007$. The model was found to correctly predict 84.2% of the predictions on open access resources and/or alerting services usage.

The study results further established six determinants of UNZA students' and researchers' usage behaviour of open access content and/or alerting services as a technology. These were facilitating conditions ($p=0.00$), performance expectancy ($p=0.002$), social influence ($p=0.005$), Internet skills ($p=0.001$), effort expectancy ($p= 0.004$) and voluntariness ($p=0.001$). Furthermore, it was noted that the performance expectancy and facilitating conditions were each significantly moderated by the level of education at p -value 0.007 and 0.004, respectively. Effort expectancy was moderated by specialisation and gender, each at $p<0.05$.

7.3 Overall conclusions

The study of open access usage, primarily in higher learning institutions in developing countries, has been an area of concern over the past years due to the many possible opportunities it offers in academia. As an emerging response to the on-going restrictive access to knowledge in scholarly

and scientific journals, the basic principle of open access was founded on the shared and equitable distribution of knowledge. Open access resources avail researchers access to scholarly research for free or at minimal costs.

7.3.1 The open access awareness and usage levels among UNZA students and researchers

Despite the results showing average awareness levels of open access resources, there is evidence of lower usage levels by students and researchers in the University. While these results confirm the low usage of online resources at UNZA as reported by earlier studies, they also reveal a slight improvement concerning open access awareness compared to earlier studies (Akakandelwa 2007:76; Kakana *et al.* 2016:7; Miyanda 2010:52). Meanwhile, ScienceDirect and JSTOR have shown sustained usage levels compared to the rest of the databases that were poorly used.

The results also showed a significant relationship between current awareness services or awareness and use of open access content, where awareness determines usage. The results further show that students used lecture notes and print recommended readings, while some lecturers demanded that their students replicate lecture notes. This could be one contributing factor to the low usage levels of open access resources in the University.

It is, therefore, necessary for the library to collaboratively partner with all key stakeholders in the University for the open access resources promotions to succeed and ultimately, enhance the usage of open access and other online resources in the University.

7.3.2 User perception of open access resources in academia and research

Despite the low usage of open access resources recorded, the results revealed that students and researchers strongly and positively regarded open access resources provided by UNZA's library. The respondents felt that open access resources are original and present high-quality scholarly research content. Those trained in using open access resources revealed that they found the resources to be very useful, relevant to their academic responsibilities and recommended them to their students and fellow researchers. This indicates that both the students and researchers highly support using the open access resources in academia and research.

7.3.3 The perceived benefits of open access resources in higher learning institutions like the University of Zambia

Among the many benefits of open access resources identified were the provision of quicker, easier, and effective access to global research content and a wide range of reliable and scholarly content. This access is believed to lessen pressure on scholars by saving them time, leading to better academic and research output. Current online resources complement the old print collection in the physical library. Since open access content is freely accessible to all, it gives researchers in developing countries opportunities to access the content they would not have accessed otherwise. The study further revealed that open access leads to improved research visibility, increased citations and provides researchers with opportunities to publish in reputable journals. This leads to improved research impact and reputation of both individual researchers and affiliate universities.

7.3.4 Open access usage challenges at UNZA

With respect to the factors that negatively affect the use of open access resources at UNZA, the study has revealed the following: poor institutional facilitating conditions (inadequate marketing, inadequate guidance and help from librarians and slow-to-poor Internet connectivity) and lack of effective information search skills among students and researchers to access and evaluate online resources for academic quality. The results also show that most (62.2%) of the respondents felt that the institutional infrastructure (Internet laboratories and computers) for accessing online resources was inadequate, there was a lack of or low awareness levels of open access resources due to low publicity and poor funding to support subscriptions. Additionally, the respondents mentioned username/password and IP-based access restrictions on some databases, negative attitudes or knowledge levels about the importance of open access resources among users, and the incorrect notion that the library offers out-dated resources as challenges. Lastly, the study results revealed that most students have continued using print textbooks, grey literature and Google, while some researchers lack motivation to write and publish other than for promotions.

7.3.5 The applicability of the UTAUT model on open access and alerting services behavioural intention and use by UNZA students and researchers

The results of the current study have demonstrated the usefulness of the UTAUT model in determining, explaining and predicting the determiners of intention and use of open access resources and/or alerting services technologies by the students and researchers of the University of Zambia. Although the study findings have brought out certain differing results from the original UTAUT with respect to a few constructs such as social influence, facilitating conditions and moderating effects on intention to use open access resources or alerting services, most of the results compare well with the original UTAUT results. This may also mean further testing and validation of the UTAUT model using different user groups and environments as recommended by other researchers (Dulle 2010:86; Hamzat & Mabawonku 2018:3; Samaradiwakara & Gunawardena 2014:27-32; Sarfaraz 2017; Sejane 2017; Taiwo & Downe 2013:48; Venkatesh *et al* 2003:425; Venkatesh, Thong & Xu 2016:157-158).

The UTAUT results have shown six direct determiners of behavioural intention to use open access resources and or alerting services by UNZA students and researchers as well as usage behaviour, with gender, specialisation and level of education moderators, as presented in Sections 7.2.12 and 7.2.13 of this chapter. Considering these results, UNZA must strengthen the factors identified as main predictors of intention and use of open access resources and alerting services to improve open access resources uptake at the University. This should be coupled with the recommendations presented in the following section.

