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THE USE OF ELECTRONIC JOURNAL ARTICLES BY ACADEMICS AT MZUZU UNIVERSITY, MALAWI.

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Abstract

The use of information technology for scholarly publication is now commonplace all over the world. Academic communities in Africa are part of this transformation. The purpose of this study was to investigate academics' use of scholarly electronic journal articles at Mzuzu University and assess the factors influencing their behaviour. Data collection instruments used for the study were the use of a questionnaire to the academics, interview with Deans of Faculties and follow up e-survey to some academics at Mzuzu University. The findings revealed that most academics had general knowledge of the electronic journals and this did not vary with education. There was no significant difference between gender and searching skills. It was evident that majority of academics prefer local publications and the use of electronic journal articles was for teaching and research. However, there were some barriers including teaching responsibilities; a lack of ICT and telecommunications; unreliable power supply; access to journals was restricted to campus and a lack of local content. Therefore, the study recommends that teaching and learning techniques such as improved use of teaching methods should be employed in order to create some time for other academic work including research and publication which contribute to the knowledge economy and the socio-economic development of Africa in particular Malawi. The study also suggest that provision of reliable power supply and development of local repositories are likely to

play a vital role in providing access to local content and encouraging publication of local materials.

Keywords

Electronic journals, academics, information behaviour, Academic libraries, Mzuzu University, Malawi

Introduction

The advent of information technology has given rise to the development of Internet and the World Wide Web. This development then drove information centres, libraries and academic institutions to new methods of providing information. The use of information technology for scholarly publication is now commonplace all over the world. Academic communities in Africa are part of this transformation due to information technology and libraries in Africa have witnessed tremendous changes in terms of collection development in the form of electronic journals.

Although printed resources are still very important in the research field, electronic resources have become popular as they bring information directly to the desktop. The majority of the sources of information, especially the journals, are now available in electronic media and available via the Internet. Studies have documented the introduction of electronic journals. Tenopir et. al. (2003) described the trend of electronic journals as “evolutionary process” and there has been a gradual increase in the use of electronic journals. They have therefore become an important information format as they are published, distributed and accessed electronically.

It is evident that electronic journals are used by the scholarly community, and libraries are part of the development of scholarly communication. There is a strong relationship between high levels of electronic journal expenditure by libraries and high levels of use. “High levels of expenditure and use are also associated with success in research

outcomes” (RIN, 2011). According to Harle (2010), electronic journals are also underutilised by many academics due to low level of research activities.

Mzuzu University is the second public university in Malawi. It was enacted by the Parliament of Malawi in May 1997 and admitted its first degree students in January 1999 (Mzuzu University, 2013). The mission is to provide high quality education, training, research and complementary services to meet the technological, social and economic needs of individuals and communities in Malawi. As at the time of research, Mzuzu University had about 164 academic staff, 2003 students including both undergraduates and postgraduates. There are five faculties, two centres and twenty-two departments which are under the management of the university. Table 1 below shows the number of staff and students at Mzuzu University.

Table 1. Staff and student population by faculty

	Faculty of Education	Faculty of Environmental Sciences	Faculty of Information Science and Communications	Faculty of Health Sciences	Faculty of Hospitality Management and Tourism
No. of staff	80	34	10	17	9
No. of students	942	348	236	194	140

Source: Registry Mzuzu University 2013.

Electronic Journals in Malawi

Initiatives have been taken in Malawi in order to have access to electronic journals. The main initiative is by the Malawi Library and Information Consortium (MALICO). There are also several partners who assist in the process of accessing to electronic journals and give consortia in low income countries heavily subsidized or donor funded access to a wide range of electronic resources. Such partners are INASP, eIFL, WHO, FAO,

UNEP, and UNESCO. At one point, one of the major constraints to accessing electronic journals was slow internet speed. MALICO benefited from eIFL pilot project to upgrade speed through deployment of VSATs at four MALICO sites including Mzuzu University which became later non-viable due to cost. Currently, some institutions in Malawi have migrated from VSAT connections to fibre optic network through the Malawi Telecommunication Limited (MTL) via Mozambique.

