University Students' E-Resource Usage: Predictors, Problems and Practical Implications

Mboni Ruzegea & Sydney Msonde
Muhimbili University of Health and Allied Sciences, Tanzania

ABSTRACT

Electronic resources play a vital role in promoting students' learning in higher education. This research investigated predicting factors for effective e-resources usage, emanating problems and practical implications. Using a survey, the study employed SPSS to analyse the resultant data. Moreover, regression analysis and One-way ANOVA determined the predicting factors and differences in e-resources usage between student categories. The findings demonstrate that undergraduates demonstrated higher usage levels of e-resources than postgraduates. The education level, Information Literacy (IL) competency, and individual experience were factors that contributed to effective e-resources utilization. Therefore, integrating IL skills into postgraduate curricula and improving IL training may bring out valuable students' competence for effective e-resource utilization.

Keywords: *E-resources, awareness, postgraduates, undergraduates, e-resources accessibility, e-resources usage*

INTRODUCTION

The significance of equipping academic libraries with quality information resources in higher learning institutions cannot be over emphasized. University libraries across the world spend a lot of money to subscribe to e-resources to enhance the availability of e-resources to users (Kinengyere, Kiyingi & Baziraake, 2012). Muhimbili University of Health and Allied Sciences (MUHAS), like other higher learning institutions, spend huge amounts of money to subscribe to e-resources with the aim of satisfying the teaching, learning and research needs of the university. Similarly, Tanzania is among the developing countries that receive free access to academic and professional peer-reviewed e-resources through Research4Life programmes such as HINARI, AGORA, OARE, GOAL and ARDI. Therefore, it is important for the University to ensure that e-resources are optimally utilized by faculties, students, and researchers to promote students' academic achievement. In that regard, several training sessions have been conducted to enable MUHAS students to acquire knowledge on how to access and utilize e-resources in their educational and research work. Despite these efforts, and the value of e-resources, access to and usage of e-resources among MUHAS students leaves much to be desired. Akpojotor (2016) mentioned some reasons for the students' inability to access and exploit e-resources. These include lack of awareness of the availability of e-resources at the library, lack of information literacy skills on how to access e-resources, and lack of ICT competence among users of e-resources (Kinengyere, Kiyingi & Baziraake, 2012).

The failure of medical students to access and use e-resources is a major problem in most universities in developing countries (Gathoni, 2012). However, the level of severity may differ from one university to another as well as from situation to situation. Thus, understanding the students' awareness and usage of e-resources at MUHAS becomes important to help librarians organize the resources accordingly and to make library planning, practice, and policy improvement. The study was guided three research objectives**:**

(1) To explore the level of awareness of electronic resources among the students.

(2) To assess students' information literacy competency in supporting the use of electronic resources

(3) To predict factors contributing to the usage of e-resources among students in higher learning institutions.

LITERATURE REVIEW

Awareness of E-Resources Among Students

The explosion of e-resources has created the need for library users to have a sound level of awareness of e-resources availability and the way they can be accessed. Most universities across the world are investing heavily in e-resources (Okiki, 2012; Kwadzo, 2015) to satisfy teaching, learning and research needs. Despite the heavy investment in e-resources in these universities, their practical use is not evident. Some studies demonstrate that the effective usage of e-resources depends solely on the awareness of their availability (Okiki, 2012; Rehman & Ramzy, 2004), and knowledge of how to access them (Asokan & Dhanavandan, 2014). Low awareness (Rehman & Ramzy, 2004), lack of search skills, and extensive use of general search engines (Kwadzo, 2015) are some of the reasons for under-utilization of e-resources. Thus, awareness becomes an important component for the effective usage of e-resources among students in higher learning institutions.

Studies about students' awareness of e-resources have widely been conducted in various higher learning institutions across the world (Bhat & Mudhol, 2014; Chandra et al., 2014; Okiki, 2012). However, the literature shows that sometimes there is a mismatch between students' awareness and usage of the available e-resources. Kwadzo (2015) highlighted three interlinked dimensions of e-resources awareness and usage. Library users may be aware of the e-resources available and use them. Sometimes library users may also be aware of the e-resources but fail to use them or may be unaware of them and therefore do not use them (Kwadzo, 2015). For example, Allen and Weber (2014) found that most graduate students were unaware of specific journal characteristics leading to failure to harness the potential of e-resources in their research (Angello & Wema, 2010). In their research Nisha & Ali (2013) also found that library users were aware of the e-resources available and used them effectively in their educational and research work. Moreover, Adesoye and Amusa (2013) report that library users at the college of health sciences of the University of Ghana Medical School had low awareness of the availability of e-resources provided through the HINARI and PERI programme. As such, they relied on PUBMED as their only source for accessing full text journal articles. Similarly, the study which examined the use of Medline database by medical students at the University of Lagos revealed lack of students' awareness of e-resources, which culminated in poor usage of the Medline database.

Furthermore, Nkebukwa (2016) conducted a study which investigated the status of usage of e-resources by students at the College of Business Education in Tanzania. The findings from this study reveal that students were not aware of the e-resources offered (Angello & Wema, 2010, which culminated in low usage of the resources. As such, Kwadzo (2015) as well as Angello and Wema, (2010) pointed out that "when students are not aware of the existence of e-resources in their library system they tend to use general search engines to meet their information needs" pp. 6. Therefore, the findings presented above suggest that there is a compelling need to increase the students' awareness of e-resources for them to comprehend the value and existence of the resources.

