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Archival Maintenance Practices for Paper-Based Archival Materials in Academic Libraries in Nigeria

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Introduction

Archives refer to the information materials which are usually noncurrent but are kept and maintained because they have continuous values. They are records that are primary source data, local and historical as well as rare and fragile in nature (Schmidt, 2011 and Mnjama, 2002). The examples of these materials are inaugural lectures, minutes of meeting of the senate, clubs and congregation, convocation brochures, instruments of bequest, photographs, artifacts, scrapbooks and alumni publications. In addition, the archival materials are highly influenced by information and communication technology thereby making room for paper based and born digital materials. However, this study focuses on paper based archival materials which are those archival materials on paper. Archival materials are important because they are mainly official records which serve as reference tools in problem and challenging times in institutions **(**Mnjama, 2002). As a result of that, maintenance of archival paper materials is imperative for the academic institutions where they are located and for posterity.

The archival maintenance practices is the act of checking, repairing and keeping archival materials such as books, pamphlets, manuscripts, photographs etc in good condition for the benefit of the host institution and researchers at large. Other things recognized as archival maintenance practices are routine maintenance practices (dusting, boxing, and shelving), disaster preparedness and control (in situations like fire incidence, landslides, and sudden violence and

other things which can destroy archival materials). Library employees are the key stakeholders in archival maintenance practices; they work every day to ensure that archival materials in academic libraries are maintained. They include the professional, para-professional and support staff in academic libraries.

Academic libraries are libraries that serve academic institutions above secondary school level such as colleges of education, polytechnics, universities, and institutes (Uwaifo, (2010). They are attached to these institutions in order to provide the information needs of researchers such as undergraduates, post-graduates and staff. Academic libraries support research activities and the curriculum of the institutions that established it (Oyegunle, 2013). They maintain different information materials including archival paper based materials for their host institutions.

The academic institutions in Nigeria especially those ones that have existed for years and are funded by the government have generated many archival paper materials which must be maintained by the reason of their continuous values. However, it seems that the academic libraries are not doing much in maintaining their archival paper based materials. It appears that they lack materials for keeping them in good temperature to withstand the effects of weather on them; most of the archival paper based materials are brittle and they needed to be reinforced and reformatted. Also, the extensive literature search by the researchers shows that archival maintenance practices for paper based archival materials has been under researched in this era of global access to information online. Therefore, it is vital to carry out an investigation on archival maintenance practices for archival paper based materials in academic libraries in Nigeria.

Research Questions

The study is set to provide answers to the following research questions:

1. What is the extent of adoption of archival maintenance practices for archival paper based materials in academic libraries in Nigeria?
2. What are the educational qualifications of library staff involved in archival maintenance practices for archival paper based materials in academic libraries in Nigeria?

Hypotheses

One null hypothesis guided the study at the level of 0. 05 level of significance.

HO_1: there is no significant difference in the mean ratings of more educational qualified and less educational qualified library staff with respect to archival maintenance practices for archival paper based materials.

Archival Maintenance Practices for Paper Based Archival Materials in Academic Libraries

The maintenance of archival paper based materials is vital and indispensable for the fact that without maintenance continuity of knowledge as contained in archival paper based materials is not guaranteed. Archival paper based materials can be maintained through different measures. Ibegwam (2010) explained that library resources such as archival materials can be safeguarded from decay and disfiguration by preventive and curative measures. The preventive maintenance practices involve physical things which are done to increase the life span of archival materials and slow down their rate of degradation while curative measures are the activities undertaken to ensure that archival materials are in good shape again. Therefore, maintenance practices for archival materials include digitization of archival materials, dusting, lamination, mending and repairing, fumigation, deacidification, environmental monitoring and control, microfilming,

control of water flow, keeping archival materials in boxes, files, folders and lock up drawers (good shelving practices) and the use of Automated Storage and Retrieval Systems (AS/RS).