This study intended to provide insight into the information behaviour of Mzuzu University academics and the use of electronic resources, scholarly electronic journal articles, in particular, and the factors influencing the academics behaviour and their use of electronic journal articles. The objectives of the study were to;

- Ascertain whether academics information behaviour varied by faculty.
- Identify the common electronic tools used by academics to access electronic journal articles.
- Determine the reason why academics used scholarly electronic journal articles.
- Assess whether the academics have the necessary skills and knowledge to access and use the scholarly electronic journal articles.
- Determine the barriers encountered by academics when using the scholarly electronic journal articles.
- Identify whether other factors influenced the academics' behaviour on the use of electronic journals.

Literature Review

Use of electronic resources has become common in all higher learning institutions, especially the use of scholarly electronic journals. Research has been undertaken on the use of electronic journal articles by academics by many different scholars and researchers, in numerous different contexts (Tenopir, 2003). Researchers in sub-Saharan Africa have highlighted poor access to electronic journals as a hindrance to their work. According to Harle (2010), based on four institutions: Chancellor College at the University of Malawi, the University of Nairobi in Kenya, the National University of

Rwanda and the University of Dar es Salaam, indicated that academics and students in east and southern Africa and across the continent do have access to a range of high-quality peer-reviewed electronic journals available to them, including many of the leading journals from major international publishers due to access initiatives and partnerships between libraries and international organisations including International Network for the Availability of Scientific Publications (INASP), Electronic Information for Libraries (eIFL) and United Nations organisations including WHO, UNEP, FAO. These sources should be useful in conducting research and preparing teaching. However, getting the electronic journals used on a day-to-day basis for research or teaching in universities remains a challenge. Harle (2010, p. 18) further indicated that “although connectivity is steadily beginning to improve, good reliable high-speed broadband connections are still not assured in all countries or in all parts of the countries”. However, he indicated that the challenge lies in influencing a change in attitude and behaviours surrounding technology access and the uses to which it is put. Providing access to electronic journals is not enough, libraries, in partnership with academic departments, also need to influence the behaviour and approach of their users to ensure usage through advocacy and training.

According to Harle (2010), substantial barriers to electronic resources access and use include a lack of research culture. In addition other factors such as heavy teaching load were also highlighted and supported by recent research (Hepworth & Duvigneau, 2012).

A number of surveys have been carried out on the information behaviour of academics on the use of electronic resources in academic communities. Several factors have been found to be associated with the use of electronic resources by academics including age, gender, profession, and discipline. The first studies carried out during the 1990s made it clear that electronic journals were here to stay. In an exhaustive review of the literature, Tenopir (2003) analysed the results of over 200 studies of the use of electronic resources published between 1995 and 2003. The conclusion of her review was that “electronic resources had been rapidly adopted in academic spheres, though scholars’ behaviour tended to vary according to discipline”. In a study by Niu & Memminger

(2011), Borrego et. al. (2007), Bar-Ilan & Fink (2005) indicated that there was increased preference for electronic resources in comparison to printed materials by users of all ages and rank. However, many studies for example, Tenopir (2003), have shown an inverse relationship between electronic journal usage and age whereby the older the academic member is, the less he or she prefers the electronic format over the printed one. Friendlander (2002) as cited by Tenipor (2003) indicated that more women than men use e-journals in their research, and use electronic sources most or all of the time more than men.

Brennan et. al. (2002) explored the habits of early adopters of electronic journals at the University of Illinois at Chicago. The study found that enthusiastic acceptance of electronic journals has changed the participants' habits. Most claimed that they visit the library less often and read more than they did in the print era. Most participants reported using generic databases. Davis (2004), as cited by Olle & Borrego (2010), reached a similar conclusion using a different approach after analysing data of how academics at Cornell University accessed electronic journals published by American Chemical Society. The results showed that the majority of references or citations originated from generic Web searchers, mainly Google.

