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Preservation Skills and Strategies of Electronic Information Resources in Digital Era: Case of University of Kwazulu-Natal Libraries

ABSTRACT

The purpose of this paper is to report results of a study on investigation of the preservation skills and strategies being used by the University of KwaZulu-Natal libraries in preserving electronic information resources (EIRs) to ensure their long term availability and access. Respondents are engaged through a census sampling technique and instrument for data collection is self-administered questionnaire comprising closed and open questions. A quantitative approach using the survey research design is used. Data is analyzed using Statistical package for the Social Sciences version 20. The analysis of the results reveals that there is intermediated level of ICT knowledge and skills regarding preservation of EIRs amongst respondents. The results also reveal that the respondents need trainings in migration, metadata and emulation techniques. It is believed that the study will assist the library staff on what areas to be improved in the EIRs management. The paper offers useful research information that can help the University libraries involved the study to properly preserve EIRs for optimal benefits of its users. Other universities in related situations can also benefit from the research findings.

Keywords: Digital preservation, preservation strategies, technological obsolescence, electronic information resources, digital preservation skills.

INTRODUCTION

Various African countries have put efforts in bringing EIRs into their libraries and these can be reflected in many academic and research libraries such as that of UKZN in South Africa. EIRs comprise the information that is written on the magnetic tapes or optical media (Wamukoya and Mutula, 2005). One can also say that it is the information that can be accessed electronically. The resources that are originally created in electronic format are called digital born resources while those that were originally in paper form then converted into e-form are termed as digitized resources. There are various types of EIRs which are available; some of the popular ones that are gaining grounds are electronic books, electronic journals, databases, electronic theses and dissertations and scanned resources (Wamukoya and Mutula, 2005).

The use of EIRs has led to reshaping information retrieval methods and access to information. In the past, information was being transferred from librarians to users. Currently, the majority of the communication and transfer of information is between users and computers and this is due to the most of information being accessed is stored electronically (Gbaje, 2011). Therefore, the need to perform digital preservation strategies and have skilled librarians in terms of managing EIRs in libraries and other collection centers that preserve EIRs is very important. According to Gbaje (2011), the increase use of the Internet and computers in many information centres as well as production of EIRs combined with the significant challenges related with ensuring long term preservation of EIRs, means that, it is vital that there should be thorough action to overcome these challenges. Also, according to Styblińska (2006), the need to preserve and have access to EIRs is currently increasing at a very fast speed. Rapid changes in the formats used and the technologies used in storing EIRs have threatened to shorten the life span of EIRs in the digital age. Minor concentration has been given to the challenges that are facing preservation of EIRs.

Particularly, there is little action done focusing on how long a given physical media on which the EIRs is meant to be preserved is going to survive with the change in technologies (Styblińska, 2006). It is observed that even under the best storage device conditions, EIRs stored can easily get lost or even have a limited life span (Styblińska, 2006).

Despite the developments in the use of information technologies in many libraries and information centers, preserving EIRs for continuous access by users is a main issue for many libraries all over the world (Ngoepe and van der Walt, 2009). The digital preservation of EIRs is thus a challenging exercise that needs appropriate digital preservation strategies. As a result, librarians involved in preserving EIRs should be Information Technology (IT) literate and there should be IT trainings whenever a change in technology occurs. According to Gbaje (2011), offering special training programmes to staff is one way of equipping them with necessary skills to perform their works effectively. Therefore, the implication of not attaining special training programmes on preservation of EIR is that librarians/information professionals will not be equipped to perform preservation of digital materials effectively (Gbaje, 2011). It is the responsibility of the librarian to monitor the library's EIRs format and see if they are still suitable for preservation. If this is not the case, the librarian is required to perform digital preservation strategy that suits. In a nutshell, there should be a continuous monitoring of the EIRs formats that is done by librarians who are experts in preserving EIRs.

PROBLEM STATEMENT

Managing electronic information is very vital within any given library but it is becoming more and more challenging of the duration over which information is needed to be preserved (Paper, 2008). This means that EIRs will only survive for the period not beyond the supported life of the application device used to preserve them. Furthermore, Moloi and Mutula (2007) identified that information centres in the third world countries are faced with issues in preserving EIRs information. Production of complex EIRs, rapid change in technologies as well as lack of expertise in the personnel preserving EIRs are among the challenges that have made EIRs preservation a difficult task. As the EIRs continue to develop exponentially, libraries are faced with the challenge of sustaining adequate skilled staff in EIRs preservation issues. This challenge is in fact increasing because most of the libraries in developing countries do not have active management and intervention (Gbaje, 2011). Poor management of EIRs is bound to outcome in information gaps. Therefore, libraries and other information centers must adopt long term preservation strategies to preserve EIRs. There is little documented evidence on preparedness of libraries in managing challenges of EIRs' preservation.

