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Utilisation of E-Resources to Support Teaching and Research in Higher Learning Institutions, Tanzania

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Abstract

This study was conducted to compare the use of electronic information resources in selected universities in Tanzania. The study employed a mixed methods research approach to collecting, processing, analysing data and discussing the resultant findings. In all, 119 academic staff and researchers participated in the study. SPSS and STATA were used to analyse the data. The key findings suggest that the majority of academic staff and researchers were aware of, have access to and utilise e-resources to support teaching and research. On the whole, the study found a significant and positive association between awareness and access, access and use. In fact, most of the e-resources the selected higher learning institutions subscribed to through COTUL were under-utilised. Apart from information literacy skills, personal motivations and e-resource infrastructures, demographic characteristics such as age and education level of academic staff and researchers are predictors in e-resources usage. Furthermore, the challenges and problems that deter the effective utilisation of e-resources were include slow internet connectivity, inability to access full-text articles, unreliable power supply, inaccessibility of e-resources outside university premises due to IP address limitations, inadequate ICT infrastructure and inadequate skills and knowledge. The study found that there was a need to promote the usage of e-resources through web technologies to enhance the quality of teaching and research.

Key words: ICT, e-resources, online databases, teaching, research, higher learning institutions, Tanzania

1.0 Introduction

The application of Information and Communication Technologies (ICTs) has changed the way the researchers and faculty access and utilise information resources. As a result, e-resources have become an integral part of the information resources for academicians and researchers and can substitute print resources (Mardhusudhan, 2010). The access to the internet by the users unfolds the utilisation of e-resources (Korobil *et al*., 2006).Generally, it is apparent that the print age is paving way to electronic information resources. Since the early 1990s, several initiatives aimed to increase the availability of e-resources have resulted in a significant increase in the number of African institutions subscribing to these

e-resources. In this regard, important initiatives include the International Network for the Availability of Scientific Publications (INASP)'s PERI (Programme for Enhancement of Research Information), African Journal Online (AJOL), and JSTOR schemes funded by commercial publishers and the United Nations (UN) namely HINARI, AGORA, and OARE (Alphonce, 2015; Msagati, 2014; Masinde *et al*., 2011). Manda (2004) reported that there were several initiatives seeking to facilitate the coping with technological changes. For example, the use of CD-ROMS by the early 1990s was the first innovative programme geared towards the adoption of e-resources. In 2001, far-reaching attempts sought to introduce the use of full-text electronic journals in Tanzania's research and academic community. Consequently, there was a significant increase in the number of higher learning institutions accessing electronic resources in Tanzania. Tsakonas and Papatheodor (2006) asserted that the electronic information resources have provided users with new tools and application for information seeking and retrieval. Additionally, the revolution has brought about dramatic changes in information storage, access and retrieval (Egberongbe, 2011). Accordingly, the formation of Consortium of Tanzania University and Research Libraries (COTUL) constitutes an innovative collaborative effort in the country aimed at broadening and consolidating access to and utilisation of e-resources. COTUL primarily seeks to address the shortage of teaching, learning and research resources through joint information resources provision activities, particularly the acquisition and subscription of e-information resources such as AJOL, JSTOR, Oxford Journals, Emerald and other e-journals as well as other databases, research, training, consultancy and other services that are crucial attaining academic excellence in learning, teaching and research (Alphonce, 2015). The present study seeks to expand on what is already known about the access and use of digital information resources in enriching the learning and research among teaching staff in Tanzania's selected higher learning institutions. The objectives of the study were to assess the levels of awareness of e-resources, access to and use of e-resources and skills and knowledge in using e-resources.

2.0 Literature review

Generally, the majority of academics and researchers are aware of different kinds of e-resources available (see, for example, Kumar, 2016; Mammo & Ngulube, 2015; Haridasan & Khan, 2009; Watton, 2007) such as e-journals, books, theses, articles, dissertations, dictionaries, encyclopaedias, databases, newspapers, magazine, e-mail, internet, OPAC and CD-ROM (Verma & Laltlanmawii, 2016; Kumar,

2016;Haridasan & Khan, 2009; Okiki, 2012). Accordingly, the researchers and academic staff are aware of different e-resources and databases (e.g. EBSCO, Emerald, PROQUEST, Springer, Science Direct, INGENTA, J-Gate, INDEST, IEEE, DELNET) (Kumar, 2016; Singh, 2013; Tyagi, 2011). The level of information literacy of researchers and academic staff predict the level of awareness (Angello, 2010; Mardhusudhan, 2010). The librarians, posters, internet, publishers are potential sources of awareness (Mammo & Ngulube, 2015). Other modalities for the users to become aware of the e-resources are through membership, library websites, notice-boards, brochures, self-interest, trial-and-error, and guidance from librarians, friends and colleagues (Kumar, 2016; Verma, 2016; Singh, 2013; Bhatt & Rana, 2011; Haridasan & Khan, 2009). Evidently, the faculty member offices, computer laboratories, homes, libraries and other places in an institution are significant places for accessing e-resources (Kumar, 2016; Singh, 2013). Additionally, Bhatt and Rana (2011) noted that e-groups and virtual conferences are also potential information sources.

However, the magnitude of the usage of these e-resources has been split between positive and negative results. Whereas some current studies such as Verma and Laltlanmawii (2016), Mollel, (2016), Alphonce (2015) and Okiki (2012) indicate insignificant use of the e-resources subscribed to, others such as Kumar (2016), Mammo and Ngulube (2015), Singh (2013), and Swain and Panda (2009) found significant use of these resources by academic and research communities. In particular, Swain and Panda (2009) show that some of the faculty members are shifting their attention more to the utilisation of commercial e-resources than print materials. Singh (2013) presents that 100 percent of faculty members and research scholars at the University of Jamia Millia Islamia used e-resources. In the same vein, Uplaonkar and Keshva (2013) observe that faculty members at Nijalingappa Medical College were positive towards the use of e-resources for studying, research and teaching, specifically online databases such Emerald, EBSCO, and PROQUEST were frequently utilised by faculty members and researchers generally. Korobil *et al*. (2006) underscore the value of e-resources by asserting that a "great majority of the faculty members use e-resources quite frequently." Accessing and utilisation of e-resources were mainly to support their teaching, learning, and research and projects (Swain& Panda, 2009). Additionally, a significant number of researchers and academic staff use the e-resources for research work. The e-resources are also utilised frequently to update knowledge, prepare assignment, study, collect data and information, entertain and