Researchers tend to seek and use information in different ways. It has been noted that users in research-intensive universities are more likely to enter via different gateways. A study by Research Information Network (2011) that assessed the patterns of their use, and the value and impact of e-journals on researchers in universities and research institutes in the UK revealed that "researchers across all disciplines use gateway services, with use particularly high in the life sciences but notably lower in economics". It was also indicated that researchers across all disciplines make use of the advanced search facilities available on gateway services, much more than they do on publisher platforms.

Dilek-Kayaoglu (2008) reported a survey on the use of electronic journals by faculty at Istanbul University. Respondents were asked how frequently they use printed or e-

journals. When cross-tabulating the frequency of the use of e-journals according to gender, age, academic rank and discipline, only age and discipline were statistically associated with the frequency of use. The percentage of respondents that were frequent users of e-journals was evenly distributed among all age groups. Another analysis of journal usage on OhioLink showed the immense popularity of the search engine among users compared to alphabetic or subject lists of journals (Nicholas, et. al. 2006). However, search engines tend to be seen as an initial resource to begin an information search.

Users have accepted the new electronic environment, but need better information literacy support (Harle, 2010). It is evident that usage is enhanced where awareness levels are high and training is provided. A survey by Gathoni (2011), on monitoring and evaluation of electronic resources in academic and research institutions in Kenya, highlighted that the majority of the respondents who were trained, indicated that training had enhanced their access and retrieval skills, were thus able to do with much ease. According to Brown, Lund & Walton (2007), on the use of electronic journals by academic staff and researchers at Loughborough University, there was modest need for training in managing electronic journals references and locating full text from references.

A number of studies have identified barriers encountered by academics when using electronic resources. A lack of computers (Siddique & Ali, 2010; Gathoni et. al. 2011), limitations of connectivity, searching skills, unfriendly interfaces, lack of time and limited publicity (Gathoni, et. al. 2011; Borrego, et. al. 2007; Chirra & Madhusudhan, 2009; Raza & Upahyay, 2006; Agaba, 2005). A study by Sangowusi (2003) on problems of accessing scholarly publications by Nigerian scientists revealed that only 32.8 percent of respondents owned a personal computer. Search and discovery skills were often under-developed. Many researchers were unable to find and download what they need and many were not aware of the resources available to them.

A survey by ACU in four African countries (Malawi, Kenya, Rwanda and Tanzania), revealed that internet connectivity and bandwidth differed significantly across the four study universities. Many respondents to the survey commented that poor connectivity, including slow speeds, dropping connections, and related problem of intermittent power supply, frustrates their attempts to access electronic resources (Harle, 2010). The problem of bandwidth and connectivity means that actually accessing and downloading materials is also not always possible. Musoke & Kinengyere (2008) as cited by Rosenberg (2008) agreed that poor connections and insufficient bandwidth often means that journal articles cannot be downloaded.

ICT facilities are relatively underdeveloped in African universities. Funding has typically been limited, both for initial capital and investments and for on-going maintenance and system development. In many cases, few PCs are available in the library, which has a particular bearing on their use for accessing scholarly information. In many instances, poor internet access means students and academic staff alike are forced to use private internet cafes (Willinsky, et. al. 2005 as cited in Harle, 2010). Researchers find it more convenient and effective to work away from the office or at home. Time on-campus and during the day is spent dealing with students and administration, with relatively little time for research. But 24/7 access, from anywhere in the world where the internet is available, has removed the barriers to working effectively beyond university and normal working day. However, access to online databases tends to be restricted off campus.

It is evident that in the 'south' there are still barriers to access, in particular physical access (networks, bandwidth, PCs etc.). But also there is an indication that people would benefit from training in how to use the electronic sources effectively, and information about what is available. However there is insufficient research into this aspect of use or non-use. Whereas in the 'north' these electronic sources are widely accepted and used, although variation does occur among different age groups and disciplines. It is evident, however, that even in the northern context academic staff do benefit from training (Brown, Lund & Walton, 2007).