7.4 Study recommendations

While the previous section looked at the conclusions of the research's findings, this section addresses the fifth research objective, which was to identify appropriate current awareness services and any other strategies UNZA can adopt in promoting open access resources and all other e-resources. The recommendations are as follows:

7.4.1 Application of appropriate current awareness services to increase open access resources uptake

Apart from establishing current awareness services appropriate for UNZA to improve open access usage, the study results have also indicated that respondents experienced few current awareness services in open access resources promotion and use. This affirms the need to apply alerting services in a more organised and effective manner to achieve a transformative effect of alerting services on the use of open access resources at UNZA. Namugera (2014:752) and Saikia and Gohain (2013:174) argue that the application of current awareness services raises the visibility and awareness of the library's ability to support the mother institution through its services and resources.

Following this, therefore, the current research suggests the adoption of the following awareness services: social media platforms (Facebook, Twitter, YouTube), email/RSS alerts, Google alerts, UNZA website, selective dissemination of information, weekly alerts based on user profiles and subject interests, WhatsApp groups, mobile phone alerts/SMS alerts, the library's Online Public Access Catalogue, vendor alerting services, and academic social platforms (ResearchGate, LinkedIn and Academia.edu).

7.4.2 Boosting the open access awareness

The aspect of awareness and a clear understanding of what open access is and what its benefits entail is crucial to its wide adoption in research and learning. The marketing of library resources and deliberate implementation of open access content awareness programmes generally raises the use of its resources and services (Mutwiri 2014:88-89,154; Namugera 2014:752; Saikia & Gohain 2013:174). Therefore, the available information resources need appropriate marketing for them to be accessed, used and appreciated by the target users.

The study established that most (65.8%) of the respondents felt that the University's marketing of open access resources was not adequate. Most students expressed ignorance of both the existence and importance of open access resources, citing that their acceptance letters into the University did not state the availability of the open access resources. To this effect, the study proposes other strategies besides the current awareness services covered above. These include increased open

access awareness through the implementation of deliberate and regular sensitisation programmes to educate the students and researchers of the availability and the academic value of open access resources, active participation in open access week advocacy, hosting UNZA radio shows, putting posters and fliers in strategic areas, improving facilitating conditions, making the use of open access mandatory and changing users' negative attitude towards the use of open access content.

Promotions could also involve online discussion groups on the Moodle and Astria e-learning platforms, sensitisation at school board meetings through liaison librarians, provision of brief booklets/guides and short videos on the available open access resources and how they can be accessed.

7.4.3 Involvement of all key stakeholders in promoting open access resources

The study results have shown that while the Serials Department of the library has been marketing open access resources, one department cannot reach all the users considering that students come and go, and numbers keep increasing. All the library departments need to work together to ensure a properly planned provision of awareness services. The librarians should also build strong communication links with schools/lecturers through school liaison librarians.

Furthermore, the researcher recommends that the awareness programmes should not be left to the library alone to undertake but should involve all key stakeholders at different levels, such as the involvement of the University Management, the schools, departments and the student body. The involvement of all concerned stakeholders is likely to increase the project's success since it will receive the support and participation of everyone.

7.4.4 Information search skill enhancement

The study's results concluded that while respondents said that they had the necessary information search skills, tests conducted showed that most users lacked search skills to access, retrieve and evaluate online resources for academic quality. As such, more than two-thirds of the respondents felt the need for massive training of the users on how to access, use and evaluate open access resources for academic quality. Training is meant to enhance the user's information

search skills. The training could be integrated into the school curriculum as a complete and examinable course to stimulate seriousness among the students. Another form of training could be peer-to-peer training using identified role models (active open access users).

Publishers of specific resources should also be invited regularly to conduct training and market their resources. This could also encourage more users to attend the training. The recommendation of training to improve the search skills of users has also been recognised by other researchers such as Anunobi (2018:34), Kaba and Said (2015), Naqvi (2013:108), Weissgerber (2021:3) and Yi (2016).

7.4.5 Removal of access restrictions such as licenses and username/passwords restrictions

The study recommends the removal of license and username/passwords restrictions where they exist to make the open access resources fully accessible. The Right to Research Coalition (2012) asserts that in the absence of price barriers that restrict access to research, open access research makes a significant positive impact on education, practice of any profession and entrepreneurs' ability to innovate. Even the best research is ineffectual if others are not able to read and build on it.

Meanwhile, the usernames/passwords of certain databases restrict access and discourage many serious users. This is why researchers have argued that the low profile of scientists in Africa and their marginalisation is partly a result of the restricted access to scientific publications through licence restrictions (Bauer, Brooks & Hampton 2020; Ivwighrehweta & Onoriode 2012:7-9; The World Bank 2021). This clearly suggests the removal of all forms of license restrictions to open access content to enable complete free access.

7.4.6 Improved facilitating conditions for open access

The World Bank (2021) argues that Internet connectivity is crucial in handling open access materials while poor bandwidth allocation blocks information flows and excludes users and researchers from benefiting from open access research. Furthermore, the World Bank (2021) and the 2015 United Nations News Report add that the digital divide keeps millions of serious scholars offline due to the unavailability of Internet services to facilitate the use of open access

scholarly research.

To this effect, the researcher suggests the improvement of Internet and Wi-Fi connections and Internet infrastructure (increased access points, number of computers and Internet laboratories) meant to facilitate access to open access resources in the University.