develop careers (Harridasan & Khan, 2009). The e-resources provide fast and reliable (Kumar & Sampath, 2008), up-to-date literature, which is less expensive and saves time more than print materials (Mardhusudhan, 2010). Also, e-resources are easily accessible in the remote areas (Khan, 2016). Consequently, the e-resources are integrated with teaching, learning research and training for excellence (see Bhatt & Rana, 2011; Okiki, 2012). According to Kumar (2016), the use of e-resources enhances communication, career development, teaching and research in addition to providing subject-specific and updated information. Similarly, Singh (2013) notes that access to e-resources raises awareness on the current research gaps, helps in the preparation of examinations and keeps the researcher and faculty up-to-date in their respective disciplines. Tyagi (2011) asserts that access to and use of e-resources helps faculty members and researchers to collect current teaching and research materials as "to a very high extent e-resources have become a substitute for printed materials". Indeed, e-resources have brought about dramatic change in learning, teaching, and research in higher learning institutions. The use of these resources, however, varies from one institution, one individual to another. In this regard, researchers and academic staff with a wide range of knowledge, skills and competencies are more likely to use e-resources than those without information literacy skills as awareness and use depend on the skill and knowledge level of information users (Angello, 2010). Mardhusudhan (2010) affirms that skills are pre-requisite to effective utilisation of the e-resources subscribed to by their institutions, with the main source of skills and knowledge coming from the library staff, external sources and attending relevant training offered by the university.

Apart from the positive impact of ICTs on information access, retrieval and application, challenges to accessing and using e-resources in supporting teaching, learning and research still remain. For example, Mammo and Ngulube (2015) opined that low bandwidth and unclear institutional policy constitute potential problems that are likely to hamper such information access and eventual use. Ubogu (2009) contends that failure to develop institutional capacities and technical capabilities is another challenge. On the whole, lack of necessary knowledge, skills and competency among livestock researchers in Tanzania limit the usage of e-resources. This problem is attributable to lack of the information literacy programmes in some institutions in Tanzania (see Angello, 2010). Other challenges include lack of computer know-how, poor internet connectivity, lack of motivation among librarians, heavy academic and teaching loads

that deter the use of e-resources in teaching, learning and research. Furthermore, some researchers have to contend with time constraints when it comes to searching for, retrieving and using the new information available on online databases (Swain & Panda, 2009). Also, language barrier, unfamiliar, technical hitches, slow downloading and lack of information training can hinder access to and use of e-resources (Harridasan & Khan, 2009). Furthermore, the shortage of computer terminals, difficulties in finding relevant information, information overload, inadequate knowledge, IT savvy, and slow internet, lack of time and assistance from library staff were some of the problems research scholars faced (see Khan, 2016; Kumar, 2016; Singh, 2013; Okiki, 2012; Mardhusudhan, 2010). As a result, the proliferation of ICTs has increased more dependency on e-resources among information users than on print or traditional resources (Bhatt & Rana, 2011). In fact, the use of print resources to support teaching, learning and research is declining among engineering academics in India. Moreover, there was a lack of awareness, high maintenance cost, high purchase, uneasy-to-read, technical problems, outdated materials and lack of statutory provision as the main challenges and problems to utilise effectively e-resources (ibid.). Okiki (2012) associates with computer illiteracy, technophobia, erratic power supply and dislike reading from a computer screen as the problems besetting effective utilisation of e-resources.

The literature reviewed indicates that different studies have been conducted to examine the use of e-resources in higher learning institutions. Most of the studies focused more on individual institutions without comparing the application trends. Additionally, among the studies reviewed, none had attempted to establish the association between awareness, access and use, and measure the influence of age and educational on information use. The present study fills these gaps.

3.0 Methodology

The study employed a mixed methods research design. Both qualitative and quantitative approaches were deployed during data collection, process and analysis. It gathered quantitative data such as demographic characteristics, frequency and purpose of using information in teaching and research. Accordingly, qualitative data such as opinions, attitude and perceptions on the use of e-resources supplemented the quantitative data. Mwantimwa (2012) contends that the use of a mixed methods design increases the

credibility and reliability of the data collected from research sites. The study drew participants from six (6) institutions in Dar es Salaam and Morogoro: the Institute of Finance Management (IFM), Ardhi University (ARU), Mzumbe University (MU), Muhimbili University of Health and Allied Sciences (MUHAS), Sokoine University of Agriculture (SUA) and the University of Dar es Salaam (UDSM).These were purposively selected to compare the trend on use of e-resources. Also, the present study aimed to establish the determinants of e-resources usage in teaching and research. In all, 119members of staff were conveniently selected. Key informants were librarians, library directors and ICT staff in libraries who were purposively selected. The questionnaires were administered with staff and students, interviews were conducted with library directors and ICT staff, and focus group discussions were held with librarians. Data was analysed both quantitatively and qualitatively. The Statistical Package for Service Solutions (SPSS) and STATA were used to analyse both descriptive and inferential statistics. Descriptive statistics such as percentages and frequency helped to establish the trend and compare the level of information use whereas inferential statistics such as chi-square tests, binary logistic regressions and correlations measured the statistical significance, strength and direction of the relationship.

4.0 Findings and discussion

This section presents and discusses the findings of the study on access to and utilisation of electronic information resources and services in Tanzania's universities and research institutes.