Research Methodology

In order to achieve the aims and objectives of the study, a combination of quantitative and qualitative methods of research were used. A survey of the academics was conducted using a paper questionnaire. The potential population for this study was approximately 164 academic members of staff. The questionnaire was distributed to all the academic staff from all the five faculties, two centres and the library. From this method of distribution a total of 130 paper questionnaires were distributed to academics and 77 were returned, giving a response rate of 59 percent.

Qualitative data gave an insight into the academics' feelings, attitudes and opinions about the use of electronic journals articles. This helped to get a better understanding of the quantitative data gathered via the questionnaire. Semi-structured interviews were used to gather narrative data. In this study, Internet based telephone interviews were deployed using Skype. Since not everyone could be interviewed, only Deans of faculties were interviewed from the five faculties of the university to get an insight into the challenges and factors that influenced the use of scholarly electronic journal articles by the academics. In addition, in order to get clarification of the responses to the questionnaire, follow up open questions were deployed using an electronic mail survey sent to some of the academics. This helped to clarify some of the previous answers given by the respondents. The use of both quantitative and qualitative approaches were therefore used to enable an in depth study on the use of electronic journal articles by academics. Triangulation was therefore possible using different but complementary data on the same topic. Mixed methods research was used to offset the weaknesses of using only quantitative or qualitative research methods and resulted in a more comprehensive approach for gathering data (Creswell & Clark, 2007).

The quantitative data gathered from the academics was tabulated, and then analysed using the Statistical Package for the Social Sciences (SPSS) software. The use of this software gave an insight as to how central, broad or diverse the spread of the data was and how closely or distantly certain features were related. It was also used to indicate

whether relationships exist and the degree to which the facts might have co-occurred. Descriptive statistics were used to analyse the demographics of the academics in relation to the use of electronic journal articles. The Spearman Correlation Coefficient (Spearman's r) was conducted on several variables to further investigate the major variables that were related to the research questions and to allow for the imbalance in number of respondents from the different faculties i.e. to see whether there was really a correlation or not.

Findings and analysis

A total of 77 academics responded to the survey. Some general information was collected about the respondents for cross-tabulation purposes. Out of 77 respondents 65 were male respondents representing 84% and 12 were females representing 16%.

The larger proportion of respondents was of the ages 31-40 (36%) and the smallest was of the ages 61 and above (7%). The sample lacked a representation of females of the ages of 51 and above as shown in Table 2 below.

Table 2. Age of respondents by gender

Age	Frequency				Total Percentage (%)
	Male	Percentage (%)	Female	Percentage (%)	
30 and below	9	12	5	7	18
31- 40	24	31	4	5	36
41- 50	20	26	3	4	30

51- 60	7	9	-	-	9
60 and above	5	6	-	-	7
	65	84	12	16	100

The largest group 41 (53.2%) of respondents was from the Faculty of Education. But by proportion in terms of number of responses and total number of faculty members, more than half of the responses were from the Faculty of Health Sciences, Faculty of Education, and Faculty of Information Science and Communications.

A total of 19 out of the 22 departments were represented. The department of Information and Communication Technology (ICT), Forestry, and Management were not represented. The majority of respondents by department, 10 (13%) were from Languages and Literature. This could be due to large proportion of members of staff in the department.

The majority of the respondents by academic status, 43 (56%) were of the rank of lecturer. The lowest number of responses were received from the rank of Associate professor 1 (1%) and Professor 1 (1%). All ranks were, nevertheless, represented in the study.

Table 3. Use of electronic journal articles

Use of electronic journal articles	Frequency	Percentage (%)
Daily	10	13
Twice a week	9	11.7
Once a month	10	13
Twice a month	3	3.9
Once a month	2	2.6
Occasionally	40	51.9
Never	3	3.9

	77	100
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The respondents were asked to indicate how often they used electronic journal articles. 74 (96.1%) indicated that they used electronic journals and 3 (3.9%) indicated that they had never used electronic journals. Although the majority of academics used electronic journals, the difference was in the frequency of use. The largest proportion of academics used electronic journal articles occasionally 40 (51.9%) i.e. less than once a month as shown in Table 3 above. However, 13% did use electronic journal articles daily and 13% once a week. Cross tabulation of the frequency of use and faculty showed that all faculties did use electronic journals and with the least being those who used once a month 2 (3%). There was no significant correlation between frequency of use of electronic journal articles and faculty ($\rho=.076$, $N=77$, $p=.511$, two-tailed).