Other studies showed variations in the level of students' awareness and usage of e-resources. For example, Akpojotor (2016) compared the level of awareness and usage of e-resources among postgraduate and final year students. Findings from this study show that there were significant differences between postgraduate and final year students on e-resources awareness. Despite the

differences in the level of awareness, there were no significant differences on the level of e-resources usage between the groups. Similarly, Baro, Endouware and Ubogu (2011) found that although 23.2% of library users were aware of Medline database, only 17% used the database. This means that the students' awareness of e-resources does not guarantee the usage of those e-resources.

Usage of E-Resources by Undergraduate and Postgraduate Students

The usage of e-resources in higher learning institutions has become more popular in recent years due to their currency and rich content. Various studies have been conducted to realize whether the subscribed e-resources are effectively being utilized. Factors such as awareness, search skills, infrastructure, and lack of training have been pointed out as factors that influence usage of e-resources. For example, Megameno (2010) investigated the usage of e-resources among nursing students at the University of Namibia. The findings from this study reveal that 86.4% of the students did not use the available e-resources because they were not aware of their availability. Similarly, the study conducted by Kwafoa, Osman and Afful-Arthur (2016) on the usage of e-resources at the University of Cape Coast in Ghana shows that 92% of the respondents were aware of the existence of e-resources at their institution. Interestingly, respondents had no idea that those e-resources were subscribed to by the university library. Moreover, the study by Chandra et al (2014) found that slow internet speed and frequent power outage are among the common problems that affect the effective usage of e-resources.

In the same line, several studies have been conducted on students' access and usage of e-resources in higher learning institutions in Tanzania. For example, Mtega et al., (2014) investigated the usage of e-resources among agricultural researchers and extension staff. These researchers found that there was low usage of e-resources from popular agricultural databases. Factors such as poor ICT infrastructure, limited funds to subscribe to e-resources and low information literacy training contributed to low accessibility and usage of e-resources. On the other hand, Nkebukwa (2016) investigated the usage of electronic resources by students at the College of Business Education in Tanzania. The findings reveal that most of the students were not using e-resources due to lack of awareness of the e-resources being available at the institution. The researcher noted that lack of searching skills and connected computers affected the usage of e-resources. Similarly, Katabalwa (2016) investigated the use of e-resources by postgraduate students at the University of Dar es Salaam. Findings show that most of the students used e-journals for various purposes, including assignments, literature review, and research report writing, among others. The researcher mentioned issues such as frequent power outage, inadequate bandwidth, lack of training, lack of awareness, limited access to computers (Mollel & Mwantimwa, 2019) and difficulty in searching, among the challenges that affected the effective usage of e-resources.

The findings described above corroborate with Manda's (2005) study which reported that PERI resources provided in academic and research institutions in Tanzania were underutilized because potential users were not aware of the resources due to lack of publicity and low bandwidth. On that basis, it is crucial for library users to possess necessary skills and competence in using technological tools for effective access to and usage of e-resources.

Students' Information Literacy (IL) and Technology (ICT) Competence

The students' competence in the use of information and communication technology (ICT) has become a necessary component in promoting learning. Effective access to and usage of e-resources is the outcome of students' being competent in using computers. Therefore, students are obligated to have ICT skills to enable them to exploit the potential of the Internet to search and retrieve e-resources useful for their research. For example, Bashorun, Isah and Adisa (2011) found computer skills and users attitudes towards computing applications were important factors for

effective accessibility and usage of e-resources. Similarly, Natarajan et al. (2010) pointed out that accessibility and retrieval of e-resources requires one to have computer skills and networked electronic information resources.

On the other hand, Ranasinghe et al (2012) noted that the recent technological development has made information literacy (IL) a necessary element for students in the medical field. As such, students' need to have knowledge of common software packages, operating systems, database management, and Internet usage. Ranasinghe's findings suggest that computer and information literacy skills influence the usage of e-resources. Moreover, the literature reveals that most students lack IL skills on how to search, retrieve and use e-resources in their learning. For example, Somaratna (2015) investigated the effectiveness of information literacy on undergraduate students at the University of Colombo. Findings show that most of the undergraduate students lacked IL and computer skills on how to use different information resources to support their studies. Therefore, insufficient computer and IL skills among students may lead to low usage of electronic databases (Ratcliff, Swartz & Ivanitskaya, 2013). Thus, developing the students' competence in computer and information literacy is of paramount importance (Mollel & Mwantimwa, 2019) especially for postgraduate students who are involved in research.

The above review of literature suggests the existence of a relationship between computer and information literacy skills and the usage of e-resources (Adeleke & Emeahara, 2016). However, the literature reviewed has not explicitly shown the predicting factors for the usage of e-resources. Therefore, this study seeks to investigate the levels of awareness, education and IL competence as key predicting factors in the usage of electronic resources.