7.4.6 Mandatory use of open access resources by students and researchers

The study established that users do not prioritise utilising open access resources because of a lack of severe consequences for non-use. The study established that making the use of open access resources mandatory, especially for students, will compel them to use it and eventually become habituated to its usage as a result of the benefits derived thereof. The idea of mandatory usage further reveals the need to establish explicit open access policies to govern the use of open access resources. The policy should spell out both the legal and illegal use of open access content and differentiate the roles of all stakeholders.

7.4.7 Change of user mind set

While all the above recommendations are required, much more is needed to change the negative perception of researchers and students on the quality, vastness, timeliness and ease of access to open access content in academia. Different strategies can be used to achieve this, but if users are not helped and encouraged to change their negative attitude, the low usage of open access resources will continue to be experienced. Users need help to experience the benefits of using open access resources as revealed in other universities through various awareness programmes and training.

7.5 Suggestions for further research

The scope and delimitations of this study, as noted in Section 1.9 of Chapter One, provide several opportunities for further research using the open access research model and research tools. As such, this study suggests the following areas for further research:

- i. Open access resources as an opportunity for higher education and research during the Covid-19 pandemic.
- ii. The establishment of an open access policy to guide the implementation and use of open access resources at UNZA.
- iii. The role of open access resources in supporting distance learning in higher learning institutions
- iv. An assessment of the effectiveness of the current awareness services and the on-going training programmes on access and use of open access at UNZA.
- v. A follow-up study to purposively sample active users of open access resources. It is hoped that this will reduce missing responses, thereby strengthening the results of theory validation.

7.6 Summary

This chapter presented and discussed the key research findings of the study in terms of the study results' summaries, conclusions, and recommendations. The chapter also presented areas of further research.

While the study revealed low usage of open access resources by UNZA students and researchers, the majority were aware of the availability of open access resources. Regarding the perception of open access resources, the majority of the respondents perceived open access resources positively. Those that used open access resources found them to be of good quality, very useful and relevant in their academic and professional work. The respondents cited various benefits of open access resources in academia and research. Among these benefits were free access to a wide range of scholarly literature, thereby simplifying learning and research, increased research impact through citations, uninterrupted access and open access complementing older print collection.

The study also revealed key factors that affect open access usage are likely to influence the application of current awareness services at UNZA. These include inadequate marketing strategies that affect awareness levels, poor Internet infrastructure, inadequate search skills by students and researchers and inadequate guidance from the library. To alleviate these challenges,

the research has recommended the implementation of robust open access awareness programmes using the various identified awareness services, involvement of all stakeholders, user training to enhance their search skills and improved Internet infrastructure meant to facilitate access to open access resources and all other e-resources in the University.

Based on the validated UTAUT model, the study established that facilitating conditions, performance expectancy, effort expectancy, Internet skills, age and specialisation were key determinants of the students' and researchers' behavioural intention of open access resources and/or alerting services usage as a technology. Similarly, facilitating conditions, performance expectancy, social influence, Internet skills, effort expectancy and voluntariness determined use of open access resources and current awareness services as a technology. Meanwhile, usage behaviour revealed two moderators - level of education and gender. The level of education moderated performance expectancy and facilitating conditions, while effort expectancy was moderated by specialisation and gender. These findings may be useful to librarians and information specialists looking at ways of increasing the awareness and usage levels of open access resources among students and faculty.

Accordingly, the researcher drew seven recommendations to enhance the open access uptake as indicated in Section 7.4 of this chapter. The study also suggested five areas of further research, as revealed in Section 7.5 of this chapter.

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APPENDICES

Appendix 1

Questionnaire for researchers

Dear respondent,

I am a PhD student in Information Science at the University of South Africa (UNISA). As a requirement for this degree, I am conducting a study to explore ways through which current awareness services can be used to improve the usage of open access resources at the University of Zambia.

Current awareness services are services used to update users with the latest information in their areas of interest or information needs. **Open Access** resources in this context refer to scholarly peer-reviewed resources that come as part of the e-resources package UNZA library subscribes to. As such, access to open access resources is only enabled when an institution has paid for subscription-based resources.

You have been randomly selected from a list of UNZA's 2018 academic staff list to participate in this exercise. Your views are very valuable and will provide critical information into the research. The information you give will be used solely for academic purposes and will be kept strictly confidential.

However, please note that you are free to decline to take part if you do not want to and your decision will be respected.

Should you need any clarification on any issue concerning this study, you can reach me on:
mobile: +260 977 875 831.

Faithfully,

Eness MM. Chitumbo.

A. Bio Data

1. What is your school and field of specialisation?.....
2. What level of education have you attained?
 - a) First Degree
 - b) Masters Degree
 - c) Doctorate Degree
 - d) Others.....
3. What is your academic Rank?
 - a) Lecturer
 - b) Senior lecturer
 - c) Assistant Librarian
 - d) Academic Librarian
 - e) Professor
 - f) Other.....
4. What is your gender?
 - a) Male
 - b) Female
5. Which of the following age groups do you belong to?:.....
 - a) 25 years & below
 - b) 26-35 years
 - c) 36-45 years
 - d) 46-55 years
 - e) 56 years & above

B. Availability and use of current awareness services in promoting open access resources at UNZA. *(Please see cover letter for definitions of terms).*

6. Kindly indicate whether you agree or disagree with the statements below.

	Yes	No
a) I receive updates on library information resources through “My journal list” or journal alerts	<input type="checkbox"/>	<input type="checkbox"/>
b) I receive updates on library information resources through the library website and its links to open access resources.	<input type="checkbox"/>	<input type="checkbox"/>
c) I receive updates on library information resources through email notifications and RSS.	<input type="checkbox"/>	<input type="checkbox"/>
d) I receive updates on library information resources	<input type="checkbox"/>	<input type="checkbox"/>

through lists of selected journal/book titles.

