Investigating the Usage and Contribution Patterns of Postgraduate Students and Faculty within the DIR

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ABSTRACT

The aim of this study is to investigate the usage and contribution patterns of postgraduate students and faculty within the Namibia University of Science and Technology (NUST) Digital Institutional Repository. This study is underpinned by Unified Theory of Acceptance and Use of Technology (UTAUT) as a part of Technology acceptance model. The qualitative method was partly used in this study through open-ended questions. However, the quantitative approach was dominantly utilised. The population comprised of faculty, Postgraduate (PG) students, Librarians and system developers. Statistical Package for the Social Sciences (SPSS) was used to analyse Quantitative data while qualitative data was analysed using content analysis. The findings revealed lack of awareness about DIR among PG students and faculty. The findings also revealed lack of awareness about DIR among PG students and faculty and misconception by faculty and PG students about DIR and open access. The findings further revealed that the usage of the repository was undermined. The study recommends that the University needs to implement a multi-faceted approach to promote the DIR. This includes increasing awareness through targeted marketing campaigns, addressing copyright concerns, potentially reconsidering the voluntary submission policy, enriching the repository's content, and improving access through strategies like semantic web integration to enhance discoverability via platforms like Google. Looking from policy perspectives, the study recommends that the University should make provisions for Faculty members and postgraduate students to personally self-archive their research work in the DIR instead of the current policy that requires only librarians to archive on behalf of researchers.

Keywords: Institutional Repository (IR), Research Output Archiving, Open Access, Self-Archiving, Scholarly Communication

INTRODUCTION

This study focuses on computer based institutional repositories (digital institutional repositories) (DIRs) which house E-print publications. Rieger (2008) describes digital institutional repositories (DIRs) as databases that are accessible online, of which scholarly materials such as articles, reports or datasets are used to enable the sharing, discovery and archiving of scholarly resources produced in a given institution. While the concept of an Institutional Repository (IR) has been assumed to refer to computer-based collections of scholarly works, the term can also be used to describe manual-based collections of scholarly publications. Institutional repositories based on manual systems are simple institutional archives with paper or print publications. Lynch (2003) asserts that DIRs are modern services for academic research which enable community members to manage and disseminate their intellectual works and creations through a digital mechanism. The term institutional repository is used in this thesis; it also connotes digital institutional repository (DIR). During the 1990s, the preservation and dissemination of intellectual works and scholarly knowledge was exclusively the responsibility of scholarly journals and university libraries. University libraries have always served as access points for information, starting from closed stacks, card catalogues and punched cards right up to the Online Public Access Catalogues (OPACs) (Christian, 2008).

Institutional repositories enable open access to scholarly publishing (Koutras & Bottis, 2014) which Kennan (2008) explains that this is supported and facilitated by new technologies such as the Internet and the World Wide Web, and their associated standards and protocols. Institutional repositories are progressively being recognised by academic institutions as vital infrastructures for preserving and disseminating scholarly materials (Jain, Bentley & Oladiran, 2013). Alemayehu (2010) asserts that open access has provided academic institutions and libraries with new methods of extensively preserving and disseminating their research output. Kennan (2008) points out that free access to institutional repositories is enabled by new technologies such as the Internet and the World Wide Web using standard protocols. The Open Access model of scholarship has the potential to bridge the gap between the 'info-poor' and the 'info-rich' in developing and developed countries respectively (Koutras, 2013).

Statement of the problem

Over the years, Namibia University of Science and Technology (NUST) has experienced an increase in student enrolment at both undergraduate and postgraduate levels. Yet, anecdotal evidence sourced from the NUST's website reveal limited depositing of scholarly work in the digital institutional repository in the institution. This situation is of concern to the university because of the cost and effort involved in establishing DIR. Low depositing of scholarly works and non-use of the institution's repositories has raised concern among scholars and university administrators (Shukla, 2018). Despite the increasing importance of institutional repositories in promoting scholarship, it is not clear why there is low deposition of scholarly materials in the DIR at NUST. The low usability of DIRs in literature has been attributed to factors such as lack of awareness, and lack of IR policies. These factors obtained in the context of NUST was the subject of investigation in this study. Currently, there is no empirical research that has been undertaken in Namibia to understand the depositing and usage patterns of scholarly publications by postgraduate students and academics. This study therefore investigated patterns of depositing of materials and the usability factors influencing the use and non-use of institutional repositories by faculty and postgraduate students at NUST. The outcome of this study can facilitate the formulation of appropriate policies and practical interventions to alleviate the problems of non-use and low depositing of scholarly works in the institutional repositories at NUST and other universities in Namibia. This study aims to investigate the usage and contribution patterns of postgraduate students and faculty within the NUST Digital Institutional Repository, specifically focusing on two key aspects: (1) the extent to which PG students and faculty are archiving their research output in the DIR, and (2) the degree to which they are utilising the content available within the DIR. Understanding the current practices and usage patterns related to the DIR is crucial for identifying potential barriers to its adoption and maximizing its impact on research visibility, accessibility, and ultimately, the university's scholarly reputation. Low submission rates or limited usage could indicate a need for targeted interventions to promote the benefits of the DIR and encourage greater participation from the NUST community. Therefore, this study seeks to address the problem of potentially underutilized research archiving and content access within the NUST DIR, exploring the gap between the intended function of the repository and its actual usage by PG students and faculty. The outcome of this study can facilitate the formulation of appropriate policies and practical interventions to alleviate the problems of non-use and also low depositing of scholarly works in the institutional repositories at NUST and other universities in Namibia.

Research objectives

To determine an extent are PG students and faculty at NUST archiving their research output in the DIR.

To determine an extent are PG students and faculty at NUST using content in the DIR.

Delimitations of the study

Creswell (1994:105) states that, "boundaries are necessary in a study to provide direction for the terms used, for the scope of the study and for the potential audience". In terms of delimitations of this study, it focused on the usability of Digital Institutional Repositories (DIRs) by PG students and faculty at NUST. The study included only faculty members, librarians, PhD and Masters students. The researcher chose faculty, Masters and PhD students because they are the main producers of research outputs at NUST. The PG students are also required to carry out research in partial fulfilment of the requirements for their respective degrees. It was also assumed that

PG students were most likely to have used, and to continue using the digital repositories in order to meet information needs related to their academic and research work.

RESEARCH METHODS

The study was underpinned by the "post-positivist paradigm". According to Teddlie and Tashakkori (2009:5), the "post positivism paradigm is a revised form of positivism that addresses several of the more widely known criticisms of quantitative orientation and, yet maintains an emphasis on quantitative methods". This study adopted a survey research design because it involves systematically collecting data through the use of interviews and a questionnaire and document review. The target population in this study comprised of faculty members (lecturers, senior lecturers, associate professors and full time professors), PG students (Masters and Doctoral students). Both groups are involved in generating and using research. The survey used self-administered questionnaires to collect data from PG students and faculty. The self-administered questionnaire was distributed to PG students and faculty because of their busy schedules.

Population of study

The target population for this study was faculty (academic staff), postgraduate students (Master's and Doctorate), and librarians (library professionals with Library Science qualifications) at the Namibia University of Science and Technology. The total population at NUST was thus 743 (as determined through institutions databases). Saunders, Lewis and Thornhill (2009:219) indicate that with a total population of 743 a sample size of 217 is adequate to provide representativeness. The relative distribution of the sample sizes of the population is provided in Table 1. The sample sizes are based on the population strengths of each population.

Table 1: Relative distribution sample sizes

Respondents	**Respondents size**	**Relative sample computation**	**size**	**Relative sample sizes**
Faculty	307	307/743x217=		90
Masters	397	397/743x217=		116
PhD	26	26/743/x217=		7
Librarians	11	11/743x217=		3
System developers	**2**	2/743x217=		1
Total population	743			**743**
Total sample	**217**			**217**

Sampling

The study applied a purposive sampling technique to sample postgraduate students (Master's and Doctorate students) and librarians (library staff involved in managing the DIR and faculty involved in publishing from all faculties). Snowballing strategy was used to reach out to the target participants. Babbie and Mouton (2001:167) state that "Snowball refers to the process of accumulation as each located subject suggests other subjects". In order to gain access to faculty and students, the researcher made use of faculty offices and study rooms and various university residences intended for postgraduate students. Faculty members were identified through their faculty offices within their departments, and librarians were identified through the library director.

Data collection methods and procedures

The study adopted both research approaches. The qualitative method was partly used in this study through open-ended questions. Nevertheless, the quantitative approach was dominantly adopted. Such an integrated approach was achieved using a questionnaire comprising open questions that generated qualitative data and closed

questions which provided quantitative data. Although the researcher selected a largely quantitative research approach and more specifically a descriptive design, the answers to the open questions introduced a qualitative element to the study.