Digitization can be defined as "the material process of converting analog streams of information into digital bits" (Brennen and Kreiss, 2016). Similarly, Techopedia (2012) stated that in digitization, there is conversion of analog signals or information in any form into a digital format which computer systems or electronic devices can understand. Digitization is defined in the Guideline on Records Digitization (2010) as the process of converting physical or analog term like paper record, photograph or graphic items into an electronic representation or image which can be stored electronically. Azim et. al. (2018) defined it as a process of converting information in digital form and pointed out that digitization is a platform for long-term maintenance of archival records; it improves access to use of archival materials; and can serve as backup in case of disasters.

Dusting of archives properly is a preventive maintenance practice that is required to keep archives clean thereby prolonging their life spans. It requires cleaning or removing fine powder that consists of particles of sand or earth that settled on the archival materials probably with a piece of cloth (Hornby, 2000). In the tropical areas and hot-arid zone, dust causes great harm to archival materials as it causes abrasion thereby making these materials to depreciate, discolour or disfigure (Ogunmadede and Ebijiuwa, 2013) and Melo, Sequeria, Lopes, and Macedo (2017). Paradoxically, cleaning the surface of archival paper based materials in order to remove dust can also cause mechanical damage to the surface and extensive research into dust within museum and historic house contexts has addressed the risks that dust poses to collection items during open static display (Shah, et. al. 2011, Lioyd,et. al.,2007, Lioyd, et. al. 2002). The results of a study carried by Melo, Sequeria, Lopes, and Macedo (2017) showed that fungal stains on

archival paper based materials are mainly caused by Aspergillus (29%) and Penicillium (13%) while the commonest colour of stains is brown (54%) which is usually caused by foxing. Moreover, they observed that there was no consistent correlation between stain colour on paper/specific fungal species and colourants/chemical compounds in the paper conservation literature. In addition, Maggi, Persiani, Gallo, Valenti, Pasquariello and Scorroano (2000:1) pointed out that "spores and conidia of micro fungi are present in dust are elements of potential damage which becomes real when the microclimatic conditions and relative percentages of water … exceed the risk levels." For instance if the temperature is 20 degrees and the relative humidity 65 percent, 10 percent of water content and 0.65aw in archival materials can encourage the germination of micro fungi. The accumulation of dirt and dust arise from poor and careless housekeeping practices and such negligence can be harmful to archival materials (Mahmood and Mari, 2013). As a result of that, dusting is a good archival maintenance practice that will help to elongate the archival paper based materials for posterity in academic libraries.

Lamination is the technique of manufacturing a material in multiple layers so that the composite materials achieves improved strength, stability, sound insulation, appearance or other properties from the use of differing materials. Rose and Greene (2015) noted that lamination is a method of strengthening fragile papers which involves deacidifying a document and layering it between tissue and thin sheets of plastic and fusing them together. In archival context, they revealed that lamination refers to the process of fusing a sheet of paper between two thin sheets of plastic which is mainly a cellulose acetate. Lamination provides stability for weak or damaged documents and helps to reduce the effect of environmental pollutants and also the damages done on documents as a result of poor handling.

Mending and repairing are synonymous in the sense that Hornby (2000) defined mending as repairing something that has been damaged or broken so that it can be used again. The archival paper based materials can damage, tear and loose by the reason of natural ageing and improper handling. However, identifying the type of tear is necessary before repairing takes place. Gaylord (1996) informed that in repairing or mending torn pages of archival materials attention is needed in order to identify the type of tear. He further revealed two types of tear namely: bevel and clean cut. The beveled tear are characterized with overlapping surfaces which can be bonded together with adhesives while clean cuts tears need to be repaired using tapes especially transparent ones to hold the two sides together. Mending or repairing becomes useful to ensure that archival materials are restored, refurbished and usable.

