

Institutional repositories adoption and use in selected Tanzanian higher learning institutions

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ABSTRACT

The study explored the adoption and use of institutional repositories among postgraduate students in Muhimbili University of Health and Allied Sciences and Sokoine University of Agriculture. This study applied a mixed methods descriptive research design employing qualitative and quantitative methods. Interviews and questionnaires were used to collect data from respondents. Simple random sampling was used to select 55 respondents. Key findings showed 48 (87.3%) respondents were aware of institutional repositories. However, 21(38.2%) were only moderately aware. Findings indicate low awareness of institutional repository services among respondents. Results also showed 43 (78.2%) respondents use institutional repositories. Nonetheless, interview findings indicate low adoption rate of institutional repositories among students. Visibility and information sharing were factors which mostly influence students to use institutional repositories. Findings further showed library staff and lecturers are sources of awareness and the pulling factors in adoption and use of institutional repositories. The study concludes that information literacy (IL) training is crucial in promoting adoption and usage of institutional repositories. The study recommends academic libraries to establish embedded IL programs to increase adoption and usage. The study also suggests improving the quality of resources in the institutional repositories to reflect students' needs.

Keywords: *academic libraries; adoption; digital repository; institutional repository; open access; scholarly communication; Tanzania; higher learning institutions.*

INTRODUCTION

An institutional repository is an electronic store of web based scholarly digital documents owned by the institution (Mgonzo and Yonah 2014). These digital documents consist of all electronic publications such as thesis, journals, books and conference papers (Okumu, 2015). Dulle (2010) and Adewumi (2012) observed that institutional repositories operate well in an open access environment which offers free access to digital content without restrictions. In recent years, institutional repositories have become effective in disseminating scientific data and scholarly communication (Okumu, 2015). Institutional repositories have become important in scholarly communication, institutional visibility, university ranking and feasible foundation of institutional knowledge management (Kakai, 2018; Anenene, Alegbeleye & Oyewole, 2017).

Institutional repositories have also helped to unlock the grey literature, such as unpublished research reports, theses and dissertations, seminar and conference papers (Kakai, 2018). Repositories are increasingly becoming podiums for publishing original and peer-reviewed contents in an open access environment (Saini, 2018). The repositories are essentially being used for acquisition, preservation and dissemination of locally-generated scholarly information. Access to scholarly information from institutional repositories can increase the usage of scientific information and author citations and visibility (Ukwoma & Dicke, 2017).

The acceleration in proliferation of institutional repositories in Europe, Asia, Australia, and the Americas can be traced from the beginning of 21st century. By the year 2005, the establishment of institutional repositories in ten European countries ranged from the lowest 1.5% in Finland Belgium, Denmark, France, Germany, Italy, Sweden, and the United Kingdom to the highest 100% in Germany, Netherlands and Norway (Abrizah, 2009). In 2006, Cullen and Chawner (2010) found all Australian universities have had institutional repositories. In the United States, there has been an increase in number of institutional repositories with 40% of all learning institutions having established institutional repositories (Okumu, 2015). Adoption of institutional repositories by continents places Europe at the lead with 47.92% of all global institutional repositories; followed by North America 29.28%; Asia 11.04% Australia 5.84%; South America 4.40% and Africa 1.52% (Saini, 2018).

In Africa, the origin of institutional repositories can be traced back to 1998, when massive initiatives took place to introduce online open access Journals (Nyambi & Maynard, 2012). Compared to other continents, the African continent has experienced sluggish growth and adoption of institutional repositories (Jain, Bentley & Oladiran, 2009). Saini (2018) observed that slow adoption and development of repositories in most developing countries is attributed to higher learning institutions still being in the process of establishing guiding principles and best practice. Slow adoption and use of institutional repositories in African countries is also being attributed to institutional challenges such as a reliable electricity supply, policies, Internet access, awareness and cost (Ampong, 2016; Tapfuma, 2016).