Given the above, the predicament which this study tried to address was the preservation of EIRs in the UKZN Pietermaritzburg and Howard College campus libraries to guarantee their long term preservation.

OBJECTIVES

The general objective of the study was to investigate digital preservation strategies used by UKZN PMB and Howard College campus libraries. In specific terms, the study intended:

1. To identify the level of ICT skills amongst the staff that preserve EIRs on the UKZN PMB and Howard College campus libraries
2. To determine the digital metadata preservation strategies used in preserving EIRs
3. To identify digital preservation challenges facing UKZN PMB and Howard College campus libraries.

SIGNIFICANCE OF THE STUDY

The findings of the study could be of help to UKZN and other University libraries in Africa in the preservation of EIRs. The study could also be of significance by either providing a foundation for a new policy or feeding into present policy with regard to EIRs preservation that will tackle the issues identified at the end of the study. Furthermore, the findings will fill in the gap and help UKZN and other stakeholders in preservation of EIRs and as well recommend suitable measures to protect them.

LITERATURE REVIEW

Librarians that preserve EIRs should have digital preservation skills. A constant need to improve Information Technology (IT) staff skills for them to keep up with the technological obsolescence is needed (Moloi and Mutula, 2007). Kanyengo (2006) stated that technical knowledge on EIRs preservation is basically missing among staff involved in preserving these resources. On the same point, Emanuel and Sife (2008) and Lefume (2004) stressed that most of librarians in developing countries apart from having low ICT skills but also lack skills in digital preservation. In addition, Lefuma (2004) pinpointed that information professionals should have experience in all areas of EIRs processing and handling. It is for this reason that one should develop a schedule of service that will attract and retain the skilled information professionals who are available in the field as well as other professionals who are within the wider parameters of library science.

Asongwe and Ezema (2012) indicated that in third world countries there are very few places where one can obtain formal specialized training in preservation of EIRs. They went on and pointed out that lacking technical expertise is a major issue in many African countries. There is a limited of information professionals who are with ICTs qualification work in information centres. On a similar vein, Asongwe and Ezema (2012) added that most of the African information professional who work in libraries lack expertise to train others in management of EIRs. Furthermore, Emmanuel and Sife (2008) in their study reported that some of the information centres have managed to recruit staff and train them but at the end they have failed to keep them. This indicates that necessary approaches should be imposed in terms of recruiting and training librarians for sustainable management of IT services in libraries that preserve EIRs.

EIRs are quite new and have been changing in terms of formats every so often due to technological obsolescence; for example MS Word, HTML, PDF and XML format. Sometimes if it is not the format changes then it is the software that created the format that needs to change. This means that the organizations are constantly needed to upgrade or rather update their systems so that to meet the hardware and software necessities. Emphasizing on the same point, Gbaje (2011) stated that techniques used to preserve the information resources have been changing periodically due to the change in technologies and libraries that preserve the resources have also been continuously

upgrading their systems to meet the changes. Therefore, there should also be a constant and nonstop training of staff who manage EIRs in terms of hardware and software skills and knowledge in order to overcome these day to day changes in EIRs preservation and management methods.

Lefuma (2004) indicated that preservation policies give information centres the right approaches needed to initiate ways which are vital for the protection of electronic information. Despite the fact that these policies are used in giving strategic directions in preservation of EIRs, Ogbebor (2010) in his paper reported that most African countries have got no policies on preservation of information both paper and e-form. In accord with Ogbebor above, Satish and Umesh (2005) stated that most of African information centres that preserve EIRs have got weak policies while some do lack. In his investigation on preservation and conservation practices, Olatukun (2008) indicated that most African nations do not have national information policies. The lack of policies means that in the event of technological obsolescence, librarians would not be in a position to react to the change with the urgency that is needed.

