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## **DECLARATION**

I, Kimbo Lemmy Shameenda, hereby declare that this dissertation is the result of my own original work except where I have indicated my indebtedness to other sources. It has not been submitted for a degree at the University of Zambia or any other University.

Signed: -----

Date: -----

## **APPROVAL**

This dissertation of Kimbo Lemmy Shameenda is approved as partial fulfilment of the requirements for the award of the degree of the Master of Library and Information Studies (MLIS) by the University of Zambia.

### **Examiners' Signatures**

1. Signed:----- Date:-----2011

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## **DEDICATION**

To the Almighty God who healed me when I fell sick during my studies. Special dedication to my loving and caring wife, Mercy, my children, family members and friends who supported me spiritually, morally and financially during my sickness.

God bless you all.

## **ABSTRACT**

This research investigated preservation and conservation of library materials, techniques and practices in the University of Zambia Library and its two branches: the Medical Library and the Samora Machel Veterinary Medicine Library. The population of the study were thirty-five library staff, six bindery staff and eleven academic faculty members in the Department of Library and Information Studies at the University of Zambia. Based on a questionnaire survey, interviews, observation and content analysis of key documentary sources, the factors that affect preservation and conservation of library materials in the University libraries were identified. The preservation and conservation issues included all managerial and financial considerations including storage and accommodation, provision, staffing levels, policies, techniques and practices in preserving and conserving library materials and the information contained in them in order to ensure long term access to them. The survey data was evaluated and analysed using Statistical Package for Social Sciences (SPSS). The data gathered from questionnaires, interviews and observations was presented both graphically and descriptively.

The research findings revealed that although the University of Zambia Libraries were involved in the long-term preservation of library materials, they did not provide a well planned preservation and conservation care because preservation aspects were given least priority and conservation programmes were addressed in varying degrees in the libraries. Proper preservation and conservation programmes were necessary because library materials were susceptible to both inherent and environmental factors; materials in the university libraries contain information for study, teaching and research.

The study identified lack of preservation and conservation planning, policies and weak commitment from the University of Zambia management on funding of libraries at the University of Zambia. Further, the study identified inadequate programmes and limited preservation and conservation education and training among librarians as other forms of obstacles to effective preservation and conservation of library materials in the university libraries. The study revealed that there was lack of awareness concerning preventive preservation measures, poor handling and use of library materials. In addition, there was lack of reformatting techniques, resulting in preserving and conserving selected materials (predominantly paper-based materials). The study also highlighted presence of dust on library materials due to irregular dusting and cleaning of shelves and storage areas. The study also

revealed that lack of conducting preservation surveys and collection maintenance in the university libraries had resulted in lack of reliable data on library materials preservation and conservation activities. The study revealed that there was inadequate security of library materials and lack of disaster preparedness and recovery plans in the University of Zambia Libraries.

To improve on the preservation and conservation of library materials and their accessibility and availability for use, the establishment of a preservation committee was recommended in the University of Zambia Library. The committee would aim at increasing awareness and education on preservation and conservation of library materials to the general public through relevant channels; the promotion of the implementation of preservation policies; promotion of communication and cooperation at local, national and international level; addressing national issues such as use of acid-free paper; and initiating research projects.

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## TABLE OF CONTENTS

<b>COPYRIGHT DECLARATION</b> .....	I
<b>DECLARATION</b> .....	II
<b>APPROVAL</b> .....	III
<b>DEDICATION</b> .....	IV
<b>ABSTRACT</b> .....	V
<b>ACKNOWLEDGEMENTS</b> .....	VII
<b>LIST OF FIGURES</b> .....	XIV
<b>LIST OF TABLES</b> .....	XV
<b>LIST OF ABBREVIATIONS AND ACRONYMS</b> .....	XVI
<b>OPERATIONAL DEFINITION OF TERMS</b> .....	XVIII
<b>CHAPTER ONE: INTRODUCTION</b> .....	1
<b>1.0 INTRODUCTION</b> .....	1
<b>1.1 HISTORY OF CONSERVATION OF PRINT AND NON-PRINT MATERIALS</b> .....	2
1.1.1 Ancient times .....	2
1.1.2 Modern times .....	3
<b>1.2 PRESERVATION AS THE RESPONSIBILITY OF THE LIBRARIANS</b> .....	4
<b>1.3 PRESERVATION AND CONSERVATION POLICY</b> .....	4
<b>1.4 THE ROLE OF THE INTERNATIONAL FEDERATION OF LIBRARY ASSOCIATIONS</b> ....	4
<b>1.5 THE ROLE OF NATIONAL LIBRARY ASSOCIATIONS</b> .....	5
<b>1.6 THE NEW TECHNOLOGIES AND PRESERVATION IN LIBRARIES</b> .....	6
<b>1.7 USER EDUCATION IN PRESERVATION OF LIBRARY MATERIALS</b> .....	7
<b>1.8 INSTITUTION CONTEXT</b> .....	7
1.8.1 The University of Zambia.....	7
1.8.2 Mission of UNZA.....	8
1.8.3 The University of Zambia Libraries .....	8
1.8.3.1 The Main Library .....	8

1.8.3.2	The Medical Library .....	9
1.8.3.3	Veterinary Medicine Library.....	9
1.8.3.4	Mission of UNZA Libraries.....	9
1.8.3.5	Library users.....	10
<b>1.9</b>	<b>PRESERVATION AND CONSERVATION INITIATIVES IN UNZA LIBRARIES .....</b>	<b>10</b>
1.9.1	The Bindery Unit.....	10
1.9.2	Reprographic Unit .....	11
1.9.3	Digitisation.....	11
1.9.4	Provision of functional air conditioners .....	12
1.9.5	Good housekeeping programmes .....	12
1.9.6	Disaster preparedness and security control measures .....	12
<b>1.10</b>	<b>CHALLENGES OF PRESERVING LIBRARY MATERIALS AT UNZA LIBRARIES .....</b>	<b>13</b>
<b>1.11</b>	<b>STATEMENT OF THE PROBLEM .....</b>	<b>13</b>
<b>1.12</b>	<b>OBJECTIVES OF THE STUDY .....</b>	<b>14</b>
<b>1.13</b>	<b>RESEARCH QUESTIONS .....</b>	<b>14</b>
<b>1.14</b>	<b>SIGNIFICANCE OF THE STUDY .....</b>	<b>15</b>
<b>1.15</b>	<b>SUMMARY .....</b>	<b>15</b>
	<b>CHAPTER TWO: LITERATURE REVIEW .....</b>	<b>16</b>
<b>2.0</b>	<b>INTRODUCTION .....</b>	<b>16</b>
<b>2.1</b>	<b>REVIEW OF PREVIOUS STUDIES ON PRESERVATION AND CONSERVATION .....</b>	<b>16</b>
<b>2.2</b>	<b>CONDITION OF LIBRARY MATERIALS.....</b>	<b>20</b>
<b>2.3</b>	<b>CAUSES OF DETERIORATION OF LIBRARY MATERIALS .....</b>	<b>22</b>
2.3.1	Deterioration of library materials caused by internal factors.....	22
2.3.2	Deterioration of library materials caused by external factors.....	22
2.3.2.1	Moisture/ relative humidity.....	22
2.3.2.2	Heat/temperature.....	23
2.3.2.3	Light.....	23

2.3.2.4	Pollutants.....	24
2.3.2.5	Biological factors .....	24
2.3.2.6	Handling of library materials.....	25
2.3.2.7	Mutilation, theft and vandalism of library materials.....	25
2.3.2.8	Disaster Preparedness and management in libraries .....	26
<b>2.4</b>	<b>PRESERVATION AND CONSERVATION TECHNIQUES AND PRACTICES .....</b>	<b>26</b>
2.4.1	Binding as a preservation strategy .....	26
2.4.2	Photocopying as a preservation strategy .....	27
2.4.3	Digitisation as preservation reformatting strategy .....	27
2.4.4	Microfilming as a preservation reformatting strategy .....	28
<b>2.5</b>	<b>ICTS AND PRESERVATION OF LIBRARY MATERIALS .....</b>	<b>28</b>
<b>2.6</b>	<b>PRESERVATION AND CONSERVATION POLICIES IN LIBRARIES.....</b>	<b>28</b>
<b>2.7</b>	<b>PRESERVATION AND CONSERVATION EDUCATION AND TRAINING .....</b>	<b>29</b>
<b>2.8</b>	<b>SUMMARY .....</b>	<b>30</b>
	<b>CHAPTER THREE: RESEARCH METHODOLOGY .....</b>	<b>31</b>
<b>3.0</b>	<b>INTRODUCTION .....</b>	<b>31</b>
<b>3.1</b>	<b>RESEARCH DESIGN .....</b>	<b>31</b>
<b>3.2</b>	<b>MIXED METHODS IN THIS RESEARCH.....</b>	<b>32</b>
<b>3.3</b>	<b>POPULATION .....</b>	<b>33</b>
<b>3.4</b>	<b>SAMPLING AND SAMPLE SIZE .....</b>	<b>34</b>
<b>3.5</b>	<b>RELIABILITY AND VALIDITY IN CASE STUDY MEASUREMENT.....</b>	<b>35</b>
<b>3.6</b>	<b>DATA COLLECTION INSTRUMENTS .....</b>	<b>36</b>
3.6.1	Questionnaires.....	36
3.6.1.1	Design of the questionnaires and layout.....	37
3.6.1.2	Pretesting the questionnaires.....	39
3.6.1.3	Administering the questionnaires.....	39