Students' e-Resource Usage Predictors

The use of e-resources by the students in higher learning institutions has been a major concern to academic library and information service centres for decades. Academic institutions, especially in low-income countries like Tanzania, incur higher costs to procure and maintain their e-resources, yet the cost and optimum use of these resources has remained a great challenge (Kumar, 2016). Students do not engage frequently enough in using the available electronic resources within their institutions (Agboola & Bamigboye, 2011) despite being aware of their existence. Demographic factors (gender, age, level of education), information literacy competency, and individual experience are among the factors observed to influence the use of e-resources in higher learning institutions. In their study about the influence of gender on e-resource usage, Bassi & Camble (2011) found male students (82.4%) were using e-resources more compared to female (17.7%) out of 5,269 sampled students. Similarly, female students experienced difficulties in finding e-resources and were less likely to use them compared to their male counterparts.

Age and year of obtaining highest educational qualifications are important in establishing information literacy and computer competency. The age variable is significant in triggering understanding which comes with an individual's maturity. Nevertheless, studies have shown that in relation to the application of information literacy and technology, the younger generations are more information and computer literate than the older generation. For example, Bar-Ilan, Peritz, & Wolman (2003) and Okiki (2012) argue that the younger people were quick to grasp things and engage in information and computer tasks compared to the adults. Moreover, Quadri's (2013) research in Nigeria revealed that education level highly correlates with utilization of library e-resources among undergraduate students. These findings support the earlier findings by Olatokun (2009) which showed a strong influence of education level on students' capability to use computer and Internet services. Furthermore, information literacy competency and individual experience was reported to be significant contributing factors in the use of e-resources in higher education

institutions. Emwanta & Nwalo (2013) demonstrate that the more people get experience in using the university library the more they are likely to use online sources.

METHODOLOGY

Setting and Sampling Techniques

The study was conducted at MUHAS which was purposefully selected because it is the only public health university in the country with the highest student enrolment and about 63 accredited postgraduate programmes and 20 undergraduate programmes. The university has a well-developed technological infrastructure with a local area network connected to teaching areas and student residence halls. Thus, the university was a more promising setting for practical considerations. The stratified random sampling procedure was used to select a sample from among the student population. The sample size was determined using Kish (1965) formula for cross-sectional studies. This sample was calculated at 95% confidence interval of estimate and margin of error in the estimate equal to 5. The statistics on total population were obtained from the human resource office and the admission office at MUHAS. The researchers used the following formula (equation) to calculate the strata sample:

$$n_h = (N_h / N) * n$$
$$\text{where,}$$

n_h is the sample size for stratum *h*,
N_h is the population size for stratum *h*,
N is total population size, and
n is total sample size.

Sample size

The total population of undergraduate students as obtained from the University admissions office was 2062 and 695 postgraduate students. The study used confidence interval of 5 to calculate the sample. The total sample calculated for undergraduate and postgraduate students was 467 and 322 respectively, of which the number of responses from undergraduate students was 192 and 108 for postgraduate students.

Data collection

Data were collected using self-administered questionnaire. The researchers developed the questionnaire using information from various sources. The tool was composed of Likert Scale, open and closed ended type of questions. Four (4) experts with extensive working experience in e-resources evaluated a draft of the questionnaire to determine whether it measured the intended variables. The suggestions received from the panel were incorporated into the questionnaire. After the modification of the questionnaire, it was pilot tested on fifty (50) students who were not part of the study. It was found that the tool was too long to easily complete, and the language used was difficult for students to understand. The researchers improved the questionnaire and simplified the language accordingly. The final version of the questionnaire was administered to 467 undergraduate and 322 postgraduate students. Respondents were requested to complete the questionnaires and return them after two weeks.

Ethical consideration

During the process of conducting this research, participants were asked to participate in this research on a voluntary basis. The information provided by the participants was kept secured and

confidential. The participants signed the consent forms before the commencement of the study and their names remained anonymous for ethical adherence.

Data analysis

The SPSS software was used to analyse quantitative data. Regression analysis was conducted to determine the factors that affect actual usage of e-resources among students while one-way analysis of variance (ANOVA) was used to determine the influence of student categories on usage of e-resources.

RESULTS

Demographic characteristics

A total of 300 students took part in the survey. Of these, 192 (64%) were undergraduate students whereas 108 (36%) were postgraduate students. Results show that there were fewer female students (98 or 32.5%) compared to their male counterparts among both undergraduate and postgraduate students. The age range varied considerably among the students. Most of the undergraduate students, 183 (95%) were between 20-30 years of age whereas 63 (58%) of the postgraduate students were between 31-40 years. Postgraduate students participating in the study, were a bit older than the undergraduate students.

Table 1: Socio-demographic characteristics (N= 300)

	Total # of students	Female	Male	Age group			
				20- 30	**31-40**	**41-50**	**>50**
Undergraduate	192	59	133	183	9	-	-
Postgraduate	108	39	69	28	63	14	3
Total	**300**	**98**	**202**	**211**	**72**	**14**	**3**

Variations in age groups may be having some influence on e-resources usage behaviour, which align with the results from previous studies (Akpojotor, 2016; Thanuskodi & Kumar, 2017) that found younger students are more inclined to using e-resources than their older counterparts.

The students' awareness and usage of e-resources

The results in Table 2 show that on one hand, more than half 112 (58%) of undergraduate student were aware of the availability of e-resources at the university. On the other hand, all the postgraduate students were aware of the existence of e-resources at the university.