Preservation strategies are well considered and documented approaches when it comes to EIRs. Information professionals who are involved in managing EIRs should have preservation strategies knowledge as it is one of the essential requirements. Kanyengo (2006) said that technical knowledge for the digital preservation strategies is largely lacking among the staff of library preservation departments. In similar vein, Okoye and Ugwuanyi (2012) suggested that there is a need for staff to be given exposure to the digital preservation strategies irrespective of the staff's rank. Discussions on the best strategies that should be adopted in EIRs preservation have been ongoing for several years now. The purpose of these strategies is to ensure long term preservation to the EIRs managed by libraries. Preservation strategies are important because of the technological landscape that changes so rapidly (Gbaje, 2011). There are two preservation strategies; migration and emulation strategy. Migration is the process of transferring EIRs from one technology to another technology, whilst trying to keep their properties (Borghoff et al., 2006). They continued by saying that migration focuses on the information resource itself and its objective is to change the EIRs in such a way that software and hardware updates will not alter the ease access of EIRs. According to Ngoepe and van der Walt (2009), emulation is the process that seeks to preserve the environment by using the up to date technologies to pretend to be like the original environment that used to create the EIRs. A good example of emulation strategy is the creation of Windows that tries to emulate MS DOS.

Kanyengo (2006) pointed out that the infrastructure of Africa is still lacking in terms of preserving EIRs in large scale. There is a need in today's circumstances to provide scalable, high performance and strong Electronic Information Management System (EIMS) to all business despite of the size. They went on and stress that a strong network infrastructure is vital in issuing reliable EIMS that have minimum disruption for mission-critical operations. Asongwa and Ezema (2012) argued that insufficient ICT infrastructure is characterized by, for example, frequent power rationing that brings serious bottlenecks to EIRs management in Africa. This situation has the effect of destroying electronic equipment and where there is standby generator then the cost of running it is too much. Since ICT infrastructure is the set of operation system, hardware, software, links, computers which all together embraces the platform for delivering and integrating information products and services to the institution, it is therefore vital that ICT infrastructure be present to support management of EIRs.

The change of technological development has led in software and hardware last for shorter period. It is very often EIRs that have been preserved by one generation of hardware and software cannot be accessed by a later generation in a given short period of time. For those EIRs that are still available, chances of them being accessed in their original form are minimal and so, if possible, will have to be converted into the up-to-date formats (Ngoepe and van der Walt, 2009). Nowadays, with the current generation, one cannot read information from floppy disk. For example, Microsoft Company has changed its operating systems various times since 1985. We can see in 1985, the operating system was Windows 1.01 and now 2016 the current ones are Windows 7 and 8. This creates a challenge as the EIRs will be required migrate whenever there is an upgrade for the resources to be accessible by users.

It is very crucial to consider where to preserve digital information. With the rapid changes in technologies one should consider the storage device that will not lose data easily within a short period of time due to becoming obsolete. Also some of the storage devices are naturally unreliable meaning that there will be loss of information due to manufacturing defects or device deterioration (Harvey, 2010). Since one cannot conclude that there is a long- lived electronic storage device, techniques such as back-up of information to a different storage device should be done to try to ensure the information stored is preserved for a longer period of time. The back-up information will be retrieved when the original storage device storing the needed information is unavailable or corrupted. According to Capron and Johnson (2002), the following strategies are needed when handling a media storage device for preserving information; moderating and making temperature and humidity stable helps keep storage alive, having a storage device that can read older media, having hardware that can connect to older media devices and also having software that can read older files from the storage devices. We have two categories of storage devices, magnetic tapes storage devices such as magnetic Hard Disk Drive (HDD) and the optical storage devices such as Compaq Disk (CD) and Digital Video Disk (DVD) (Capron and Johnson, 2002).

When preserving EIRs one should always consider file formats. Selecting a file format that is not easily affected by rapid change of technology is a very vital strategy. File formats that go unsupported within short period of time for the example those created on word processing document and saved as an ASCII file format should be avoided in digital preservation (Hunter, 2000). On the same point, Paper (2008) indicated that crucial information should not be held in files that will no longer be compatible with the future software because as electronic information becomes more and more complex and integrated, the threat of file format obsolescence is set to increase. The file formats that are considers to be popular on the World Wide Web (WWW) are; Hypertext Markup Language (HTML), Portable Document File (PDF) and Extensible Markup Language (XML). Hunter (2000) indicated that file formats that have open specifications, those which are basically independent of particular software should be considered for digital preservation (Hunter, 2000).

RESEARCH METHODS AND METHODOLOGY

The research paradigm adopted for this study was positivism because the researchers were concerned in collecting data that can be objectively observed and grouped. Because the research paradigm selected was positivism, quantitative approach was used. This is because the researchers were interested in gathering statistical data. Since surveys are mainly conducted in order to gather quantitative information (Maree, 2007), research survey was used as research design and data for the study was collected using a self-administered questionnaire.