4.1 Socio-demographic characteristics

The socio-demographic characteristics are sex, age and education and responsibilities. This study involved 119 academic staff from six higher learning institutions. The results show that 39 (32.8%) of the respondents were from the UDSM, 23 (19.3%) from Mzumbe, 22 (18.5%) from SUA, 16 (13.4) MUHAS, 10 (8.4%) ARU and nine (7.6%) were from IFM. While 69 (58%) were male respondents, 50 (42%) were female. Regarding age, 43 (36.1%) were between 31 and 40, 33 (27.7%) 41 and 50, 25 (21%) more than 51 and 18 (15.1%) between 21 and 30. Also, the outputs indicate 71 (59.7%) were master's degree holders, 41 (34.5%) were PhD and 7(5.9%) bachelor's degree holders. Furthermore, the results indicate that 111 (93.3%) of the respondents involved in teaching while 104 (87.4%) in research. Table 1 below summarises the socio-demographic characteristics:

Table 1: Summary of socio-demographic characteristics

Variable (n = 119)		**Frequency**	**Percent**	
Institutions	ARU	10	8.4	
	IFM	9	7.6	X^2 = 15.798
	MUHAS	16	13.4	df = 5
	Mzumbe	23	19.3	p-value = .000
	SUA	22	18.5	
	UDSM	39	32.8	
Gender	Female	50	42	X^2 = 2.429, df = 1
	Male	69	58	p-value = .119
Age	21-30	18	15.1	X^2 = 11.655
	31-40	43	36.1	df = 3
	41-50	33	27.7	p-value = .009
	51+	25	21	
Education level	PhD	41	34.5	X^2 = 9.69
	Masters	71	59.7	df = 2
	Bachelor	7	5.9	p-value = .000
Responsibilities	Research	104	87.4	X^2 = 18.322, df = 5
	Teaching	111	93.3	p-value = .136

In general, a notable percentage (32.8%) of the respondents was drawn from the UDSM due to its nature of the population. Chi-square test (x^2 = 15.798, df = 5, p-value = .000) suggest there is a significant different on the respondents participated in the study. In fact, UDSM has large population of academic staff and research scholars compared to SUA, Mzumbe, MUHAS, IFM and ARU. This study has also taken into account the gender issue, and so both genders are well-represented in the study. On sex, the

Chi-square test (x^2 = 2.429, df = 1, p-value = .119) confirm that an insignificant difference was found between male and female respondents. Generally, the number of male teaching staff at institutions of higher learning is higher than that of female faculty. Accordingly, the findings indicate that the majority (63.8%) of academic staff were aged between 31 and 50 years, whereas a few were aged between 21 and 30 and 51+ years. The result that the majority of academic staff were aged 31-50 is attributable to Tanzania's education system whose majority of staff are young adults. This result concurs with the trend at the UDSM where only 17 percent of academic staff members are aged 51-60 (UDSM, 2015). In terms of education level, the findings suggest that the majority of academic staff were master's degree holders followed by those with PhDs. Only a few had a bachelor's degree. Their difference was significant as shown by Chi-square test where p-value is greater than .05 (i.e. p – value = .000). On the whole, master's and PhD holders constitute large proportion of the academic staff in the universities under review. For example, at the UDSM the trend shows that 30 percent of academic staff members have been trained up to PhD level whereas those with the master's constitute 42 percent of all academic staff (see UDSM, 2015). Furthermore, the findings imply that the majority of academic staff was responsible for teaching and conducting research primarily because the core functions of academic staff are teaching and research. Indeed, the selected respondents perform dual tasks such as teaching and research activities.

4.2 Awareness of e-resources

This section provides findings on the students' and staff's level of awareness of the available e-resources. In this regard, the respondents were asked to indicate whether they were aware of e-resources and other online databases accessible and retrievable through their respective institutions. Furthermore, cross-tabulation assessed the level of awareness in the institutions under review. The data outputs indicate that 50 (100%) of female respondents and 67 (97.1%) of males were aware of the e-resources. Also, the results show that all (100%) the respondents at the UDSM, MUHAS, SUA and IFM were aware of these information e-resources. Furthermore, the results show that 22 (95.7%) of the respondents from Mzumbe and nine (90%) from ARU were aware of these e-resources. Table 2 presents the results:

Table 2: Cross-tabulation of awareness by gender and institution

Variable (n = 119)	**Respondents**	
	Aware	**Not aware**

Sex	Female	50 (100%)	0 (0.0%)
	Male	67 (97.1%)	2 (1.7%)
Institution	IFM	9 (100%)	0 (0.0%)
	ARU	9 (90%)	1 (10%)
	Mzumbe	22 (95.7%)	1 (4.3%)
	MUHAS	16 (100%)	0 (0.0%)
	SUA	22 (100%)	0 (0.0%)
	UDSM	39 (100%)	0 (0.0%)
	Total	**117 (98.3%)**	**2 (1.7%)**

Results show that the majority (98.3%) of the academic staff and researchers were aware of the availability of e-resources and online databases to which their universities subscribed. The findings further indicate that only a few of the academic staff and researchers were not aware of the e-resources. The findings show that there are minor differences between institutions in terms of awareness of e-resources. Whereas all (100%) the respondents from the UDSM, MUHAS and SUA were aware of these information e-resources, few respondents from ARU and Mzumbe were not aware. This high awareness was found to be associated with the respective institutional marketing of e-resources. Cross-tabulation results on the relationship between gender and awareness of e-resources show all (100%) the female respondents were aware of electronic resources as compared to 97.1 percent of their male counterparts. In other words, gender has nothing to do with awareness of e-resources. On awareness, the studies (e.g. Kumar, 2016; Mammo & Ngulube, 2015; Singh, 2013) support the view that most of the academic staff and researchers in higher learning institutions were aware of e-resources. In fact, promotion activities through their websites, flyers, notice-boards and information literacy programmes were found to be important avenues for raising awareness among academic staff and researchers.

4.3 Sources of information on e-resources

The selected academic staff and researchers were requested to explain how they had learned about the availability of e-resources in their respective institutions. The results show that 58 (48.7%) were informed through the institution's library website, 55 (46.2%) library staff, 25 (21%) social networks, 21 (17.6%) friends, 20 (16.8%) brochures and 17(14.3%) through seminars. Seventeen (14.3%) others cited notice-boards, four (3.4%) academic mentors, and two (1.7%) indicated staff webmail as the basis of their awareness. Figure1 summarises the data outputs:

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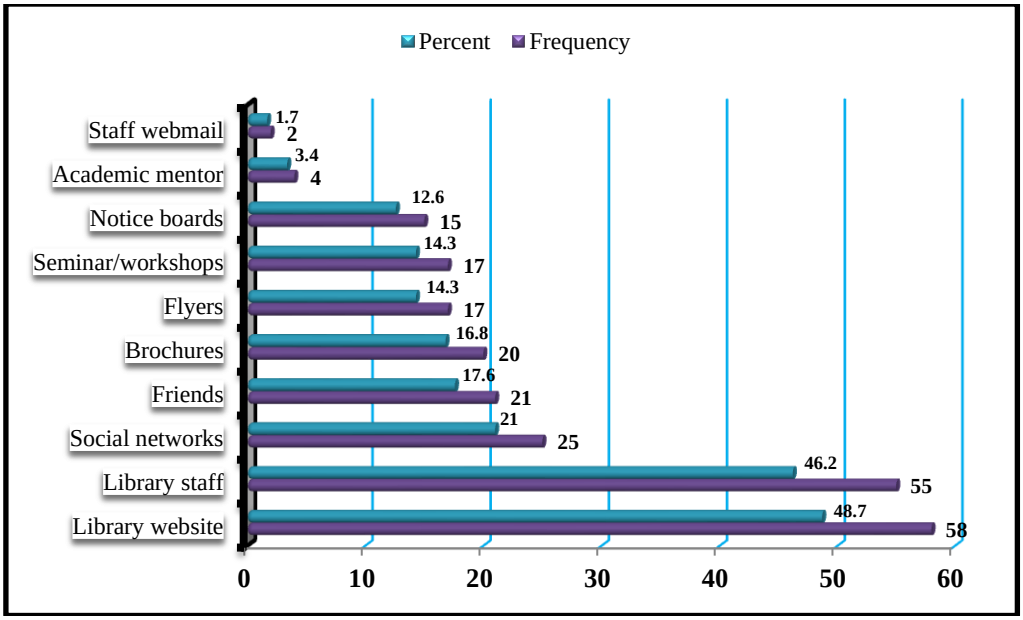

Figure 1: Sources of awareness of e-resources

The study findings revealed that the library website (48.7%) and academic staff (46.2%) were the most relied upon sources for learning about the availability of e-resources in their respective institutions. During an interview, the Director of SUA Library mentioned various marketing tools the library employed, specifically the use of posters and notice-boards across the University and University mail that informed the students and faculty—who all have university-based email accounts—about the available e-resources. SUA also used its websites including social media platforms such as Facebook, as well as training sessions every Wednesday which target postgraduate students and faculty to popularise the available e-resources among potential information users. To ensure effectiveness, the library also makes use of 'champions', that is, individuals who go to various departments to convince students and faculty to attend library user training sessions. During the Focus Group Discussion with library staff at SUA Library, participants said that trade fairs, specifically Nanenane which is organised annually in Morogoro region also serves as an important avenue for marketing the e-resources available through the library and university subscriptions.

Similarly, the UDSM library indicated that they used as marketing strategies websites, brochures, and notice-boards, as well as friends of the library and periodic letters addressed to the School Deans, Institute

Directors, College Principals and Heads of Department. Physical visits were common at Mzumbe whereas websites and departmental training used at IFM. The director of IFM library reported that they conducted training "for 1-2 hrs for a week by reducing the content to cover key issues". MUHAS, on its part, use group email to all staff, the website, library notice-boards, blogs, library Facebook page as e-resource marketing strategy. On the whole, both physical and electronic mechanisms of marketing their e-resources were utilised in these libraries. Empirical findings from previous studies (e.g. see Kumar, 2016; Verma & Laltlanmawii, 2016; Singh, 2013; Okiki, 2012; Bhatt & Rana, 2011; Tyagi, 2011; Swain & Panda, 2009) concur with these findings as they affirm that library websites, librarians, friends, brochures, seminars and colleagues helped to raise awareness among information users. Bhatt and Rana (2011) observed that trial-and-error were common helped to engineering academics in India become aware of the availability of these e-resources for use in their work.

4.4 Accessing e-resources and means of access

Academic staff and researcher were also asked to state whether they have access to e-resources in their respective institution. The results show that 94 (79%) of the responding academic staff indicated having access to e-resources and databases in their institutions whereas 17 (14.7%) noted the absence of access to such e-resources. Furthermore, a cross-tabulation of staff access to e-resources by institution produced results presented in Table 3:

Table 3: Access to e-resource by institution

Institution	**Access to e-resources**		
	Have access	**No access**	**No response**
IFM	4 (44.4%)	5 (55.6%)	0 (0.0%)
ARU	3 (30%)	4 (40%)	3 (30%)
Mzumbe	15 (65.2%)	4 (17.4%)	4 (17.4%)
MUHAS	12 (75%)	4 (25%)	0 (0.0%)
SUA	22 (100%)	0 (0.0%)	0 (0.0%)
UDSM	38 (97.4%)	0(0.0%)	1 (2.6%)
Total	94 (79%)	17 (14.3%)	8 (6.7%)

Generally, the findings suggest that the majority of academic staff at SUA (100%), UDSM (97.4%), MUHAS (75%) and Mzumbe (65.2%) had such access. Specifically, SUA and UDSM had the highest level of access to e-resources. This high e-resource access rate could be attributable to the availability of

infrastructures that support e-resource access, retrieval and use. Such infrastructure includes cabled and wireless computer connectivity. Additionally, training to raise not only awareness but also the use of e-resources has also helped to raise the profile of e-resources in these institutions. On the other hand, only few staff from both ARU (30%) and IFM (44.4%) had access to e-resources, which implies that the level of access to e-resources in these institutions is low. Despite the findings revealing that average percent of the academic staff and research scholars at ARU and IFM, the studies (e.g. Singh, 2013; Kumar, 2016; Bhatt & Rana, 2011; Mardhusudhan, 2010; Haridasan and Khan, 2009) show that the majority (i.e. between 60% and 100%) of academic staff and researchers have accessed e-resources in their respective institutions. For other institutions under review, the findings on awareness affirm a close relationship between awareness and access. Also, the selected academic staff members were asked to explain ways and place from which they accessed e-resources and online databases in their respective institutions. Table 4presents the results:

Table 4: Means of access to e-resources

Access point (n = 119)	**Frequency**	**Percent**
Library	48	40.3
Computer laboratory	33	27.7
Office computer	74	62.2
Personal computer	59	49.6%
Mobile devices	31	26.1%
Home	29	24.4
Internet cafe in the campus	7	5.9%