South Africa and Kenya are the leading African countries with the highest number of institutional repositories, with 31 and 21 repositories respectively (Open-DOAR, 2016). Tanzania is ranked 4th among African nations with institutional repositories with 11 repositories. Muhimbili University of Health and Allied Sciences (MUHAS) and Sokoine University of Agriculture (SUA) which are the institutional repositories under study became operational in 2012 and 2014 respectively. These repositories were established to collect, preserve and disseminate research output in the respective universities. A number of studies (Dulle 2010; Muneja 2010; Lwoga & Questier 2014 and Mgonzo & Yonah 2014) have been conducted on institutional repositories in Tanzania. These studies have shown institutional repositories in Tanzania have yet to be fully explored by potential users. In fact, no study could be traced which specifically investigated students' adoption and use of institutional repositories in public higher learning institutions in Tanzania. This study, therefore sought to investigate students' adoption and use of institutional repositories using Muhimbili University of Health and Allied Sciences (MUHAS) and Sokoine University of Agriculture (SUA) as case studies. The study will specifically assess students' awareness of institutional repositories, sources used to create student's awareness, use, frequency, attitude and materials preferred to be deposited in institutional repositories.

LITERATURE REVIEW

Global overview of institutional repositories adoption and usage

Institutional repositories have widely been used to disseminate and communicate scientific information (Okumu, 2015). Literature indicates Europe, America and Australia have a higher adoption rate of institutional repositories compared to other continents across the globe (Abrizah 2010; Okumu, 2015; Cullen and Chawner 2010). According to Cullen and Chawner (2010), in 2006, all Australian universities had functioning institutional repositories. In fact Europe leads other continents with 47.92% of universities having institutional repositories. Adoption and usage of institutional repositories in developed countries is being influenced by the availability and extensive dissemination of scholarly work, authors' professional visibility, constraints in self-archiving, perceived poor quality of repository materials, copyright issues, fear of plagiarism,

lacking quality control and less prestige (Tmava & Miksa 2017; Casey 2012). Despite heightened adoption and usage of institutional repositories in developed countries, the rate of submission of scholarly works among American Universities is fairly low (Casey, 2012).

In Asia, literature indicates India, Taiwan, Japan and Thailand lead other Asian countries in adopting and using institutional repositories (Okumu 2015; Abrizah, 2010). Increased adoption of institutional repositories in Asia is attributed to a number of factors. These include user awareness of archiving and quality control policies, availability of documents in the repositories, types of the publications and ease of use of the institutional repository software and system (Ammorukleart, 2017). Other adoption factors in Asia are expected academic benefits, visibility, cultural issues, content availability, accessibility and quality, user awareness, fear of plagiarism, attitude and copyright issues (Kim, 2010; Ammorukleart 2017; Park and Qin, 2013).

Contrary to the developed and Asian countries, African countries have recorded a low adoption rate of institutional repositories (Ezema, 2013; Kathewera, 2016; Lwoga & Questier 2014; Dulle 2010; Fasae, et al. 2017) The adoption of institutional repositories in Africa has not been promising and among the factors contributing to the low adoption are lack of institutional repositories awareness, unreliable electricity, insufficient information communication and technology (ICT) skills and lack of skilled manpower (Christian, 2008; Nwakaego, 2017; Saulus, Mutula & Dlamin, 2017). Other critical adoption factors in Africa and most developing countries include expected repositories' benefits, awareness and understanding of self-archiving service (Anenene, Alegbeleye & Oyewole 2017; Bamigbola 2014; Dulle 2010); ignorance of publishers' policy (Bamigbola 2014). In Tanzania where this study was conducted, adoption and usage of institutional repositories has not been promising. Low adoption and usage of institutional repositories is attributed to inadequate content in repositories; accessibility; discoverability; poor visibility of local content; lack of motivation and skills (Mgonzo & Yonah, 2014; Muhogole & Laizer 2014; Muneja, 2010) for the modalities of offering information literacy (IL) programs (Lawal, Underwood, Lwehabura & Stilwell, 2010); lack of an understanding of copyright laws (Lwoga & Questier 2014); lack of awareness; attitude; insufficient information searching skills and Internet connectivity (Dulle, 2010). From the literature reviewed, it appears adoption and usage of institutional repositories in developing countries is mostly affected by the lack of awareness of the services available, limited technical expertise, copyright issues, insufficient resources and managerial, while adoption in developed countries seem to be largely influenced by the quality of resources and authors' visibility.