POPULATION AND SAMPLING

The study sample was obtained from the population of one hundred and eighteen (118) staff. The target population of the study cuts across the subject librarians, metadata librarians and the electronic resources librarians. The population was preferred in terms of their expertise to give pertinent information on the issue being investigated. Furthermore, they would be the staff most concerned in the management of EIRs in their libraries. According to Neuman (2003), census sampling technique covers all information on properties of the whole population in a given area. Similarly, Bell (2003) stated that census sampling aims to wrap hundred percent (100%) of the population. For this reason, given that the population in the study was relatively small then census sampling was used as a sampling technique. All the 33 subject librarians, metadata librarians and electronic resources librarian who were available in the two college campuses were involved in the study.

DATA ANALYSIS

Of the 33 self administered questionnaires distributed to subject librarians, metadata librarians and an electronic librarian, 28 were returned representing a response rate of 84.8%. This was taken as a very good response rate. According to Livingston and Wislar (2012), a response rate that is less than 60% is termed as poor. All subsequent percentages and the response rate percentage have been rounded off to one decimal place.

Data analysis included both quantitative and qualitative analysis (Babbie and Mouton, 2001). Quantitative analysis using Statistical package for the Social Sciences (SPSS) version 20 was used to analyze and interpret the data obtained from the closed ended questions while content analysis was used to analyze the open ended questions. During this approach, significant response groupings for responses to the open ended questions were then created and later were coded to allow for computer input and processing of the responses.

PRESENTATION AND DISCUSSION OF THE RESEARCH FINDINGS

Biographic data of the respondents

Table 1: Gender and age cross tabulation (N=28)

Gender	Age			Total
	30-39	40-49	50+	
Female	5	7	4	16
Male	2	7	2	11
No response	0	0	1	1

Total	7	14	7	28
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Out of 28 respondents, 21 (75.0%) were between the ages of 30 and 49 years and only seven (25.0%) were 50+ years. The most in both age groups were female. There was one respondent who indicated to be aged 50+ years but did not reveal her his sex. The findings show that there were the same number of female and male respondents at the age between 40 and 49 which comprising 50% of the population. To what degree will respondents age influence the their answers is not identified but there is a likelihood that quite high percentage of middle-aged respondents were not as technologically “knowledgeable” as their younger counterparts and this could had an effect on their answers provided.

ICT skills and training of staff in preservation of electronic information resources

Moloi and Mutula (2007) argued that there is a regular need to upgrade ICTs staff skills in order for them to keep up with technological obsolescence. Due to these rapid changes in information technologies, it would be difficult for information professional to provide suitable services without any ongoing training and, specifically in terms of this study, staying up to date with the trends in the ICT field in relation to EIRs preservation activities. As a results computer literacy, in its many and varied forms, has become a crucial competency for information professionals in any position.

When respondents were asked whether they considered themselves as being adequately skilled in the preservation of EIRs as shown in the Table 2, only 16 (57.1%) respondents indicated that they do see themselves adequately skilled in doing so. Accordingly, a significant 42.9% of respondents did not consider themselves adequately skilled.

Table 2: Respondent’s EIRs preservation skills (N=28)

Do you consider yourself sufficiently skilled in EIRs preservation?	Responses	
	Frequency	Percentage
Yes	16	57.1%
No	12	42.9%
Total	28	100.0%

Lefuma (2004) argued that many information centres do not have competent and expert information professionals and that ICT training should be significant to local conditions and also be of high quality. This is because with insufficient ICT training, an EIRs preservation programme is assured to fail. It is recognized in the literature that there is a need for librarians who are well trained in ICT and particularly in the EIRs preservation activities (Asongwa and Ezema, 2012). This is also inline with the findings which showed that only five (17.8%) of the respondents indicated that the uppermost level of knowledge available in their information centres is expert as shown in the Figure 1. This can be connected with the literature that highlights that technical understanding on EIRs preservation strategies being mainly lacking among staff that are managing these resources (Kanyengo, 2006).