Storage of books and documents inside structures intended for their maintenance has created new manmade environments for microbial species such as fungi and bacteria to inhabit. Kowalik (1980), Nitterus, (2000) as cited by Montanari, Melloni, and Inoncenti (2012). Therefore, fumigation is necessary as it is a control measure which involves using gaseous pesticides or fumigants to suffocate or poison the pests living in a defined environment or place; these pests or insects include silverfish, fish moths, firebrats, termites, cockroaches, bettles, booklice and psocids and rodents such as rats and mice (Sahoo, 2013).The most effective method is disinfection (the destruction of pathogenic and saprophytic micro-organisms and their spores by physical or chemical agents in order to prevent infection); in the past few years, there has been increasing interest in silver nanoparticles, because of their high antimicrobial properties (Kim et. al., 2007and Rai et. al., 2009).The accumulation of dirt's and dust in addition to bringing in food items into academic libraries encourage the growth and multiplication of living organisms. Chopra (2004:179) brought to limelight that the insect known as silver fish attacks

photographs, labels, paper sizing's; fish moths, firebrats, and termites attack slick magazine paper. In addition, rodents like rats and mice eat up archival paper based materials. They cause permanent damage to them if unchecked.

Deacidification is a process of treating paper documents for the purpose of neutralizing acids within the paper. It is also a process of deeping sheets of paper in solutions of alkaline earth bicarbonates to neutralize the acidic level of the paper and to prevent the recurrence of an acidic condition by that process alkaline buffer is created. This is because high acidity levels contribute to the deterioration of paper by causing yellowing, brittleness and instability. Also, Batty (2010) reported that the useful lifetime of books, maps, manuscripts and works of art on paper during storage, circulation and display in libraries and museums are threatened by embrittlement. As a result of that paper artifacts can be saved by giving it a treatment known as deacidification in order to stabilize it for use by increasing the pH of acidic paper. Stauderman, Bruckle and Bischoff (1996) mentioned that there are two processes in deacidification of papers namely: aqueous and non-aqueous method. The later as they further stated is intended for library and archives collections as it employs "elaborate machinery to deposit deacidifying agents into groups of books and documents". It is also referred to as mass deacidification. However, they emphasized that the smaller-scale use of deacidificants such as carbon magnesium methoxide, and carbon magnesium methoxide ethoxide in some cases are impractical or dangerous.

Environmental monitoring and control is an aspect of archival maintenance practices which requires controlling of environment to elongate archival paper based materials, Ling and Rhys-Lewis cited in Teygeler (2001) noted that environmental monitoring and control should always be of a high standard. Environmental monitoring and control is vital because the temperature is not constant, it keeps changing. At times it goes higher or lower and all these have implication to

archival paper based materials. Temperature can make or mar archival paper based materials; when the temperature is too high it can make these materials to dry, brittle, shrink and loose shape but when the temperature is too low then it causes dampness to these materials. The dampness encourages the growth of fungi on the materials. The archival paper based materials absorb moisture highly especially when the humidity is high. Sahoo (2013) posited that "certain amount of humidity is necessary for the flexibility of paper but in prolonged high humid conditions, paper becomes soggy and moisture weakens the fibers of paper". When this happens the archival paper based materials weakens, the glue used in binding them loses, the ink spreads than usual and the pages of the paper stick together thereby causing difficulty while opening it.

However, the ideal humidity for storage of books and archival materials is between 40% and 65% and some instruments such as thermometer and barometer can be used to check the temperature and relative humidity level of the archival storage areas (Gallo in Ogunmodede and Ebijuwa, 2013). The reason is that the atmospheric control is not constant but fluctuates. Precisely, Saka (2010) maintained that a relative humidity of 40 to 55% is ideal for the control of temperature and humidity in the storage areas of archives. Kademani, Kalyane and Kumar (2003) emphasized that placing silica gel at right places in academic libraries will help to control the environmental factors as well as installing dehumidifiers. Monitoring the environment will help to keep archival materials in good temperature by air conditioning and other measures.

Reprography or photocopying is the process of reproducing copies of documents. It is a good archival maintenance practice which needs to be done with uttermost care. Ritzenthaler (1990) opined that some archival records created with poor quality of paper such as thermofax, verifax, mimeograph, ditto and early xerographic process are to be photocopied with archival bond paper. In addition, before photocopying the damaged and fragile archival paper based

material kept in polyester sleeves, the polyester sleeves are to be removed before photocopying the records using electrostatic copy machine. For the bound and oversized volumes, they should not be forced to lie flat on the photocopier rather other measures such as Photostatting, photographing and microfilming can be used.