Validity and reliability of instruments

Reliability of instruments was achieved by adopting survey questionnaires that have been successfully used to investigate usability and the use of electronic information systems such as DIR in several universities, such as Jagero et al.'s (2014), which was used to assess usability of the Africa University Digital Library in Mutare, Zimbabwe. The inspection of the instruments by experts prior to data collection was also done to achieve reliability. The reliability of instruments was also achieved through pretesting to ensure that they are worded correctly in an effort to evade misunderstandings by participants. The researcher carried out a pilot study with 12 respondents that were not part of the study population in order to discover inadequacies in the design of the questionnaire and ensure they were correctly worded. Using feedback from the pre-testing of the study and observation by the researcher throughout the process, a final questionnaire was compiled before the actual data collection.

LITERATURE REVIEW

Theoretical perspectives

This study is underpinned by UTAUT as a part of Technology acceptance model. UTAUT model is well-thought-out appropriate for this study since its constructs would have a direct effect on authors' behavioural intentions and usage of digital repositories. Wirba, Singeh, Abrizah, and Karim (2013) state that "acceptance is seen as the researcher's readiness and awareness of those particular issues relating to self-archiving and those managed activities that address open access as well as the behavioural intention and plan to self-archive in an institutional repository; the researcher's level of awareness, current practices, behavioural intention, and barriers to self-archiving will determine their level of readiness towards self-archiving". Venkatesh et al. (cited in Wirba Singeh, Abrizah, and Harun Abdul Karim (2013) recommend UTAUT as an acceptance model after a thorough evaluation of prominent models used in user endorsement of technology, namely: the theory of reasoned action (TRA); and the technology acceptance model (TAM). The UTAUT model comprises of effort expectancy (EE), social influence (SI), performance expectancy (PE) and facilitating conditions (FC) as key determinants of behavioural intentions and use behaviour. Facilitating conditions (FC), behavioural intention, and use behaviour were found as relevant aspects to this study.

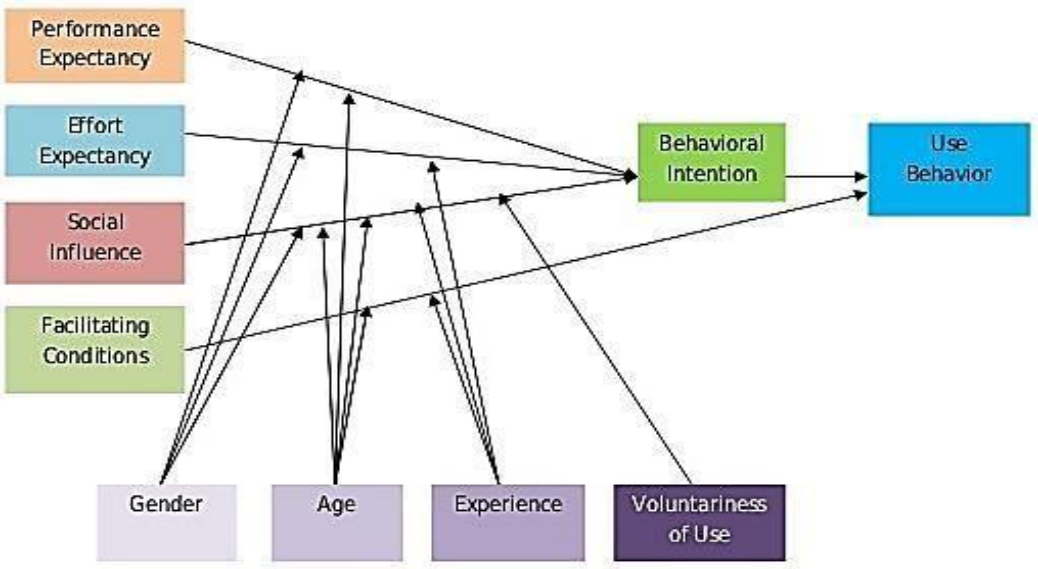

Figure 1: Unified Theory of Acceptance and Use of Technology (UTAUT) (Source: Venkatesh et al., 2003)

Table 2 summarises the mapping of research questions to the usability variables investigated in this study.

Table 2: Mapping of research questions to the usability variables in this study

Research questions	Usability variables in the ATAUT theories
To what extent are PG students and faculty at NUST archiving their research output in the DIR?	Effort expectancy (EE) and facilitating conditions (FC) Intention to use (IU)
To what extent are PG students and faculty at NUST using content in the DIR?	Usage behaviour (UB)

Previous experience on DIR contribution

Bamigbola (2014) who reported that despite the general positive attitude to DIR by faculty and students, there was low submission of scholarly works by both categories of users. The results revealed that faculty did not submit their research work to DIR because they pointed out that they were not aware of the need to submit their research work to the institutional repository. Other faculty were ignorant of the value of depositing their research work in the repository. In addition, some faculty were wary to deposit in the repository for fear that journals restricted authors to submit their research work elsewhere. This threatens the growth of contents in digital institutional repository. Hence, the archiving efforts in this institution should be enhanced. These results are reflected in literature showing no improvement. Ondari-Okemwa (2007) asserts that in the context of Namibia the deposition by scholars of their publications in the IRs remains very low. An example is, by the year 2016 the country had only 1,207 scholarly publications in the DIRs at both UNAM and NUST compared to Mozambique with 3,103 publications in one repository alone, while Zambia had 3,395 in a single repository respectively (Ezema and Onyancha, 2016). Swan (2008), and Swan and Brown (2005) found that many academic authors were not familiar with the concept of institutional repositories or simply did not understand its importance. Swan (2008) also noted some researchers were not aware of self-archiving. Swan (2008); Swan and Brown (2005); Shukla, and Ahmad (2018) agree that there are clear indications that researchers' participation in contributing research works to DIRs is not improving year-in-year out.

Preferences in submitting research work to open repositories

Davis and Connolly (2007) who surveyed authors in the USA and results revealed many of respondents were found reluctant to contribute to the institutional repositories. Moreover, researchers displayed a very limited knowledge of institutional repositories compare to knowledge of open access journals. Another survey at Cornell University found that scholars "were not contributing their research work to the institutional repository". Wu's (2015) study at Roger Williams University in Bristol, Rhode Island, examined causes of low faculty contributions to IR content growth, particularly at small academic institutions. The study identified two major issues, poor adaptation to actual faculty needs and copyright worries as the major bottlenecks in building the case for DIRs. The findings also revealed that academics at Cornell University hardly contribute to the institutional repository as it remained few contents and hardly used. This was linked to the fact that academics are not motivated use the institutional repository (Davis & Connolly, 2007). Similarly, Shukla and Ahmad (2018) assessed the impact of Institutional Repositories on scholarly practices of scientists at the Council of Scientific and Industrial Research (CSIR) laboratories of India. The study revealed that 'Peer-Review Scholarly Journals' are a favoured medium for publishing research content and the maximised visibility to grey literature was the greatest noteworthy impact of DIR on respondents. This study confirms that researchers are still reluctant in contributing to the repository as this has been reported in previous studies. Hence, their preparedness had not changed.

Intention to contribute scholarly work to DIR in future

Yang and Li's (2015) study at Texas A and M (University (TAMU) which assessed faculty members' attitudes towards, and willingness to contribute to an institutional repository (IR). In addition, they investigated the perceptions of faculty members towards newer OA trends and resources, including Open Educational Resources (OER) and Data Management Plan Tool. They found that tenured faculty are more engaged and interested in OA publishing topics in general, and tenure-track faculty are more willing to adopt new initiatives such as Open Textbooks. Overall, the TAMU faculty are willing to consider publishing in OA publications, and almost half of

them believe OA journal publications are acceptable for consideration of tenure and promotion in their departments. Koulouris,et al. (2013), in a survey which focused on institutional repositories, policies and best practices for encouraging self-arching at a Greek University, found that the faculty members were all willing to deposit their work. More than half of them indicated that they would proceed with self-archiving procedures. In addition, more than 89% were willing to learn self-archiving procedures as well as uses of the DIR.