The findings show that academic staff, who participated in the study, used their office computers (62.2%) and personal computers (54.6%) as major means for accessing e-resources and online databases. The least used point of access is on-campus Internet cafes. The predominance of e-resource access through the office can be explained by the fact that most of academic members of staff having offices equipped with an internet-connected computer. Moreover, they can access the wireless network using their laptops from these offices. As Internet connectivity fees are covered by the institution, the office becomes the best point for accessing e-resources and databases compared to other points of access. Indeed, when accessing these e-resources outside the university gateway, the information users were asked to subscribe as individuals even for resources to which their institutions subscribed. Such e-resource access traits are not only common in the selected higher learning institutions Tanzania but also among academics and researchers in

other higher learning institutions in India (see, for example, Khan, 2016; Swain & Pand, 2009; Haridasan & Khan, 2009) and Nigeria (see Okiki, 2012). In fact, libraries, departmental offices, internet cafés, personal computers, smart mobile devices, home and computer laboratories are generally important means and places for accessing e-resources. For example, the common name for computer laboratory at the UDSM library is 'clusters'. Other computer laboratories are found in departments of respective institutions. During an interview, the Director of SUA Library said:

> Access to e-resources is not a problem at the institution because wireless access has been established at all major points within the institution inclusive of [the] Mazimbu Campus [the second off-site major campus of the university), such as the library, computer laboratories, classrooms and other premises.

These findings concur with those on the awareness and accessibility of e-resources and databases whereby all academic staff at SUA were not only aware of these resources but also accessed and used them. The implication is that wireless networks are becoming dominant and, hence, helping to enhance the utilisation of e-resources and databases in the higher learning institutions under review.

4.5 Perception of access to e-resources

The academic staff and researchers were further asked to state their views on the difficult or easiness of accessing e-resources and online databases. A comparative analysis on how the academic staff perceived such access was performed. The results show that 48 (40.3%) of academic staff perceived access to e-resources to be very easy and 54 (45.4%) to be easy whereas eight (6.7%) perceived it to be difficult and nine (7.6%) did not respond to the question. The findings are presented in Table 5:

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Table 5: Perception of access to e-resources

Name of Institution	Access to e-resources/online database				Total
	Very easy	Easy	Difficult	No response	
IFM	5 (55.6%)	0 (0%)	0 (0%)	4 (44.4%)	9 (100%)
ARU	8 (80%)	0 (0%)	0 (0%)	2 (20%)	10 (100%)
Mzumbe	11(47.8%)	11 (47.8%)	0 (0%)	1 (4.3%)	23 (100%)
MUHAS	7 (43.8%)	8 (50.0%)	0 (0%)	1 (6.2%)	16 (100%)
SUA	6 (27.3%)	12 (54.5%)	4 (18.2%)	0 (0%)	22 (100%)
UDSM	11 (28.2%)	23 (59%)	4 (10.3%)	1 (2.6%)	39 (100%)
Total	**48 (40.3%)**	**54 (45.4%)**	**8 (6.7%)**	**9 (7.6%)**	**119 (100%)**

On the whole, the findings indicate that the majority (85.7%) of the academic staff in the selected higher learning institutions perceived access to e-resources to be easy. On the other hand, an insignificant percentage (6.7%) of the staff perceived it to be difficult. This result is consistent Acceptance Model by Davis and Vanketesh (2004), which stipulates that when the user perceives technology to be easy-to-use, the possibilities of actual utilisation is very high. Indeed, the findings demonstrate that the selected academic staff utilised the e-resources and databases as they perceived easy access to and use of these e-resources. In all, the perceived positive attitude towards e-resources boosts the accessibility and usability of e-resources among academic staff and other researchers in academic institutions (see also, Mammo and Ngulube, 2015; Singh, 2013). The positive attitudes are associated with less costs, more informative information and time-saving.

4.6 Use of e-resources in teaching

The survey sought to establish the use of e-resources by academic staff for teaching. The findings revealed that 106 (89.1%) of the respondents indicated that they used e-resources whereas 11 (9.2%) indicated otherwise. Two (1.7%) respondents did not respond to the question as indicated in Table 6:

Table 6: Institution, gender and age on use of e-resources in teaching

Variables (n = 119)		Use of e-resources in teaching			Total
		Use	Not use	NA	
Institution	IFM	6 (66.7%)	2 (22.2%)	1 (11.1%)	9 (100%)
	ARU	7 (70%)	2 (20%)	1(10%)	10 (100%)

	Mzumbe	21 (91.3%)	2 (8.7%)	0 (0.0%)	23 (100%)
	MUHAS	13 (81.2%)	3 (18.8%)	0 (0.0%)	16 (100%)
	SUA	20 (90.9%)	2 (9.1%)	0 (0.0%)	22 (100%)
	UDSM	39 (100%)	0 (0%)	0 (0.0%)	39 (100%)
	Total	**106 (89.1%)**	**11 (9.2%)**	**2 (1.7%)**	**119 (100%)**
Gender	Female	45 (90%)	4 (8%)	1 (2%)	50 (100%)
	Male	61 (88.4%)	7(10.1%)	1 (1.4%)	69 (100%)
	Total	**106 (89.1%)**	**11 (9.2%)**	**2 (1.7%)**	**119 (100%)**
Age	21-30	14 (77.8%)	4 (22.2%)	0 (0.0%)	18 (100%)
	31-40	39 (90.7%)	3 (7%)	1(2.3%)	43 (100%)
	41-50	31 (93.9%)	2 (6.1%)	0 (0.0%)	33 (100%)
	51+	15 (93.8%)	0 (0.0%)	1(6.2%)	16 (100%)
	Not responded	7 (77.8%)	2 (22.2%)	0 (0.0%)	9 (100%)
	Total	**106 (89.1%)**	**11 (9.2%)**	**2 (1.7%)**	**119 (100%)**

The findings show that the majority (89.1%) of the academic staff used e-resources whereas the least (9.2%) did not use e-resources to support teaching. This implies that a significant percentage of the academic staff utilised e-resources mainly because of the shortage of books and the outdated print publications, particularly journals, available in academic libraries. Institution-wise, findings show that all (100%) the selected academic staff at the UDSM used e-resources in teaching, whereas some staff respondents from each of the other institutions did not. With regard to gender, a significant percentage of female (90%) and male (88.4%) respondents used e-resources, which imply that gender does not necessarily influence the use of e-resources in teaching in the institutions under review. The findings further indicate that those in 21-30 age category used e-resources in teaching less (77.8%) than those in other age categories (90.7%, 93.9% and 93.3% of those aged between 31-40, 41-50 and 50+, respectively).Although the findings suggest that application of e-resources at Mzumbe University is high (91.3%), the results from interview sessions with the Director of the Mzumbe Library appears to differ. This discrepancy could be explained by the higher use of open access e-resources that the majority use to support research and teaching than subscription based e-resources which show low usage due to poor search techniques coupled with lack of formal information search skills training. The Mzumbe University Library director attributed lack of information search training programmes to a shortage of funds for that purpose:

> During the orientation period, time set for library orientation is inadequate, and that when training programmes are organised, it is usually on voluntary basis. Another explanation for low usage is inaccessibility of some of the e-resources. The use of IP address is also another factor for low usage of e-resources because the e-resources can only be accessed through an IP address.