Creating disaster management and recovery plans is archival maintenance practice which aimed at safeguarding archival materials from events of disasters. Disasters can cause damage to archival paper based materials thereby creating difficulties in service delivery in archives and libraries. In addition, it can cause loss of archival paper based materials. Disasters can be manmade or caused by natural disasters. Eden and Matthew as cited in King'ori and Otike (2007) defined disaster as "any incident which threatens human safety and /or damages, or threatens to damaged, a library building, collection or items, equipment and systems." Disaster is also a "sudden event such as an accident or natural catastrophe that causes great damage or loss of life." It is also "an event or fact that has unfortunate consequences or fact that has unfortunate consequences" (Disaster, 2016). Therefore, disaster in this context is any sudden occurrence as a result of natural phenomenon which is likely to endanger or cause loss of archival materials. The examples of disasters are fire, flood, earthquake, volcanic eruptions, wars etc (King'ori and Otike, 2007). Disasters can be referred to as accidental factors such as flood, fire, volcanoes, earthquakes, war, landslides etc. Other types of disasters are wildfire; tornadoes, hurricanes, sinkhole, thunderstorms and lighting (Restore your economy.org, 2015). Disaster can last for hours, days or weeks in events of causing havoc and destructions. The commonest disasters in Nigeria are fire, wildfire, war, insurgency, erosion, student's riot and theft. In relation to that, Alegbeleye (1993) unveiled that fire ravaged the library and archival materials of the Institute of Policy and Strategic Studies, Kuru in 1987. Fire can be caused by faulty electrical systems,

failure to turn out electrical sockets, switches and equipment after the close of work, bringing in highly inflammable things inside or beside the library buildings, poor inspection of electrical appliances. Therefore creating disaster preparedness and control measure to take care of archival paper based materials in events of sudden disasters is pertinent.

Microfilming is another method of maintaining archival paper based materials. Acland and Gwinn as cited in Ngulube (2002) maintained that microfilming is a photographic process of producing reduced images on a roll film which usually requires optical assistance in order to read the intellectual content of documentary material. Drowner, (2000) opined that microfilm is a document maintenance format which is normally used in academic and research related fields to save vital information without taking up much storage space. Therefore, microfilm is a technology that is invented and can be used to store archival documents in a miniaturing size and can later be retrieved and viewed with the machine meant for it. Microfilm has a potential life of about five hundred years and provides a solid foundation for scanning to other media (Drowner, 2000). Water damages almost all types of library resources: paper-based, photographs, films or digital. Water damage can range from dampness or wetness at the edges to completely soaked or submerged items (Zaveri, 2015; Ilo, Nkiko, Izuagbe and Furfuri, 2020). Therefore, controlling water flow in academic libraries is a maintenance practice that helps to keep archival paper based materials safe. Water damages archival paper based materials permanently. It may come from leaky-roof, uncontrolled tap water, flood and other forms of water outages (Suleman, 2009). All these mentioned above can make fungi and bacteria to grow on archival materials and make their pages to hold together thereby making it almost impossible to open the paper based archival materials especially if not detected on time. In addition, water makes the ink on archival paper

materials to fade causing eventual loses of the rare information material and makes the adhesives used in binding them to lose.

Storing archival paper based materials in appropriate envelopes, sleeves, albums, and boxes is fundamental to their maintenance. Boxing is an alternative for damaged volumes that provides greater protection than does tying while bound materials that are valuable and/or in poor condition are scheduled for boxing and/or repair (National Archives, 2016). Boxing of archival materials, keeping them in envelopes, files and folders; providing lock up drawers for sensitive ones are regarded as good shelving practices. However, good shelving practices surpass them to include arrangements of library and archival materials on the shelves according to their notation symbols (Edoka, 2000). Three types of plastics are currently considered acceptable for long-term storage: they include Polyester, Polyproplene and polyetrhylene (Gaylord Archival, 2016). Ritzenthaler (1990) brought to lime light that improving shelving practices, keeping archival paper based materials with acid-free boxes, files and folders among others prolong the life span of archival materials. Edoka (2000) emphasized that cabinets with locked up keys are vital for keeping sensitive archival materials while maps, plans and chart are kept flat in cabinets or shallow drawers. In addition, Ritzenthaler (1990) argued that boxes are not to be overfilled or under filled with archival materials and corrugated acid-free spacer boards should be used to support archival records that are under filled. This enables the archival materials in the boxes to be in good shape without bending, slumping, curving and distorting. This implies that shelving is an aspect of caring for archival materials as it gives the library staff the opportunity to know the physical conditions of archival paper based materials in order to keep them well for users in academic libraries.