Mandatory and voluntary submission policy

Stanton and Liew (2011) who reported respondents expressed they prefer a voluntary system or were ambivalent toward archiving their work in an institutional repository. One respondent quoted, indicated that submission should not be made compulsory, but researchers should be given an option to choose whether to publish their research output in the repository or not. Some students in Stanton and Liew's (2011) study were reportedly against archiving their work in a repository. One participant cited concerns regarding plagiarism and strongly opposed having their research published electronically. However, in the same study, Stanton and Liew (2011) found a high level of willingness to comply with the mandatory thesis deposit policy was observed. Positive responses ranged between 91.6% from respondents in the College of Science to 100% in the College of Creative Arts. However, within the literature, there is a debate concerning the essential for "mandatory submission policies" for researcher's intellectual output. Some stakeholders claimed that mandatory policies would cause more "harm" than "good" in relation to researcher's accordance, preferring a library liaison and advocacy approach, while others (including some of the academics themselves) are not concerned with mandatory submission policy (Palmer et al., 2008). Other authors argue that mandatory policy is the only way to achieve appropriate submission rates (Sale, cited Stanton and Liew, 2011). Xia and Sun (2007) who examined self-archiving practices in nine well-known open access institutional repositories using the E-prints system in USA. They found that an exercise of self-archiving for institutional repositories had not been extensively accepted by researchers. They also found that the availability of full texts in those repositories was relatively low though the Australian repositories were the exception. Xia and Sun (2010) reported that one possible reason for the low rate of author self-archiving was the use of a liaison system where librarians working with departments deposited works on behalf of faculty members.

Banach and Li (2011) are of the view that most IRs do not have well-defined policies about the types of records that should be deposited in these repositories. They pointed out that only 2.72% of IRs have a defined policy regarding types of material to be submitted, whereas around 3.04% policies do not provide guidelines. As to how content is deposited in the DIR, Banach and Li (2011) found that three methods were common namely: author self-archiving by third party on behalf of the author, and by repository staff.

The librarian respondents were asked to explain how the policy guided the archiving and submission or depositing of the materials into the DIR and whose responsibility it was to upload items. It was revealed that the policy only allowed faculty librarians to upload the materials into the repository. The respondents also indicated that the institution relied on voluntary submissions.

Stanton and Liew's (2011) study expressed concerns over the mandatory submission policy. While supportive of placing their work in the repository and happy to comply, the interviewees expressed preference for the voluntary submission. The review of literature has shown that IR policies are some of the issues that may influence use and the participation of PG students and Faculty in depositing their research work in the Dirs. A brief examination of some IR policies revealed, for example, that the University of Tasmania IR policy mandated researchers to make available OA digital copies of all research outputs and their related metadata via the Institutional OA Repository. Voluntary submission of research outputs to the Institutional OA Repository by other members of the University community and the wider Tasmanian community is encouraged to achieve the benefits of Open Access wherever possible (University of Tasmania IR policy, 2017). Similarly, at the University of Auckland the IR policy indicates that where staff members create any form of intellectual property other than an excluded copyright work in the course of their employment or using university resources, the university must be acknowledged as having rights to that intellectual property (The University of Auckland intellectual property policy, 2013). Previous studies which investigated the impact of mandatory policy towards the growth of DIRs content such as that of Sale (2006) in Australia have shown that mandatory submission has an impact on DIRs' content growth.

The findings from this current study also revealed that performance expectancy (PE), facilitating condition (FC) and attitude towards (AT) did not influence PG students' and faculty's behavioural intention to archive in the DIR. Even though PG students and faculty tended to agree that institutional repositories are a good way of disseminating information and use them frequently (which implies positive attitude), most of them have not fully embraced archiving in digital institutional repositories. The study found that facilitating condition and policies issues needed to be addressed first as far as promoting open access through DIR is concerned before attitude towards open access, because attitude towards open access publishing is quite positive. Venkatesh et al. (2003) highlight that, "facilitating conditions" and "Intention to use Internet information resources" have significant effects on users. Similarly, environment factors such as policies have an influence on users' behaviour and can motivate the PGs and faculty to start using the DIR. As indicated earlier, PGs and faculty were averse to mandatory submission policy which resulted in low content submission. On the other hand, Sale (2006) reported that mandatory submission policy has an impact on DIRs content growth.

Self-archiving and Using DIRs for accessing content

In this study, self-archiving means the items in the repository by themselves rather than someone doing it on their behalf. Harnad (2001) describes self-archiving as the act of (the author's) depositing a free copy of an electronic document on the Internet, or more specifically on the World Wide Web, in order to provide open access to it. The term usually refers to the self-archiving of peer-reviewed research journal and conference articles, as well as theses and book chapters, deposited in the author's own institutional repository or open archive for maximising its accessibility, usage, and citation impact. Wirba, Singeh, Abrizah, and Karim (2013) studied Malaysian authors' acceptance to self-archiving in institutional repositories. Despite of all efforts worldwide, DIRs are still facing the threat of low contributions from the scholars. Scientists and research scholars are well aware about the gains of open access DIRs; however, they are hesitant to disseminate their scholarly research results through self-archiving (Shukla, 2018). Therefore, the present study attempts to review literature on the extent to which PG students and faculty members archive their research output and use the content deposited in the DIR.

Self-archiving is an action of (the author's) depositing a copy of an electronic document on the Internet freely, or more specially on the "World Wide Web" to provide open access to it. The term is commonly known as the self-archiving of peer-reviewed research journals and conference articles, as well as theses and book chapters, submitted in their own institutional repository or open archive for the purpose of increasing its accessibility, usage and citation impact, which is one method of maximising the visibility of research output (Harnad, 2001). Kodua-Ntim (2024) study explored the authors self-archiving to create awareness of open access institutional repositories in universities. The study's qualitative approach was informed by the interpretive paradigm and the case research design. The study revealed that author self-archiving could improve awareness of open access institutional repositories. The study recommended that universities fully implement the author's self-archiving protocol, and the university and university library should provide rigorous policies and incentives for author self-archiving.

In a study by Xia and Sun (2007) in the United States of America (USA), self-archiving practice was examined in nine well-known open access institutional repositories using E-prints system. It examined self- archiving practices in nine well-known open access institutional repositories using the E-prints system. The study found that researchers had not extensively accepted the self-arching exercise for institutional repositories. Xia and Sun (2007) also found that full-text availability in those repositories was low; however Australian repositories were exempted. Xia and Sun (2007) reported that using librarians to work with departments in depositing their researchers' works in the repositories on their behalf was one possible reason for the low rate of contribution to the repositories.

Chakulya et al. (2021) study titled "Effective Tools for Self-Archiving in Institutional Repositories". Research undertaken in this research showed that scholars at the University of Zambia (UNZA) had different reasons as to why they do not fully practice self-archiving, reasons varied from the practice being way too complex, practice consumes a lot of time and this brings us to how self-archiving at the UNZA can be improved. One of the ways that self-archiving can be improved is through the development of self-archiving software tools that can make

the seemingly tedious and monotonous ways of depositing content to the IR at UNZA effective and easy, which was the sole purpose of this research.

Using DIRs for accessing content

Russell and Day's (2010) study at Cornell University reported that most researchers (9 out of 11) believed repositories to be stand-alone services which had to be searched separately (Davis and Connolly, 2007). Consequently, it is unlikely that direct searching of repositories (either local or remote) would occur from researchers. Arndt (2012) assessed doctoral students in New Zealand and found that low awareness of Institutional Repository was responsible for low direct use of IRs in conducting research. Most respondents reported using Google Scholar and could unknowingly have accessed open access repository content. Achieng (2016) analysed the usage of a digital repository in an academic institution in Kenya and found underutilization of the digital repository content.

Tools used to access research output

Arndt (2012) reported low direct use of DIRs for conducting research by scholars; instead, the vast majority used Google Scholar. Achieng (2016) analysed the usage of a digital repository in an academic institution in Kenya. The results revealed that the digital repository was underused partly because of lack of access to computers. The research revealed that independent variables effectiveness, efficiency, satisfaction, and awareness contributed to usage of the digital repository and e-resources. Each of these factors influenced the usage of the repository either positively or negatively. The usage drivers were identified as lack of awareness and information, satisfaction and frequency of use, increased information needs, and reduction of barriers to access. The research also revealed that effectiveness, efficiency, satisfaction, and awareness constructs have positive impact on the usage of the repository and the e-resources, and can be used to increase usage of a digital repository. A study by Stanton and Liew (2011) reported that only two participants indicated that they directly used institutional repositories directly for information access. Seven out of the eight participants mentioned that they accessed institutional repositories through Google Scholar or through the Online Public Access Catalogue, but not essentially aware that they were using the university's digital institutional repository in the process. One student indicated that he never used repositories because his research needs are mostly answered though libraries and the Internet. Although, it is likely that much of the journal articles the participants had accessed through Google Scholar were in fact housed in repository collections, or those articles published in open access journals. In terms of PG students' use of repositories and open journals in their own research, the study revealed that only few of the respondents had used open access research services for example "Australasian Digital Theses and Ethos". Nevertheless, most respondents used Google Scholar, so it is possible that they retrieved open access material from journals and institutional repositories without realizing it. The dominance of search engines is also clear in the academic sector. A 2005 survey by Online Computer Library Centre (OCLC) established that 89 percent of students from high learning institutions usually begin their research with Google, and that only 2% starts their search at library websites (DeRosa and OCLC, 2005). According to Haglund and Olsson (2008), a repeat of that survey five years later revealed that that the situation for libraries had only worsened, as no respondents reported visiting library websites at the outset of their research (DeRosa et al., 2010).