The respondents were asked to indicate the region where they obtained their educational qualifications. The assumption was that academics who obtained their educational qualifications in Europe and America would use electronic journals more. There was clear indication that all respondents used electronic journal articles despite the region where they obtained their educational qualifications. The majority 7 (9.6%), who used electronic journals daily, obtained their qualifications in Africa.

The respondents were asked to indicate the ways which they used to access electronic journal articles. A high number of respondents 39 (69.6%) often used home computers.

The respondents were asked to indicate tools used to locate electronic journal articles. The majority of respondents 42 (67.7%) used a search engine to locate electronic journals. It was also interesting to note the importance given to Open Access journals. This could be because of the nature of the materials as they are easy to find.

The respondents were asked to indicate sources which they used to access electronic journal articles. Table 4 below shows that the majority of respondents 27 (40.9%) used African Journals Online and 24 (36.4%) used JSTOR. This could be due to high number

of respondents from the Faculty of Education which is humanities biased, reflecting the coverage of these sources. Respondents used a range of sources subscribed by the University (see Table 4). The study further revealed that some academics used other sources including Google scholar and individual sources subscribed to through professional bodies.

Table 4. Sources used to access electronic journals

Sources Used	Frequency	Percentage (%)
African Journals Online	27	40.9
Cambridge Journals	7	10.6
EBSCOHost	15	22.7
Edinburgh University Press	5	7.6
Royal Society of Chemistry	1	1.5
University of Chicago	2	3.0
Institute of Physics	3	4.5
HINARI	10	15.2
OARE	6	9.1
AGORA	10	15.2
Bio-one	3	4.5
Nature	2	3.0
Jstor	24	36.4
Emerald	11	16.7
Sage	4	6.1
Wiley Interscience	7	10.6
Palgrave-Macmillan	4	6.1

The respondents were asked to indicate their preference for electronic and printed journals. The majority of respondents 43 (56%) preferred electronic journals and 34 (44%) preferred printed journals.

The majority of the age group who preferred electronic journals were between 31-40 years old. Table 5 below shows that 17 (22%) preferred electronic journals compared to 11 (14%) of the same age group who preferred printed journals. All age groups preferred electronic journals although the lowest percentage of age group who preferred electronic journals was aged between 61 and above.

Table 5. Preference between electronic and printed journals

	Electronic	Percentage (%)	Printed	Percentage (%)
30 and younger	7	9.1	7	9.1
31-40	17	22.1	11	14.3
41-50	16	20.8	7	9.1
51-60	2	2.6	5	6.5
61 and older	1	1.3	4	5.2

The respondents were asked if they retrieved appropriate articles when they used electronic journals. The majority of the respondents 52 (69%) indicated sometimes they get the necessary articles. The fact that they indicated 'sometimes' could be due to lack of knowledge of the sources available. Alternatively it could be due to the information available. Nineteen (25%) indicated often, 4 (5%) indicated never and two respondents skipped the question.

The respondents were asked to indicate the purpose of using of electronic journals. The question allowed multiple answers. The majority of respondents 65 (86.7%) indicated that they used electronic journal articles for research purposes; 55 (73.3%) for teaching and the least 30 (40%) for seminars and papers; many users appeared not to understand the difference between seminars/writing papers and publishing articles due to the phrasing of the question. The study further revealed that some academics used electronic journal articles for general knowledge.

The respondents were asked to indicate their academic status. The assumption was that academics that are senior in rank would use electronic journals for a broad range of purposes. The majority of academics, who selected electronic journals for the purpose of publishing articles and books, were of the Lecturer and Senior Lecturer rank and academics that were senior in rank (Associate Professor and Professor) did not select using electronic journals for publishing articles/books, which was surprising. This could be due to the amount of teaching and administration they have to do.