Based on the reviewed literature, it appears the nexus between adoption and usage of institutional repositories is being influenced by critical success factors. These include quality services offered which meet user needs (Armstrong 2014; Nwakaego 2017); cost in managing institution repositories (Kim, 2010); ease of use and visibility (Ammorukleart, 2017); quality control, poor infrastructure, management commitment, policy issues, funding and lack of human resource for planning, developing and managing institutional repositories (Lagzian, Abrizah & Wee 2015; Nwakaego, 2017) and access to quality full text repository contents (Armstrong, 2014). In particular, a clear institutional repository policy and managerial issues are crucial in the operability and sustainability of institutional repositories as they guide on the type of content deposited, preserved, withdrawn and the day to day interoperability of institutional repositories (Kakai, 2018; Moahi, 2018; Lagzian, Abrizah & Wee 2015). Adoption, use and sustainability of institutional repositories also extensively depend on the volume of research and repository content submission in a particular field of study. For instance, science and agricultural based disciplines contribute more in research and repository content when compared to other disciplines (Casey, 2012; Bamigbola, 2014).

METHODOLOGY

The study adopted a mixed methods descriptive research design where both quantitative and qualitative approaches were used. The study was conducted at the Muhimbili University of Health and Allied Sciences (MUHAS) and the Sokoine University of Agriculture (SUA) from August to October 2016. The two universities are public higher learning institutions located in the Dar es Salaam and Morogoro regions of Tanzania respectively. A total number of postgraduate students (1,102) were admitted in the 2015/2016 academic year at the two universities. 634 students were admitted at MUHAS while 468 were enrolled at SUA. Simple random probability sampling was used to select 55 postgraduate students which is a 5% sample of the 1102 postgraduate student population. Thus, targeted population from MUHAS of 634×0.05 made a sample size of 31 respondents. Likewise, the targeted population from SUA of 468×0.05 made a sample size of 24 respondents. Purposive sampling was used to select two heads of institutional repositories, one from MUHAS and the other from SUA. Questionnaires and interview guides were the tools used for data collection. Questionnaires were used to collect quantitative data from postgraduate students while interviews were used to collect qualitative data from heads of institutional repositories. IBM SPSS was the software used to analyse descriptive quantitative data. Content analysis was used to analyse qualitative data.

RESULTS

Socio-Demographic Characteristics of the Respondents

Gender

The characteristics of respondents showed that 35 (63.6%) of the respondents were male whereas 20 (36.4%) were female. Gender distribution at the institution level indicated that 19 (61.3%) respondents from MUHAS were male whereas 12 (38.7%) were female. On the other hand, SUA had 16 (66.7%) male respondents and 8(33.3%) were female.

Age

The age of respondents was divided into five categories: 18-25; 26-39; 40-50; 51-60; and 61 and above. It was observed that the majority, 38 (69.1%), were aged between 26 and 39 years and least 17 (30.9%) were aged between 40 and 50 years.

AWARENESS AND USE OF INSTITUTIONAL REPOSITORIES

Respondents were asked to indicate their level of awareness of institutional repositories. The findings of this study revealed that the majority 48 (87.3%) were aware of the term “institutional repository” and few 7 (12.7%) were not. Further results about their level of awareness indicated that the majority 21(38.2%) were moderately aware and 11 (20.0%) were highly aware. Findings showed 8 respondents (14.5%) were least aware while six respondents (10.9%) were neutral.