That same report revealed a decrease in traditional search engine use, but also noted for the first time the use of social media search engines for their research. Another 2005 survey in the UK found that "students preferred to locate information or resources via a search engine above all options, and Google was the search engine of choice" (Griffiths and Bophy, 2005). The information-seeking behaviours of upcoming academic researchers in Sweden display an "almost complete dominance of Google as a starting point for searching scientific information". Rieger (2009) on the other hand reported an extensive use and satisfaction with Google and Google Scholars among scholars. Rieger (2009) pointed out both academics and students preferred search engines over other information retrieval systems in supporting their academic search and learning. Rieger (2009) also reported that there was sufficient awareness of specialised Google tools such as Google scholar and Google books among the faculty members and PG students. Kroll and Forsman (2010) in the United States studied researchers at four active universities and their study revealed that Google and Google scholars was effective their information needs and participants described these search engines results as good in many cases.

These results give a strong impression that besides efforts of introducing other library information retrieval systems, the Google and Google scholars remains mostly and extensively used by researchers. Connell (2011) compared the use of digital materials that have been deposited in The Ohio State University (OSU) Knowledge Bank (KB). Results showed that mediated and unmediated content were used, and therefore justified the preservation costs for unmediated content. Results also showed articles and undergraduate these were the most frequently used type of materials leading to the conclusion that it is important to collect content from all levels of the educational process. Haglund and Olsson (2008) emphasised that to understand the information needs of young university researchers better, an observational study was carried out at three universities in Stockholm, Sweden. The study found that "most of the researchers used Google for everything, that they were confident that they could manage on their own, and that they relied heavily on immediate access to electronic information" (Haglund and Olsson, 2008:52). The researchers had very little interaction with the library, and their awareness on the value librarian competence could add to their research was very limited nor recognize it. One significant conclusion of the project is that "librarians must leave the library building and engage themselves with research environment, as well as considering the fact that library use is considered complicated, but Google (etc.) is easy. The findings of Haglund and Olsson (2008) project will have an impact on changes in library services for now and in future. Haglund and Olsson (2008) stated that, a repetition of that survey five years later established that the situation for libraries had only worsened, as 0% of respondents reported visiting library websites at the outset of their research (DeRosa et al., 2010). The similar report finds a small drop in use of the traditional search engine, but also noted for the first time, the social media search engines use for initial research. Another 2005 survey in the UK found that students favoured to retrieve information or resources though search engines on top of all options, and Google was the best search engine chosen (Griffiths & Brophy, 2005). The information searching behaviours of young academic researchers in Sweden revealed complete dominance of Google as a starting point for searching scientific information by faculty.

Thus, Tmava and Alemneh (2013) pointed out that to increase content visibility search engines are the most popular way users search for information; they account for 88 percent of users' search time when they are looking for information (Bifet & Castillo, 2005). This is because most users like to search by keyword, and they expect to retrieve useful results. The popularity of Google search engines is attributed to its ease of use, it is free, and it is extremely fast and produces useful results. For the most part, Google generates search results by matching search terms entered with Web page content, usually referred to as full text searching. Yin, et al. (2011) explained how "Subject norm" and "Intention to use Internet information resource" have significant effects on users. Furthermore, they pointed out that environment factors such as the opinions of users, tutors, friends, schoolmates, and colleagues on the usage of Internet information resource are very important to users' behaviour in using the DIRs. Previous studies on the adoption of information systems results have revealed that people often use technology if they find it useful and easy to use (Lu, et al.2003).

In order to improve the efficiency of the usage of Internet information resource, Yin, et al. (2011) explored the key factors which affect the actual usage of Internet information resource in China. Structural Equation Modelling (SEM) and Partial Least Squares (PLS) were used to test the conceptual model. Empirical data were collected through questionnaires. From the perspective of users, the results indicated that the key factors including self-efficacy, subjective norm, intention to use have significant effect on users' actual usage of Internet information resource. Figure 6.3 below demonstrates the relationship between subjective norm and actual usage of the Internet information resources.

RESULTS

Self-archiving

In this study, self-archiving means how the authors deposit the items in the repository by themselves rather than someone doing it on their behalf. Harnad (2001) describes self-archiving as the act of (the author's) depositing a free copy of an electronic document on the Internet, or more specifically on the World Wide Web to provide open access to it. The term usually refers to the self-archiving of peer-reviewed research journals and conference articles, as well as theses and book chapters deposited in the author's own institutional repository or open archive for the purpose of maximising its accessibility, usage and citation impact. Wirba, at al. (2013) investigated Malaysian authors' acceptance of self-archiving in institutional repositories using the Unified Theory of

Acceptance and Use of Technology (UTAUT) and TAM models. Both models focus on performance expectancy, effort expectancy, social influence, and facilitating conditions on using technology. According to the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980), attitudes and subjective norms would affect an individual's intention, and intention has influence on behaviour in sequence. In this study, "facilitating condition" and "behavioural intention" (see UTAUT) were used to measure the extent to which PG students and faculty at NUST are: a) archiving their research output in the DIR, b) using content in the DIR.

Previous experience on DIR contribution

As a result of using behaviour constructs from UTAUT, the PG students were asked if they have in the past submitted their scholarly work to the Digital Institutional Repository at NUST. The results showed that 9 (10.91%) of the students had previously contributed digital materials to the DIR, 73 (89.09%) had never contributed to the DIR. The high number of non-contributors could be attributed to the fact that most of them were master's students who were focusing on completing their theses.

Faculty respondents were similarly asked if they had deposited their scholarly work into the Digital Institutional Repository at NUST. The results showed that 25 (71.4%) had previously deposited into the repository, while 10(28.6%) had not.

During the interview, the librarians were asked how they rated the growth of the DIR in the institution. Librarian A noted the growth as being slow because some researchers were reluctant to submit their scholarly work to the repository. Librarian B concurred that the growth of the repository was slow because this depended on the output of lecturers depositing into it.

Librarian B further added:

"*If the level of research in the institution was high obviously the repository would grow. The DIR growth is predicated on the research activities within the institution. Currently the research in the institution is low, compounded by the fact that not every researcher submits their work to the library for uploading into the DIR. Some researchers prefer other platforms for depositing their research work.*

Preferences in submitting research work to open repositories

By using the behaviour intention construct from UTAUT, faculty were asked to state their preferences in submitting their research work to institutional repositories. The results in **Table 5.12** below show that the highest number of faculty amounting to 8 (32.0%) deposited their research in the DIR, followed by 7 (28.0%) who submitted their work to the Print Institutional Repository and 3(12.0%) who submitted their research work to professional/ research group open access websites, 5(20.0%) that submitted their work to departmental websites/portals, and those who preferred to submit their research work in subject repository were 2 (8.0%).

Table 3: Faculty preference in submitting research work to open repositories

		Responses	
		N	Percent
Where do you prefer to submit?	Digital institutional repository	8	32.0%
	Institutional print repository	7	28.0%
	University/department website	5	20.0%
	To professional/ research group open accessed website	3	12.0%
	Subject repository	2	8.0%

	Personal webpage	0	0.0%
Total		25	100%

Intention to contribute scholarly work to DIR

Through using the behaviour intention construct from TAM, the PG students who stated that they did not contribute materials to the DIR were asked whether they planned to contribute materials in future. The results in figure 5.2 showed that the majority as represented by 46 (63.1%) respondents said that they are planning to do so, followed by 21(28.7%) who were undecided, while 6(8.2%) were not planning to contribute to the DIR.

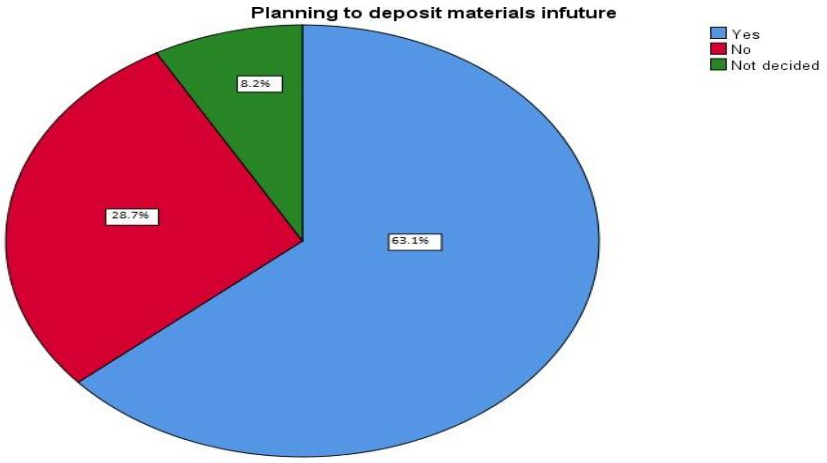

Figure 2: PG students' intention to contribute materials to the DIR

Faculty were similarly asked if they planned to submit their research output to the institutional repository in the future. The results in figure 5.3 below show that the highest number of respondents at 15 (39.5 %) indicated that they are planning to contribute their publications to the repository, followed by 12 (31.6 %) who were undecided. Nine (23.7 %) indicated that contributing to the repository does not apply to them and only 2 (5.2 %) said they were not planning to contribute their publications to the repository.