The Automated Storage and Retrieval System (AS/RS) is another device which can be used to store and retrieve archival materials in order to avoid damage and loss as a result of fire outbreaks, flood and earthquakes. The AS/RS creates greater storage density, provides users with increased inventory control and tracking, increases the safety of a workplace, relieves personnel from harsh and difficult working conditions and reduces labour costs (Zollinger, 2011). The AS/RS ensures the proper maintenance of archival paper based materials from instability emanating from environmental factors. The rare and archival paper based materials and other special collections are stored in boxes which are bar coded and stored in special racks with very large materials and retrieved in the same way. Any time requests are made, a robotic crane will retrieve the materials stored in the AS/RS quickly. It also conserves spaces and the information materials stored there cannot be destroyed by accidental or sudden disasters like landslides, erosion, and earthquakes.

Research Methods

The descriptive survey was used for the study while the area studied was South East, Nigeria located at the eastern part of Nigeria and comprises five states, namely: Abia, Anambra, Ebonyi, Enugu and Imo states. It is also one of the six geopolitical zones in Nigeria which is within the tropical zone usually characterized by excessive humidity, breed of insects and rodents which endanger archival paper based materials. A total number of 277 library staff which constitutes the population was used for the study; they are working and have worked in archival sections of federal and state academic libraries that have existed for many years. Two instruments used for data collection were questionnaire and structured interview developed by the researchers. The entire questionnaires distributed were retrieved showing the percentage response of 100%. Data collected was analyzed using the Statistical Package of Social Sciences (SPSS) version 20.

Frequencies and percentages were used in determining the highest educational qualification of library staff in academic libraries while mean scores and standard deviations were used to elicit information on the archival maintenance practices for archival paper based materials. The hypothesis was tested using Analysis of Variance (ANOVA). The Real Limits Numbers include: 3.50 – 4.00 = Strongly Agree (SA); 2.50 - 3.49 = Agree (A); 1.50 – 2.49 = Disagree (A); 0.5 – 1.49 = Strongly Disagree (SD).

Results

Research Question 1: What are the extents of adoption of archival maintenance practices for paper based archival resources in academic libraries in south East, Nigeria?

*Table 1**: The Mean Ratings and Standard Deviations of Respondents on the Extents of Adoption of Archival Maintenance Practices for Paper Based Archival Resources***

Adoption of Archival Maintenance Practices for Archival Paper Resources	Universities		Colleges of Education		Polytechnics		Total		Decision
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	
Digitization of archival resources	3.14	0.89	2.34	1.05	2.66	1.10	2.87	1.02	Agree
Dusting of archival resources	3.43	0.53	3.12	0.80	3.22	0.65	3.32	0.63	Agree
Lamination of archival resources	2.98	0.79	2.59	0.90	2.76	0.87	2.85	0.85	Agree
Mending/repairing archival resources	3.29	0.74	3.00	0.70	3.00	0.70	3.17	0.73	Agree
Fumigation of resources	3.07	0.87	2.79	0.83	2.69	0.78	2.93	0.86	Agree
Deacidification of deteriorating archival resources	2.84	0.88	2.33	0.80	2.40	0.84	2.64	0.88	Agree
Environmental monitoring and control	3.00	0.98	2.83	0.86	2.67	0.89	2.90	0.94	Agree
Good shelving practices	3.49	0.62	3.38	0.62	3.36	0.79	3.44	0.66	Agree
Reprography to ensure duplicate copies	3.25	0.69	2.98	0.76	3.07	0.65	3.16	0.70	Agree
Creating disaster management and recovery plans	3.06	0.80	2.66	0.85	2.71	0.77	2.90	0.82	Agree
Microfilming of archival resources	2.76	0.85	2.22	0.84	2.45	0.75	2.58	0.85	Agree
Control of water flow in the academic libraries	3.12	0.69	2.95	0.94	3.00	0.90	3.06	0.80	Agree
Boxes for keeping archival resources	3.30	0.62	3.12	0.70	3.22	0.84	3.25	0.69	Agree
Envelopes for keeping archival resources	3.32	0.68	3.00	0.75	2.91	0.88	3.17	0.76	Agree
Files/ folders for keeping archival resources	3.24	0.78	3.09	0.73	3.22	0.70	3.21	0.76	Agree
Lock up drawers for keeping archival resources	3.15	0.80	2.95	0.83	2.72	0.91	3.02	0.85	Agree
Automated Storage and Retrieval Systems AS/RS	2.94	0.95	2.48	0.96	2.29	1.08	2.71	1.02	Agree