<b>3.7</b>	<b>INTERVIEWS</b> .....	39
3.7.1	Administering interviews.....	40
<b>3.8</b>	<b>OBSERVATION</b> .....	40
<b>3.9</b>	<b>PROCESSING AND ANALYSIS OF DATA</b> .....	41
3.9.1	Data coding .....	41
3.9.2	Computer processing.....	42
<b>3.10</b>	<b>ETHICAL CONSIDERATIONS</b> .....	42
<b>3.11</b>	<b>EVALUATION OF RESEARCH METHODOLOGIES</b> .....	43
<b>3.12</b>	<b>LIMITATIONS</b> .....	44
<b>3.13</b>	<b>SUMMARY</b> .....	44
	<b>CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS</b> .....	45
<b>4.0</b>	<b>INTRODUCTION</b> .....	45
<b>4.1</b>	<b>BACKGROUND INFORMATION OF RESPONDENTS</b> .....	45
4.1.1	Response rate .....	45
4.1.2	Library staff .....	46
4.1.3	Academic faculty.....	47
<b>4.2</b>	<b>GENERAL CONDITIONS OF LIBRARY MATERIALS</b> .....	48
<b>4.3</b>	<b>CAUSES OF DETERIORATION OF LIBRARY MATERIALS</b> .....	51
4.3.1	Handling and care.....	52
4.3.1.1	Control of temperature and relative humidity in the university libraries .....	52
4.3.1.2	Control of light in the university libraries .....	52
4.3.1.3	Pest management in the university libraries .....	52
4.3.1.4	Handling and storage of library materials.....	55
4.3.1.5	Disaster preparedness and management in the libraries.....	56
4.3.1.6	Security measures in the university libraries .....	57
<b>4.4</b>	<b>PRESERVATION AND CONSERVATION TECHNIQUES AND PRACTICES</b> .....	58
<b>4.5</b>	<b>WRITTEN PRESERVATION AND CONSERVATION POLICY</b> .....	59

<b>4.6</b>	<b>LIBRARY STAFF TRAINED IN PRESERVATION OF LIBRARY MATERIALS</b> .....	62
<b>4.7</b>	<b>FINDINGS OF EXAMINATION OF MATERIALS IN UNZA MAIN LIBRARY</b> .....	63
<b>4.8</b>	<b>FINDINGS FROM DOCUMENTARY REVIEWS AND OBSERVATIONS</b> .....	67
4.8.1	Circulation Desks .....	67
4.8.2	The Short Loan Section .....	68
4.8.3	Bindery Unit.....	68
4.8.4	Condition of a storeroom for damaged materials in the Bindery Unit.....	69
4.8.5	Disinfection and fumigation services .....	69
<b>4.9</b>	<b>SUMMARY OF RESPONDENTS’ COMMENTS</b> .....	70
<b>4.10</b>	<b>SUMMARY OF THE FINDINGS</b> .....	71
	<b>CHAPTER FIVE: INTERPRETATION AND DISCUSSION OF FINDINGS</b> .....	74
<b>5.0</b>	<b>INTRODUCTION</b> .....	74
<b>5.1</b>	<b>BACKGROUND INFORMATION OF RESPONDENTS</b> .....	74
<b>5.2</b>	<b>GENERAL CONDITIONS OF LIBRARY MATERIALS</b> .....	75
<b>5.3</b>	<b>CAUSES OF DETERIORATION OF LIBRARY MATERIALS</b> .....	77
5.3.1	Handling and care of library materials .....	81
5.3.1.1	Control of temperature and relative humidity in the University Libraries .....	81
5.3.1.2	Control of light in the storage environment in the university libraries .....	82
5.3.1.3	Control of pest management in the university libraries environment.....	83
5.3.1.4	Handling and storage of library Materials .....	85
5.3.1.5	Disaster preparedness and management in university libraries .....	87
5.3.1.6	Security measures in the University of Zambia Libraries .....	88
<b>5.4</b>	<b>PRESERVATION AND CONSERVATION TECHNIQUES AND PRACTICES</b> .....	90
<b>5.5</b>	<b>PRESERVATION AND CONSERVATION POLICY</b> .....	93
<b>5.6</b>	<b>TRAINING OF STAFF IN PRESERVATION TECHNIQUES AND PRACTICES</b> .....	95
<b>5.7</b>	<b>FINDINGS OF EXAMINATION, DOCUMENTARY REVIEWS AND OBSERVATIONS.</b> ...	97
<b>5.8</b>	<b>SUMMARY</b> .....	98

<b>CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>99</b>
<b>6.0 CONCLUSIONS .....</b>	<b>99</b>
<b>6.1 RECOMMENDATIONS .....</b>	<b>100</b>
<b>6.2 FURTHER RESEARCH.....</b>	<b>102</b>
<b>REFERENCES.....</b>	<b>103</b>
<b>APPENDIX 1: COVERING LETTER FOR LIBRARY STAFF QUESTIONNAIRE .....</b>	<b>108</b>
<b>APPENDIX 2: QUESTIONNAIRE FOR LIBRARY STAFF.....</b>	<b>109</b>
<b>APPENDIX 3: COVERING LETTER FOR ACADEMIC FACULTY QUESTIONNAIRE .....</b>	<b>114</b>
<b>APPENDIX 4: QUESTIONNAIRE FOR ACADEMIC STAFF.....</b>	<b>115</b>
<b>APPENDIX 5: INTERVIEW GUIDE FOR LIBRARY ADMINISTRATORS/ PROFESSIONALS....</b>	<b>117</b>
<b>APPENDIX 6: INTERVIEW GUIDE FOR BINDERY STAFF .....</b>	<b>118</b>
<b>APPENDIX 7: VARIOUS PHOTOS OF DAMAGED LIBRARY MATERIALS.....</b>	<b>119</b>

## **LIST OF FIGURES**

Figure 1: General condition of library materials.....	49
Figure 2: Extermination methods used .....	54
Figure 3: Written policy on preservation and conservation necessary .....	60
Figure 4: Some of the damaged books waiting to be repaired in the Main Library .....	118
Figure 5: Falling ceiling board due to rain water leakages in the Main Library .....	119
Figure 6: Some of the soaked library materials in the Main Library.....	120
Figure 7: Old model guillotine machine in the Bindery Unit.....	121

## **LIST OF TABLES**

Table 1: Distribution of respondents by age group.....	46
Table 2: Respondents' highest academic qualification.....	47
Table 3: Respondents' work experience .....	47
Table 4: Print Materials and non-print materials.....	50
Table 5: Frequency extermination of pests .....	54
Table 6: Frequency of general library cleaning .....	56
Table 7: Distribution of damaged print library materials.....	64
Table 8: Estimates of collections on sampled sections .....	66

## **LIST OF ABBREVIATIONS AND ACRONYMS**

AAU:	Association of African Universities
ACU:	Association of Commonwealth Universities
AGORA:	Access to Global Online Research in Agriculture
ALA:	American Library Association
CCTV:	Closed Circuit Television Cameras
CD:	Compact Disc
DB:	Deutsche Bucherei
DOS:	Disc Operating System
FINNIDA:	Finnish International Development Agency
HINARI:	Health InterNetwork Access to Research Initiative
HVAC:	Heating, Ventilation and Air-conditioning System
IAU:	International Association of the Universities
ICA:	International Council on Archives
ICTs:	Information Communication Technologies
IFLA:	International Federation of Library Associations and Institutions
IMCA:	Intermuseum Conservation Association
INERSOR:	Institute for Social and Economic Research
JICPA:	Joint International Committee on Preservation in Africa
LRCN:	Librarians' Registration Council of Nigeria
LIS:	Library and Information Studies
MARC:	Machine Readable Catalogue
MS:	Microsoft
ND:	Not Dated
NLA:	Nigerian Library Association
OPAC:	Online Public Access Catalogue

OSL:	Official Shelf List
PAC:	Preservation and Conservation
PERI:	Program for the Enhancement of Research Information
ROM:	Read On Memory
SLC:	Short Loan Collection
SPSS:	Statistical Package for Social Sciences
SSA:	Sub Saharan Africa
UK:	United Kingdom
UNESCO:	United Nations Educational, Scientific and Cultural Organisation
UNZA:	University of Zambia
UNZALIBS:	University of Zambia Library Server
USA:	United States of America
UTH:	University Teaching Hospital
UV:	Ultraviolet
WHO:	World Health Organisation
WWW:	World Wide Web
ZLA:	Zambia Library Association

## **OPERATIONAL DEFINITION OF TERMS**

<b>Conservation:</b>	Specific practices taken to slow deterioration and prolong the life of library materials by directly intervening in its physical or chemical make-up.
<b>Deterioration:</b>	In this study has been defined as a loss of quality in any library material which decreases its ability to carry out its intended function.
<b>Digital preservation:</b>	Long-term, error-free storage of digital information, with means for retrieval and interpretation for the entire time span the information is required for.
<b>Library materials:</b>	In this study refers to books, serials, audiovisual materials, computer databases, web sites, maps, microforms, etc.
<b>Microfilming:</b>	A photographic process of producing reduced images on a roll film, which usually require optical assistance to be read.
<b>Preservation:</b>	Includes all the managerial and financial considerations, including storage and accommodation provisions, staffing levels, policies, techniques and methods involved in preserving library and archival material and the information contained in them.
<b>Preservation policy:</b>	Outlines explicitly the responsibilities of the library profession for the preservation of library materials of all types in order to guarantee access to the information they contain, both for the current generation of library users and for generations to come.
<b>Technological obsolescence:</b>	The evolution of technology: as newer technologies appear, old ones cease to be used.