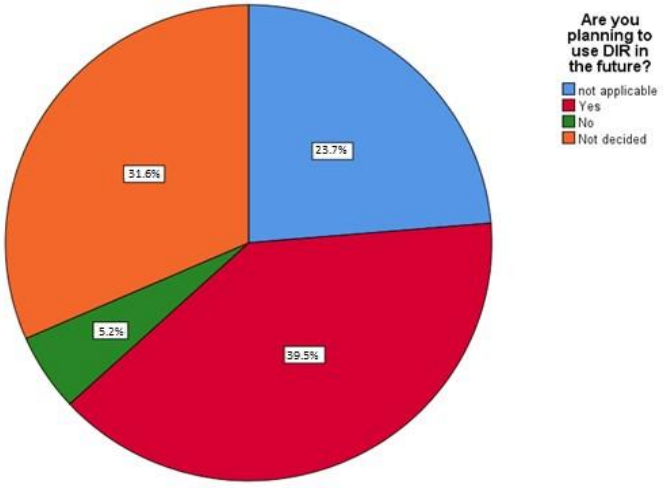

Figure 3: Faculty's intention to contribute scholarly work to NUST's DIR (n=38)

Mandatory and voluntary submission policy

There was a high level of willingness to comply with the voluntarily submission policy by respondents. Results as shown in table 5.13 revealed that 53 (48.1%) strongly agreed, 41(37.2%) agreed, 5 (4.5%) were neutral and 10 (9.0%) strongly disagreed, while 1 (1.2%) disagreed with the voluntary submission policy. Forty (36.4%)

strongly agreed with the mandatory submission policy, while 39 (35.5%) agreed, 10 (9.1%) were neutral, 19 (17.3%) strongly disagreed, while 2 (1.7%) disagreed.

Table 4: PG students' opinion on mandatory and voluntary submission policy (n=110)

		Frequencies and percentage				
		Agree Strongly	**Agree**	**Neutral**	**Strongly Disagree**	**Disagree**
Prefer submission	**Voluntary**	53(48.1%)	41(37.2%)	5(4.5%)	10(9.0%)	1(.9%)
Prefer a mandatory submission policy		40(36.3%)	39(35.4%)	10(9.0%)	19(17.2%)	2(1.8%)

Twelve (31.7%) of the faculty agreed to comply with the mandatory policy, 10 (26.3%) strongly disagreed, 8 (21.0%) were neutral, 4 (10.5%) disagreed, and 4 (10.5%) strongly disagreed with the mandatory policy. Faculty were asked whether they preferred the mandatory or voluntary submission policy. The results in figure 5.4 show that the highest number of respondents at 19 (50%) strongly agreed with the voluntary submission policy, followed by 9 (23.7%) who agreed and 7 (18.4%) were neutral, 2 (5.3%) disagreed and 1(2.6%) strongly disagreed with the voluntary submission policy (see figure 4 below).

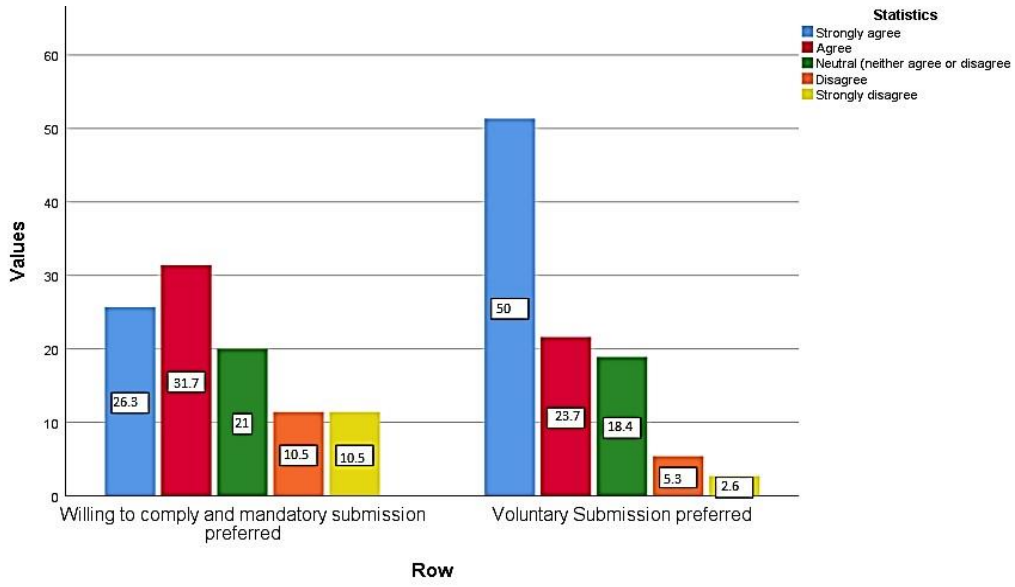

Figure 4: Mandatory and voluntary submission policy: Faculty response

Moreover, the researcher sought to know whether respondents were aware of the institution having the archiving policy. Librarian A responded that they were not aware if the institution had an archiving policy; however, librarian B responded that she was aware that there is an institutional repository policy in place but was not sure about the archiving policy. Librarian B was also not sure when the policy was implemented. The researcher further sought clarification on how the policy guided the archiving or uploading of the documents into the DIR. The librarian respondent indicated that:

"*I am aware the archiving policy is pretty clear on what is expected from us when we are uploading documents and archiving documents for the researchers."*

The respondents were further asked to explain how the policy guided the archiving and submission/depositing of the materials into the DIR and whose responsibility it was to upload items. It was revealed that the policy only allowed faculty librarians to upload the materials into the repository. The respondents also indicated that the institution relies on voluntary submissions, where the authors voluntarily submit their research work to the library for uploading in the DIR.

Using DIRs for accessing content

In using the behaviour and actual use constructs from TAM, postgraduate students were asked if they ever used the DIR for accessing information. The results showed that most of them as represented by 67(61%) respondents, have never used the DIR for accessing information, and only 43 (39%) respondents have used it.

Tools used to access research output

PG students were asked what tools they used to access research output in their institution. Results in figure 5.5 indicate that the highest number of respondents (30, 36.6%) used Google scholar, followed by Google (23, 28.0%). Others used library shelves (10, 12.2%), NUST e-resources databases (16, 19.6%), and those who access the DIR indirectly through other modes were only 3 (3.6%).

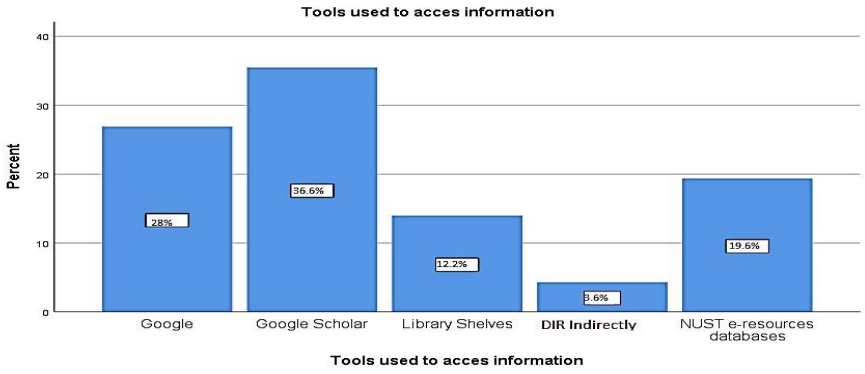

Figure 5: Tools used to access research output within NUST

The PG student respondents were asked to state the source of information that students mostly access on the DIR. The respondents noted that though the institution subscribes to several databases, such as Proquest, Jstore, NUST Library discovery service, Emerald and many more, the majority of students are inclined to use Google as a primary source of information. Some other students prefer to use print sources as well.