The respondents were asked to indicate how they learnt how to use electronic journals and the support they needed to use electronic journals. The majority of respondents 18 (26.1%) who learnt how to use electronic journals through self-instruction also showed a greater need for support in terms of knowledge of the sources that were available.

The Pearson chi-square test on gender and support needed on searching skills and knowledge of the sources available showed that there was no significant difference between gender and support needed on the searching skills and knowledge of the sources available.

$\chi^2 (1, N=77) = .082, df= 1, p= .774$ and $\chi^2 (1, N=77) = .197, df=1, p=.657$ respectively.

The respondents were asked to indicate the methods they used when searching for electronic journals. A high number of respondents often used fields like Author, Title, and the Boolean AND when searching for electronic journals. However, a high number of respondents never used truncation or the Boolean OR when searching for electronic journals. This indicated a need for training since these commands are useful when searching for information, particularly when searching for variations on a term.

The respondents were asked to indicate how they benefited from accessing electronic journals. Majority of the respondents indicated that access to electronic journals stimulated their teaching and research. Comments included:

“Easy to access”

“Up-to date research materials”

“Enhances my research efforts”

“Help me prepare for my classes/ my teaching has improved”

“They broaden my knowledge”

“I get relevant information for my teaching and research publications”

A few respondents indicated that they had never benefited from accessing electronic journals. Some of the reasons respondents made for not benefiting included;

“because of the work I do I have no time, if I had more time available. I could make more use of them”

“the benefit is very minimal because of poor internet access”

The respondents were asked to indicate the problems they encountered when using electronic journal articles. The question allowed multiple answers. Table 6 below shows that the highest percentage of the respondents 72 (94.7%) indicated slow internet as a problem. ‘Not easy to use’ was only selected by 3 (3.9%) of respondents. As indicated above time was also a limiting factor. This was probably due to the staff student ratio and teaching load.

Table 6. Problems encountered when using electronic journal articles

Problems encountered	Frequency	Percentage
Intermittent electricity	47	61.8
Lack of personal computer	12	15.8
Slow Internet	72	94.7
Difficult to read from screen	9	11.8
Lack of training	16	21.1
Not easy to use	3	3.9
Lack of journals on my discipline/field	26	34.2
Unaware of electronic journal services	16	21.1
Access to good journals restricted to campus	37	48.7

Interview Results

Interview results confirmed that quite a number of academics in faculties were using electronic journals. Although some academics use electronic journals, the majority still used books. The study revealed that some members of the faculties do not have office computers but they rely on personal laptops. Access to internet was through both the university wired and wireless connection and personal connections through use of dongles (a broadband wireless adapter). Some departments did not have any internet connection and they had to rely on the wired library connection using their own laptops because it is where one could get reliable connection.

Interviewees indicated that there was need for further support. They requested for the continuation of information literacy programmes including searching skills; how to make good use of electronic journals; and how to access and search for relevant journal articles. It was indicated that electronic journals were important for writing articles and getting published. One respondent revealed that there were some challenges with publishing.

“If you want to publish you have to pay something. Funding to publish is a bit of a challenge at Mzuzu University”.

However, it is possible that there were opportunities for publishing that did not involve a fee. It was further revealed that there were few sources which were relevant *“We need to pay for other sources. We have very few sources in my field of land management which are up to date and which are very helpful”.*

From the interviews, all interviewees confirmed that the internet connection was a problem.

E-survey Results

In order to get clarifications of the responses to the questionnaire, follow up questions were used. Some of the reasons given for preference of printed journals include:

"I find it difficult to read on a computer screen and the campus wireless network does not work in our offices."

"They are easily accessible without electricity or internet blockage"

"I feel being harassed by technology because each time I try to use technology I find technology delaying me because the internet connection is not reliable in the university"

Most respondents indicated that they did not have office computers and internet connection. One respondent further commented:

"I can only access internet when am in the library".

From the e-survey, the majority of respondents again cited internet connection as a problem with regard to accessing electronic journals. As a result they tended to use their own internet connection. However, the lack of access to electronic journals off campus meant that this was not necessarily a solution.