# CHAPTER ONE: INTRODUCTION

## 1.0 Introduction

Preservation and conservation of library materials is an exercise that every library should cultivate in order to extend the life span of library materials. Library materials such as books and documents are made from organic raw materials largely plants and animal skin. This makes them prone to decay and vulnerable to their environmental conditions; particularly the effects of pollutants and biological pests such as fungi, insects and rodents. The poor quality of the raw materials, particularly paper made from ground wood pulp, the use of alum-rosin sizes or the inappropriate tanning of binding leather, has exacerbated the problems (Ojo-Igbinoba, 1993).

Library materials are vital sources of information and as such they are made to be used, read and studied. This requires that library materials be accessible to users, thus subjecting them to handling. Any form of use will accelerate the deterioration of the item and, ultimately, its destruction if intervention does not occur (Rosenberg, 1995). Librarians who are responsible for the libraries have a professional duty to ensure that library materials within their collections are maintained in a condition appropriate to their use and their intrinsic value. This does not mean that all items must be, or should be, preserved indefinitely. At the local, national or international level, the resources are not normally available to enable all library materials to be preserved for posterity. It is necessary for librarians to determine policy for the preservation and conservation of their collections appropriate to the aims and objectives of the institution, the needs of users and the value of the individual items. Therefore, knowledge of the causes of deterioration of library materials is essential for all librarians and others who are concerned about the preservation and conservation of information stored in books and non-books formats.

Setting the context of the enormity of library materials' deterioration, it is instructive to consider the following statistics. According to Alegbeleye (1999), it is estimated that six million volumes in the Library of Congress have deteriorated so badly that they cannot be given to users without the risk of irreparable damage. Further, at the New York Public Library, it has been estimated that as much as half of the collection has reached advanced stages of disintegration. Furthermore, it has been reported that about one-fourth of the

volumes in large research libraries in the United States of America (USA) are described as brittle.

Akussah (1991) submitted that of the 2,511 total book acquisition of the University of Ghana in 1986, up to 600 physically disintegrating books were taken to the bindery section for repairs; and that there were still many more disintegrating books on the shelves that had not been identified. As Akussah (1991) observed, these depressing statistics may serve two functions; firstly, it may be consolation to librarians in other institutions who may be made to feel that their problems are unique. Secondly, the statistics show what problems are in store for librarians, regarding preservation and conservation of library materials. The statistics have forced the more forward-looking librarians to conduct surveys on the condition of their library materials as a preliminary step to taking preventive as well restorative action.

### **1.1 History of conservation of print and non-print materials**

Ojo-Igbinoba (1993) observed that in the international effort of preserving and conserving printed materials started in 1898 when the Prefect of the Vatican Library convened a Congress at St. Gall to examine ways and means of preventing, but not altogether stopping the deterioration of wood pulp paper. While solutions to preservation issues for paper-based library materials are relatively well understood, the preservation of digital resources, like the medium itself, is in its infancy (Jantz and Giarlo, 2005).

#### **1.1.1 Ancient times**

According to Gates (1976), before the twentieth century, conservation and preservation practices were based on good storage. For example, in Africa, scrolls were kept in cylindrical boxes of wood or ivory, clay pots or pitchers, or wrapped in cotton or linen cloth to guard against dust and humidity (Ojo-Igbinoba, 1993). Dark places, windowless rooms in the interior of houses were used to store materials to guard against the action of heat and light (Gates, 1976). Other preventive techniques that were used before the middle ages include storage in underground depositories or environments which existed in less publicised places in Africa as in other continents. Therefore, these ancient preservation and conservation techniques and practices seem to have been successful for documents discovered in ancient tombs, courts, palaces, pyramids, temples, churches, and mosques, which were found to be still in good conditions. For example, Ojo-Igbinoba (1993) reported the activities of universities in collecting Arabic manuscripts from all parts of West Africa and other parts of Africa.

### **1.1.2 Modern times**

Today, many organisations involved in preservation and conservation work are in existence. According to Ojo-Igbinoba (1993), the Institute di Patologia del Libro established in Rome in 1938 was the first scientific restoration centre for books. Similarly, in 1953, the Intermuseum Conservation Association (IMCA) was set up at Oberlin, Ohio, as a cooperative conservation effort in USA. Further, in 1957, the USA government established the Council on Library Resources, which funded the work of William James Barrow 1959 at Virginia State Library among others. Furthermore, the Library of Congress has since 1967 established a conservation research laboratory, which incorporates the Barrow Laboratory, the National Bureau of Standards and the U.S. National Archives (Pakala (1978). On the other hand, Ojo-Igbinoba (1993) reported that the British Library in 1976 appointed a Head of Conservation with overall responsibility for the binding and conservation of books and the overall preservation of its stock. Therefore, all these concerted efforts were being launched in many ways to conserve and preserve collections and to move towards actions to spread the “gospel” of preservation.

The birth of the electronic word has brought various preservation and conservation challenges. The vast and ever growing literature of digital preservation from the 1980s attests to the emergence of a set of problems associated with the long-term retention of digital objects, i.e. their permanence and usability in respect to access, maintenance of form and functionality and of content understandability (Rothenberg, 1995). The dangers of digital volatility both in terms of storage media permanence and of uncontrolled obsolescence of technology had been reflected in changes in operating systems, file formats, input and output devices, programming languages and software applications have been recognised as serious threats (Jantz and Giarlo, 2005) to the future of exponentially growing digital assets.

Mazikana (1993) observed that very few studies have focused on preservation in Africa. This could be the major reason why preservation management did not appear to occupy the centre stage in African university libraries. However, as Ojo-Igbinoba (1993) argued, African university libraries have learned a lot about conservation through publications, seminars and training facilities of these councils, associations, and research institutes. IFLA and UNESCO have furthered these interests, as discussed in section 1.4.

## **1.2 Preservation as the responsibility of the Librarians**

Preservation is not solely the domain of a few specialists, but a job for all librarians. The message must be clear that preservation is everyone's job and that it cuts across all library operations. A "preserving attitude" on the part of every library staff member is essential if the library as a whole is to come to terms with the awful pressure of deterioration of library materials (Olatokun, 2008). Encouraging the development of a common understanding of what constitutes preservation would improve communication among library staff involved in its functions. Helping library staff appreciate their roles in preservation would enable the library to better meet its preservation objectives. When preservation is viewed narrowly, it gets separated from the mainstream functions and becomes identified as someone else's domain. In other words, in the absence of preservation attitude, damaging practices will continue. In this regard, an informed library member of staff is worth infinitely more than all the information compiled in a report, or neatly filed in a cabinet marked "preservation." The Preservation Planning Programme can be an effective step in developing that informed staff (Mazikana, 1993). Therefore, libraries should establish an environment conducive to preservation changes, involve users, and create a common understanding among administration, and staff.

## **1.3 Preservation and conservation policy**

According to Chapman (1990), the starting point of conservation programmes is the creation of a policy document that specifies preventive measures to minimise deterioration of library materials in storage and handling; staff and user training programmes; housekeeping routines to clean, protect, and extend the life of materials; security measure and contingency plans for disaster control and recovery; substitution programmes; conservation treatment for repair of damaged originals; and procedures for exhibitions and loans. Preservation policies must not be formulated in isolation, but must be geared to the mission of an institution and should be integrated with other library policies, including collection and security policies. Preservation policies set out preservation needs and should provide a realistic framework for meeting those needs. Therefore, preservation and conservation policy should be the underlying basis that provides the rationale, justification, goals and objectives of planned preservation and conservation programme.

## **1.4 The role of the International Federation of Library Associations (IFLA)**

Internationally, the International Federation of Library Associations and Institutions (IFLA) has set up a core programme on preservation and conservation based at the Preservation

Office, Library of Congress, with regional centres in Germany and France. According to Pakala (1978), the Regional Centre in Germany established a restoration workshop at the Deutsche Bucherei (DB) in Leipzig in 1964 to translate research findings into the practice of large-scale preservation and restoration involving mechanisation and to improve cost benefit ratio for these operations. It provides training for interested parties from any part of the world. Another Centre in France was established at the Bibliotheque Nationale in 1979. Most university libraries in Francophone Africa normally send their personnel requiring training in conservation to the Bibliotheque Nationale. IFLA also encourages member associations to urge their national policy-making bodies to formulate national programmes for conservation and preservation of library materials (Ojo-Igbinoba, 1993).

Ojo-Igbinoba (1993) observed that for Africa south of the Sahara, the United Nations Educational Scientific and Cultural Organisation (UNESCO) has established, in cooperation with the Nigerian Federal Government, a centre for the training of Museum Technicians at Jos. The course is open to students from Africa south of the Sahara. Its programmes; at both the basic and advanced levels are pertinent to the training of conservation librarians, at least at middle management levels.