DISCUSSION

Self-archiving and Using DIRs for accessing content

In this study, self-archiving means the items in the repository by themselves rather than someone doing it on their behalf. Harnad (2001) describes self-archiving as the act of (the author's) depositing a free copy of an electronic document on the Internet, or more specifically on the World Wide Web, in order to provide open access to it. The term usually refers to the self-archiving of peer-reviewed research journal and conference articles, as well as theses and book chapters, deposited in the author's own institutional repository or open archive for maximising its accessibility, usage and citation impact (see also section 1.11).

Wirba, et al, (2013) studied Malaysian authors' acceptance to self-archiving in institutional repositories. The authors used the unified theory of acceptance and use of technology (UTAUT) and TAM model. UTAUT postulates that performance expectancy, effort expectancy, social influence and facilitating conditions on using technology, influence technology acceptance. Similarly, the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980) posits that attitudes and subjective norms would affect an individual's intention to use technology, and intention has influence on behaviour. This study used the facilitating condition, behavioural intention, and use behaviour from UTAUT to measure the extent to which PG students and faculty at NUST were: a) archiving their research output in the DIR, b) using content in the DIR.

Previous experience on DIR contribution

As a result of using the behaviour construct from TAM, PG students were asked if they have submitted their scholarly work to the Digital Institutional Repository at NUST in the past. The results showed that 9 (10.91%)

students had previously contributed digital materials to DIR, while (73, 89.09%) had never contributed to the DIR. The high number of non-contributors could be attributed to the fact that most of them were Masters Students who were focusing on completing their theses. In addition, it seems students were not aware that they could submit their research work in the DIR. Similarly, faculty respondents were asked if they had deposited their scholarly work into the Digital Institutional Repository at NUST. The results showed that 25 (71.4%) had previously deposited into the repository, while 10 (28.6%) had not. These results reveal that the majority of participants contributed their research work in the DIR. In the opinion of the librarian respondents, there is low level of content submission by both PG students and faculty. These results confirm the findings of Bamigbola (2014) who reported that despite the general positive attitude to DIR by faculty and students, there was low submission of scholarly works by both categories of users. The results revealed that faculty did not submit their research work to DIR because they pointed out that they were not aware of the need to submit their research work to the institutional repository. Other faculty members were ignorant of the value of depositing their research work in the repository. In addition, some faculty were wary to deposit in the repository for fear that journals restricted authors to submit their research work elsewhere. This threatens the growth of contents in digital institutional repository. Hence, the archiving efforts in this institution should be enhanced. These results are reflected in literature showing no improvement. Ondari-Okemwa (2007) asserts that in the context of Namibia the deposition by scholars of their publications in the IRs remains very low. For example, by the year 2016 the country had only 1,207 scholarly publications in the DIRs at both UNAM and NUST compared to Mozambique with 3,103 publications in one repository alone, while Zambia had 3,395 in a single repository respectively (Ezema and Onyancha, 2016). Swan (2004), and Swan and Brown (2005) found that many academic authors were not familiar with the concept of institutional repositories or simply did not understand its importance. Swan (2008) also noted some researchers were not aware of self-archiving. Swan (2004), Swan and Brown (2005), Swan (2006), and Shukla, and Ahmad (2018) agree that there are clear indications that researchers' participation in contributing research works to DIRs is not improving year-in-year out.

Preferences in submitting research work to open repositories

As a result of using the behavioural intension variable from UTAUT, faculty respondents who stated that they have contributed their scholarly work were asked to state their preferences in submitting their research work to open repositories. The results showed that the majority of faculty (8, 32.0%) deposited their research in the DIR followed by 7 (28.0%) who submitted their work to the Print Institutional Repository; 3 (12.0%) submitted their research work to the professional/research group Open access website; 5 (20.0%) submitted their work to the department website/portals and those who preferred to submit their research work in subject repository were only 2 (8.0%).

The results reveal that, although the majority of respondents have contributed to the DIRs, there were still others who preferred to submit their research work elsewhere. These results agree with the findings from Davis and Connolly (2007) who surveyed authors in the USA and results revealed many of respondents were found reluctant to contribute to the institutional repositories. Moreover, researchers displayed a very limited knowledge of institutional repositories compare to knowledge of open access journals. Another survey at Cornell University found that scholars "were not contributing their research work to the institutional repository". The reasons behind the state of affairs were related to academics having limited knowledge and lack of motivation to use the institutional repository (Singeh, et al, 2013).

Scholars generally tend to have misconception of self-archiving believing that self-archiving violates copyright agreements which they have contracted with their publishers once they contribute their research output into an institutional repository (Harnad, 2006). Furthermore, scholars appeared uneducated about copyright issues, considering that some publishers give permission to authors to make contributions into their institutional repositories though making their articles accessible via their university's institutional repository. A study "on open access initiatives in academic libraries" by Sale (2006) reported that of ten respondents who contributed materials in an institutional repository, only one was confident about issues surrounding copyright when submitting his previously published journal article to the library's institutional repository. The rest were reported to "have a slight idea". Authors seemed to have misunderstandings and were overcautious about what is permissible according to publisher agreements.

There are therefore many issues limiting deposition of scholarly works into institutional repository by scholars. Some scholars are much more reluctant to share work that has not gone through peer review and been accepted for formal publication because of the perception that mistakes in the material may be propagated, thus affecting professional reputation of the scholar (Davis & Connolly, 2007). There is also a feeling among scholars that subject repositories are adequate to meet their needs and don't have reason to use general digital repository (Davis & Connolly, 2007). In addition, faculty and scholars in general tend to perceive an institutional repository as a single island completely isolated from other institutional repositories. In this sense, one has to know where to find relevant information. It becomes unrealistic to have material in multiple repositories and require someone to search them separately.

Other challenges that affect self-archiving by scholars include lack of time to self-deposit, lack of staffing or a dedicated manager to help with self-archiving, copyright clearance issues, difficulty in obtaining content (especially faculty publications), restrictive policies, limited IT support, and more. Wu's (2015) study at Roger Williams University in Bristol, Rhode Island, examined causes of low faculty contributions to IR content growth, particularly at small academic institutions. The study identified two major issues, poor adaptation to actual faculty needs and copyright worries as the major bottlenecks in building the case for DIRs. The findings also revealed that academics at Cornell University hardly contribute to the institutional repository as it remained few contents and hardly used. This was linked to the fact that academics are not motivated use the institutional repository (Davis &Connolly, 2007). Similarly, Shukla and Ahmad (2018) assessed the impact of Institutional Repositories on scholarly practices of scientists at the Council of Scientific and Industrial Research (CSIR) laboratories of India. The study revealed that 'Peer-Review Scholarly Journals' are a favoured medium for publishing research content and the maximised visibility to grey literature was the greatest noteworthy impact of DIR on respondents. This study confirms that researchers are still reluctant in contributing to the repository as this has been reported in previous studies. Hence, their preparedness had not changed.

Intention to contribute scholarly work to DIR in future

As a results of using behaviour intention variable from TAM, PG students who stated they did not contribute materials to the DIR were asked whether they planned to contribute materials in future. The results showed that the majority 46 (63.1%) plan to do so, followed by those 21(28.7%) who were undecided, while some 6 (8.2%) were not planning to contribute to the DIR. Similarly, faculty respondents were asked if they planned to submit their research output to the institutional repository in the future. The results showed that the highest number of respondents, 15(39.5 %) plan to contribute their publications to the repository, followed by some 12(31.6 %) who were undecided. Nine (23.7 %) indicated that contributing to the repository does not apply to them and only (2, 5.2 %) said they were not planning to contribute their publications to the repository. These results support the findings of previous studies which reveal that the researchers were willing to contribute their research work in the DIRs. These results concur with Yang and Li's (2015) study at Texas A and M (University (TAMU) which assessed faculty members' attitudes towards, and willingness to contribute to an institutional repository (IR). In addition, they investigated the perceptions of faculty members towards newer OA trends and resources, including Open Educational Resources (OER) and Data Management Plan Tool. They found that tenured faculty are more engaged and interested in OA publishing topics in general, and tenure-track faculty are more willing to adopt new initiatives such as Open Textbooks. Overall, the TAMU faculty are willing to consider publishing in OA publications, and almost half of them believe OA journal publications are acceptable for consideration of tenure and promotion in their departments. Similarly, Koulouris, et al. (2013), in a survey which focused on institutional repositories, policies and best practices for encouraging self-arching at a Greek University, found that the faculty members were all willing to deposit their work. More than half of them indicated that they would proceed with self-archiving procedures. In addition, more than 89% were willing to learn self-archiving procedures as well as uses of the DIR.