Table one reveals the mean ratings of respondents on the extent of adoption of archival maintenance practices for archival paper resources in academic libraries in South East, Nigeria.

The results show the different levels of agreement on the adoption of archival maintenance practices with the following means scores: dusting of archival resources (3.32), lamination (2.85), mending and repairing (3.17), fumigation (2.93), deacidification of deteriorating archival resources (2.64), environmental monitoring and control (2.90), good shelving practices (3.44), reprography (3.16), creating disaster management and recovery plans (2.90), microfilming of archival resources (2.58), control of water flow (3.06), boxes for keeping archival resources (3.25), envelopes for keeping archival resources (3.17), files/ folders for keeping archival resources (3.21), lock up drawers (3.02), Automated storage and Retrieval Systems AS/RS (2.71). The Table also shows that there is a close range of standard deviation scores indicating a close agreement on the extent of adoption of archival maintenance practices in academic libraries.

Research Question 2: The educational qualifications of library staff involved in archival maintenance practices in academic libraries in South East, Nigeria.

Table 2: ***The Educational Qualifications of Library Staff Involved in Archival Maintenance in Academic Libraries in Nigeria***

Educational Qualifications	Frequency	Percent
NCE	10	3.6
OND	33	11.9
HND	39	14.1
B.A	67	24.2
BLS	40	14.4
BED	8	2.9
MA	5	1.8
MLS	51	18.4
Ph.D	24	8.7
Total	**277**	**100.0**

Table two above reveals the respondents response based on their educational qualifications. The frequency of NCE holders is 10 with the corresponding percentage of 3.6%. OND shows 33 as frequency which amounts to 11.9%, HND shows the frequency of 39 with 14.1%, B.A has the frequency of 67 which is 24.2%, BLS has 40 as frequency resulting to

14.4%. Other frequencies and percentages as shown by the table above include: BED – 8, 2.9%, MA - 5, 1.8%, MLS- 51, 18.4%, and Ph.D -24, 8.7% respectively.

Table 3: Hypothesis tested on the educational qualifications of library staff involved in archival maintenance practices for paper based resources in academic libraries in Nigeria

HO_1: There is no significant difference in the mean ratings of library staff with respect to their educational qualifications for the adoption of archival maintenance practices for paper based resources in the academic libraries.

Table 3: ***One Way ANOVA Analysis between the Mean Ratings of Library Staff with Respect to their Adoption of Archival Maintenance Practices for Paper Based Resources in the Academic Libraries.***

Descriptives

Adoption

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
NCE	10	3.0700	.28107	.08888	2.8689	3.2711	2.61	3.52
OND	33	2.8161	.42530	.07404	2.6653	2.9669	2.24	4.00
HND	39	3.0374	.50481	.08083	2.8738	3.2011	1.73	3.91
B.A	67	2.8415	.46830	.05721	2.7273	2.9557	1.79	4.00
BLS	40	3.0010	.51702	.08175	2.8356	3.1664	1.61	3.88
BED	8	2.9963	.49335	.17443	2.5838	3.4087	2.36	4.00
MA	5	3.0180	.73622	.32925	2.1039	3.9321	2.30	4.00
MLS	51	3.1316	.56704	.07940	2.9721	3.2910	1.97	4.00
Ph.D	24	3.0775	.58089	.11857	2.8322	3.3228	1.79	4.00
Total	277	2.9788	.51288	.03082	2.9182	3.0395	1.61	4.00