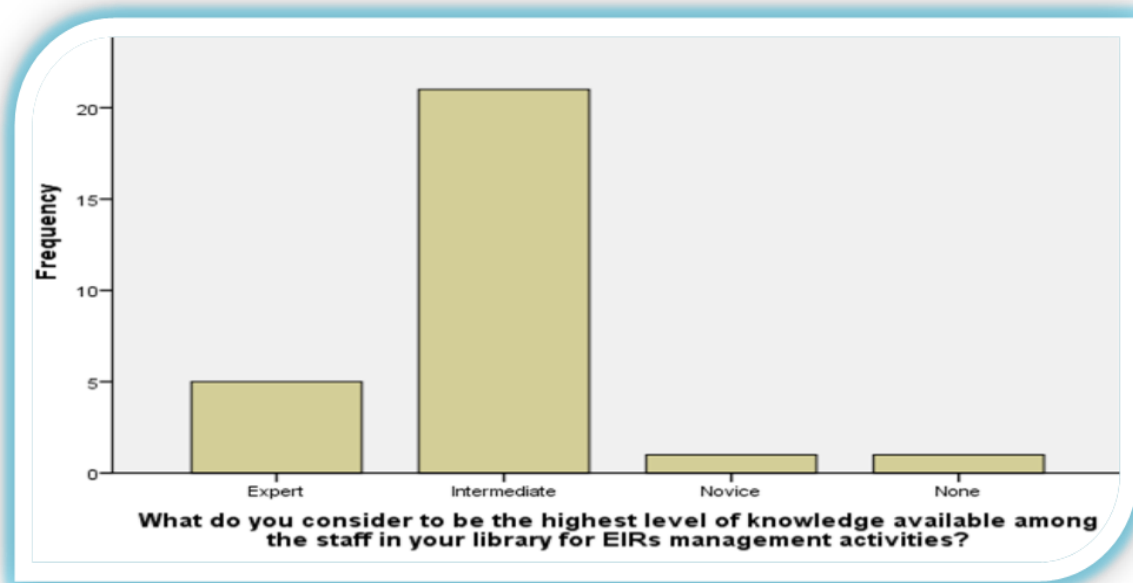


Figure 1: Level of knowledge in EIRs preservation (N=28)

On the other hand, Ngoepe and van der Walt (2009) indicated that most African trainers are not experts and are not ready for the chore of training personnel in the art of EIRs management as compared to other countries outside Africa.

Emmanuel and Sife (2008) highlighted that most information professionals in African countries have low ICT skills. They went further and stated that some information centres have managed to employ and educate their own ICT experts but in the end they have failed to keep them. This indicates that deliberate strategies are needed in terms of staffing and training information professionals for sustainable preservation and maintenance of ICT services in information centres and to guarantee that there is long term preservation of EIRs. Therefore, information professionals have to acquire new skills needed to handle and provide access to EIRs whenever there is change of technology and information centres ought to try to retain their information professionals once they have been educated.

Metadata preservation strategies used in EIRs preservation

The findings showed that a general need for training in various preservation techniques. For example, of the 28 respondents, 19 (67.9%) indicated a need for training in metadata techniques while 18 (64.3%) needed training in migration, emulation, maintenances and bit preservation techniques as shown in the Table 3. Kanyengo (2006) in his study established out that technical awareness for the preservation of EIRs is principally lacking among the staff of library preservation departments. Accounting for this, he pointed out that most information centres and information science schools offer EIRs management training at the theoretical level only. In a similar vein, Okoye and Ugwuanyi (2012) recommended that there is a call for librarians to be

provided with preservation of EIRs skills irrespective of the staff's rank. They also suggested that information professionals have to acquire skills to manage applications and apply new techniques of analysis for dealing with EIRs. Without doubt, this study points to a definite necessity for further training amongst respondents in what can be termed as a vital area of EIRs management, namely, preservation. Information professionals are needed to have skills in preservation techniques such as migration and emulation. This is because through these preservation techniques, the information professionals safeguard the information centres against frequently rapid changing in technology.

Table 3: Techniques in which training is needed (N=28)

Techniques	Responses	
	N	Percentage
Training in metadata techniques	19	67.9%
Training in migration techniques	18	64.3%
Training in emulation techniques	18	64.3%
Training in maintenance techniques	18	64.3%
Training in bit preservation techniques	18	64.3%
No response	1	3.6%
Total	*92	328.7%

*Multiple responses received

Digital preservation challenges facing UKZN PMB and Howard College campus libraries