Mandatory and voluntary submission policy

Facilitating conditions are perceived enablers or barriers influencing a person's perception of ease or difficulty of performing a task. In this study facilitating was considered to include skills training, information or available materials, and administrative support. These facilitating conditions were also found to influence the use of instructional technologies in teaching (Teo, 2010). Facilitating condition construct from UTAUT was used with

the aim to measure how the institution administration encourages the PG students and faculty to submit their research work to the DIR. There was a high level of willingness to comply with the voluntary submission policy by respondents. Results revealed that 53(48.1%) strongly agreed, 41(37.2%) agreed, 5(4.5%) were neutral, (10, 9.0%) strongly disagreed, while 1(1.2%) disagreed with the voluntary submission policy**.** Forty (36.4%) strongly agreed with mandatory submission policy, while (3, 35.5%) agreed; 10(9.1%) were neutral, 19 (17.3%) strongly disagreed and 2 (1.7%) disagreed.

Faculty members were asked whether they preferred the mandatory or voluntary submission policy. Twelve (31.7%) of faculty agreed to comply with the mandatory policy, 10 (26.3%) strongly disagreed, 8 (21.00%) were neutral, 4 (10.5%) disagreed and 4 (10.5%) strongly disagreed with the mandatory policy. Faculty members were also asked whether they preferred the mandatory or voluntary submission policy. The results in figure16 show that the highest number of respondents 19(50%) strongly agreed with voluntary submission followed by 9 (23.7%) who agreed and 7 (18.4%) were neutral, 2 (5.3%) disagreed, while 1(2.6%) strongly disagreed with voluntary submission policy. These results affirm the findings of Stanton and Liew (2011) who reported respondents expressed they prefer a voluntary system or were ambivalent toward archiving their work in an institutional repository. One respondent was quoted to have indicated that submission should not be made compulsory but researchers should be given an option to choose whether to publish their research output in the repository or not. Some students in Stanton and Liew's (2011) study were reportedly against archiving their work in a repository. One participant cited concerns regarding plagiarism and strongly opposed having their research published electronically. However, in the same study, Stanton and Liew (2011) found a high level of willingness to comply with the mandatory thesis deposit policy was observed. Positive responses ranged between 91.6% from respondents in the College of Science to 100% in the College of Creative Arts.

However, within the literature, there is a debate concerning the essential for "mandatory submission policies" for researcher's intellectual output. Some stakeholders claimed that mandatory policies would cause more "harm" than "good" in relation to researcher's accordance, preferring a library liaison and advocacy approach, while others (including some of the academics themselves) are not concerned with mandatory submission policy (Palmer et al., 2008). Other authors argue that mandatory policy is the only way to achieve appropriate submission rates (Sale, cited Stanton & Liew, 2011). Literature indicates that the mandatory deposit policy is a useful strategy to develop an essential collection of an institutional repository and one that is supported by the majority of the respondents in Stanton and Liew's (2011) survey. Furthermore, during interviews the librarian respondents were also asked whether their institution had an archiving policy. The results reveal that the institution did not have an archiving policy; however, institutional repository policies were in place. The researcher further asked clarity on how the existing policy guided uploading the items and whose responsibility it was to upload items to the repository. The librarians who were responsible for archiving scholarly works on behalf of the authors noted that they were aware of the archiving policy guidelines regarding uploading of documents that were clear despite some technical limitations in archiving materials in the repository. The results suggest that though the institutional repository policy existed, it did not encourage authors to self-archive; instead, responsibility was delegated to the librarians to carry it out on behalf of the authors. The respondents also indicated that the institution relied on voluntary submissions, where the authors voluntarily submit their research work to the library for uploading into the DIR.

These results agree with Xia and Sun (2007) who examined self-archiving practices in nine well-known open access institutional repositories using the E-prints system in USA. They found that an exercise of self-archiving for institutional repositories had not been extensively accepted by researchers. They also found that the availability of full texts in those repositories was relatively low though the Australian repositories were the exception. Xia and Sun (2010) reported that one possible reason for the low rate of author self-archiving was the use of a liaison system where librarians working with departments deposited works on behalf of faculty members. Banach and Li (2011) are of the view that most IRs do not have well-defined policies about the types of records that should be deposited in these repositories. They pointed out that only 2.72% of IRs have a defined policy regarding types of material to be submitted, whereas around 3.04% policies do not provide guidelines. As to how content is deposited in the DIR, Banach and Li (2011) found that three methods were common namely: author self-archiving by third party on behalf of the author, and by repository staff.

The librarian respondents were asked to explain how the policy guided the archiving and submission or depositing of the materials into the DIR and whose responsibility it was to upload items. It was revealed that the policy only allowed faculty librarians to upload the materials into the repository. The respondents also indicated that the institution relied on voluntary submissions. Some participants in Stanton and Liew's (2011) study expressed concerns over the mandatory submission policy. While supportive of placing their work in the repository and happy to comply, the interviewees expressed preference for the voluntary submission. The review of literature has shown that IR policies are some of the issues that may influence use and the participation of PG students and Faculty in depositing their research work in the Dirs. A brief examination of some IR policies revealed, for example, that the University of Tasmania IR policy mandated researchers to make available OA digital copies of all research outputs and their related metadata via the Institutional OA Repository. Voluntary submission of research outputs to the Institutional OA Repository by other members of the University community and the wider Tasmanian community is encouraged to achieve the benefits of Open Access wherever possible (University of Tasmania IR policy, 2017).

Similarly, at the University of Auckland the IR policy indicates that where staff members create any form of intellectual property other than an excluded copyright work in the course of their employment or using university resources, the university must be acknowledged as having rights to that intellectual property (The University of Auckland intellectual property policy, 2013). Furthermore, at University of Cape Town (in South Africa), the IR policy encourages employees and students to make available all forms of works of scholarship through the appropriate platforms and service in digital format and of a type that is consistent with policies and practices. Regarding copyright issues, the UCT policy further states that, authors should utilise Sherpa/Romeo or publishers' websites to confirm publishers' copyright policies and permissions that are normally granted in terms of their copyright transfer agreements. The policy states that the university recommends that authors should avoid the transfer of copyright to publishers, where the publisher does not permit archiving, re-use or sharing as a minimum of a submitted version of scholarly publication. UCT provides a simple mechanism through which authors can inform publishers of their need to comply with the institution's policy so it is consistent with the permissions granted by the staff member to the University; the policy also encourages authors to publish their scholarly publications in peer reviewed open access journals. In this case, the author should supply the metadata to the Institutional Repository in order to maximise institutional and personal discoverability (UCT IR policy, 2016).

Previous studies which investigated the impact of mandatory policy towards the growth of DIRs content such as that of Sale (2006) in Australia have shown that mandatory submission has an impact on DIRs' content growth. The findings from this current study also revealed that performance expectancy (PE), facilitating condition (FC) and attitude towards (AT) did not influence PG students' and faculty's behavioural intention to archive in the DIR. Even though PG students and faculty tended to agree that institutional repositories are a good way of disseminating information and use them frequently (which implies positive attitude), most of them have not fully embraced archiving in digital institutional repositories. The study found that facilitating condition and policies issues needed to be addressed first as far as promoting open access through DIR is concerned before attitude towards open access, because attitude towards open access publishing is quite positive. Venkatesh et al. (2003) highlight that, "facilitating conditions" and "Intention to use Internet information resources" have significant effects on users.

Similarly, environment factors such as policies have an influence on users' behaviour and can motivate the PGs and faculty to start using the DIR. As indicated earlier, PGs and faculty were averse to mandatory submission policy which resulted in low content submission. Nevertheless, Sale (2006) reported that mandatory submission policy has an impact on DIRs content growth.

Using DIRs for accessing content

Using the use behaviour and actual use constructs from TAM, postgraduate students were asked if they ever used the DIR for accessing information. The results showed that 67 (61%) had never used the DIR for accessing information, and only 43 (39%) respondents have used it. These results suggest that the DIRs were hardly used for information access partially due to the lack of awareness on the existence, benefit and role of DIRs. The low use of DIRs for content access has also been reported in previous studies. Russell and Day's (2010) study at

Cornell University reported that most researchers (9 out of 11) believed repositories to be stand-alone services which had to be searched separately (Davis & Connolly, 2007). Consequently, it is unlikely that direct searching of repositories (either local or remote) would occur from researchers. Arndt (2012) assessed doctoral students in New Zealand and found that low awareness of Institutional Repository was responsible for low direct use of IRs in conducting research. The vast majority of respondents reported using Google Scholar, and could unknowingly have accessed open access repository content. Achieng (2016) analysed the usage of a digital repository in an academic institution in Kenya, and found underutilisation of the digital repository content.