On the other hand, qualitative findings indicated low awareness of institutional repositories. One respondent explained:

Students' level of awareness of institutional repository is still low, some are not even aware of the existence of institutional repositories, its role, benefits and functions and availability of opportunities for using the repository to deposit their work.

Another interviewee noted:

For the majority of the students, institutional repository and its functions remains a new phenomenon which they do not understand.

Awareness of institutional repository services

The study also sought to establish students' awareness of repository services. Respondents were asked about their awareness of the repository services such as Self-archiving, Data Protection Service, Open Bibliographic Data Service and Remote Access Service. Findings indicate low awareness of self-archiving (37, 67%), data protection (37, 67%) and remote access service (31, 56%). See Figure 1 below.

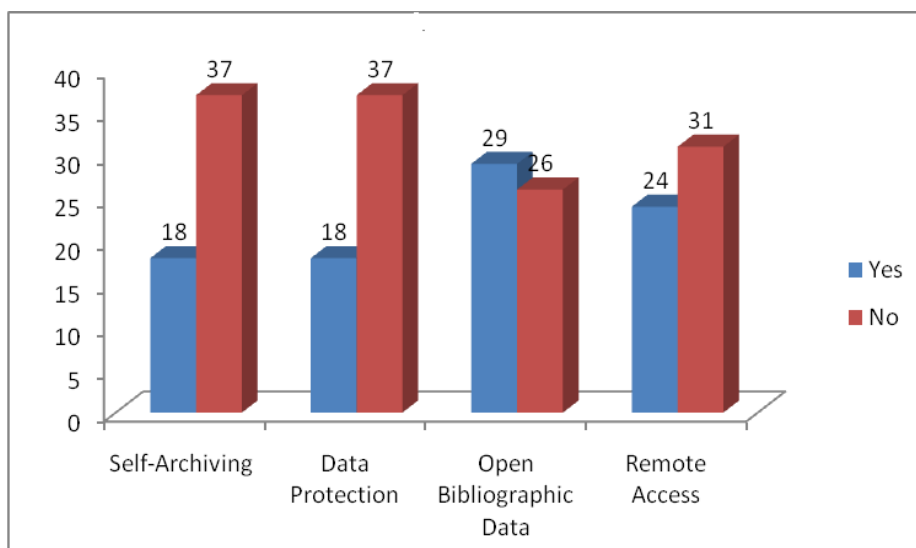


Figure 1: Students' awareness of institutional repository services

Sources of awareness of institutional repositories

Respondents were further asked to indicate the source of their awareness of institutional repositories. Results showed sources of respondents' awareness of institutional repositories were library staff 34 (61.8%), lecturers in the class 18 (32.7%), university website 18 (32.7%), Internet browsers 14 (25.5%) and friends 4 (7.2%). Findings showed library staff, lecturers and University website were the mostly used sources in creating awareness among students of institutional repositories.

Use of institutional repositories

This study also wanted to find out whether students used institutional repositories. Respondents were therefore asked to indicate whether they used the institutional repository of their universities to access scholarly information. Findings showed that 43 (78.2%) respondents used institutional repositories to access scholarly information whereas 12 (21.8%) did not do so.

Moreover, qualitative findings indicated low adoption and usage of institutional repositories. One interviewee noted:

Generally, repository adoption and usage is low as the trend on the in-site search remains low when compared to the number of students admitted into various programs.

Another interviewee explained:

The number of repository visits by users upon clicking on repository web address is insignificant as far as admission records are concern.

Association between gender and institutional repositories use

A cross-tabulation was done to determine the distribution of gender relative to institutional repositories usage. Findings showed females were using institutional repositories more than males. See Table 1.