- e) I receive updates on library information resources through mobile phone messages
- f) I receive updates on library information resources through social media e.g. Facebook.
- g) I receive updates on library information resources through Tables of Contents or JournalTOCs.
- h) I receive updates on library information resources through vendor/publisher alerts
- i) I receive updates on new library information resources through other media such as (please specify)

7. If your answer to any sub-questions of 6 is **Yes**, rate the level of usefulness of the updates you received.

- a) Very useful
- b) Useful
- c) Fairly useful
- d) Not useful

8. If your answer to any sub-questions of 6 is **No**, how would you want to receive updates on open access and other e-resources? Tick all that apply to you.

		Yes	No
a)	Through emails alerts	<input type="checkbox"/>	<input type="checkbox"/>
b)	Through Tables of Contents	<input type="checkbox"/>	<input type="checkbox"/>
c)	Through selected journal/book title lists in my field	<input type="checkbox"/>	<input type="checkbox"/>
d)	Directly through vendor/publisher alerts	<input type="checkbox"/>	<input type="checkbox"/>
e)	Through monitoring agents such as Google alerts	<input type="checkbox"/>	<input type="checkbox"/>

- c) Scholarly open access resources are easily accessible due to less access restrictions [] [] [] [] []
- d) Marketing for open access resources in the University is adequate [] [] [] [] []
- e) I find open access resources relevant in my academic and professional work [] [] [] [] []
- f) I encourage students and fellow lecturers to use open access resources and all other e-resources provided by the library [] [] [] [] []
- g) The use of open access in the University is voluntary [] [] [] [] []
- h) Use of open access in the University should be mandatory [] [] [] [] []

13. What do you think would help improve the use of open access resources in the University?

.....

D. Challenges users face when accessing open access resources.

14. Kindly indicate how the following statements apply to you as an information user.

- | | Yes | No |
|--|------------|-----------|
| a) I have the necessary Internet search skills to access open access resources | [] | [] |
| b) I find it easy to access scholarly open access resources online | [] | [] |
| c) Fellow researchers encourage (motivate) me to use open access resources | [] | [] |
| d) Students motivate me to use open access resources. | [] | [] |
| e) I know how to evaluate the quality of e-resources including open access | [] | [] |

resources

- f) It is necessary to train researchers on how to access and use open access resources. [] []
- g) Librarians are helpful in accessing open access resources. [] []
- h) Guidance is available for me to effectively use the Internet to access open access resources [] []
- i) The institutional infrastructure for accessing online resources at UNZA is good. [] []
- j) My institution recognises the need for open access resources for my career development (promotion criteria) [] []
- k) Other challenges faced.....

E. Possible opportunities open access resources provide to higher learning institutions like UNZA

15. To what extent do you agree with the following statements about open access?

- | | Strongly agree | Agree | Not sure | Disagree | Strongly disagree |
|---|----------------|-------|----------|----------|-------------------|
| a) Open access gives equal opportunity to university students and academic staff in developing countries to access global research content more easily. | [] | [] | [] | [] | [] |
| b) Open access resources help supplement budget decline for resource subscriptions. | [] | [] | [] | [] | [] |
| c) Open access resources widen the range of scholarly content available to users. | [] | [] | [] | [] | [] |
| d) Other benefits | | | | | |

16. Your recommendations.....

17. Would mind a follow-up interview? A) Yes [] b) No []

Thank you so much for your time and knowledge

Appendix 2

Questionnaire for students

Dear respondent,

I am a PhD student in Information Science at the University of South Africa (UNISA). As a requirement for this degree, I am conducting a study to explore ways through which current awareness services can be used to improve the usage of open access resources at the University of Zambia.

Current awareness services are services used to update users with the latest information in their areas of interest or information needs. Meanwhile, **Open Access** resources in this context refer to scholarly peer-reviewed resources that come as part of the e-resources package UNZA library subscribes to. As such, access to open access resources is only enabled when an institution has paid for subscription-based resources.

You have been randomly selected from a list of UNZA 2018 fully registered students to participate in this exercise. Your views are very valuable and will provide critical information into the study. The information you give will be used solely for academic purposes and will be kept strictly confidential.

However, please note that you are free to decline to take part if you do not want to and your decision will be respected.

Should you need any clarification on any issue concerning this study, you can reach me on: mobile: +260 977 875 831.

Faithfully,

Eness MM. Chitumbo.

A. Bio Data (Please read the definitions on the cover letter to understand the topic at hand)

1. Which school and department do you belong to?.....
2. What degree are you pursuing?.....
 - a) Undergraduate []
 - b) Postgraduate []
 - c) Other.....
3. Which year are you in?
4. What is your gender?
 - a) Male []
 - b) Female []
5. Which of the following age groups do you belong to?:.....
 - a) 25 years & below []
 - b) 26-35 years []
 - c) 36-45 years []
 - d) 46-55 years []
 - e) 56 years & above []

B. Availability and use of Current awareness services to promote open access resources at the University of Zambia. (Please see cover letter for definition of terms)

6. Kindly indicate whether you agree or disagree with the statements below.
- | | Yes | No |
|---|------------|-----------|
| a) I receive updates on library information resources through “My journal list” or journal alerts | [] | [] |
| b) I receive updates on library information resources through the library website and its links to open access resources. | [] | [] |
| c) I receive updates on library information resources through email notifications and RSS. | [] | [] |
| d) I receive updates on library information resources through lists of selected journal/book titles. | [] | [] |