Discussion, conclusion and recommendations

Use of electronic journals is not new. In this study the use of electronic journals by academics showed that most of the academics had a general knowledge of the electronic journals. Although majority of respondents had this knowledge, the level of use was found to be low and a larger proportion of respondents only used electronic journals occasionally i.e. less than a month. However, there was an indication that their infrequent use of electronic journals could be due to a number of problems which they encountered including physical access to electronic journals. It was further revealed that the general knowledge of electronic journals did not vary with education and there was no significant difference on the use of electronic journals and the region where qualifications were obtained. Analysing further the frequency of use of electronic

journals by faculty, gender, age, academic status, indicated that there was no correlation between the frequency of use of electronic journals and the faculty which respondents belonged to, indicating that academics use of electronic journals does not vary with discipline, gender, age and academic status.

Although the study indicated that gender, age, academic status, and discipline had little impact on searching behaviour, there was a slight indication that older staff valued printed sources more. There was no significant difference between gender and searching skills, though there was a stated need for support and training concurring with Brown, Lund & Walton, 2007.

Results emanating from this study further reflect that the academics prefer electronic than print journals despite age and gender. Previous studies also showed a favourable attitude towards electronic journals. Bar-Ilan, Peritz & Wolman (2003) indicated that users find electronic journals indispensable. This shows that more academics are comfortable with technology irrespective of age.

It was noted that respondents used home computers more in order to access electronic journals than other ways of accessing electronic journals i.e. office computers. It was also noted that respondents used search engines often in locating electronic journal articles. From further analysis of the data, there was an indication that respondents, who use home computers often, also use search engines when locating electronic journals. This could be attributed to the fact that most of the respondents use their own computers and could not access other electronic journals i.e. databases subscribed by the library due to IP authentication and as a result they would choose search engines to locate journal articles. This implies that restricting access to the campus contributes to low recorded use of electronic journals. There is therefore a need to ensure that access should not be restricted to the campus.

Publishing was also included as an option to select as purpose of using electronic journals. The low score for publishing articles/books by Associate Professors and

Professors could be attributed to age of respondents and also that there is need for these staff to be heavily engaged in teaching and administration. This implies that a research and publishing culture among academics is underdeveloped. It is therefore indicated that staff do need assistance with publishing, for example, where and how to effectively publish their work. Financial barriers were also cited which again implies need to develop capabilities associated with bringing in research funding. However, this may be influenced by other factors such as a lack of funding for the institution from government.

A large number of respondents use African Journals Online database as a source to access electronic journal articles. This implies that, to some extent, academics prefer local journals than journal articles published in international databases. This is probably because there are few local articles published in international databases that are perceived as directly relevant to the local context and, furthermore, that international journals due to their European and North American coverage may not be perceived as relevant. This concurs with Harle (2010) in the study of access to research in east and southern African universities who revealed that coverage of top 20 titles in business studies and economics appeared to be US focused. A better understanding and an awareness of the sources that are available especially in international databases and how, if this is the case, they can benefit academics in Malawi is necessary. In the future local repositories are likely to play a vital role in fulfilling this needs and providing access to local content as well as encouraging the publication of local materials, which in turn may encourage future authors.

The study further revealed that there was no statistical association between gender, age, academic status, discipline and searching skills. However, there was an indication that training was required in the use of the retrieval systems. This was reflected in the lack of the use of commands such as truncation and the Boolean OR which are fundamental when searching for information and ensuring information is retrieved using variations in language, such as synonyms etc. Furthermore the majority of respondents were self-taught and would probably benefit from more systematic training.

The fact that the institution is of a higher learning and the growing numbers of people attending university, most of the respondents have teaching responsibilities. A consequence is an increase in demand for teaching due to the teacher student ratio, where there are a large number of students and an inadequate number of teaching staff, for example, the Faculty of Information Science and Communication has 1:24 teacher student ratio (Registry Mzuzu University, 2013) compared to University of Malawi which had 1:9 (Harle, 2010 p. 9). This contributes to low electronic journal usage levels since it leaves little time for research.