Table 1: *Cross-tabulation on institutional repositories use by gender*

Gender	Use of Institutional Repositories			
	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Male	25	71.4%	10	28.6%
Female	18	90.0%	2	10.0%
Total	43	78.2%	12	21.8%

Moreover, from the cross tabulated findings, the study sought to establish whether there is an association between gender and institutional repository usage. Results indicate a Pearson Chi-square value of 2.573, a significance value of 0.176 and a 0.05 probability level of significance. This test indicates no direct relationship between the two variables.

Use of institutional repositories by institution

A cross-tabulation by institution indicates that institutional repository usage was relatively higher at SUA (19; 79.2%) than at MUHAS (24; 77.4%). See Table 2.

Table 2: *Cross tabulation on Use of Repositories by Institution*

Institution	Use of Institutional Repositories			
	Yes		No	
	Frequency	Percentage	Frequency	Percentage
SUA	19	79.2%	5	20.8%
MUHAS	24	77.4%	7	22.6%

Frequency of use of institutional repositories

This study also wanted to determine the frequency of use of institutional repositories among postgraduate students. Findings revealed that the majority 15 (27.3%) used institutional repositories occasionally/once a month; 14 (25.5%) least often/at least once a week and 11 (20%) use often/ on daily basis. Results showed 6 (10.9%) rarely use institutional repositories.

Attitude towards institutional repository adoption and usage

Respondents' attitude towards adoption and usage of institutional repositories were also investigated. Findings showed authors' visibility, information sharing and plagiarism were factors affecting students' adoption and usage of institutional repositories. Table 3 below illustrates.

Table 3: *Attitude towards institutional repository adoption and usage*

Factors affecting usage	Positive attitude	Ranking	Negative attitude	Ranking
Visibility	(49; 89%)	1	(2; 4%)	5
Information sharing	(33; 60%)	2	(2; 4%)	5
Plagiarism	(32; 58%)	3	(14; 26%)	2
Copyright laws	(19; 35%)	6	(21; 38%)	1
Uploading process	(28, 51%)	4	(9; 16%)	4
Quality of documents deposited	(27, 49%)	5	(11, 20%)	3

Type of materials preferred to be deposited into institutional repositories

Results on what materials respondents were willing to deposit into institutional repositories showed that 44 (80%) preferred thesis or dissertations; 34 (61.8%) journal articles; conference papers 25 (45.5%) and seminar papers 25 (27.3%). The findings of the current study showed that most students preferred to deposit dissertations 44 (30.6%) and journal articles 34 (61.8%) than other materials.

DISCUSSION

Adoption and usage of institutional repositories

Rogers (2003, p.12) described adoption as an innovation, as any idea, object or practice that is perceived as new by members in a social system. Important attributes of adoption include user need, awareness, sources of creating awareness of an innovation, attitude, attributes of an innovation, time and usage. The innovation process entails knowledge, persuasion, decision, implementation and confirmation.

Findings of this study revealed students are aware and make use of institutional repositories to address their academic needs. The results confirm those of Muneja (2010), Dulle (2010) and Lwoga and Questier (2014), for usage of institutional repositories in Tanzania. However, findings showed the majority (21; 38.2%) of respondents to be moderately aware of institutional repositories. In addition, interview findings also showed low awareness of institutional repositories in the selected institutions. These findings could imply that, although students are aware and use institutional repositories, yet, the actual level of awareness and use seems to be low.

Supporting low awareness, findings showed students had low level of services provided by institutional repositories which include awareness of self-archiving, data protection and remote access service. These services are crucial for the sustainability of institutional repositories as they offer an important platform for authors to access, protect and freely deposit their scholarly documents (Xia *et al.*, 2012; Singeh, Abrizah & Karim, 2011). Awareness of such services can promote adoption and use of the services and have an impact on scholarly activities and communication.

The present findings are in line with those of Mgonzo and Yonah (2014) and Ampong (2016) who also found the level of awareness of institutional repositories in Tanzania and Ghana to be low. It is indicative that most students are still less aware and have not gained adequate knowledge on how to adequately use the institutional repositories. Lack of adequate knowledge tends to influence student's persuasion to search for information from the institutional repository. The argument on low awareness and adoption and use is being supported by the fact that the majority of students occasionally (27%) use institutional repositories.