Table 2: Awareness of the availability of e-resources

Awareness	Degree programme				Total	
	Undergraduates		**Postgraduates**		**Total**	
	Frequency	%	Frequency	%	Frequency	%
Yes	112	58	108	100	220	73
No	80	42	0	0	80	27
Total	**192**	**100**	**108**	**100**	**300**	**100**

Specific to the available MUHAS library e-resources, the results in Table 3 revealed that 26.2% of the students were able to mention only a few databases out of 84 available databases. The most mentioned databases were HINARI with an overall average of 83.7% for both undergraduate and postgraduate students, followed by Institution Repository 69.3%, Google Scholar 63.3%, Wikipedia 55.7% and Emerald 51.7%. The rest of the databases mentioned were below 50% among both student categories. These results imply that the students were less aware of many e-resources available in the library contrary to their beliefs.

Table 3: Databases students are aware of

Database Name	Programmes				Total	
	Undergraduate		**Postgraduate**			
	Frequency	%	Frequency	%	Frequency	%
HINARI	170	88.5	81	75.7	251	83.7
Sage publications	95	49.5	51	47.2	146	48.7
Wiley online library	98	51.0	43	39.8	141	47
Emerald	100	52.1	55	50.9	155	51.7
JSTOR	64	33.3	27	25.0	91	30.3
Taylor and Francis Journals	57	29.7	32	29.6	89	29.7
TEEAL & Agora	72	37.5	49	45.8	121	40.3
OARE	67	34.9	38	35.2	105	35
PUBMED	102	53.1	49	45.4	151	50.3
Biomed Central	78	40.6	46	42.6	124	41.3
Google Scholar	139	72.4	51	47.2	190	63.3
TRIP databases	71	37.0	34	31.5	105	35
Online (AJOL)	77	40.1	45	41.7	122	40.7
British Medical Journal (BMJ)	76	39.8	40	37.0	116	38.7
Oxford Journals	62	32.5	38	35.2	100	33.3
England Journal of Medicine	57	29.8	33	30.6	90	30
Nature Journals	50	26.2	24	22.2	74	24.7
COCHRANE Reviews	77	40.1	35	32.4	112	37.3
Wikipedia	118	61.5	49	45.4	167	55.7
Cambridge Journals Online	82	42.7	37	34.3	119	39.7
DOAJ	57	29.7	37	34.3	94	31.3
MUHAS Inst. Repository	143	74.5	65	60.3	208	69.3

Although the students demonstrated some awareness of e-resources, the researchers were interested to know their practical experience in using those databases. Thus, the students were asked to indicate how often they used online journals and e-books in their educational and research activities. The data in Table 4 indicate that 102 undergraduate students (53%) used online journals and e-books on a weekly basis, more than was the case with postgraduate students (41 or 38%).

Table 4: *Student Usage of e-resources*

Programmes	Question	Student Responses				
		Daily	Weekly	Monthly	Once in three months	Never used
Undergraduate	How often do you use online journals and e-books?	59(30.7)	102(53.)	12(6.2)	9(4.7)	10(5.2)
Postgraduate	How often do you use online journals and e-books?	29(26.9)	41(38.0)	33(30.6)	4(3.7)	1(0.9)

However, just under 1 in 3 postgraduate students (30.6%) used online journals and e-books monthly, compared to just over 1 in 20 undergraduate students (6.2%). These results were surprising. While postgraduate students by virtue of their work are expected to demonstrate a high usage rate of e-resources in their scholarly work, this was not the case at this university.

Students' information literacy (IL) competences

A Five Point Likert scale with 33 items was used to measure information literacy (IL) competence for undergraduate and postgraduate students. The results in Table 5 show the merged results between Good and Very good such that all the 33 IL competencies were scored low.

Table 5. *Students IL competency in the use of e-resources*

S/N	Characteristics	Undergraduate (%)	Postgraduate (%)
1.	Ability to identify gaps in your knowledge	81 (42.2)	38 (35.2)
2.	Ability to convert information needs into answerable questions	87 (45.3)	41 (38.0)
3.	Awareness of major information types and sources	89 (46.4)	44 (41.5)
4.	Identification of appropriate information sources	90 (46.9)	47 (43.9)
5.	Selecting right search tools	74 (38.5)	46 (42.6)
6.	Ability to formulate relevant searches	85 (44.3)	48 (44.9)
7.	Ability to search information by using one keyword searching	80 (41.7)	50 (46.3)
8.	Medical subject headings (MESH Terms)	88 (45.8)	48 (44.9)
9.	Boolean operators for searching information (AND, OR, NOT)	84 (43.8)	51 (48.1)
10.	Ability to search information by using truncation or wildcard	83 (43.2)	52 (48.1)
11.	Ability to search information by using Google search operators	93 (48.4)	45 (41.7)
12.	Browsing the database	95 (49.5)	51 (47.2)
13.	Ability to use of synonyms in searching information	77 (40.1)	49 (45.4)