ANOVA

Adoption

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3.808	8	.476	1.855	.067
Within Groups	68.791	268	.257		
Total	72.599	276			

Table 3 above shows the ANOVA analysis between the mean ratings of library staff with respect to their educational qualifications for the adoption of archival maintenance practices for

paper based archival resources in the academic libraries. It shows that the sig. is .067 at 276 degree of freedom and at 0.05 level of significance. The sig. which is .067 is more than 0.05 which is the level of significance. This implies that the null hypothesis is accepted. Therefore, there is no significant difference between the mean ratings of library staff with respect to their educational qualifications for the adoption of archival maintenance practices in the academic libraries

Discussion on Findings

The archival maintenance practices adopted for archival paper based materials in academic libraries are mainly good shelving practices, dusting archival material, mending and repairing, enveloping of archival materials, reprography of archival materials to ensure duplicate copies, boxing of archival materials, control of water flow in the academic libraries, keeping the sensitive archival materials in lock up drawers, fumigation of archival materials, environmental monitoring and control, creating disaster management and recovery plans, lamination of archival materials, storing archival materials using Automated Storage and Retrieval Systems AS/RS, deacidification of deteriorating archival materials and microfilming of archival materials

Good shelving practices involve arrangement of archival paper based materials according to their call numbers for fast retrieval. The members of library staff embark on shelving of information materials including archival materials every day especially in the morning before engaging in other activities. This is to make the materials easily accessible for users. This is in line with the findings of Edoka (2000) that proper shelving of information materials enables the materials of the same kind to be together for easier retrieval. Also, good shelving practices

prolong the life span of archival materials by making to be in good forms it also allows archival paper based materials to stand on the boxes and shelves without scattering.

Reprography to ensure duplicate copies of archival materials is an important maintenance practice found out by the present day study. Reprography has to do with photocopying archival materials as a maintenance practice. This is usually done in order to make more copies available for users especially if it is only a copy of the original archival paper based material is available. The original can be photocopied and kept well while the photocopies are made available for researchers use. In addition, when the archival paper based materials become brittle because of the type of paper used in producing them or by reason of age, it can be photocopied so that the contents will not be lost. In line with this, Ritzenthaler (1990) support that the archival materials such as records created with poor quality of paper such as thermofax, verifax, mimegraph, ditto and early xerographic process need to be photocopied with archival bond paper in order to prolong their life spans.

Furthermore, the control of water flow as a maintenance practice is adopted in academic libraries in Nigeria. Water is good in academic libraries only when it is under control. Uncontrolled water flow in form of leaky roofs, excessive water flows from taps and flood can wreck havoc to library materials in general and archival materials in particular in the academic libraries. Suleman (2009) support that uncontrolled water flow from leaky-roof, uncontrolled tap water and flood can damaged archival paper based materials.

Dusting of archival paper based materials as found out by the study is a maintenance practice adopted in academic libraries in South East, Nigeria. These involve removal of dust from archival materials by cleaning them and general maintenance of the environment. That is

why Ling and Rhys-Lewis in Teygeler (2001) maintained that internal housekeeping measures including environmental monitoring and control must be of a high standard in academic libraries so as to elongate the life span of archival materials. Likewise, Ogunmadede and Ebijiuwa (2013) support the removal of dust through proper cleaning of archival materials.

Mending and repairing, fumigation of libraries, reprography to ensure duplicate copies and control of water flow are also maintenance practices found out according to the findings of the study. Concerning mending and repairing, it provides reinforcement to archival materials through stitching; binding and other repairing measures. Gaylord (1996) and Dirisu (2010) noted that they are useful techniques for restoration, refurbishing archival paper based materials for them to be usable again. However, from the interview schedule, it was gathered that every academic library in South East, Nigeria has a section for binding and restoring paper materials such as archival materials. Paradoxically, most of them do not have adequate machines and well trained staff to carry out this function.