Tools used to access research output

PG students were asked what tools they used to access research output in their institution. Results in figure 6.3 indicate that the highest number of respondents (30, 36.6%) used Google scholar followed by Google (23, 28%). Others used library shelves (10, 12.2%), NUST e-resources databases (16, 19.6%), and those who access DIR indirectly through other modes (3, 3. 6%). The respondents were to indicate further what resources they mostly used. Majority of the respondents indicated they used databases such as Proquest, Jstore, NUST Library discovery service, Emerald and many more. However, many other students were inclined to use Google as a primary source of information, while others preferred to use print source of information. The preference of Google Scholar could be attributed to awareness that repository content appears in Google Scholar. This finding suggests the need for attention to enhanced metadata for optimising discoverability of the IR content through general search engines (Arndt, 2012). Russell and Day (2010) assert that one way in which repositories might be useful to researchers would be to integrate deposit and other repository interactions into research practice and workflows (Russell & Day, 2010).

The findings of this study strongly agree with the previous search findings for most researchers. Previous studies had found that researchers mostly use search engines to find information rather than using the libraries. Russell and Day (2010) assert that unsurprisingly there is little detailed information available about the use and usefulness of repositories generally, and particularly for resource discovery. Arndt (2012) reported low direct use of DIRs for conducting research by scholars; instead, the vast majority used Google Scholar. Achieng (2016) analysed the usage of a digital repository in an academic institution in Kenya. The results revealed that the digital repository was underused partly because of lack of access to computers. The research revealed that independent variables effectiveness, efficiency, satisfaction, and awareness contributed to usage of the digital repository and e-resources. Each of these factors influenced the usage of the repository either positively or negatively. The usage drivers were identified as lack of awareness and information, satisfaction and frequency of use, increased information needs, and reduction of barriers to access. The research revealed that effectiveness, efficiency, satisfaction, and awareness constructs have positive impact on the usage of the repository and the e-resources, and can be used to increase usage of a digital repository.

A study by Stanton and Liew (2011) reported that only two participants indicated that they directly used institutional repositories directly for information access. Seven out of the eight participants mentioned that they accessed institutional repositories through Google Scholar or through the Online Public Access Catalogue, but not essentially aware that they were using the university's digital institutional repository in the process. One student indicated that he never used repositories because his research needs are mostly answered though libraries and the Internet. Although, it is likely that much of the journal articles the participants had accessed through Google Scholar were in fact housed in repository collections, or those articles published in open access journals. In terms of PG students' use of repositories and open journals in their own research, the study revealed that only few of the respondents had used open access research services for example "Australasian Digital Theses and Ethos". Nevertheless, the majority of respondents used Google Scholar, so it is possible that they retrieved open access material from journals and institutional repositories without realising it. The dominance of search engines is also clear in the academic sector. A 2005 survey by Online Computer Library Centre (OCLC) established that 89 percent of students from high learning institutions usually begin their research with Google, and that only 2% starts their search at library websites (DeRosa and OCLC, 2005). According to Haglund and Olsson (2008), a repeat of that survey five years later revealed that the situation for libraries had only worsened, as no respondents reported visiting library websites at the outset of their research (DeRosa et al., 2010).

That same report revealed a decrease in traditional search engine use, but also noted for the first time the use of social media search engines for their research. Another 2005 survey in the UK found that "students preferred to locate information or resources via a search engine above all options, and Google was the search engine of choice" (Griffiths & Bophy, 2005). The information-seeking behaviours of upcoming academic researchers in Sweden display an "almost complete dominance of Google as a starting point for searching scientific information".

Rieger (2009) reported an extensive use and satisfaction with Google and Google Scholars among scholars. Rieger (2009) pointed out both academics and students preferred search engines over other information retrieval systems in supporting their academic search and learning. Rieger (2009) also reported that there was sufficient awareness of specialised Google tools such as Google scholar and Google books among the faculty members and PG students. Kroll and Forsman (2010) in the United States studied researchers at four active universities and their study revealed that Google and Google scholars was effective their information needs and participants described these search engines results as good in many cases. These results give a strong impression that besides efforts of introducing other library information retrieval systems, the Google and Google scholars remains mostly and extensively used by researchers.

Connell (2011) compared the use of digital materials that have been deposited in The Ohio State University (OSU) Knowledge Bank (KB). Results showed that mediated and unmediated content were used, and therefore justified the preservation costs for unmediated content. Results also showed articles and undergraduate these were the most frequently used type of materials leading to the conclusion that it is important to collect content from all levels of the educational process. Haglund and Olsson (2008) emphasised that to understand the information needs of young university researchers better, an observational study was carried out at three universities in Stockholm, Sweden. The study found that "most of the researchers used Google for everything, that they were confident that they could manage on their own, and that they relied heavily on immediate access to electronic information" (Haglund and Olsson, 2008:52). The researchers had very little interaction with the library, and their awareness on the value librarian competence could add to their research was very limited nor recognise it. One significant conclusion of the project is that "librarians have to leave the library building and engage themselves with research environment, as well as considering the fact that library use is considered complicated, but Google (etc.) is easy. The findings of Haglund and Olsson (2008) project will have an impact on changes in library services for now and in future.

According to Haglund and Olsson (2008), a repetition of that survey five years later established that the situation for libraries had only worsened, as 0% of respondents reported visiting library websites at the outset of their research (DeRosa et al., 2010). The similar report finds a small drop in use of the traditional search engine, but also noted for the first time, the social media search engines use for initial research. Another 2005 survey in the UK found that students favoured to retrieve information or resources though search engines on top of all options, and Google was the best search engine chosen (Griffiths and Brophy, 2005). The information searching behaviours of young academic researchers in Sweden revealed complete dominance of Google as a starting point for searching scientific information by faculty. Thus, Tmava and Alemneh (2013) pointed out that to increase content visibility search engines are the most popular way users search for information; they account for 88 percent of users' search time when they are looking for information (Bifet & Castillo, 2005). This is because most users like to search by keyword, and they expect to retrieve useful results. The popularity of Google search engines is attributed to its ease of use, it is free, and it is extremely fast and produces useful results. For the most part Google generates search results by matching search terms entered with Web page content, usually referred to as full text searching.

Yin, et al. (2011) explained how "Subject norm" and "Intention to use Internet information resource" have significant effects on users. Furthermore, they pointed out that environment factors such as the opinions of users, tutors, friends, schoolmates, and colleagues on the usage of Internet information resource are very important to users' behaviour in using the DIRs. Previous studies on the adoption of information systems results have revealed that people often use technology if they find it useful and easy to use (Lu, et al. 2003). In order to improve the efficiency of the usage of Internet information resource, Yin, et al. (2011) explored the key factors which affect the actual usage of Internet information resource in China. Structural Equation Modelling (SEM) and Partial Least Squares (PLS) were used to test the conceptual model. Empirical data were collected through

questionnaires. As of the perspective of users, the results indicated that the key factors including self-efficacy, subjective norm, intention to use have significant effect on users' actual usage of Internet information resource.

CONCLUSION

The aim of this study was to investigate the extent to which PG students and Faculty members at NUST were archiving their research output in the DIR and using content in the DIR at the Namibia University of Science and Technology (NUST). It was revealed that the policy only allowed faculty librarians to upload the materials into the repository and does not allow self-arching now. The respondents also indicated that the institution relies on voluntary submissions, where the authors voluntarily submit their research work to the library for uploading in the DIR. While most PG students and faculty expressed intentions to contribute to the DIR in the future, current contribution rates are low. This discrepancy is attributed to several factors, including a lack of awareness of the DIR and its benefits, concerns about copyright restrictions, and the absence of a mandatory submission policy. The study also highlights the underutilisation of the DIR for content access, likely due to low awareness, limited content, and the pervasive use of alternative resources like Google. Furthermore, the study found that performance expectancy, facilitating conditions, and attitude towards technology did not significantly influence behavioural intentions to archive in the DIR. These findings suggest that simply having a positive view of the technology or having the necessary resources is not enough to drive adoption. Therefore, the study concludes that the university needs to implement a multi-faceted approach to promote the DIR. This includes increasing awareness through targeted marketing campaigns, addressing copyright concerns, potentially reconsidering the voluntary submission policy, enriching the repository's content, and improving access through strategies like semantic web integration to enhance discoverability via platforms like Google. Future research could explore the specific barriers to adoption in more detail and investigate the effectiveness of different intervention strategies.

RECOMMENDATIONS

Looking from policy perspectives, the study recommends that the University should make provisions for Faculty members and postgraduate students to personally self-archive their research work in the DIR instead of the current policy that requires only librarians to archive on behalf of researchers. This may help to increase the rate of depositing in the repository. Academic institutions in Namibia should get more information revolving the conflict with publisher's policies regarding author's issues related to archiving. Since scholars appeared uneducated about copyright issues, considering that some publishers give permission to authors to make contributions into their institutional repositories though making their articles accessible via their university's institutional Repository.

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