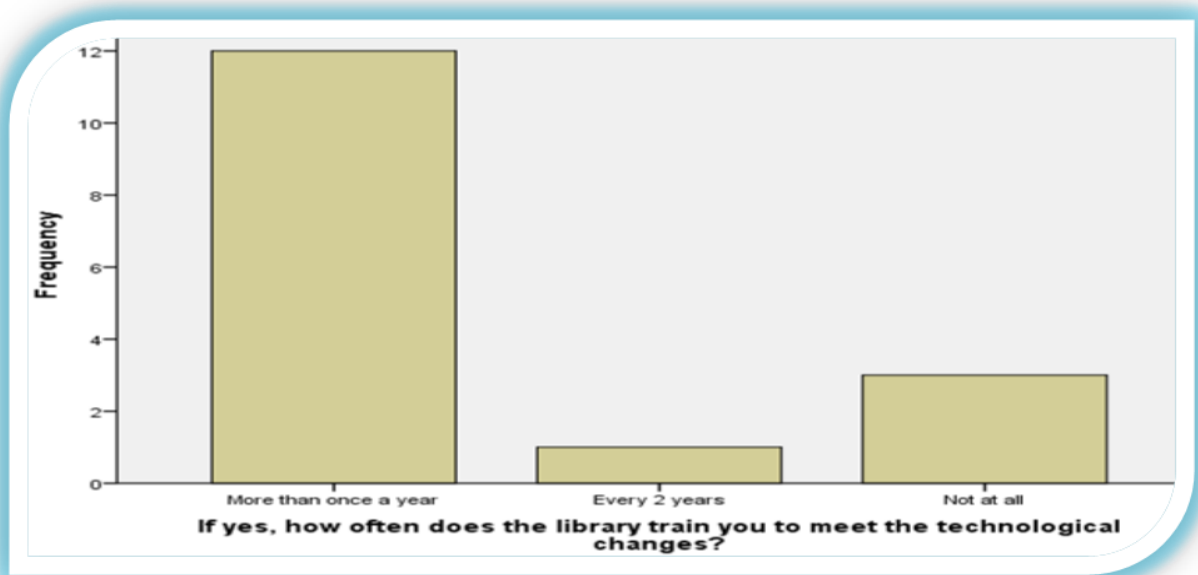


Figure 2: Technological changes (N=16)

In order to determine how current the respondents were keeping abreast with the rapid change in technological, respondents were asked to show how frequently they were qualified in ICT in relation to EIRs preservation. The question was particularly asked of those who see themselves adequately skilled in preserving EIRs in their information centres. Out of the sixteen respondents, 12 (75.0%) stated that they get educated more than once a year, one (6.3%) received training every two years and, surprisingly, three (18.7%) respondents pointed out that they were not trained at all to meet obsolescence of technological as shown in the Figure 2. The findings thus show that it is only 12 respondents out of the 28 who undergo training more than once a year to be up to date with technological developments. This is only 42.9% of the total percentage which is little when one considers the rapid rate of technological development. Ongoing training is essential if respondents are to keep up with the challenge of changing in technology.

Table 4: Level of library’s involvement in EIRs management activities (N=28)

My library's level of involvement in EIRs management activities has been limited by:	Responses						Total
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	No Response	
Concerns about technology obsolescence	3	4	16	1	2	2	28
Insufficient policy or plans for preservation	0	2	17	4	2	3	28
Lack of staff with digital preservation/technological expertise	1	3	9	3	11	1	28
Insufficient electronic resources for preservation	3	7	9	5	2	2	28

The respondents were also asked to indicate their level of agreement with various statements which may have affected their information centres' involvement in digital preservation activities. One statement referred to a "Lack of staff with digital management/technological expertise". Half of the respondents (14) agreed with the statement while nine remained neutral. This is also in connection with the finding which showed that the libraries were having only one electronic librarian who was concerned with the preservation of EIRs in all campus libraries. This is clearly seen that the libraries are being affected with the shortage of staff who are expertise in managing these EIRs. On the same point, respondents were asked to comment if they had further comments regarding the overall EIRs management in their library. Two (50.0%) respondents out of the four who commented, indicated that more staff who are sufficiently skilled in EIRs preservation should be recruited.



Figure 3: EIRs management policy or regulation (N=28)

According to Satish and Umesh (2005), most of information centres in Africa that preserve EIRs have got weak policies while others do not have them at all. The absence of these policies it implies that in the situation of technological obsolescence, the librarians would not be in a point to respond to the change the urgency is required. Therefore in terms of EIRs preservation policy or regulation, the majority of the respondents, 16 (57.1%) indicated that their information centres have an EIRs preservation policy or regulation(s). The huge majority of those 16 respondents said that the EIRs preservation policy provides guidelines for digitization (13 or 83.1%) and acquiring materials in digital form (15 or 93.8%). Of the same 16 respondents who indicated that their libraries have an EIRs preservation policy or regulation, 14 (87.5%) said that it met their library's current requirements. This shows that the EIRs preservation policy or regulation used in these libraries is strong.