14.	Phrase searching	80 (41.7)	48 (44.4)
15.	Ability to use advanced online database search techniques	80 (41.7)	47 (43.5)
16.	Ability to access evidence/information	87 (45.3)	51 (47.2)
17.	Ability to critically analyze evidence against set standards	58 (30.2)	52 (48.6)
18.	Ability to determine how valid the material is	67 (34.9)	39 (36.1)
19.	Ability to determine usefulness of material	77 (40.1)	46 (42.6)
20.	Ability to apply information to individual cases	62 (32.3)	42 (38.9)
21.	Reference management by using Mendeley	63 (32.8)	48 (44.4)
22.	Reference management by using Zotero	60 (31.2)	45 (41.7)
23.	Reference management by using Endnote	69 (35.9)	47 (44.8)
24.	Use of web 2.0 tools for storing and sharing information	73 (38.0)	45 (42.1)
25.	Use of web 2.0 tools for engaging public e.g., blog, wiki	77 (40.1)	44 (41.1)
26.	Use of web 2.0 tools for sharing scientific presentations	74 (38.5)	44 (40.7)
27.	How to design online questionnaires	79 (41.1)	45 (41.7)
28.	Online tools for measuring research impact and citation	76 (39.6)	51 (47.2)
29.	How to upload research publications in the MUHAS repository	68 (35.4)	40 (37.0)
30.	How to upload research publications in other open access tools	86 (44.8)	43 (39.8)
31.	Information self-services on publishers' websites	76 (39.8)	44 (41.1)
32.	Statistical analysis tools for data management and analysis	76 (39.6)	46 (42.6)
33.	Copyright & licensing issues of publications	87 (45.3)	47 (43.5)

Generally, all the students scored below 50% on all the measured information literacy competency items. Such a situation has implications for increased training in all IL competency areas for both undergraduate and postgraduate students. Mastery in IL competency would lead to the increase in usability of e-resources.

Predictors of actual use of e-resources among students

The researchers were interested in determining variables that influenced the actual use of e-resources among students. Therefore, multiple linear regression analysis was used to predict factors that led to student use of e-resources in their educational and research work. The multiple regression model was significant with five predictors (gender, age, education level, IL competence, and experience), R^2 = .0.125, $F (11, 288)$ = 3.734, p = 0.000. The results in Table 6 indicate that experience in using e-resources (β =0.213), IL competencies (β =0.168) and highest education attainment (β =0.181) influenced the actual use of e-resources among students.

Table 6: Predictors of actual use of e-resource among students

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Sex of respondent	-0.05	0.085	-0.033	-0.59	0.556
Highest level of education	0.257	0.106	0.181	2.422	0.016
Age	-0.105	0.075	-0.104	-1.415	0.158
IL Competence	0.25	0.085	0.168	2.951	0.003
For how long have you been using online journals and books?	0.163	0.045	0.213	3.64	0
School enrolled:					
Pharmacy	0.097	0.105	0.053	0.928	0.354
Dentistry	0.248	0.163	0.086	1.526	0.128
Nursing	0.013	0.14	0.005	0.094	0.925
Public health	0.148	0.22	0.038	0.673	0.502
Allied health sciences	0.161	0.221	0.041	0.73	0.466
Traditional medicine	0.294	0.674	0.024	0.436	0.663

Based on the results from the multiple linear regression analysis it was necessary to conduct a one-way Analysis of Variance (ANOVA) test to assess the actual usage of e-resources among different student categories. The results in Table 7 below indicate that there was a slight but significant difference in the use of e-resources between undergraduate student (Mean= 3.16, SD = 0.73) and postgraduate students (Mean= 2.9, SD = 0.67), *p* = 0.012.

Table 7: *Use of e-resources among postgraduate and undergraduate students*

	N	Mean	Std. Deviation	Std. Error	F	Sig.
Postgraduate	108	2.9178	0.67217	0.04851	4.46	0.012
Undergraduate	191	3.167	0.73236	0.0708		
3	1	3.1923	.	.		
Total	**300**	**3.0076**	**0.70224**	**0.04054**		

DISCUSSION

Findings from this study indicate that undergraduate and postgraduate students were aware of the availability of e-resources at the university. These findings are in accordance with previous studies (Egberongbe, 2011; Dolo-ndlwana, 2013; Nisha & Ali, 2013). However, there were variations in the levels of awareness between them such that postgraduate students demonstrated a higher

awareness on the availability of e-resources compared to undergraduate students. These results are not surprising since postgraduate students by virtue of their research activity were expected to be more aware of e-resources. These results are in line with the findings of Akpojotor (2016) study which compared the level of awareness of e-resources among postgraduate and undergraduate students. These scholars found a significant difference between these categories of students in e-resources awareness.

The previous research (Megameno, 2010; Kwafoa, Osman & Afful-Arthur, 2014; Nkebukwa, 2016) associated inadequate usage of e-resources with the lack of awareness, however, the current study found the use of e-resources among postgraduate students was limited regardless of their high level of awareness. Surprisingly, undergraduate students demonstrated higher usage of e-resources compared to postgraduate students. Such a situation is not common in most higher learning institutions where postgraduate students are more inclined to use of e-resources due to the nature of their educational and research work (Adeleke & Emeahara, 2016; Kwadzo, 2015). On the one hand, the low usage of e-resources among postgraduate students may be attributed to the deprivation of IL skills (Mtega et al., 2015; Mollel & Mwantimwa, 2019) that are essential in boosting e-resources usage. On the other hand, the presence of information technology (IT) and information literacy (IL) courses taught to MUHAS first year undergraduate students might have precipitated these variations. Similarly, it can also be associated with the fact that undergraduate students are younger as found in previous studies (Akpojotor, 2016; Thanuskodi & Kumar, 2017) whereby the younger students are inclined to use e-resources more than their older counterparts. These findings have implications for understanding the students' behaviour regarding the use of e-resources, whereby, being aware of e-resources availability does not guarantee whether students had used those same e-resources (Kinengyere, 2007).