### **1.5 The role of National Library Associations**

The American Library Association (ALA) has many scholarly journals that publish articles on preservation topics, such as *College and Research Libraries*, *Information Technology and Libraries*, and *Library Resources and Technical Services* (American Library Association, 1992). Scholarly periodicals in this field from other publishers include *International Preservation News*, *Journal of the American Institute for Conservation*, and *Collection Management* among many others.

The national library associations in African countries south of the Sahara and north of Limpopo are in the vanguard of preservation and conservation (PAC) of library materials in their various countries (Ojo-Igbinoba, 1993). These associations do not seem to possess a coherent and articulate philosophy about PAC in their various countries. But as member states of IFLA, they have held state and national conferences on PAC. Symposia, lectures, seminars, and workshops have been held in an attempt to publicise the subject and formulate plans of action. Publications have been written by members, both academic and professionals in local and international periodicals. However, the only drawback they have suffered so far

is their inability to make any laudable marks on the home governments to establish guiding principles for formulating and implementing national programmes for PAC.

The above situation had arisen out of lack of legal recognition of these library professional associations by the various African governments. With the exception of a few countries like Ghana (Alemna, 1991) and Zimbabwe (Pakiri, 1989) several national associations are not legally recognized. However, the latest example of the recognised national library association which could be cited in Africa is that of the Nigerian Library Association (NLA). According to the Decree Number 12 of 1995 passed by the Council of Nigerian Act, NLA determines who is a librarian; maintain discipline within the profession (Okojie, 1995). It also determines standards of knowledge and skills to be attained by persons seeking to become registered by Librarians' Registration Council of Nigeria (LRCN) as librarians and maintain a register of librarians in the country.

However, an attempt toward library legislation was made in 1978 by the Zambia Library Association (ZLA) but could not go through due largely to the fact that the policy-makers did not seem to understand, let alone appreciate the profession's past, present, or possible future contribution to society (Phiri, 1981). It is therefore, imperative that librarians in Africa follow the example of Nigeria; they must lobby to get legislation enacted, as recognition by the government raises the prestige and morale of the members.

### **1.6 The new technologies and preservation in libraries**

With old media deteriorating or showing their vulnerabilities and new media becoming available, research remains active in the field of conservation and preservation. Everything from how to preserve paper media to creating and maintaining electronic resources is being explored by students and professionals in library and information studies (LIS). The three main issues that most libraries tend to face are the rapid disintegration of acidic paper, careless handling, and water damage (due to roof leakages and plumbing problems). Olatokun (2008) argued that digital technology holds great promise for the world's research libraries, for it could revolutionise how the information will be captured, stored, preserved, and accessed. Through digitisation and reformatting, librarians are able to retain materials while at the same time adapting to new methods. In this way, libraries can adapt to the changes in user needs without changing the quality of the materials themselves. While this does not mean that Gutenberg is dead, or that paper will become unknown in the next century, librarians should try hard to grasp the fact that new technology adds a complex and

challenging factor to preservation. Therefore, until these concerns associated with maintaining long-term accessibility to material stored in digital form can be resolved; many libraries are loath to initiate digital projects beyond the pilot phase.

### **1.7 User education in Preservation of library materials**

The education of users is difficult to achieve in the libraries. In fact, one of the biggest challenges in the field of preservation and conservation today is educating a library's community, especially librarians and other staff, in the best ways to handle library materials as well as the conditions in which particular materials will decay the least. Adcock (1998) warned that there should be no eating and drinking within collection areas. The library staff must confine the consumption, disposal and storage of food away from collections; as there is the risk of spillage as well as attracting pests and insects, which can prove very damaging to collections primarily made up of organic materials. Therefore, in libraries where user education was active; it has assisted in the successful implementation of conservation policies.

### **1.8 Institution context**

#### **1.8.1 The University of Zambia**

The University of Zambia (UNZA) is Zambia's oldest and largest university, founded in 1966. UNZA is divided into nine schools, that is, Agricultural Sciences, Education, Engineering, Humanities and Social Sciences, Law, Medicine, Mines, Natural Sciences, and Veterinary Medicine and offers diploma and first degree as well as postgraduate programmes (University of Zambia, 2009b).

Its main campus, the Great East Road Campus, is located on the Great East Road, about seven kilometres from Lusaka City. It also has the Ridgeway Campus within Lusaka City located at the University Teaching Hospital (UTH); this campus specifically houses students pursuing medical, nursing and pharmacological and health related courses. The University of Zambia has other facilities such as the Institute for Social and Economic Research (INESOR) located at Munali and the Institute of Distance Education located within the Main Campus in the School of Education (University of Zambia, 2009b).

UNZA is a member of the Association of African Universities (AAU), the Association of Commonwealth Universities (ACU), and the International Association of the Universities (IAU). The University derives a major share of its income from an annual government grant

based on a formula that involves staff-student ratios, student fees, and income generating undertakings (University of Zambia, 2009b).

### **1.8.2 Mission of UNZA**

According to UNZA (2009b) in its Strategic Plan, the University of Zambia's mission is to be a centre of excellence in higher education for individuals, industry and society through the provision of quality education, research and scholarly programmes for strategic human resource development, in order to promote national and regional development, through relevant and appropriate partnerships.

### **1.8.3 The University of Zambia Libraries**

The library is the backbone of any educational institution. A well-equipped library is therefore very vital to education and general information to the users. This is why the thought of stocking the library with adequate information resource materials such as books and non-book forms readily comes to mind when an institution is to be established.

The University of Zambia Libraries are managed as a unified service at the University level (University of Zambia, 2009b). The University Library system consists of three libraries namely, the Main Library, the Veterinary Medicine Library and the Medical Library. The library system has continued to provide the required services to support the core business of the University of Zambia through availing their services to the user community for teaching, learning, and public service. As its major goal, the University of Zambia library system focuses its attention on the improvement of access to current information through acquisition and accessing up-to-date information resources through any type of media. From the foregoing, it is therefore imperative to preserve and conserve the library materials.

#### **1.8.3.1 The Main Library**

The Main Library was opened in 1969. The present library building was built by the financial investment made through public funds and was opened on 27<sup>th</sup> August 1969. The Main Library was declared a National Reference Library for Zambia on official opening on 27<sup>th</sup> August 1969 (Mwacalimba, n.d) and is as such open to the general public. The library building was designed to hold 300,000 volumes and to seat 1,600 readers. Most of the materials in the collection are reference materials, which are readily available on an open-access basis. The Library is also a repository for printed official documents of the United Nations and its agencies (University of Zambia, 2009b). Other collections include government documents, *Zambiana*, including oral history and archival materials. In addition,

accessioned volumes include items taken over from other libraries of former international organisations' publications.

The Library regularly conducts user education for undergraduate and postgraduate students and academic staff on access to online databases and free electronic resources. Under the Programme for the Enhancement of Research Information (PERI), the International Network for the Availability of Scientific Publications (INASP) currently sponsors several online databases for academic institutions in Zambia (University of Zambia, 2009b). The University of Zambia Library is the current coordinator of this programme within the University and to other institutions.

### **1.8.3.2 The Medical Library**

This branch is located at the University Teaching Hospital on Nationalist Road. The Library does not only serve the staff and students in the School of Medicine, but also the senior medical and Para-medical staff of the hospital. It has a seating capacity of 180 readers. It holds over 40,000 printed volumes and has an extensive range of high quality electronic resources, which can be accessed through the Health InterNetwork Access to Research Initiative (HINARI) programme; as well as Program for Enhancement of Research Information (PERI). Currently the Library receives 290 periodical titles by purchase or by regular gift (University of Zambia, 2009b). In addition, it acts as a repository for the printed official documents of the World Health Organisation (WHO) and other agencies.

### **1.8.3.3 Veterinary Medicine Library**

The Veterinary Library was established in 1986 to serve the Samora Machel School of Veterinary Medicine students. It holds 10,000 print and electronic volumes covering veterinary medicine and other related subjects. It is designated to seat 42 persons. It has access to Access to Global Online Research in Agriculture (AGORA) and Program for Enhancement of Research Information (PERI).

### **1.8.3.4 Mission of UNZA Libraries**

The Libraries share one mission statement whose main aim is to make the resources available and useful to the entire university community and the Zambian people and to sustain and preserve a universal collection of knowledge and creativity for future generations (University of Zambia, 2009b). The fundamental functions of the libraries are closely linked to the basic functions of the University namely, to conserve and preserve the existing knowledge; to transmit knowledge through teaching, and to create new knowledge through research. The

Libraries are, therefore, the University's principal instruments in the preservation and conservation of knowledge through their rational, systematic and comprehensive acquisition of all types of human communications records, published and unpublished, written or oral in recorded form, that embody the ideas of the past, present and future.

#### **1.8.3.5 Library users**

Given the varied kinds of collections at the University of Zambia Libraries, they attract a lot of users who constantly consult the information materials. The main users of the university libraries are undergraduate students and postgraduate students, members of the Academic and Administrative staff, as well as external researchers. For example, as at first semester 2009 academic year, a total of 13 248 students were enrolled (Dean of students Affairs Annual Report, 2009a). Out of the total number of 13 248, 12 830 students were undergraduate and only 418 were graduate students. In terms of distance students, the records in the Office of Readers Services Librarian show that for 2010/2011 academic year, a total of 1,400 plus students were enrolled. With all the categories of material being constantly used, the collections were prone to poor handling, damage, and deterioration, in addition to environmental factors that favour infestation of insects and rodents leading to loss of information. It is therefore, important that preservation measures are taken to ensure that the information continues to be accessible and the originals preserved for future reference and research.