In trying to determine if the libraries are being affected the challenge of lacking enough resources such as computers in managing EIRs, the respondents were asked to state the number of computers available for both staff and patrons to use. The findings show that most of the libraries have enough computers for EIRs preservation. Twenty three (82.1%) indicated that their libraries have more than 20 computers and only one (3.6%) respondent indicated that his/her library has less than five computers while the remaining four (14.3%) said that their libraries have between five and twenty computers. Linking with the literature, Asongwa and Ezema (2012) indicated that serous bottleneck to preservation to EIRs can be experienced when there is no enough ICT infrastructure in a given information centre. In the given libraries in this study, the issue of insufficient ICT infrastructure is not a problem.

In order to establish the ways in which the libraries are overcoming the challenge of frequently power rationing in Africa, the respondents were asked to indicate if the libraries do have a standby electricity generator in case of power cut. The response given showed that eleven (39.3%) indicated that their libraries do not have a standby generator while seventeen (60.7%) said their library do have. The fact that the (39.3%) respondents indicated their libraries do not have standby generator could be due to the initial cost of a standby generator as well as its running cost, which is in line with

the findings when the respondents were asked if the budget devoted for library was enough and majority 20 (71.4%) indicated that it was not enough. Therefore, this high percentage (71.4%) indicates the budget devoted for EIRs management is not enough. Another fact could be because power cut was not a serious problem to the country.

CONCLUSION

The results showed that just over 40.0% of the respondents did not consider themselves sufficiently skilled in electronic information resources preservation. For those respondents who indicated that they do consider themselves skilled, only 75.0% said that they get trained more than once a year to meet the change in technologies. What is surprising was that three respondents indicated that they were not trained at all to meet technological changes while one said they were trained once every two years. This latter respondent indicated that he/she does consider himself/herself sufficiently skilled for EIRs preservation.

The study also revealed that the respondents needed trainings in migration, metadata and emulation techniques. It is evident that the libraries where respondents work, lack expertise in EIRs preservation – only some (17.9%) of the respondents said the highest level of knowledge in EIRs preservation available in their library was expert

It can be concluded that there is a shortage of personnel/human capital with Information Technology qualifications working in the libraries represented. This may exacerbate the condition when there is a disruption of digitized services thereby leading to a lack of continuous access to electronic information. With regard to skills, it can be concluded that a majority of the respondents are in need of training in EIRs preservation techniques.

The findings also showed that there were an arguably high number of respondents (16) who indicated that their libraries did have an EIRs preservation policy. Majority of those (16) respondents said that their preservation policy provide guidelines for digitalization and acquiring resources in digital form. This shows that EIRs preservation used in these libraries is not weak.

RECOMMENDATIONS

Recommendations below are based on the results of this study and the conclusion reached. It is believed that the recommendations relating to staff development and training will lead to the improving the librarians in preserving EIRs in their libraries.

- ✓ It is evident that majority of the staff working in these libraries do not consider themselves sufficiently skilled in preserving electronic information resources. Therefore, there is a need for training and skills development in Information Technology with regards to preservation of electronic information resources for all the staff involved in such activity. In particular, metadata techniques, emulation techniques and migration technique need to be emphasized in such training. This should not be overlooked as complete obsolescence of the technology that exists needs to be avoided.
- ✓ A needs analysis should be done to establish individual and organizational weakness and strengths in terms of Information Technology knowledge and skills with regards to EIRs preservation in libraries. This should be done periodically.