Regarding Information Literacy (IL) and Information Technology (IT), it was clear that students had limited IL and IT competences. Such a situation hindered them in carrying out effective literature searches and retrieval of e-resources. Although the previous studies recognized gender and age (Bassi & Camble, 2011), education level (Quadri, 2013) and individual experiences (Emwanta & Nwalo, 2013) as important factors that influence information literacy and computer application, they have not accounted for the actual predictors of e-resources usage. This study revealed that gender and age does not influence the use of e-resources as noted in some of the previous research conducted (Bassi & Camble, 2011). However, individual experiences, information literacy competence and education level were predictors of e-resources usage among students. These findings are in line with Quadri (2013) and Olatokun (2009) who noted a strong correlation between education level and individual experiences on utilization of e-resources among students. Furthermore, in this study, education level showed slight differences with higher mean differences noted among undergraduate students when compared to postgraduate students.

These results are important as it was expected that postgraduate students would demonstrate higher usage of e-resources, but this was not the case at this university. On the one hand, undergraduate students are taught IL and learning technologies as a mainstream one semester course. The training on learning technology and IL skills would have therefore increased their IL competence levels and thus boosted their e-resources usage. On the other hand, MUHAS postgraduate students received short course training on IL and scientific writing about 3 to 4 times per semester as part of their preparation for their literature search and retrieval for their research. As such, Isowe (2016) argued "the university should consider having a generic ICT course for all students that entail actual practical work as a requirement for admission to enable many students to participate" in effective literature searching, retrieval, and e-resources usage. Similarly, the "library should prepare online tutorials and guides on how to access and use digital library resources" (ibid).

CONCLUSIONS AND RECOMMENDATIONS

Various studies indicate that a growing number of e-resources pose potential problems, and more often users need some IL skills to be able to establish its scope and relevance (Kichuk, 2010; Sethi & Panda, 2012). Many of these studies focused on determining students' awareness, access and factors hindering e-resources usage. These studies have not provided enough evidence to justify the factors that have a positive influence towards e-resources usage among students as many of them were descriptive. In contrast, this paper provided an understanding of the levels of awareness and predictors of e-resources usage, drawing on inferential statistics to determine factors related to the actual use of e-resources. The findings obtained from this research have practical implications for continuous training and promotion of e-resources by librarians in academic institutions (Bhukuvhani, Chiparausha & Zuvalinyenga, 2012).

Although the MUHAS library offers an IL and IT training course to undergraduate students, there is a need to integrate and upscale the IL course in the MUHAS postgraduate curricula just as it is the case for undergraduates. Librarians as information professionals should play a key role in providing students with continuous IL and search skills training (Akpojotor, 2016; Okiki, 2012; (Bhukuvhani, Chiparausha & Zuvalinyenga, 2012) to enable them to become competent in harnessing the available e-resources (Beard, 2016). Since, the students' levels of awareness of e-resources were greater than the actual utilization of them, such a situation jeopardizes the University effort to realize the value for money incurred to procure e-resources that are more expensive. An overview of e-resources usage at MUHAS demonstrates lack of mainstreaming of IL skills into postgraduate curricula. As such, support from the institution's management is needed to help increase e-resource usage among the students by streamlining the IL and IT skills across the University programmes (Bhukuvhani., Chiparausha & Zuvalinyenga, 2012). Based on the findings and discussions presented above, the study provides some recommendations to ensure that e-resources are accessed and utilized effectively to improve practice and evidence-based decision making.

- Strengthening e-resources course content through periodical reviews. The university through Quality Assurance unit should encourage students to use relevant and current e-resources to ensure the best quality of research and academic outputs and to increase University ranking and visibility to the world.
- Conducting user needs assessment periodically. Librarians should conduct regular user studies to understand potential problems facing library patrons and address them accordingly.
- Offer continuous training since new students are enrolled each year. Librarians should develop and review training manuals to reflect new e-resources demand.
- The IL and IT course content be integrated into postgraduate curricula.
- The University management to increase budget allocations for subscription of more academic databases relevant to students' courses in their programmes. Currently MUHAS pays subscription fees for 8 academic databases and other e-resources are obtained from open-source databases.
- The university management should provide a conducive and friendly learning environment through improving ICT infrastructure for easy accessibility of e-resources (Kumar, 2016) with speedy internet connections. Finally, deployment of standardized e-metrics tools for data capture and sharing for informed decision making is highly recommended.

LIMITATIONS OF THE STUDY

The study findings may be somewhat limited because of the small sample, that is, 38% (n=300) out of 789 administered questionnaires. In this regard, the results should be interpreted with

caution, but the significance of the results should not be undermined. Therefore, future studies should incorporate more rigorous research methods including experimental and qualitative data collection methods to help in assessing awareness and effectiveness of e-resources usage within higher learning institutions. Such undertakings will help to determine and improve the students' e-resource usage behaviour and likely lead to the restructure of e-resource collection development policy and library services provision and practices.