### **1.9 Preservation and conservation initiatives in UNZA Libraries**

At the University of Zambia, issues concerning preservation and conservation of library materials are centrally done at the Main Library. Since the inception of the University of Zambia Library, a lot of safety measures have been put in place to ensure that the Library resources are well preserved and conserved. These preservation and conservation methods can be divided into the following sub-headings:

#### **1.9.1 The Bindery Unit**

The establishment of a functional bindery unit was, among many other preservation and conservation initiatives that were put in place by the Library Management. The Bindery Unit is located in the Main Library at the University of Zambia Main Campus and is managed by one professional and five assistants or paraprofessionals. Kanyengo (2009) observed that preservation and conservation of all library materials, except for electronic information at the University of Zambia Library is delegated to the bindery unit. This Unit is responsible for

mending damaged books and journals for all the three university libraries. The Unit also accepts minor repairs and binding of student's projects at a minimum fee. Hence, the unit also generates funds for the Library.

### **1.9.2 Reprographic Unit**

Microfilming facility was another preservation initiative that the University of Zambia Library Management had established in its endeavour to preserve and conserve library materials. The microfilming facility was located within the Reprographic Unit in the Main Library. This preservation facility was responsible for preserving and conserving library materials that were vulnerable to damage and loss through constant handling and poor environmental conditions as well as to facilitate access to endangered research materials (Olatokun, 2008). Another preservation initiative that was put in place by the Library Management was a photocopying service. Photocopying preservation was done in the libraries to reduce usage of the restricted original materials.

### **1.9.3 Digitisation**

Digitisation of library materials has always been attributed to fragility and ephemeral nature of the archival print materials. This process has released content from its media or carrier and is considered one facet of digital preservation (Ngulube, 2003). The component characteristics of digitisation is that it helps to preserve unique collections, provide faster access to information, facilitate dealing with data from more than one location, and enhance distributed learning environments. As a result, traditional libraries, which were known as repositories of knowledge, have now become accessible in database form; the Internet and the Web are making knowledge universal and linked internationally.

This is certainly the case in the University of Zambia Libraries. The traditional library catalogues and other services have been migrated to the Web for global reach and access.

For example, an institutional repository database has been constructed and is already operational, going by the name of the University of Zambia Research Repository Online. This service which is maintained by the University Main Library, apart from digitally preserving the University's intellectual output, will increase the visibility of UNZA's research; help reach worldwide audience through exposure to search engines such as Google.

#### **1.9.4 Provision of functional air conditioners**

Functional air conditioners help to lower the temperature and relative humidity of the libraries. The importance of air conditioning system in the university libraries was meant to encourage cross ventilation and also to deny the agents of deterioration the needed high temperature (heat) and relative humidity (moisture) they needed to initiate deterioration of library materials (Patkus, 1999). Apart from the installation of the air conditioners, a standby generator was also installed at the Main Library to ensure that the air conditioners were operational even when there was power failure.

#### **1.9.5 Good housekeeping programmes**

The University Library Management over years had maintained a deliberate policy of good housekeeping, i.e. frequent cleaning of library collections, washing of floors, shelves and furniture. This policy was meant to reduce the effect of dust on library collections thereby prolonging the life span of the library materials in the university libraries.

Good housekeeping in the university libraries also included seasonal application of insecticides and rat poison in order to exterminate rats, cockroaches and other insects, which could cause serious threats to library materials. In a study, Shuhaimi (1986) observed that libraries provide quiet and darkened homes full of good nourishing food for insects. Therefore, the University Library Management usually applies rodenticides and insecticides in order to exterminate the biological agents. Further, in the initial plans to preserve and conserve library materials, the University Library Management had included a fumigation facility. Fumigation is the process of exposing documents to chemical fumes known as fumigants in order to combat biological infestation of library materials. Fumigants have been discovered to be very effective means of controlling pests, which are inside the pages of books in most university libraries. In addition, the Library Management formulated rules and regulations which were meant to forbid library users to bring food items into the libraries and need to prevent mishandling, mutilation and theft of library materials. Therefore, these preservation and conservation techniques and practices were put in the university libraries in order to prolong the life span of library materials.

#### **1.9.6 Disaster preparedness and security control measures**

In response to the emergency measures required in most modern libraries, the Main Library building was provided with fire exits and fire extinguishers. However, preservation of library materials with no security measures to minimise thefts can lead to the loss of all the vital

materials kept in the libraries. In order to prevent break-ins, security surveillance systems were installed in the university Libraries (University of Zambia, 2009b). A major impact of this activity had resulted in “zero” break-ins. On the other hand, the Main and Medical Libraries had acquired book detection systems in order to reduce incidents of library materials pilferage. The Veterinary Library was yet to be equipped with a book detection system.

### **1.10 Challenges of preserving library materials at UNZA Libraries**

Library materials should be preserved and conserved in the academic libraries because there has been a drastic reduction in the allocation of funds for library materials, limiting the library’s ability to acquire new materials such as books and journals, which carry the latest findings by researchers, are the worst hit (Simui and Kanyengo, 2003). This makes preservation of existing collections essential. Further, more than 90 percent of library materials are foreign publications. The high foreign exchange rate is a problem, and therefore librarians must preserve materials they have already acquired. In this regard, library materials must last as long as possible, and preserved for active use for the next generation.

Preservation and conservation of library materials faces two challenges in the University of Zambia Libraries. The first challenge is how to cope with the resources and facilities that the libraries currently have. The second challenge is to ensure that steps are taken to prevent the same mistakes from happening again. In other words, the libraries are faced with the impending deterioration of present collections on one hand and with preventing deterioration of future collections on the other. The first challenge is probably the most expensive and overwhelming. The second is more manageable.

### **1.11 Statement of the problem**

Deterioration of library materials in university libraries has been established in the literature as a universal phenomenon. While these materials are negatively affected by natural and human factors, observations and experience have shown that they were more vulnerable to decay and damage by climatic and environmental factors leading to loss of information. The library materials in the University of Zambia Libraries were not only acquired with scarce financial resources, but were processed, catalogued, and organised before they were made ready for consultation and use for learning and research purposes.

It is therefore expected that their preservation and conservation is a matter of priority. However, library shelves in the University of Zambia Libraries are filled with books and

journals at varying levels of deterioration. Since low cost measures are available to prevent damage to the materials, why then are information resources in the University of Zambia Libraries not properly preserved? Could lack of knowledge of preservation and conservation issues by staff or attitude towards preservation and conservation be responsible for this situation? This is what this study aims to investigate.

### **1.12 Objectives of the study**

The study explored the preservation and conservation of library materials, practices and techniques used, problems and challenges affecting library materials at the University of Zambia Libraries in order to provide direction or guidance on preservation and conservation issues.

The specific objectives of the study were:

1. To explore the existing state of library materials;
2. To investigate the cause of deterioration of library materials;
3. To assess the activities and techniques used in preservation and conservation of library materials;
4. To identify and discuss existing policies on preservation and conservation of library materials; and
5. To establish the level of skills and experience in preservation and conservation management.

### **1.13 Research questions**

Rephrasing the research objectives outlined in section 1.12 generated the research questions. Thus, the following research questions guided the study:

1. What is the existing deterioration state of library materials in the University of Zambia Libraries?
2. What are the causes of deterioration of library materials in the University of Zambia Libraries?
3. What are the activities and techniques used in the preservation and conservation of library materials in the University of Zambia Libraries?
4. Does the University of Zambia Library have a policy document on preservation conservation of library materials?

5. What is the level of skills in preservation and conservation management in the University of Zambia Libraries?

#### **1.14 Significance of the study**

The study hopes to raise awareness of the importance of preserving and conserving of library materials by the library staff in the University of Zambia Libraries. It is further hoped that the information generated from the study might contribute to improving preservation and conservation practices and techniques that already existed in the University of Zambia Libraries. Finally, it is hoped that the study might stimulate the initiation of in-service training programmes at the University of Zambia Library for library staff and Library Administrators in order for them to effectively participate in the day-to-day care of library resources.

#### **1.15 Summary**

This chapter has established that preservation and conservation of library materials is still one of the major problems facing libraries throughout the world. As a result, preservation and conservation management has remained the subject at many national, regional, and international organizations meetings. The fact that the subject is discussed repeatedly is a reliable indication that problems remain unsolved.

While considerable efforts have been devoted to research on deterioration of library materials in Europe and United States of America (USA), there is paucity of such information on library materials in Africa in general and Zambia in particular. The sharp drop in the rate of acquisition of library materials by university libraries in Africa is due to declining financial resources in recent years against the increased enrolments of students. It is against this background that the university libraries should preserve and conserve what they already have in their collections.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.0 Introduction**

This chapter provides an insight into studies that have been carried out by various authors on preservation and conservation of library materials. The chapter is divided into five sections, including the summary. The first section reviews some of the previous researches done on preservation and conservation of library materials in general. The second section deals with preservation and conservation management issues in university libraries. The third section discusses causes of deterioration of library materials, such as internal and external factors. Therefore, biological, chemical, environmental, and physical factors, handling of materials and disaster preparedness plans would be discussed at this stage. The fourth section deals with preventive preservation and conservation aspect of library information resources. The fifth section briefly highlights common preservation strategies (binding, photocopying, digitisation, and microfilming). The sixth section looks at education and training in preservation and conservation in Africa. Lastly, a summary is given at the end.