What the Director said was confirmed by library staff during the focus group discussion. On top of that, the usage statistics of the subscribed e-resources by Mzumbe library were not significant. Most of the academic staff used the e-resources to which their academic library did not subscribe. In fact, open access resources are becoming dominant in supporting teaching among academic staff in Tanzania's higher learning institutions. These findings are not in line with the findings by Swain and Panda (2009) who found that the majority of faculty members (in the less than 50 age groups) of business schools favoured commercial e-resources whereas those aged above 50 were against the commercial e-information resources.

Furthermore, the academic and researchers were required to indicate how they made use of e-resources in teaching. The findings revealed that 97(81.5%) of the respondents indicated preparing teaching notes, 92(77.3%) providing up-to-date references, 78(65.5%) improving teaching methods, 65(54.6%) updating the examination process, and seven (5.9%) for demonstrations. The findings show that the majority of the academic staff uses e-resources in a number of ways, including preparing lecture notes, providing up-to-date references, improving teaching methods, and the updating examination process. Preparing lecture notes predominates as was a major that the respondents used information from e-resources and databases in teaching. Fewer respondents indicated using e-resources for demonstrations. In all, e-resources and databases play a pivotal role in strengthening teaching methods, the examination process, referencing and the accessibility of teaching resources. On the whole, the accessibility and usability of e-resources enhance teaching and learning activities (see also Appleton, 2006) by sharpening knowledge, boosting communication, and preparing assignment and learning (Kumar, 2016; Haridasan & Khan, 2009).

4.7Use of e-resources in research

Academic staff and researchers were asked to indicate how they used e-resources to support research. The findings revealed that 99 (83.2%) indicated that they used it for that purpose whereas nine (7.6%) indicated otherwise. Nine (8%) of them did not respond to the question. The findings reveal that the majority (83%) of academic staff used e-resources to support their research activities. However, there are some (8) who indicated not using it for that purpose. These findings disclose that access to and the utilisation of e-resources enhances research activity in selected higher learning institutions. This is

common among researchers and academic staff in other higher learning institutions. For example, Singh (2013) found that all (100%) of academic and research at the University of Jamia Millia Islamia used e-resources for research activities. On research productivity, academic staff and researchers were required to indicate in which ways e-resources support their research undertakings. The results are summarised in Table 7:

Table 7: Role of e-resources in research productivity

Activity (n = 119)	**Frequency**	**Percent**
Facilitate the process of proposal writing	100	84
Conduct literature review	99	83.2
Research report writing	89	74.8
Identification of research areas	89	74.8
Access to secondary data	85	71.4
Timely submission of research reports	70	58.8

In general, the major purposes for which respondents use e-resources in their research undertakings were to facilitate the process of proposal writing (84%) and conducting literature review (83.2%). Other purposes include research report writing and identification of research areas (74.8%) and access to secondary data were also mentioned by the majority of respondents. They also indicated that timely submission of research reports was possible because the relevant e-resources and databases were easily and readily available and accessible. In fact, the awareness, access and utilisation of e-resources and databases enhance the quality and quantity of the research in their institutions. Indeed, the main purpose for e-resource usage is to support research project works, identification of research gaps, keep in touch with advances and development in their respective research field, proposal and paper writing (see also, Singh, 2013; Okiki, 2012), collecting data and information, thesis and dissertation writing (Kumar, 2016; Tyagi, 2011), improve communication and career development (Kumar, 2016).

4.8 Relationship between awareness, access and use of e-resources

The researchers were interested in establishing the relationship between awareness, access and use e-resources. The Spearman's rho was performed to establish the relationship for these the three variables. Table 8 summarizes the correlation of awareness, access and use of e-resources.

Table 8: Correlations on awareness, access and use of e-resources

Spearman's rho		Awareness	Access	Use of e-resources
Awareness	rho	1.000	.226*	.164
	p- value	.	.013	.075
Access	rho	.226*	1.000	.767**
	p-value	.013	.	.000
Use of e-resources	rho	.164	.767**	1.000
	p-value	.075	.000	.

Correlation is significant at the 0.05 level (2-tailed).

The findings suggest that there was a significant association between awareness and access (rho = .226, *p* value = .013) access and use of e-resources (rho = .767, *p* value = .000) among academic staff and researchers were found while between awareness and use of e-resources (rho = 164, *p* value = .075) was not found. It should be noted that any *p*-value of less than 0.05 significance level indicates that the variables are probably correlated in the population from which the sample has been drawn (see Leedy & Ormrod, 2005). Moreover, the findings indicate that the association between awareness and access, access and use of e-resources among academic staff and researchers range from weak (e.g. rho = .226) for awareness and access to strong (rho = .767) between access and use of e-resources. The directions of the relationship are positive. The implication is that academic staff and researchers who are aware are most likely to access and use e-resources than those who are not. Although being aware and having access does not necessarily induce academic staff and researchers to use e-resources, they boost their likelihood of actually using these e-resources in their work. Other factors such as knowledge, skills, technology savvy and personal motivation must be taken into consideration. Leedy and Ormrod (2005) caution that correlation data alone never allows for drawing clear-cut conclusions on the cause-and-effect relationships.