- e) I receive updates on library information resources through mobile phone messages [] []
- f) I receive updates on library information resources through social media e.g. Facebook. [] []
- g) I receive updates on library information resources through Tables of Contents or JournalTOC. [] []
- h) I receive updates on library information resources through vendor/publisher alerts [] []
- i) Other (please specify)

7. If your answer to any sub-questions of 6 is **Yes**, rate the level of usefulness of the updates you received.

- a) Very useful [] c) Fairly useful []
- b) Useful [] d) Not useful []

8. If your answer to any sub-questions of 6 is **No**, how would you like to receive updates on open access and other e-resources? Tick all that apply to you.

- | | Yes | No |
|--|-----|-----|
| a) Through emails and alerts | [] | [] |
| b) Through Tables of Contents | [] | [] |
| c) Through selected title lists in my field | [] | [] |
| d) Alerts directly through vendors/publishers | [] | [] |
| e) Through monitoring agents such as Google alerts | [] | [] |
| f) Through customised alerts such as social media tools like Facebook, Twitter, WhatsApp, LinkedIn, academic.edu, Research Gate, researcher ID, etc. | [] | [] |

12. Kindly rate the following statements, from strongly agree to strongly disagree.

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
a) Scholarly open access publications are original present high quality research content.	[]	[]	[]	[]	[]
b) UNZA's library provides high quality scholarly open access resources.	[]	[]	[]	[]	[]
c) Scholarly open access resources are easily accessible due to less access restrictions	[]	[]	[]	[]	[]
d) Marketing for open access resources in the university is adequate	[]	[]	[]	[]	[]
e) I find open access resources relevant in my academic and professional work	[]	[]	[]	[]	[]
f) I encourage fellow students to use open access resources and all other e-resources provided by the library	[]	[]	[]	[]	[]
g) The use of open access in the University is voluntary	[]	[]	[]	[]	[]
h) Use of open access in the University should be mandatory	[]	[]	[]	[]	[]

13. What do you think would help improve the use of open access resources in the University?

.....

D. Challenges users face when accessing open access resources.

14. Kindly indicate how the following statements apply to you as an information user.

	Yes	No
a) I have the necessary Internet search skills to access open access resources	[]	[]

- b) I find it easy to access scholarly open access resources online [] []
- c) Fellow students encourage (motivate) me to use open access resources [] []
- d) My lecturers motivate me to use open access resources. [] []
- e) I know how to evaluate the quality of e-resources including open access resources [] []
- f) It is necessary to train students on how to access and use open access resources. [] []
- g) Librarians are helpful in accessing open access resources. [] []
- h) Guidance is available for me to effectively use the Internet to access open access resources [] []
- i) The institutional infrastructure for accessing online resources at UNZA is good. [] []
- j) My institution recognises the need for open access resources in my academic work. [] []
- k) Other challenges.....

E. Possible opportunities that open access resources provide to higher learning institutions like UNZA.

15. To what extent do you agree or disagree with the following statements about open access?

- | | Strongly agree | Agree | Not sure | Disagree | Strongly disagree |
|---|----------------|-------|----------|----------|-------------------|
| a) Open access gives equal opportunity to university students and academic staff in developing countries to access global research content more easily. | [] | [] | [] | [] | [] |

- b) Open access resources help supplement budget [] [] [] [] []
decline for resource subscriptions.
- c) Open access resources widen the range of [] [] [] [] []
scholarly content available to users.
- d) Other benefits

16. Your recommendations

.....

Thank you so much for your time and knowledge.

Appendix 3

Questionnaire for librarians

Dear respondent,

I am a PhD student in Information Science at the University of South Africa (UNISA). As a requirement for this degree, I am conducting a study to explore ways through which current awareness services can be used to improve the usage of open access resources at the University of Zambia.

Current awareness services are tools used to provide information users with updates on the latest information in their subject areas of interest or information need. **Open access resources** in this context refer to scholarly peer-reviewed resources that come as part of the e-resources package UNZA library subscribes to. As such, access to open access resources is only enabled when the institution has paid for subscription-based resources.

You have been randomly selected to participate in this exercise. Your views are very valuable and will provide critical information into the study. Please be assured that the information you give will be used solely for academic purposes and will be kept strictly confidential.

However, kindly note that you are free to decline to take part if you do not want to and your decision will be respected.

Should you need any clarification on any issue concerning this study, please reach me on +260 977 875 831.

Faithfully,

Eness MM. Chitumbo.

A. Bio Data

- 1. What is your field of specialisation?.....
- 2. What level of education have you attained?.....
 - a) Undergraduate degree []
 - b) Masters degree []
 - c) PhD Degree []
 - d) Other
- 3. What is your academic rank?.....
- 4. What is your gender?
 - a) Male []
 - b) Female []
- 5. Which of the following age groups do you belong to?
 - a) 25 years & below []
 - b) 26-35 years []
 - c) 36-45 years []
 - d) 46-55years []
 - e) 56 years & above []

B. Availability and use of current awareness services in promoting open access resources at UNZA. (Please see cover letter for definition of terms)

- 6. Do you agree or disagree with the following statements?