### **2.1 Review of previous studies on preservation and conservation**

Some previous studies on preservation and conservation of library materials are dealt with in this section. The studies that are reviewed in this section include those studies carried out in other parts of the world and Africa. The review deals with studies that were done in United Kingdom (UK), USA, Canada and Africa and concludes with studies carried out in more than one region of the world.

Eden and Feather (1997) carried out a study in the United Kingdom (UK) that was to get “recent and detailed information” about preservation management in archives in UK archives. The objective of their study was to analyse the existing preservation policies and practices in archives as well as obtain data on preservation policies in archives comparable with that already obtained for libraries (Eden and Feather, 1997). The study was based on a questionnaire survey of 290 archives and records offices, visits to archives and libraries as well as interviews with archivists and conservators. The aspects of preservation covered by the study were preservation policies and strategies, environmental control, housekeeping activities, training in the handling of archival materials (patrons and staff), security, disaster management and access (Eden and Feather, 1997).

The study revealed that in order to make better use of scarce resources, preservation surveys of nationally important collections were essential. The study concluded that there was need

for a national preservation strategy because the preservation of the documentary materials could no longer be left at the mercy of individual organisations (Eden and Feather, 1997).

On the other hand, as a result of a lack of information about the preservation of library and archives materials in Massachusetts libraries and records repositories, Trinkaus-Randall (1990) carried out a survey to determine the preservation needs of public, academic and special libraries, manuscript repositories, historical societies and town clerks' offices. Data for the State of Massachusetts survey was collected by means of a questionnaire that was mailed to 1100 institutions (Trinkaus-Randall, 1990). Nine hundred and sixty (87%) respondents returned completed surveys. The survey results revealed that some buildings did not have any security measures in place. The findings indicated that 70% of the institutions could not maintain a constant climate throughout the whole year and most respondents knew very little about the effect of the environment on their collections. In terms of disaster preparedness, the study findings revealed that 93% had fire extinguishers, 60% reported having smoke detectors, 44% had heat detectors and 25% had sprinkler systems. Forty six percent of the respondents' fire detection systems were not connected to the local fire department. However, on preservation issues, the findings showed that preservation plans were nonexistent, whilst 21% of the respondents used microfilm for preservation (Trinkaus-Randall, 1990).

Ovowoh (2010) carried out a study to assess the preservation and conservation programmes and activities in libraries in Nigeria. The study was designed to investigate the preservation and conservation of library materials in higher education institution libraries in Nigeria. A survey was used to gather data on preservation and conservation of information bearing materials in Delta State University, Abraka (DEISU) and Petroleum Training Institute (PTI) Library, Effurun. The population of this study covered staff of DELSU and PTI. A total of 50 staff was chosen from the two libraries for the study. The study findings revealed that there was no written policy in the higher education institutions studied, and decisions on preservation and conservation were arbitrarily and inconsistent. Further, the findings revealed that all respondents confirmed that there was need to have such a policy and that the policy should spell out the percentage of the budget to be used for preservation and conservation programme. The findings also showed that there were no personnel trained in preservation and conservation of library materials, but all the libraries accepted that non-professionals had received some training in general librarianship. However, as argued by Ovowoh (2010), the

job of preservation of library resources cannot be left in the hands of only professionals, because awareness and concern for preservation was the responsibility of all.

Asiamah (2008) carried out a case study of the Kwame Nkrumah University of Science and Technology Main Library in Ghana. The study was on preserving of print and non-print library materials. The findings revealed that physical building, storage practices, pollution, light and biological agents, security of library materials as well as the poor handling of library materials were the major constraints that the university library faced in the area of preservation and conservation of library materials. Therefore, proper preservation was necessary because documents were susceptible to both inherent and environmental factors.

Another study was conducted by Olatokun (2008) on the various techniques used in the preservation and conservation of library materials in selected universities in Nigeria. It particularly examined the causes and nature of deterioration, patterns and strategies used to control the causes of deterioration, existence of preservation and conservation policies and constraints limiting effective preservation and conservation. The findings of the study revealed that preservation and conservation techniques, though adopted in the university libraries were not effectively used. The study findings also revealed that cleaning and dusting of library materials was the commonly used technique. The study established that there were indeed incidences of deterioration and the most prominent of them all were books becoming torn, while cracking and scratching were noticed on non-print library materials. Further, the results showed that though some of the libraries adopted and used some digital preservation techniques, they were still not effectively used. Furthermore, the findings revealed that inadequate funding was the most severe inhibitor to effective preservation and conservation activities in the university libraries.

Arnoult (1986) conducted a survey on the state of preservation and restoration of archives and library materials in Kenya. The study concluded that there were no consistent policies on the preservation and conservation of materials. The collections were housed in rooms with leaking roofs, insecure doors and large unprotected windows, and were poorly maintained. The study further concluded that most environmental factors (for example, temperature and humidity) were not controlled and monitored in the repositories and stack rooms; and disaster management plans were conspicuously absent (Arnoult, 1986).

On the other hand, Khayundi's (1995) study in eastern and southern Africa, excluding South Africa and Namibia, sought information on stock, buildings, environmental control,

preservation facilities, personnel, handling and budgetary provisions. The study findings revealed that most collections were not housed in purpose-built buildings and that very few countries had environmental control systems. Though most libraries and archival institutions had preservation facilities such as a bindery, a restoration workshop and photographic laboratory, there was an acute shortage of trained staff in the field of preservation and conservation. Furthermore, the study revealed that mishandling of materials was rife; preservation was given a low budgetary priority; most countries had no policy documents spelling out preservation policies; and lack and unavailability of relevant literature denied staff running preservation programmes the opportunity to update their skills and knowledge (Khayundi, 1995).

At the international level, the International Council on Archives (ICA), the International Federation of Library Associations and Institutions (IFLA) and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) had commissioned some studies on preservation (Clements, 1987; Seton, 1984). One such study was conducted by Seton (1984), which surveyed private archives located in a wide variety of repositories in 28 countries in all parts of the world. The population of the study was selected member states of UNESCO. Data for the study were gathered through the use of a 30-item questionnaire sent to 65 institutions, records, offices, libraries and museums “thought to have holdings of private archives and manuscripts”. Of the 39 institutions that responded 6 were from Africa (that was, two from Kenya and one each from Nigeria, Senegal, Zambia and Zimbabwe). Further, the study findings revealed that the problems faced by most libraries and archives were similar and these included inadequate buildings and equipment, lack of an effectively functioning national library and archival system, lack of trained staff, lack of funds and low staff morale (Seton, 1984).

Similarly, Clements (1987) carried out an international study to assess the state of the world patrimony. Some 850 questionnaires were sent to 300 archives and 550 libraries and 417 (49%) replies were received. As a follow up to the questionnaire, selected experts in preservation visited twelve countries in various parts of the world in order to refine the results of the survey and to collect more detailed information. Out of the twelve countries that were visited four were from Africa, namely, Kenya, Gabon, Sudan and Tunisia. The study findings showed that most of library materials were housed in unsuitable buildings where, environmental control and monitoring were neglected, and the collections were infested with pests. Despite the fact that many of the institutions surveyed had in place rules of handling

materials, it was discovered that improper handling of print library materials during photocopying was the major cause of deterioration of documents. Furthermore, the findings revealed that there were lack of preservation of library resources and information on preservation because they were no properly trained staff (Clemets, 1987).

Although there has been no empirical research that has been carried out in Zambia on preservation and conservation of library materials, Kanyengo (2009) wrote an article on preservation and conservation of information resources in the University of Zambia Main Library. This article has brought to the fore several issues that require an empirical research that would provide indepth understanding of the issues critical to the preservation and conservation of library materials in the University of Zambia Libraries. This research was carried out to fill the gap of a lack of data and empirical studies on preservation and conservation management in the university libraries.

This literature review might not be exhaustive in identifying all studies on preservation and conservation due to limited access to relevant literature in Zambia. The lack of research in library collection preservation partly explains why there is limited reliable information about preservation in libraries in Zambia. However, some of the observations made by different authors of previous studies reviewed in this study could apply to the University of Zambia Libraries as well. Therefore, these studies have shed some light on preservation and conservation problems in libraries in general and in African university libraries in particular.

## **2.2 Condition of library materials**

University libraries acquire materials to support learning, teaching and research needs of the universities. But all physical formats of library materials, from paper to magnetic tapes, will decay over time. According to the National Library of Australia (2004), deterioration of library materials was of the major crises facing libraries throughout the world. In this regard, it is the responsibility of the library staff to keep these materials in good physical condition so that they are made available for users at all times. Unless preservation and conservation of library materials is done to stop the deterioration process, library collections deteriorate and will continue to deteriorate. Many of the materials been destroyed by deterioration are very expensive to acquire and more importantly, contain vital information, which may not be acquired again in the university libraries once lost to the agents of deterioration. Preservation is the action taken to anticipate, prevent, stop, or slow deterioration, while conservation is an act of preservation, protecting and shielding material from destructive influences that shorten

their life span (Olatokun, 2008). Preservation and conservation should be part of collection management strategies in university libraries because it supports current and future access to recorded information. This is a battle that has to be waged against the deterioration of the library materials. Therefore, preservation and conservation of the library materials is imperative.