The major barriers reported are teaching responsibilities, lack of ICT, lack of telecommunications, lack of reliable power and access to international journals restricted to campus only. At Mzuzu University it was evident that access was a significant issue due to internet connectivity and the lack of computers. There is need to solve access problems if usage is likely to increase. The majority of the respondents were not satisfied with the ICT infrastructure. A large proportion of the respondents had no access to computers and as a result, they rely on their own personal laptops and a 'dongle' to access the internet. This finding supports those of Gathoni et. al (2011) who revealed that the lack of computers was one of problems faced by respondents in academic institutions in Kenya. There is therefore need to increase the number of computers for staff.

From the e-survey results, respondents who had indicated that they do not have computers also indicated that they do not have an internet connection in their offices. Poor connections and insufficient bandwidth often means that journals either cannot be downloaded or it is extremely slow (Musoke & Kinengyere, 2008) and data could be lost. Academics are likely therefore to be forced to use private internet cafes, dongles or home computers, where they would not be able to access databases subscribed by the library. This could also contribute to low research activities and may be also a reason why printed journals were an important resource. Therefore, there is need to improve internet connectivity.

A lack of unreliable power supply is a significant barrier to using electronic journals. This study found, as did (Harle 2010) in Central and East Africa; Evans & Zarnosky (2000) in University of Agriculture, Nigeria, who revealed that unreliable power is the major barrier to using electronic journals. Therefore, there is need to improve power supply at Mzuzu University if electronic journals are to be used effectively.

Positive efforts have been made by INASP and other international organisations to provide access to electronic journals. Mzuzu University therefore needs to improve in the provision of ICT and telecommunications in order to take full advantage of these initiatives.

In conclusion this research shows that to some extent similar factors affect the usage of online journal articles in Malawi as elsewhere in the world, more especially in other developing countries. In particular, a lack of connectivity due to on site access and the ICT infrastructure. This supports the work of Harle (2010), Siddique & Ali, (2010), Gathoni et. al. (2011), Sangowusi (2003), and Musoke & Kinengyere (2008). One other similar factor was the need for training (Gathoni (2011), Brown, Lund & Walton (2007)). However, in comparison to previous studies (Tenopir (2003) there was little evidence that use or non-use varied with discipline. Nor did usage vary with age or educational background as indicated by Zhang, Ye & Liu (2011).

This research identified other factors that are less represented in the literature. These included teaching and administrative responsibilities where the staff to student ratio is big leaving little time for research. This supports the work of Harle (2010) and should perhaps be given more weight than it has had in the past. Research capacity is another factor that has not been reflected in previous studies that had an impact on usage. Furthermore there was an indication that a lack of electronic publications that originate locally or relates to the local context may also inhibit usage. This has not been explored in previous studies and deserves further research to determine the influence of this factor and whether this applies in some disciplines more than others.

In view of the above it is recommended that:

- Provision of ICT equipment and telecommunications i.e computers to academics and high speed broadband internet should be a priority in order to enhance effective use of electronic journals. This can be done by buying computers for academics. Management of Mzuzu University should also provide a campus wide internet connection to improve access.
- The library should enhance awareness, training campaigns, and support in problem understanding with regard to electronic sources that are available. Such awareness and support can be enhanced through the following means:
 - Regular information literacy programmes.
 - Regular workshops to promote the usage of electronic journals.
- Top management need to increase its financial support in this service as more journals are needed in other disciplines. This can also assist in the development of the institutional repository and digitising of local materials in the library.
- It is also recommended that management should provide reliable power supply. This can be done by involving the Department of Energy Studies of the university on solar system.
- The library to provide remote access to electronic journals. This can increase use and capitalise on academics time as they can read appropriate articles anywhere.
- Teaching and learning techniques should be improved in order to create some time for other academic work, including research and publication. Top management should assist in lessening the demands of teaching and provide

creative ways in teaching and learning that help academics deal with the large numbers of students.

- There is need for information for academics to know where they can publish in order to make contribution to the world and increase local publications. The scholarly community should be encouraged to publish in electronic journals. This will in turn improve their use and understanding of electronic journals.

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