	Yes	No
a) The library provides its users with updates on information resources through “My journal list” or journal alerts	[]	[]
b) The library provides its users with updates on information resources through the library website and its links to open access resources.	[]	[]
c) The library provides students with updates on information resources through the student portal	[]	[]
d) The library provides its users with updates on information	[]	[]

resources through email notifications and RSS.

- e) The library provides its users with updates on information resources through lists of selected journal/book titles. [] []
- f) The library provides its users with updates on information resources through mobile phone messages [] []
- g) The library provides its users with updates on information resources through social media e.g. Facebook. [] []
- h) The library provides its users with updates on information resources through TOCs or JournalTOCs. [] []
- i) The library provides its users with updates on information resources through vendor/publisher alerts [] []
- j) The library provides updates on information resources through other media such as (please specify)

.....

7. If your answer to any sub-questions of 6 is **yes**, rate the level of usefulness of the updates to the users.

- a) Very useful []
- b) Useful []
- c) Fairly useful []
- d) Not useful []

8. If your answer to any of the sub-questions of 6 is **No**, what type of updates would you recommend the library to use in promoting the open access resources and other e-resources in the University? Tick all that apply to you.

- | | Yes | No |
|--|-----|-----|
| a) E-mails and alerts to users | [] | [] |
| b) Tables of Contents | [] | [] |
| c) Selective Dissemination of Information i.e. lists of selected titles to respective schools or user group. | [] | [] |

and represent high quality research

- | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| b) UNZA provides good quality open access resources. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c) Scholarly open access resources are easily accessible due to less access restrictions | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d) Marketing for open access resources in the University is adequate | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e) I find open access resources provided by UNZA library relevant in my academic and professional work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f) I encourage students to use of open access resources and all other e-resources provided by the library | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g) Use of open access in the University is voluntary. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| h) Use of open access in the University should be mandatory. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

13. What do you think would help improve the use of open access resources in the University?

.....

.....

.....

D. Challenges users face when accessing open access resources

14. Kindly indicate the extent to which you agree or disagree with the following statements.

	Yes	No
a) Researcher and students have the necessary Internet search skills to access open access resources	[]	[]
b) Researchers and students find it easy to access scholarly open access resources online	[]	[]
c) Researchers and students encourage (motivate) each other to use open access resources	[]	[]
d) Researchers encourage their students to use open access resources.	[]	[]
e) Researchers and students know how to evaluate e-resources including open access resources for quality.	[]	[]
f) It is necessary to train researchers and students on how to access and use open access resources.	[]	[]
g) Librarians are helpful in accessing open access resources.	[]	[]
h) Guidance is available to effectively use the Internet to access open access resources	[]	[]
i) The institutional infrastructure for accessing online resources at UNZA is good.	[]	[]
j) UNZA recognises the need for open access resources for staff career development (promotion criteria)	[]	[]
k) Other challenges faced.....		

E. Possible opportunities that open access resources provide to higher learning institutions like UNZA

15. Rate the following statements on the benefits of open access content; from strongly agree to strongly disagree.

Strongly Agree Not Disagree Strongly

	agree		sure		disagree
a) Open access gives equal opportunity to university students and academic staff in developing countries to access global research content more easily.	[]	[]	[]	[]	[]
b) Open access resources supplement declining budget allocation for resource subscriptions.	[]	[]	[]	[]	[]
c) Open access resources widen the range of scholarly content the library provides to its users	[]	[]	[]	[]	[]
d) Other benefits.....					

16. Your recommendations

.....

Thank you so much for spending your valuable time to answer this questionnaire

Appendix 4

Interview guide for researchers and librarians

Dear Respondent,

I am a PhD student in Information Science at the University of South Africa. As a requirement for this degree, I am conducting a study to explore ways through which current awareness services can be used to improve the usage of open access resources at the University of Zambia.

Current awareness services are services used to provide information users with updates on the latest research information in their areas of interest. **Open access** refers to scholarly peer-reviewed resources that come as part of the e-resources package UNZA library subscribes to.

You have been purposively selected to participate in this interview as an active user of e-resources. Your views are very valuable and will provide critical information into the study. The information you give will be used solely for academic purposes and will be kept strictly confidential.

A. Bio Data

- School and specialisation
- Qualification:
- Academic Rank:
- Age range:
- Gender:

User perception of the relevance of open access in academic and professional work

1. What are your experiences with open access resources provided by UNZA's library, in terms of quality and usefulness to your academic and professional work?

Possible opportunities of using open access resources

2. What benefits, if at all, are there in using open access resources in academia?

Challenges students and researchers face in accessing open access resources

3. What do think are the general challenges associated with access and use of open access resources in the University? (Internet skills, lack of motivation, infrastructure, institution rewarding system, etc.)?
4. What should be the role of students, lecturers, researchers and librarians in promoting the use of open access resources in the University?
5. The use of open access resources in the University voluntary and not mandatory. What you support the status quo?

Availability and application of current awareness services

6. What kind of updates do you have experience with based on your subject-related research information? (Google alerts, publisher alerts, emails, social media, etc.)
7. How useful have you found these alerts?
8. How would you prefer to receive updates on available information in your areas of interest?

Appropriate current awareness services and other strategies that could be used to promote open access resources in the University

9. How best do you think open access resources can be promoted to increase uptake in the University?
10. What are your recommendations?

Thank you so much for according me your time to attend to this interview

Appendix 5

Interview guide for students

Dear respondent,

I am a PhD student in Information Science at the University of South Africa. As a requirement for this degree, I am conducting a study to explore ways through which current awareness services can be used to improve the usage of open access resources at the University of Zambia.