There is an old adage that “Prevention is better than Cure”. The same is true for the science of preservation. The surest way to preserve your books in good health is to treat them as you would your own children, who are sure to get sick if confined in an atmosphere which is impure, too hot, too cold, too damp or too dry. Preventive conservation is the practice of keeping the library materials in a healthy, good and usable condition.

Senapati and Nagta (1996) identified the need for preventive measures in conservation and preservation of library materials and records. These included proper housing of documents, protection against heat, humidity, light, air pollution, dust, insects, fungi, fire, water, and mishandling. They suggested inclusion of conservation and preservation in library education and training. Similarly, Alegbeleye (1999) advocated a preventive conservation and preservation approach in African countries, which should focus on improving the environment, controlling light, temperature, humidity, and pollution. Mazikana (1993) was of the view that all libraries needed to preserve and conserve their collections against deterioration from a variety of sources including chemical and biological threat, as well as physical damage through handling. Reilly, Nishimura and Zinn (1995) identified the basic factors affecting magnetic tapes; as temperature and humidity, unfavourable storage conditions, dust, and moisture.

Swan (1981) discussed preservation of photographs, and advised librarians, archivists, and curators on the care of photographic collections, including environmental control and proper preparation of materials for handling. Olatokun (2008) identified dust, water, and insects as the factors that affected non-book materials. He recommended that library materials should be cleaned regularly to remove dust, kept away from water, which could cause the materials to corrode, and kept away from insects. Further, he identified dampness, poor ventilation, which could cause mould and fungi attacks on documents, high temperature and humidity, aerosols and noxious gases from polluted air, insect and rodent infestations, as enemies of non-print materials. Electronic or electric machinery could be an enemy to magnetic tape, because they could generate magnetic currents. He therefore recommended that magnetic

tapes should be stored in cardboard or inert plastic and be rewound at least once a year. Therefore, library preservation is faced with the double tasks of making information accessible and at the same time ensuring its ultimate survival.

### **2.3 Causes of deterioration of library materials**

Any librarian responsible for the preservation and conservation of library materials should know the various causes of deterioration of library materials and the possible techniques and practices for their preservation and conservation. Deterioration, which can be, defined in this context as a loss of quality in any library material, which decreases its ability to carryout, its intended function (Nwokedi and Nedosa, 1999); is the result of two categories of actions on library materials: those caused by some inherent instability of the materials or internal factors; and those caused by actions external to the materials or external factors. The following section discusses some of the causes of deterioration.

#### **2.3.1 Deterioration of library materials caused by internal factors**

Directly related to the internal factors of deterioration of library materials includes the acidic nature of some kinds of paper and the light-sensitive nature of the silver halide image-bearing layer of a photograph. Nwokedi and Nedosa (1999) submitted that until the 18<sup>th</sup> century, paper that was produced was highly acidic in content. They further explained that the more acidic a paper was, the more likely it would deteriorate fast. Therefore, comparatively, papers that have low acidic contents remain in good condition for a longer time before they deteriorates. This observation by Nwokedi and Nedosa (1999) corroborates the works of Alegbeleye (1999) and Owowoh (2010).

#### **2.3.2 Deterioration of library materials caused by external factors**

According to Shuhaimi (1986), the main elements of this type of deterioration are the actions of moisture, heat, light, pollutants, biological agents such as moulds, insects and rodents, handling, human factors such as theft and vandalism and natural disasters.

##### **2.3.2.1 Moisture/ relative humidity**

Moisture works for and against the preservation of library materials (Shuhaimi, 1986). A certain amount of moisture is necessary for flexibility in paper. Too little moisture makes paper brittle while excess encourages mould growth. High humidity and temperature accelerates the failure of adhesives. Patkus (1999) also observed that the naturally high humidity in tropical and subtropical regions of the world is the greatest concern to librarians. He argued that although fungi can be destroyed by high temperature, for example, the oven,

heat and fungicides, the most effective treatment is to control the moisture, which is necessary for their growth.

### **2.3.2.2 Heat/temperature**

Heat, food and moisture are the three conditions for microbial growth and these accelerate the chemical deterioration of paper (Lee et al, 2002). Computers, motion picture films, photographs are sensitive to changes in temperature like audiotapes and discs. Lee et al (2002) argued that films, tapes and records were thermoplastics in nature and could soften when heated and harden when cooled. Cellulose fibres are deteriorated by hydrolysis, that is, decomposition by chemical reaction with water, oxidation and photosynthesis and each of the processes is accelerated by heat in the presence of minute quantities of iron, copper and other impurities, which are always found in paper. Reilly, Nishimura and Zinn (1995) explained that if paper materials were stored at lower temperature, their life expectancy would be significantly lengthened. To this effect, studies have shown that most paper-based materials stored at 22° C and 50% relative humidity would have an approximate lifetime of 33 years, but if the temperature were lowered to 16° C and the humidity to 40%, such materials would have a lifetime of 88 years (Reilly, Nishimura and Zinn, 1995). Similarly, if materials were to be subjected to high temperatures and humidities (such as 28° C and 75% relative humidity) noticeable deterioration would occur in nine years or less. Furthermore, Reilly, Nishimura and Zinn (1995) demonstrated that if temperature and relative humidity were kept at either 14°C or 50% or 16° C and 35%, the materials would have a lifetime of close to 100 years. This implies that low temperature areas in the library prolong the life span of library materials.

### **2.3.2.3 Light**

All library materials are light sensitive. Photosensitised deterioration occurs in ultra violet and low visible light range. Shuhaimi (1986) pointed out that ultraviolet radiation and visible light cause fading, discolouration, and embrittlement to library and information resource materials. Artificial light is least destructive; it takes a little longer to degrade paper materials. However, light damages could be minimised by reducing the quantity of light falling on any of the information resources. The quantity of light transmitted by windows can be controlled with tinted glass and curtains.

#### **2.3.2.4 Pollutants**

Shuhaimi (1986) observed that dust and dirt are sources of both physical and chemical deterioration of the library collection. Dust acts as a nucleus around which moisture collects and this moisture provides the necessary humidity for the growth of micro-organisms and chemical reaction, which leads to the formation of acids. Further, since dust and dirt are of solid particles of varying size and hardness they exert abrasion on the surface of non-print materials and cause paper-based materials become discoloured and brittle. Dust usually enters the library through doors and windows, which in turn aid fast deterioration of library resources. In order to control pollutants, it is vitally important that an overall policy of cleaning and tidying is maintained in the libraries.

#### **2.3.2.5 Biological factors**

Ojo-Igbinoba (1993) argued that the biological factors that might impact library materials included the activities of microorganisms, insects and rodents. These organisms were known to cause great damage to library resources especially in Africa. Plumbe (1964) described Africa as a headquarters for termites. He further argued that termites were causing more damage to books and documents in Sub-Saharan Africa than time, wind, fire, flood and climatic conditions combined (Plumbe, 1964). Therefore, regular inspection of the libraries and their contents would easily detect the presence of termites by their long winding earthen tunnels, which shelter them. Once the tunnels were destroyed, the termites would be exposed to adverse conditions and move elsewhere or die.

Libraries in several countries have reported the presence of fungi on books and documents (Ojo-Igbinoba, 1993). Apart from the destruction of materials, the presence of these fungi on book materials and invariably in the library environment may constitute potential risks to the health of library users.

According to Parker (1986), bookworm is a general word used to describe the beetle larvae, which feed, on paste and glue used on book spines and binding covers. A book attacked by bookworms is full of small, round holes gnawed by them. They feed on glazed paper, starch, glue, pastes, dyes, the sizing in the paper and cellophane. Like cockroaches, they are mostly active at night. They are common in Sub-Saharan African libraries. Quite often they are destroyed by fumigation.

Rodents like mice and rats, destroy library materials. They attack paper products to gain access to food, water and nesting sites and also cause deterioration by urinating and

defecating on them. In addition they are disease carriers. According to Ojo-Igbinoba (1993), the environment on Sub-Saharan African university campuses is very attractive to rodents. Food concessions are found in every conceivable corner, in some cases right in front of libraries. Associated with food concessions are rubbish heaps. A combination of rigid cleaning, fumigation and rodenticides would be more effective in decimating the rodent population than rigid cleaning alone. Therefore, every possible effort should be put in place to combat them in good time.

#### **2.3.2.6 Handling of library materials**

Conway (1990) observed that the university libraries attracted a lot of users who constantly consulted the information materials making the collections prone to poor handling, damage and deterioration. The use involved reading, interlibrary loans, but also photocopying, thus increasing the heavy wear and tear. The situation was made worse by high numbers of students chasing very few books (Conway, 1990). The consequence of this heavy use was that most libraries were left with a lot of damaged books and journals which were in need of conservation and preservation (Figure 4).

Library staff and patrons should be made to realise that library materials need to be handled carefully and skilfully, not used or abused until they were worn out and then discarded and replaced, since replacement might not be possible. Woodlee (1988) observed that to restrict or ban materials because they were in heavy demand would be self-defeating. He added that where library materials were in heavy demand and the materials were frail or fragile and conservation was not immediately possible, substitutions must be made. The substitute could be of different kinds: a duplicate of a book, a photographic reprint (offset), a photocopy, or microform, which could be offered so that the original could be preserved. Ngulube (2003) pointed out that microfilm copy was recommended since microfilm can last many years.