The findings also showed library staff and lecturers as sources which influence awareness, usage and adoption of institutional repositories. The results are contrary to those by Okumu (2015) who found the majority (76%) of users learnt about the availability of institutional repositories through emails and websites and not through the library staff or lecturers. The results indicate the role played by libraries in providing IL training to students and lecturers towards adoption of institutional repositories. It appears that the partnership between library staff and lecturers which was previously weak in academic libraries in Tanzania (Lawal, Underwood, Lwehabura & Stilwell 2010) has been strengthened. The two cited sources highlight the role of intrapersonal and interpersonal sources in persuading students in adoption of innovations. Rogers (2003) observed intrapersonal and interpersonal sources are crucial in influencing behavioural and cultural changes. As the adoption and use of technology entails changing user attitudes, the use of these two sources becomes crucial.

Moreover, adoption is being influenced by user needs. To promote adoption and usage, institutional repositories ought to have necessary information materials which students need. As the findings showed, students prefer to deposit and use theses and dissertations more than other learning resources, so access to and availability of such materials in institutional repositories should ensure adoption and usage. Lee, Hsieh and Hsu (2011) observed usefulness and user friendliness of technology to be crucial in adoption and usage of an innovation in the learning environment. The availability of theses and dissertations does not only shed light on the importance of resources availability, but if the repository contains resources which do not reflect students needs or the user interface is complex, it is more likely students will abandon the repository and seek information from other user friendly sources such as search engines.

Moreover, adoption of an innovation is also being influenced by user's perception of an innovation. As the student learning process entails evaluation, critical thinking towards problem solving (Lawal, Underwood, Lwehabura & Stilwell 2010), students' positive perception on institutional repositories tend to influence usage. From the findings, it is evident that students make use of institutional repositories because of the perceived benefits accrued from the content

in the repositories. Such benefits include visibility, information sharing, plagiarism, copyright and quality of information content. Similar factors were observed by Anenene, Alegbeleye & Oyewole (2017), Lwoga and Questier (2014) and Tmava and Miksa (2017). These attributes align well with those of the diffusion of innovations which are relative advantage, compatibility, trialability, complexity and observability (Rogers, 2003). The adoption of institutional repositories depends on how students perceive the benefits of institutional repositories when compared to other information resources. Similarly, Nwakaego (2017) and Anenene, Alegbeleye & Oyewole (2017) found that repository users were adopting and using institutional repositories as a result of benefits they received. Users will similarly not adopt an innovation if it is perceived not to have benefits after observing it for some time (Rogers, 2003).

As the findings showed, users had negative perception on copyright issues, plagiarism and the quality of documents deposited in institutional repositories. These barriers need to be addressed to promote usability and adoption. Users' views on barriers to adoption have perhaps differed from those of Muhogole and Lazier (2014) and Muneja (2010) who found accessibility and poor visibility of local content to be factors which affect adoption and usage of institutional repositories in Tanzania. Raju et al. (2013); Okumu (2015) and Lwoga and Questier (2014) also found author's visibility, copyright and content issues to be factors which affect institutional repository adoption and usage.

The findings of this study on gender usage of institutional repositories are instructive. Although males were the majority group, their institutional repositories usage was surpassed by females. These findings contradict a number of studies (Corrin 2010; Khan & Nisa 2017; Goswami & Dutta 2016) which had indicated men were better adopters and users of technology and electronic resources (Smith, 2015) compared to females. Female increased usage could be attributed to preference for articles from online journals (Khan & Nisa, 2017), ease of use and usefulness (Okazaki & Santos, 2012), increased skills in searching techniques and perhaps attending IL trainings in libraries. Other reasons could be willingness to adopt and use services in the library (Applegate, 2008) and increased technology savvy. Low usage of institution repositories by male students could be associated with a perception that males are more results oriented and thus tend to be discouraged by complexities arising from using institutional repositories (Goswami & Dutta, 2016). Institutional repositories low usage by male could also be attributed to fewer visits to libraries and less usage of library services which include information literacy (Applegate, 2008). However, despite the gender and institutional repositories usage comparative analysis indicating female students use institutional repositories more than male students, the statistical test showed no direct relationship between gender and use of institutional repositories.