Current awareness services are services used to provide information users with updates on the latest research information in their areas of interest. **Open access** refers to scholarly peer-reviewed resources that come as part of the e-resources package UNZA's library subscribes to.

You have been purposively selected to participate in this interview as an active user of e-resources. Your views are very valuable and will provide critical information into the study. The information you give will be used solely for academic purposes and will be kept strictly confidential.

Bio Data

- School and specialisation
- Study programme/type:
- Year of study:
- Age range: Below 25, 25-35,36-45,46-55,56+
- Gender:

User perception of the relevance of open access in academic and professional work

1. What are your experiences with open access resources provided by UNZA's library, in terms of quality and usefulness to your academic and professional work?

Possible opportunities of using open access resources

2. What benefits, if at all are there in using open access resources in academia?

Challenges students and researchers face in accessing open access resources

3. What do think are the general challenges associated with access and use of open access resources in the University? (Internet skills, lack of motivation, infrastructure, institution rewarding system, etc.)?
4. What should be the role of students, lecturers, researchers and librarians in promoting the use of open access resources in the University?
5. The use of open access resources in the University voluntary and not mandatory. What you support the status quo?

Availability and application of current awareness services

6. What kind of updates do you have experience with based on your subject-related research information? (Google alerts, publisher alerts, emails, social media, etc.)
7. How useful have you found these alerts?
8. How would you prefer to receive updates on available information in your areas of interest?

Appropriate current awareness services and other strategies that could be used to promote open access resources in the University

9. How best do you think open access resources can be promoted to increase uptake in the University?
10. What are your recommendations?

Thank you so much for according me time to attend to this interview

Appendix 6

Research consent form

Dear respondent,

I am a PhD student in Information Science at the University of South Africa (UNISA), student Id No. 61523569. As a requirement for this degree, I am conducting a study on the “**impact of current awareness services on promoting access and use of open access resources at the University of Zambia.**”

The principle aim of this research is to understand aspects behind the low uptake of the open access resources in the University and how the application of current awareness services can increase the usage.

By **current awareness services**, we refer to means of sending updates on latest information to users based on subject areas of their interest. **Open access content** in this context refers to scholarly peer-reviewed online resources that come as part of the e-resources package UNZA’s library subscribes to, such as Oxford Online resources, JSTOR, Cambridge University resources, etc. As such, access to open access resources is only enabled when the institution has paid for subscription-based resources.

You have been purposively randomly selected to participate in this exercise and your views are very critical into the study. The information you give will be solely for academic purposes and will be kept strictly confidential. The interview will take between 15-25 minutes and with your permission, the interview will be audio recorded for the purpose of transcribing later on.

Further, note that you are free to decline to take part in this study if you do not want to and your decision will be respected.

If you agree to take part in this interview, kindly sign this consent form below.

Should you need any clarification on any issue concerning this study, you can reach me on +260 977 875 831 or echitumbo@unza.zm.

Consent declaration

1. I have read the objectives on this study and have understood its purposes.
2. I also understand that participation is voluntary and I am free to withdraw my data or myself from the interview at any time, without giving reasons or facing adverse consequences.
3. I therefore, voluntarily agree to participate in this study.

Signature of research participant

.....

Signature

.....

Date

Signature of researcher

We believe that the participant is giving informed consent to participate in this study.



Signature

24th December 2020

Date

Appendix 7

Researcher observation data collection guide

A. Bio Data

1. Specialisation
2. Level of education
3. Academic status
4. Age range
5. Gender

Current awareness services and open access resources

6. What are the main types of updates/prompts do users use (Google alerts, publisher alerts, emails, social media, etc.)?
7. What are the main activities and information/social platforms that users are engaged in?
8. What are the main sources of online information for users?
9. Are users aware of the availability of open access and other e-resources provided by the University library?
10. Do users use open access resources in their academic and professional work?
11. If no, why don't they use these resources?
12. How useful do students and researchers find open access and other e-resources in their academic/professional work?
13. How best can open access resources be promoted to increase uptake?
14. How do users regard open access resources in terms of:
 - a. Quality,
 - b. Availability
 - c. Easy accessibility due to less access restrictions

- d. Relevance
- e. Range of resources

15. Are open access resources adequately marketed in the University?
16. Do lecturers encourage/motivate students to use open access and other e-resources?
17. What are the other challenges associated with access and use of open access and other e-resources (Internet skills, lack of motivation, infrastructure, institution rewarding system, etc.)?
18. Are librarians helpful to users towards accessing open access and other e-resources?
19. Do lecturers encourage students or fellow lecturers to use open access resources?
20. Do students encourage fellow students or their lecturers to use open access resources?
21. Is the institutional infrastructure enough to support access to open access resources?
22. How easy is it to access open access resources from the databases?
23. Recommendations

Appendix 8

Citation analysis data collection Guide

Section A: Bio data

1. Author's specialisation
2. Level of education
3. Academic status
4. Age range
5. Gender

Section B: Publication details

6. What is the total number of citations per article?
7. What information sources do researchers use in their research work? (Books, journals, reviews, reports, etc.)?
8. Do researchers use e-resources; especially open access resources in their research work?
9. What is the ratio/percentage of open access resources to subscription-based resources as sources of information used by researchers?
10. What is the ratio/percentage of e-resources to print resources as information sources used by researchers?
11. How current are the information sources used by the researchers at the time of publishing the research output?
12. What type of platforms do researchers use for publishing, open or closed/subscription access
13. Any recommendations