REFERENCES

- Asongwa, B. and Ezema, I. (2012). The challenges of preservation of archives and records in the electronic age. <http://unllib.unl.edu/LPP/PNLA%20Quarterly/asogwa-ezema76-3.htm> (Accessed 16th January 2016).
- Babbie, E. and Mouton, J. (2001). *The practice of social research: an introduction to reading research*. Cape Town: Oxford University Press.
- Bell, J. (2003). *Doing your research project: a guide for first-time researchers in education and social science*. Maidenhead: Open University Press.
- Borghoff, U.M., Rödiger, P., Schmitz, L. and Scheffczyk, J. (2006). *Long-term preservation of digital documents: Principles and practices*. Berlin and Heidelberg: Springer-Verlag.
- Capron, H. L. and Johnson, J. A. (2002). *Computers: tools for an information age*. New Jersey: Prentice Hall.
- Emmanuel, G. and Sife, A. S. (2008). Challenges of managing information and communication technologies for education: experiences from Sokoine National Agricultural Library. *International Journal of Education and Development using Information and Communication Technology*, 4, (3), 137-142.
<http://www.google.co.za/url?sa=t&rct=j&q=preservation%20of%20electronic%20resources%20in%20africa&source=web&cd=30&cad=rja&ved=0CGgQFjAJOBQ&url=http%3A%2F%2Fijedict.dec.uwi.edu%2Finclude%2Fgetdoc.php%3Fid%3D4581%26article%3D456%26mode%3Dpdf&ei=AQy7UZv3COBX7AaAn4HoDw&usg=AFQjCNHY302azTAp2Grw56d3mbHu6uAPDg> (Accessed 14th December 2015).
- Gbaje, E. S. (2011). Digital preservation strategies: A case study of Nigerian national information centres, *International Federation of Library Associations and Institution*, 37, (3), 218-227. http://www.ifla.org/files/assets/hq/publications/ifla-journal/ifla-journal-37-3_2011.pdf (Accessed 15th November 2015).
- Harvey, R. (2010). *Digital curation: a how-to-do-it manual*. London: Facet Publishing.
- Hunter, G. S. (2000). *Preserving digital information: a how-to-do-it manual*. New York: Neal-Schuman Publishers.
- Kanyengo, C. W. (2006). Managing digital information resources in Africa: preserving the integrity of scholarship. Bridging the North-South Divide in Scholarly Communication on Africa, Threats and Opportunities in the Digital era, September 6-8, Leiden, the Netherlands. <http://www.ascleiden.nl/pdf/elecpublconfkanyengo.pdf> (Accessed 10th December 2015).
- Lefuma, S. (2004). An investigation into the management of electronic records in the public sector in Lesotho. http://researchspace.ukzn.ac.za/jspui/bitstream/10413/1957/1/Sejane_Lefuma_2004.pdf (Accessed 14th December 2015).

- Livingston, E. H. and Wislar, J. S. (2012). Minimum response rates for survey research. <http://archsurg.jamanetwork.com/article.aspx?articleid=1107333> (Accessed 27th December 2015).
- Maree, K. (2007). *First steps in research*. Pretoria: Van Schaik.
- Moloi, J. and Mutula, S. (2007). E-records management in an e-government setting in Botswana. *Information Development* 23(4). <http://idv.sagepub.com/content/23/4/290> (Accessed 10th December 2015).
- Neuman, W. L. (2003). *Social research methods: qualitative and quantitative approaches* 5th ed. Boston: Pearson Education.
- Ngoepe, M. and van der Walt, T. (2009). "Strategies for the preservation of electronic records in South Africa: implications on access to information," *Innovation*, 38, 1-25.
- Ogbebor, O. (2011). Challenges of digital preservation in Africa. <http://osarome.blogspot.com/2011/12/challenges-of-digital-preservation-in.html#!/2011/12> (Accessed 25th January 2016).
- Okoye, M. O. and Uguwuanyi, C. F. (2012). Management of electronic resources by cataloguers in Nigerian Federal University libraries. *Library Philosophy and Practice*. <http://unllib.unl.edu/LPP/> (Accessed 13rd December 2015).
- Olatokun, M. W. (2008). A survey of preservation and conservation practices and techniques in Nigerian University libraries. *LIBRES Library and Information Science Research Electronic Journal* 18 (2). <http://libres.curtin.edu.au/> (Accessed 3rd January 2016).
- Paper, W. (2008). The long-term preservation of digital information. <http://www.tessella.com/wp-content/uploads/2008/03/DigitalArchiving.pdf> (Accessed 1st December 2015).
- Satish, M. V. and Umesh M. (2005). Challenges of digital preservation in digital libraries, 3rd Convention PLANNER, 10-11 November. <http://ir.inflibnet.ac.in/bitstream/handle/1944/1356/7.pdf?sequence=1> (Accessed 23rd January 2016).
- Styblińska, M. (2006). Long-term preservation of digital assets – some specific aspects, Proceedings of the International Multi conference on Computer Science and Information Technology. <http://www.proceedings2006.imcsit.org/pliks/149.pdf> (Accessed 10th November 2015).
- Wamukoya, J. and Mutula, S. M. (2005). Capacity building requirements for e-records management: the case of East and Southern Africa. *Records Management* 15(2), 71–79. <http://www.emeraldinsight.com/journals.htm?articleid=1509490&show=html> (Accessed 10th November 2015).