Findings also showed students from SUA used institutional repositories more than those from MUHAS. The findings are surprising as the SUA institutional repository was established two years after that of MUHAS. A number of reasons could have resulted in the observed results and trends. SUA may have devised a more extensive and effective information literacy program which reaches out to students and lecturers. The other reason contributing to the difference in adoption and usage in the two institutions could be that SUA adopted early integration of IL into curriculum (Lawal, Underwood, Lwehabura and Stilwell, 2010). The conventional practise in most academic libraries is IL training being offered through library orientation, seminar presentations, hands-on practice, leaflets and information posted on institutional websites.

Despite SUA leading in adoption and usage, it is evident that institutional repository usage in the selected institutions is extensively influenced by library staff and lecturers. The frequency of IL training and lecturers involvement is an effective strategy to influence students' usage of institutional repositories. Currently, SUA allocates three hours a week every Wednesday specifically for information literacy training to all registered users. The use of library staff and

lecturers as reliable sources and dissemination pathways is crucial in influencing awareness, change of attitude and promoting adoption and usage (Rogers, 2003) of institutional repositories. To change user attitudes towards an innovation and have an adoption take place, time is needed (Rogers, 2003; Ntebe & Raisamo, 2014). Students need time for observation, trialability, before effectively using institutional repositories. As institutional repositories use information technology, current conventional practises used to offer IL such as orientation, seminars (Lawal, Underwood, Lwehabura & Stilwell, 2010) ought to change. Adoption rate can be increased by Information Scientists and Librarians applying new methods in IL training by combining information technology such as effective use of institution websites and practising embedded librarianship in respective academic units. An effective IL program can contribute to quality research, increase research output, promote usage, resources based learning and student centered learning (Lawal, Underwood, Lwehabura & Stilwell, 2010).

CONCLUSION and RECOMMENDATIONS

This study explains postgraduate students' adoption and usage of institutional repositories in two Tanzanian higher education public universities. Although students were found to have a positive perception of institutional repositories and they are increasingly using them, the study found awareness and adoption to be low. Student awareness of institutional repositories services which include self-archiving was low. In regard to the role of library staff and lecturers in influencing adoption and usage of institutional repositories, the findings suggest that the library staff and lecturers need to collaborate to influence students to use institutional repositories. To promote student understanding and adoption of institutional repositories, library staff and lecturers ought to be committed by frequently informing students on the use of institutional repositories. It was further observed that generally students have a positive attitude towards institutional repositories except copyright issues. The study concludes that promoting awareness, change of attitude and an understanding of the repository benefits hinges on the availability of a vigorous information literacy programme. Effective information literacy can promote use of institutional repositories, increase authors' visibility and attract collaboration and funding. The findings also indicate theses/dissertations and journal articles are resources students mostly prefer and are willing to deposit in the institutional repositories. Furthermore, from the findings of this paper, the universities in Tanzania can understand the rate of adoption of institutional repositories for scholarly communication and seek measures to promote usage. In fact, male students have a higher adoption and usage rate of institutional repositories. The study suggests that the university management change present strategies and policy to reach more male students and enable students to self archive their dissertations in repositories. The study also recommends more awareness for scholars on best practices to self-archive their articles and other works legally protected without infringing copyright laws to promote awareness, usage and adoption of institutional repositories. To promote awareness, usage and adoption of institutional repositories in higher learning institutions in developing countries, libraries ought to change from conventional awareness practices towards establishing IL programs which build and promote rapport between students, lecturers and subject librarians with the aid of ICT tools.

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