Fumigation of archival paper based materials is also one of the maintenance practices adopted in academic libraries as revealed by the findings of the study. As a type of maintenance practices which involves using gaseous pesticides to either suffocate or poison pests living in the academic library environment, caution is required. In connection to that Mahmood and Mari (2013) warned that archival paper based materials should not be treated directly with chemical formulations that can become harmful on the materials, users and staff. However, there are chemicals, insecticides and pesticides which Mahapatra and Chalkrabarti (2003) recommended for controlling insects and pests. They include Dieldrins, DOT and DDT for controlling pests and insects inside the library and crude cresosate in kerosene (1:1) or siedren in water (1:60) for pouring around academic library buildings.

However, it was gathered through interview that microfilming of archival materials, deacidification of deteriorating archival materials, constant air conditioning, environmental monitoring and control and AS/RS are not adopted as archival maintenance practices for paper based archival materials in the academic libraries. It appears that microfilming, deacidification are phasing out in this digital driven world. Environment monitoring and control including constant air conditioning are good archival maintenance practices which are not adopted due to lack of equipment, unstable power supply and under development. Automated Storage and Retrieval Systems (AS/RS) are not available in any academic library for proper maintenance of archival materials. In the earlier study of Rosenberg (2015) and Zollinger (2011), they noted that AS/RS can store and retrieve information materials as well as archival materials effectively. This is due to the fact that it is a computer-controlled system which places and retrieves loads automatically from a defined storage location usually used for high density automated shelving.

Furthermore through interview, it was revealed that envelopes, boxes, files and folders are mainly used in the academic libraries for keeping unbound archival paper materials and pamphlets. This is in line with the findings of Mackenzie as cited in Teygeler (2001) and Edoka (2000) that all archival records and unbound materials are kept in envelopes, files and folder to protect them from dust while shelves accommodates boxes which are used to keep pamphlets and other form of unbound volumes. It was also gathered through interview that there was no lock up drawer reserved for keeping sensitive archival materials in those academic libraries. However, in the findings of Edoka (2000), lock up drawers with keys is important for keeping sensitive archival materials. Moreover, through the interview, it was gathered that there was no equipment for environmental monitoring and control. However, in few academic libraries, archival materials were kept in air conditioned places to regulate the temperature of the rooms.

The educational qualifications of library staff involved in archival maintenance

From the findings of the study, the majority of the library staff involved in archival maintenance practices for paper based materials at academic libraries in Nigeria has first degree as their highest educational qualification. This first degree is further shown as Bachelors of Arts (B.A) Bachelors of Library and Information Science (BLIS) and Bachelors of Education (BED). A degree holder is exposed widely to different learning experiences in the higher institutions attended especially the universities. As a result of that s/he can take up any responsibility competently such as archival maintenance practices in academic libraries. Also, a degree holder in Nigeria is regarded as an educated person that is better equipped in the society to take up any task. This task can be in academic library particularly for archival maintenance. This is in connection with the recommendations of the Librarians Registration Council of Nigeria (2016) that professional library staff should have the minimum of first degree in Library and Information Science or a first degree in another discipline with masters in Library and Information Science and also certification with LRCN.

Conclusion

Archival maintenance practices for paper based materials are actions taken in order to keep archival materials in good conditions for posterity in academic libraries. It also aims at making efforts to ensure that the rate of deterioration of archival paper based materials slows down by enforcing diverse strategies. Archival paper based materials are useful information materials which are not current but they are kept and given attention by the reason of their values to teaching, learning, and research. More importantly, they are mainly the primary source data for researchers, historical documents of their host institutions and reference tools in challenging

times. Basically, archival paper based materials need to be maintained to avoid discoloration, decay, damage and loss.

Another issue that revolves around this research is the educational qualifications of library staff involved in archival maintenance practices for paper based materials in academic libraries. The majority of the members of library staff have first degree in conventional universities which shows that they have acquired high standard of education required for handling archival maintenance practices in academic institutions.

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