REFERENCES

Adeleke, D. S. and Emeahara, E. N., 2016. Relationship between information literacy and use of electronic information resources by postgraduate students of the University of Ibadan. *Library philosophy and practice*. Available at https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=3788&context=libphilprac

Adesoye, A.E. and Amusa, O.I., 2013. Use of electronic resources in health sciences institutions in Ogun State, Nigeria. *PNLA Quarterly*, vol. 77, no.3, pp.28-41.

Agboola, I.O. and Bamigboye, O.B., 2011. Students' level of study and user of library resources in Nigerian universities: A comparative study. *Library Philosophy and Practice*, p.1.

Akpojotor, L.O., 2016. Awareness and usage of electronic information resources among postgraduate students of library and information science in Southern Nigeria. *Library Philosophy and Practice (e-journal).*

Allen, E.J. and Weber, R.K., 2014. The library and the web: Graduate students' selection of open access journals for empirical literature searches. *Journal of Web Librarianship*, vol. 8, no. 3, pp.243-262.

Angello, C. and Wema, E., 2010. Availability and usage of ICTs and e-resources by livestock researchers in Tanzania: Challenges and ways forward. *International Journal of Education and Development Using ICT*, vol. 6, no. 1, pp.53-65.

Asokan, L. and Dhanavandan, S., 2014. Use and awareness of electronic information resources: An exploratory study. *International Journal of Library Science™*, vol. 10, no. 1, pp.1-8.

Bar-Ilan, J., Peritz, B.C. and Wolman, Y., 2003. A survey on the use of electronic databases and electronic journals accessed through the web by the academic staff of Israeli universities. *The Journal of Academic Librarianship*, vol. 29, no. 6, pp.346-361.

Baro, E.E., Benake-ebide, C.E. and Ubogu, J.O., 2011. Awareness and use of online information resources by medical students at Delta State University in Nigeria. *Library Hi Tech News*, vol. 28, no. 10, pp.11-17.

Bashorun, M.T., Isah, A. and Adisa, M.Y., 2011. User perception of electronic resources in the University of Ilorin, Nigeria (UNILORIN). *Journal of Emerging Trends in Computing and Information Sciences*, vol. 2, no. 11, pp. 554-562.

Bassi, M.D. and Camble, E., 2011. Gender differences in use of electronic resources in university libraries of Adamawa State, Nigeria. *Library Philosophy and Practice*, *549*.

Beard, R.M., 2016. An investigation of graduate student knowledge and usage of open-access journals. *Journal of Electronic Resources Librarianship*, vol. 28, no. 1, pp.25-32.

Bhat, I. and Mudhol, M.V., 2014. Use of E-resources by Faculty Members and Students of Sher-E-Kashmir Institute of Medical Science (SKIMS). *DESIDOC Journal of Library & Information Technology*, vol. 34, no. 1, pp.28-34.

Bhukuvhani, C., Chiparausha, B. and Zuvalinyenga, D., 2012. Effects of electronic information resources skills training for lecturers on pedagogical practices and research productivity. *International Journal of Education and Development Using ICT*, vol. 8, no. 1, pp.16-28.

Chandran, V., 2013. Use and user perception of electronic information resources: A case study of Siva Institute of Frontier Technology, India. *Chinese Librarianship: An International Electronic Journal*, vol. 36. pp.85-98.

Chandra, K., Sankaranarayanan, D., Nagarajan, M. and Mani, V., 2014. A study on use pattern e-resources among faculty members in arts and science colleges in Chennai. *Journal of Advances in Library and Information Science*, vol. 3, no. 1, pp.01-05.

Cherry, E., Rollins, S.H. and Evans, T., 2013. Proving our worth: The impact of electronic resource usage on academic achievement. *College & Undergraduate Libraries*, vol. 20, no. 3-4, pp.386-398.

Dange, J.K., Girish, T., Savitha, M., Jogan, S.N. and Veenakumari, C., 2013. A study on awareness and usage of digital information sources and services by PG Students of Kuvempu University. *Indian Journal of Education Research Experimentation and Innovation*, vol. 3, no. 2, pp.1-8.

Dolo-Ndlwana, N., 2013. *Use and value of library's electronic resources by academics and postgraduate students at Cape Peninsula University of Technology.* Doctoral dissertation, University of Cape Town.

Egberongbe, H.S., 2011. The use and impact of electronic resources at the University of Lagos, *Library Philosophy and Practice*. Available at https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1490&context=libphilprac

Emwanta, M.G. and Nwalo, K.I.N., 2013. Influence of computer literacy and subject background on use of electronic resources by undergraduate students in universities in South-western Nigeria. *International Journal of Library and Information Science*, vol. 5, no. 2, pp.29-42.

Gathoni, N., 2012. Enhancing access to health information in Africa: a librarian's perspective. *Journal of health communication*, vol. 17 (sup 2), pp.18-22.

Isowe, L.D., 2016. *Utilization of Information and Communication Technologies by Distance Learners at the Open University of Tanzania Library in Accessing Academic Information* (Doctoral dissertation, The Open University of Tanzania).