Appendix 9

Content analysis data collection guide

Section A: Usage details

1. Name of the database involved
2. Type of database involved, either open access or subscription-based
3. What and how many search options are available at homepage level?
4. What types of updates/prompts does the database provide (e.g. Google alerts, publisher alerts, emails, social media, etc.)?
5. What is the overall usage statistics per year? From 2015-2018
6. What has been the usage trend of open access resources in the last 3 years?
7. Is there any difference in usage of open access databases versus closed access databases?
8. Is there a difference in usage between and among schools or subject specialisation?
9. What is the quality of the open access content these databases provide?
10. How relevant is the open access content to the University's subject mix, hence to students/researchers academic and professional work?
11. How easy is it to access or use these databases (searchability of databases, username/passwords, etc.)?
12. Is the institutional infrastructure available for accessing open access resources adequate?
13. Recommendations

Appendix 10

Publications analysed for the Citation Analysis

1. [Ed-Mirriam](#)
2. [Ed-Anolt](#)
3. [Vet-Simulundu](#)
4. [Vet-Hang'ombe](#)
5. [NS-Jackson](#)
6. [NS-Alinan](#)
7. [PH-Michelo](#)
8. [PH-Jacobs](#)
9. [Vet-Katendi](#)
10. [Vet-Simuunza](#)
11. [HSS-Kusanthan](#)
12. [HSS-Tamara](#)
13. [HSS-Menon](#)
14. [HSS-Mwaba](#)
15. [Eng-Chabota](#)
16. [Eng-Muya](#)
17. [IDE-Chitalu](#)
18. [IDE-Simui](#)
19. [Med-Price](#)
20. [Med-Vwalika](#)

Appendix 11

Reliability test results for individual alpha values if “item is deleted”

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Gender of Respondent	98.34	202.224	0.125	.	0.873
Age group of respondent	98.78	203.557	0.052	.	0.874
Awareness through TOCs or journal alerts	98.00	202.299	0.229	.	0.873
Awareness through Library website	98.22	200.192	0.291	.	0.872
Awareness through Email and RSS alerts	97.99	202.294	0.237	.	0.872
Awareness through SDI	98.05	202.076	0.196	.	0.873
Awareness through Mobile phones	98.00	202.721	0.177	.	0.873
Awareness through social media	98.15	201.894	0.176	.	0.873
Awareness through TOCs	98.02	202.230	0.180	.	0.873
Awareness through Vendor/Publisher alerts	98.09	201.496	0.218	.	0.872
Other ways of updates	97.96	203.381	0.124	.	0.873
How useful one finds OA resources in academics and professional work	96.00	191.387	0.265	.	0.875

Update through TOCs	97.80	201.638	0.089	.	0.875
Update through email and RSS alerts	98.49	204.055	-0.018	.	0.876
Update through SDI	98.12	200.421	0.129	.	0.874
Update through Google alerts	98.18	201.560	0.080	.	0.875
Update through Vendor/publisher alerts	97.86	201.942	0.072	.	0.875
If one is aware of OA resources	98.39	195.867	0.579	.	0.869
Update through social media	98.59	205.165	-0.071	.	0.877
How one got to know-Students	97.81	189.420	0.539	.	0.867
How one got to know-Training	97.48	194.182	0.553	.	0.868
How one got to know-UNZA website	97.70	189.543	0.592	.	0.866
How one got to know-Friends	97.63	191.008	0.579	.	0.867
How one got to know-Vendor/Publisher alerts	97.45	194.484	0.581	.	0.868
How one got to know-Social Media	97.51	192.967	0.597	.	0.867
How one got to know-Posters	97.49	194.506	0.515	.	0.868

If one uses OA resources	98.29	196.992	0.480	.	0.869
Whether one agrees or not with statement	97.44	187.483	0.511	.	0.867
How one got to know-Fliers	97.45	194.837	0.567	.	0.868
Whether one agrees or not with statement	97.00	189.319	0.420	.	0.869
Whether one agrees or not with statement	97.10	187.749	0.547	.	0.866
Whether one agrees or not with statement	97.32	184.923	0.563	.	0.866
Whether one agrees or not with statement	96.61	194.014	0.278	.	0.873
Whether one agrees or not with statement	97.44	185.346	0.501	.	0.867
Whether one agrees or not with statement	97.37	189.744	0.440	.	0.869
Challenges users face when accessing OA resources-Search skills	98.53	198.545	0.323	.	0.871
Whether one agrees or not with statement	97.08	193.410	0.248	.	0.874
Motivation from fellow researcher or students	98.15	198.586	0.366	.	0.871
Find it easy to access OA resources	98.43	196.393	0.452	.	0.869

Know how to evaluate OA resources	98.22	197.793	0.381	.	0.870
Motivation from students	98.40	196.174	0.473	.	0.869
Availability of guidance to effectively use online resources	98.20	197.778	0.388	.	0.870
Librarians are helpful towards accessing OA resources	98.32	197.386	0.390	.	0.870
Need training	98.71	200.549	0.256	.	0.872
Institution recognises OA resources use in academics	98.46	195.602	0.511	.	0.869
Institutional infrastructure for accessing OA resources is good	98.25	198.835	0.322	.	0.871
Supplements budget	97.25	192.982	0.382	.	0.870
The benefits OA resources offers-Equal opportunity to Developing countries	97.73	191.207	0.357	.	0.871
Wide range of resources	97.69	190.275	0.444	.	0.869