4.9 Influence of gender, age and education level on the use of e-resources.

To determine the influence of gender, age and level of education on the usage of e-resources, logistic regression was performed. The odds ratio was used to determine whether the predictors have influence on the usage of e-resources. Table 9 summarises the data outputs:

Table 9: Logistic regression (Use of e-resources: sex, age and level of education)

Logistic regression	Number of obs = 119
	LR chi^2 (13) = 12.53
	Prob > chi ^{2} = 0.029
	Pseudo R^2 = 0.166

Log likelihood-31.308						
Use of e-resources	**Odds Ratio**	**Std. Err.**	**z**	**P>z**	**[95% Conf.Interval]**	
Sex						
Female						
1						
Male	1.385	0.691	-0.000	0.998	0.257	3.877
Age						
21-30	1					
31-40	1.125	1.512	0.120	0.908	0.151	8.354
41-50	3.447	3.345	1.283	0.202	0.515	23.094
>51	2.929	1.466	2.15	0.056	1.311	3.813
Level of education						
Bachelor's degree	1					
Master's	1.296	1.122	-1.481	0.138	0.245	2.674
PhD	1.109	1.170	0.101	0.921	0.141	8.762
_cons	1.385	0.996	-1.394	0.164	-3.338	0.567

Note that the odds ratios are for a one-unit change in the variable.

The overall logistic regression propose that the probability (i.e. Prob > chi^2 = 0.029) is statistically significant, hence signifying that one or more than one of the predictors have a bearing on the use of e-resources by academic staff and researchers. The findings suggest that there is a one-unit increase in e-resources use by male academic staff and researchers as indicated by odds (-1.385). Note that gender has an insignificant negative influence on the use of e-resources. This entails that neither male nor female are much more likely to utilise e-resources. For each increase in one-unit of the academic staff and researchers aged 31-40 there is an increase in the odds ratio of using e-resources by 1 whereas the increase among those aged 41-50 is 3 and >51 is 2. These results show that the academic staff and researchers aged between 31 and 40 are much more likely to use e-resources in teaching and research more than those in between 31 and 40 and > 51. Additionally, those aged 41 and 50 are more likely to use e-resources for writing papers for publication in peer-reviewed journals for promotion purposes. Accordingly, the odds for level of education indicate that there is an increase by 1 in one-unit. The findings imply that academic staff and researchers who hold Master's and PhD degrees are more likely to use e-resources than those with only a bachelor's degree. Odds ratio on the level education reveal a 1 unit increase in the education level there is an increase in the use of e-resources among academic staff and researchers because assistant and senior lecturers, and professors are more involved in teaching, research and consultancy than tutorial

assistants, the junior staff at the very bottom of the academic ladder. Also, they are much more likely to get involved in writing research proposals and articles than the junior cadre.

4.10Quality of research

Members of staff were also asked to indicate whether the quality of research would be negatively affected in the absence of e-resources. The data outputs show that 94 (79%) of the respondents agreed that the quality of research in the absence of e-resources would be negatively affected whereas 13 (10.9%) disagreed with the statement. Twelve (10.1%) others were non-committal as they did not give a response. These findings show that the majority (79%) of staff indicated that the quality of research would suffer in the absence of e-resources. However, there were some respondents who believed that the quality of research would not be negatively affected in the absence of e-resources. These findings entail that the quality of research depends on the accessibility and usability of e-resources and databases for enriching the research proposal, literature review, and data. Moreover, the utilisation of e-resources helps to corroborate the research findings from the existing knowledge. Furthermore, staff who indicated that the quality of research would be negatively affected in the absence of access to e-resources was also asked as a follow-up question to indicate what they think so. Responding, 35 (37.2%) cited creation of shortage current materials, 31(32.9%) compromising the quality of publications, 24 (25.5%) cited a decline in publications, 15 (15.9%) spending too much time on searching for materials analogically, 12 (12.8%) limiting opportunities to get new research areas and eight (8.5%) indicated failure to check for plagiarism rate. The results are summarised in Table 10:

Table 10: Research without access to e-resources

Response (n = 94)	**Frequency**	**Percent**
Creating a shortage of current materials	35	37.2
Reduction in the quality of publications	31	32.9
Decrease in publications	24	25.5
Too much time being spent on searching for materials analogically	15	15.9
Limiting opportunity to get new areas of research	12	12.8
Failure to check plagiarism rate	8	8.5

Findings show that creating a shortage of current materials and reduction of the quality of publications were major consequences that would occur when research is carried out without access to e-resources. These were followed by those who indicated that research without access to e-resources decreases the number of quality publications, with much time being spent on searching materials analogically, limited opportunities for getting new research areas and failure to check for plagiarism. In this regard, Mammo and Ngulube (2015) assert that the absence of e-resources deter accessibility and usability of scholarly literature and publishing. Moreover, Bhatt and Rana (2011) found that cost in terms of time, resources and difficulties are associated with the problem of access to and use of e-resources.

4.11 Types of e-resources used by academic staff and researchers

Academic staff and researchers were required to indicate the types of e-resources/online databases they used. The results show that 83 (48.7%) of the academic staff and researchers used Emerald, 58 (48.1%) JSTOR, 37 (31.1%) SAGE Publications, 33 (27.7%) Taylor and Francis, 29 (24.4%) Cambridge University Press, 27 (22.7%) IMF e-Library and 26 (21.8%) said they accessed and used Wiley Online Library Full. The detailed results are presented in Table 11:

Table 1: Online resources used

Online databases (n = 119)	**Frequency**	**Percent**
American Chemical Society Journals and Magazines	15	12.6
American Institute of Physics journals	12	10.1
American Physical Society	12	10.1
ASA - Journal of the Acoustical Society of America (JASA)	9	7.6
ASABE Technical Information Library	13	10.9
British Institute of Radiology Journals	7	5.8
Cambridge University Press - Cambridge Journals Online	29	24.4
Cochrane Library	15	12.6

De Gruyter LIS Journals	8	6.7
Edinburgh University Press Developing Countries Initiative	13	10.9
Geological Society - The Lyell Collection Complete	8	6.7
HST - The Biomedical and Life Sciences Collection	10	8.4
IMF eLibrary	27	22.7
Institute for Operations Research and Management Sciences (INFORMS)	20	16.8
IOP Publishing- IOPscience	12	10.1
JSTOR	58	48.7
Liebert Online	5	4.2
Nature Publishing Group Journals	9	7.6
OECD iLibrary	15	12.6
OSA Journals	9	7.6
OUP - Oxford Journals	16	13.4
Palgrave Macmillan Journals	16	13.4
Policy Press	5	4.2
Royal College of Physicians	5	4.2
Royal Society - Royal Society Journals Online	9	7.6
Royal Society of Chemistry - RSC Journals Archive	9	7.6
Sage Online Journals	37	31.1
Taylor & Francis eBestseller Packages	33	27.7
University of California Press	11	9.2
University of Chicago Journals	12	10.1
Wiley Online Library Full	26	21.8
Wiley Online Library SSH	19	15.9
Wiley Online Library STM	20	16.8
Emerald	83	69.7
AGORA	5	4.2
LIBHUB	4	3.4
Virtual Library	4	3.4