Katabalwa, A.S., 2016. Use of electronic journal resources by postgraduate students at the University of Dar es Salaam. *Library Review*, vol. 65, no. 6/7, pp.445-460.

Kichuk, D., 2010. Electronic collection growth: an academic library case study. *Collection Building,* vol. 29, no. 2, pp.55-64.

Kinengyere, A. A., 2007. The effect of information literacy on the utilization of electronic information resources in selected academic and research institutions in Uganda. *The Electronic Library*, vol. 25, no. 3, pp.328-341.

Kinengyere, A.A., Kiyingi, G.W. and Baziraake, B.B., 2012. Factors affecting utilisation of electronic health information resources in universities in Uganda, *Annals of Library and Information Studies*, vol. 59 (0), pp.90-96.

Kish, L., 1965. Sampling organizations and groups of unequal sizes. *American sociological review*, pp.564-572.

Kumar, R., 2016. Use of E-resources by the Medical Students of MM University, Ambala: A Case Study. *DESIDOC Journal of Library & Information Technology*, vol. 36, no. 1.

Kwadzo, G., 2015. Awareness and usage of electronic databases by geography and resource development information studies graduate students in the University of Ghana, *Library Philosophy and Practice,* vol. 0, no.1, pp.1-28.

Kwafoa, P.N.Y. and Afful-Arthur, P., 2014. Assessment of the use of electronic resources among administrators and faculty in the University of Cape Coast, *Library Philosophy &Practice,* vol. 0, no.1, pp.1-18.

MacDonald, J., Heap, N. and Mason, R., 2001. "Have I learnt it?" Evaluating skills for resource-based study using electronic resources. *British Journal of Educational Technology*, vol. 32, no. 4, pp.419-433.

Manda, P.A., 2005. Electronic resource usage in academic and research institutions in Tanzania. *Information development*, vol. 21, no. 4, pp.269-282.

Mtega, W.P., Dulle, F., Malekani, A.W. and Chailla, A.M., 2014. The usage of e-resources among agricultural researchers and extension staff in Tanzania, *Library and Information Research*, vol. 38, no. 119, pp. 47-66.

Megameno Ndinoshiho, J., 2010. The use of electronic information services by undergraduate nursing students at the University of Namibia's Northern Campus: A descriptive study. *Information Development*, vol. 26, no. 1, pp.57-65.

Mollel, M.M. and Mwantimwa, K., 2019. Users' Acceptance of E-Resources Usage at the Institute of Finance Management, Tanzania. *International Journal of Education and Development using Information and Communication Technology*, vol. 15, no. 4, pp.5-21.

Natarajan, K., Suresh, B., Sivaraman, P. and Sevukan, R., 2010. Use and user perception of electronic resources in Annamalai University: a case study, *Annals of Library, and Information Studies (ALIS),* vol. 57, no. 1, pp. 59-64.

Nisha, F., and Ali, N, 2013. Awareness and use of e-journals by IIT Delhi and Delhi University library users. *Collection Building*, vol. 32, no. 2, pp.57-64.

Nkebukwa, L.L., 2016. Status on the Usage of Electronic-Resources by Students at the College of Business Education. *Business Education Journal*, vol. 1, no. 2, pp.1-13.

Obaje, A.M. and Camble, E., 2008. Use of CD-ROM databases by staff and students in the University of Jos library. *An International Journal of   Information and Communication Technology,* vol. 5, no. 1, pp.7-8

Okiki, O.C., 2012. Electronic information resources awareness, attitude and use by academic staff members of University of Lagos, Nigeria, *Library Philosophy and Practices*. vol. 834, pp.1-9.

Olatokun, W.M., 2009. Analysing socio-demographic differences in access and use of ICTs in Nigeria using the capability approach. *Issues in Informing Science & Information Technology*, vol. 6, pp.479-496.

Quadri, G.O., 2013. Influence of demographic factors on use of online library resources by undergraduate students in two private Nigerian university libraries. *Library Philosophy and Practice*, p.0_1.

Ranasinghe, P., Wickramasinghe, S.A., Pieris, W.R., Karunathilake, I. and Constantine, G.R., 2012. Computer literacy among first year medical students in a developing country: A cross sectional study. *BMC research notes*, vol. 5, no. 1, pp.504.

Ratcliff, A., Swartz, B. and Ivanitskaya, L., 2013. Information literacy skills in speech-language pathology students: Skill differences across academic levels. *Contemporary Issues in Communication Science and Disorders*, vol. 40 (Spring), pp.31-39.

Rehman, S. and Ramzy, V., 2004. Awareness and use of electronic information resources at the health sciences center of Kuwait University. *Library Review*, vol. 53, no. 3, pp.150-156.

Sethi, B.B. and Panda, K.C., 2012. Use of e-resources by life scientists: A case study of Sambalpur University, India. *Library Philosophy and Practice*, p.1.

Somaratna, S. D. (2015). A credit based information literacy course module for science undergraduates: an assessment, *Annals of Library and Information Studies (ALIS)*, vol. 62, no. 1, pp.19-26.

Thanuskodi, S. and Kumar, A.A., 2017. Usage of Electronic Resources among Ophthalmologists. *Library Philosophy & Practice*. *Available at* http://digitalcommons.unl.edu/libphilprac/1491.

_____