The findings reveal that respondents use e-resources at different frequencies. The findings suggest that a significant percent (69.7%) of academic staff use emerald database to access teaching and research resources. These were followed by those who used JSTOR (48.7%) and Sage Online Journal (31.1) databases. These results imply that Emeralds, JSTOR and Sage Online Journals were accessed and used by noticeable percentage of academic staff. On the whole, an insignificant percentage of academic staff used other databases. Generally, all the journals with the exception of JSTOR and Emeralds were used by fewer teaching staff and researchers than other e-resources. What are the explanations? This trend can be attributed to lack of motivation among users and access problems as most of the databases require usernames and passwords for full-text access to be granted. Also, some of the online databases were not

relevant to the academic staff and researcher under study because their disciplines and specialisation vary. In this regard, the director of SUA Library said:

> Users had access to a wide range of e-resources, including HINARI which is accessible through the support of WHO, as well as DOAJ and OPENDOAR which are accessible freely. Support to e-resources, which became accessible through the institution since 2001, is also through FAO and Government support, to mention but a few.

On how the users searched for e-resources in the database, the director said:

> Today it is possible to search all databases simultaneously through the LIBHAB database, benefiting users through retrieving results from all multiple databases. The main benefit is that it saves users time as well as allows them to retrieve results from all major disciplines.

This statement affirms that the new innovation in SUA library saves users time as stipulated by Ranganathan's fourth law that 'save the time of the reader' when offering library resources and services. Studies such as Kumar (2016) and Tyagi (2011) found that EBSCO, Science Direct, IEEE, Springer, J-Gate were some of the main online resources utilised by academic staff and researchers in India. Apparently, both open and closed e-resources were being utilised by academic staff and researchers in the area understudy. In fact, the open access resources are predominantly used to supplement the closed access e-resources.

4.12 Challenges of access to and use of e-resources.

Academic staff and researchers were required to indicate the challenges they face in accessing e-resources. Their response show that 81 (68.1%) of the respondents cited inability to access full-text articles all the time, 59(49.6%) slow internet connectivity, 51 (42.9%) unreliable power supply, 30 (25.2%) shortage of computers, 29 (24.4%) cited the presence of non-reputable publishers publishing online and 14 (11.8%) indicated lack of awareness as summarised in Table12:

Table 12: Challenges in accessing online databases

Response	Frequency	Percent
Inability to access full text articles all the time	81	68.1
Slow internet connectivity	59	49.6
Unreliable power supply	51	42.9

Shortage of computers	30	25.2
Not all publishers who publish online are reputable	29	24.4
Lack of awareness	14	11.8

The findings reveal that there are numerous challenges that deter the effective utilisation of e-resources and databases in supporting teaching and research. For example, the findings show that the majority (68.1%) of the respondents indicated that inability to access full-text articles was the most challenging problem. Other major challenges mentioned are slow Internet connectivity (49.6%) and unreliable power supply (42.9%).Moreover, the findings propose that awareness was not one of the critical problems that deter the effective utilisation of e-resources and database to support teaching and research in the selected higher learning institutions. Similarly, during an interview, the director of SUA Library mentioned slow Internet connectivity and users failing to retrieve relevant results due to inadequacy of search skills as some of the challenges they had to contend with. Other challenges include limited funding for subscriptions to e-resources (over-reliance on donors, for example which causes donor fatigue), unreliable power supply, negative attitudes and management unwillingness to incorporate library user training in the curriculum. Also, during FGD with staff at the SUA library, the participants mentioned challenges, specifically lack of awareness among teaching staff, senior staff not responding to email sent to them, negative attitude, fewer academic staff attending library user training programmes, some students being inadequately skilled in computer use, increasing enrolment which pose a problem to effective orientation programmes, erratic electric supply and network problems. During the FGD with library staff at Mzumbe University, the participants cited unreliable power supply, shortage of computers, negative perceptions and attitudes toward e-resources, lack of interest among professors, low response rate by staff for IL programmes, lack of confidence among library staff, and time constraints to conduct IL programmes as some of the overriding problems. In fact, limited computers, slow internet speed, time constraints, inadequate knowledge, inadequate subscribed e-resources and unreliable resources are not only the barriers to access and use of e-resources among academics and researchers in Tanzania but also in other higher learning institution in other part of the world (see, for example, Kumar, 2016; Khan, 2016; Singh, 2013; Mardhusudhan, 2010). Okiki (2012) contends that information overloads, erratic power supply, dislike of reading from computer screens are contributory factors to ineffective application of e-resources.

5. Conclusion and recommendations

Awareness, access to and usage of e-resource among academic staff and researchers are on the upswing. The e-resources are used to support teaching and research in the higher learning institutions under study. Demographic characteristics such as age and level of education of the academic staff and researcher are some of the predictors of the use of e-resources. Despite its importance to supporting teaching and research, most of the subscribed e-resources are insignificantly utilised. It appears academic staff and researchers frequently use open access resources than those subscribed. Also, there are a number of challenges which have to be addressed, such as slow internet connectivity, inability to access full-text articles, unreliable power supply, inaccessibility of e-resources outside university premises due to IP address limitations, inadequate ICT infrastructure and inadequate skills and knowledge. These challenges and problems deter the effective utilisation of e-resources among the academic staff and researchers. To boost the utilisation of e-resources, the following strategies should be taken into account: Academic libraries should strengthen consortium (COTUL) to share the cost of subscription to e-resources; libraries should establish/strengthen institutional repositories to increase visibility and promote access to local content in addition to enhancing the reliability of power supply by installation of solar panels and automatic generators; libraries should also diversify income generating projects and organise user outreach programmes through embedded librarianship model; they should also foster effective use of social networks to promote e-resource utilisation in addition to integrating IL training programmes into university curricula and improving internet connectivity by increasing bandwidth.

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