#### **2.3.2.7 Mutilation, theft and vandalism of library materials**

Ojo-Igbinoba (1993) observed that humans can cause untold damage to library materials when they leave steel pins, clips, staples which rust and stain the paper within a book, press back pages of a book, spill ink, paint or oil on the paper, mark, underline words within or scribble on a book, shelve books too tightly on the shelves, or use self-adhesive tapes on books in the name of repair. In addition, angry people have even been known to set a library on fire. Library materials may be saved through extra vigilance and tighter security measures. However, breaches of security can occur through the failure of man or technology. A human

security guard can make mistakes or other lapses creating loopholes for theft; or they can be part of the people abating the theft. Power supplies often fail throwing the most sophisticated electronic surveillance gadgets into "epileptic fits" or complete blackout (Ojo-Igbinoba, 1993). Where there are standby power generators, it takes some minutes for them to come on. Although theft and mutilation affect the optimal use of the library resources, security planning to guard against theft had not been accorded high priority in university libraries (Ojo-Igbinoba, 1993).

#### **2.3.2.8 Disaster Preparedness and management in libraries**

In the context of libraries, Ngulube (2003) described a disaster as an event whose timing was unexpected and the consequences seriously disruptive. These include natural disasters such as flood and water, and man-made disasters like fire outbreaks, riots, strikes, among many others. A disaster in a library therefore results in the sudden destruction or removal of library resources from accessibility and use. Ngulube and Magazi (2006) explained that in a study conducted of public libraries in Kwa-Zulu Natal, libraries surveyed were not prepared to handle disasters and thefts in their libraries. Therefore, in response to the emergency measures required in most modern libraries, libraries should cater for fire extinguishers, emergency fire exits, telephone networks and alarm systems.

### **2.4 Preservation and conservation techniques and practices**

The following subsection is going to highlight the four common preservation and conservation strategies used in university libraries. These are binding, photocopying, digitisation, and microfilming.

#### **2.4.1 Binding as a preservation strategy**

Academic libraries have binderies responsible for the rebinding of torn and worn-out library materials, supplemented by student projects and assistance from others in the university community (Mazikana, 1993). Books and journals require binding to withstand the rigours of library use. Mazikana (1993) stressed the need for a combination of facilities and maintenance procedures that are conducive to longevity of information resources. In-house repairs ensure that the library has complete control over its bibliographic resources. The bindery could also be very instrumental in binding back issues of newspapers and journals to facilitate a relatively easier storage, retrieval and dissemination of information. Recognising the limitations of time and resources, books must be selected and prioritised within the constraints of the University Libraries (Ngulube, 2003). Use-driven systems identify

damaged books needing repair from volumes being reshelfed after circulation. Therefore, libraries should strengthen their binderies as a permanent solution to the problem of the preservation of damaged library materials.

#### **2.4.2 Photocopying as a preservation strategy**

Ojo-Igbinoba (1993) observed that most libraries in Africa substituted photocopies of restricted materials. A lot of photocopying is done in the libraries to reduce usage of the restricted original materials as a preservation measure. It is also possible that a lot of photocopying of parts of library materials is done for research purposes at a fee; however, this is done in-line with copyright rules and regulations that allow photocopying for strictly educational purposes. Photocopying is therefore used to prolong the lifespan of the library collection. However, Ngulube (2003) noted that photocopies lack permanence if they are not done on acid-free paper. Therefore, this operation needs to be handled with care.

#### **2.4.3 Digitisation as preservation reformatting strategy**

According to Jantz and Giarlo (2005), digital preservation has been defined as the managed activities necessary for the long- term maintenance of a byte stream (including metadata) sufficient to reproduce a suitable facsimile of the original document and for the continued accessibility of the document contents through time and changing technology. Digitisation as a method of preservation is a global phenomenon and the new trend in managing library materials and contents, especially precious ones. Jantz and Giarlo (2005) pointed out that digital technology could revolutionise how university libraries capture, store, preserve, and access information. From a preservation perspective, digitisation solves the traditional library problems like conservation, preservation, storage and space. It provides wider access to information to different users. Ngulube (2003) argued that digital technology's capability to create a higher quality reproduction of a deteriorating original, the ability to reproduce digital images over and over again with no loss of image quality, greater flexibility in terms of output and distribution, and potential cost savings associated with storage offers unprecedented opportunities for access and use.

Although the advantages of digital technology for preservation reformatting and access enhancement were numerous, there were drawbacks as well (Jantz and Giarlo, 2005). These centred on the obsolescence associated with the rapid changes occurring in the development of hardware/software system design, a lack of experience on the part of institutions. Digital resources can be stored on any medium that can represent their binary digits or bits, such as a

CD-ROM or a DVD. If the digital medium deteriorates or becomes obsolete before the digital information has been copied into another medium, the data will be lost. Digital preservation involves copying the digital information into newer media before the old media becomes obsolete. Therefore, until the concerns associated with maintaining long-term accessibility to material stored in digital image form can be resolved, many libraries and archives are loath to initiate digital projects beyond the pilot phase (Lee et al., 2002).

#### **2.4.4 Microfilming as a preservation reformatting strategy**

Microfilming, also called microphotography, is the process that involves photographing information materials onto reels of film at high reduction factors, requiring a special reader to use. The term 'microfilm' (according to Ngulube, 2003) describes film that is used to store by photographic means and at greatly reduced size, facsimile images of a great number of original items, documents, pages of books, and so on. According to Ngulube (2003) microfilming may have its limitations, but it is still the appropriate solution in low-income countries such as Zambia. He added that microfilming, while not perfect, has proven to be the effective technology for rescuing brittle paper and for facilitating access to endangered research materials.

#### **2.5 ICTs and preservation of library materials**

The impact of current information revolution and information technology have changed libraries totally in a new shape, as one of the important media for communication and preservation of knowledge. One of the technologies successfully used for quite long time for preserving print materials is microfilming. Microfilming technologies have been accepted in LIS world as a reliable technology for preserving print media (Rothenberg, 1995). However, recent developments in digital technologies have opened new avenues and many libraries are resorting to digitisation technologies for both long-term preservation and easy dissemination of information using Web-enabled applications. Digital technologies are still evolving and no one is sure about their long-term viability as technologies change very rapidly and become outdated. According to Jantz and Giarlo (2005), digital preservation techniques are not effectively in use in Africa. This implies that digital preservation has not been fully adopted in many libraries in Africa.

#### **2.6 Preservation and conservation policies in libraries**

To tackle the massive preservation and conservation problems that are found throughout the world requires both properly thought through and systematic policies. Mazikana (1993)

argued that the starting point of a preservation and conservation programmes is the creation of a policy document specifying preventive measures to minimise deterioration in storage and handling, staff and user training programmes, housekeeping routines to clean, protect and extend the life of materials; security measures and contingency plans for disaster control and recovery, substitution programmes, conservation treatment for repair of damaged originals and procedures for exhibitions and loans. The International Federation of Library Associations (IFLA) guidelines (Adcock, 1998) summarises the main threats such as the nature of the material itself; the environment in which it is kept; the way material is handled; and natural and man-made disasters. Such a preservation policy must be geared to the mission of the institution, for example, in the case of the University of Zambia Libraries of supporting learning, teaching and research, including collection and security policies. Therefore, if a written policy on preservation and conservation does not exist, planning for preservation becomes very difficult if not impossible. In the end preservation and conservation activities become a matter of trial and error.

## **2.7 Preservation and conservation education and training**

Education and training are fundamental to the improvement of the preservation and conservation of library collections in Sub Saharan Africa (Mazikana, 1993). Training at all levels can aid acquisition of knowledge and skills in the preservation of library materials. Knowledgeable and skilled staff is likely to expend scarce resources on projects that reflected the greatest preservation and conservation needs. Lack of essential knowledge and skills can be inimical to the preservation of library materials. According to Henchy (1998) quoted by Ngulube (2003), in Vietnam the poor physical conditions in libraries and archives, and problems of deteriorating collections were reportedly exacerbated by the well-meaning but uninformed activities of untrained staff.

However, Mazikana (1993) observed that library materials and archival preservation education is underdeveloped. Rhys-Lewis (1996) also acknowledged that the availability of suitable and effective training for developing countries was limited. How can staff without preservation and conservation know-how think of allocating resources for preservation surveys, good housekeeping, storing library materials under suitable conditions, complying with agreed standards of preservation and access, reformatting heavily used materials and those in a poor condition, undertaking conservation treatment, formulating disaster plans and adequate preservation strategies, raising awareness of the importance of preservation and

fund-raising for preservation projects? For example, without the necessary skills and knowledge, information professionals are not likely to effectively allocate resources for their collection management that encompassed preservation and conservation education.

According to an overview of documentary preservation education and training in Anglophone Africa, it was revealed that out of the 27 institutions that were studied only seven (25.9%) had a specific module dedicated to preservation and conservation (Ngulube, 2001). The teaching of preservation and conservation at the Universities has been more often an elective than a core course. This clearly demonstrates that course and module offerings at universities' and colleges' teaching departments do not cover the essential preservation and conservation issues adequately.

The lack of training in preservation in most tertiary institutions in SSA is in stark contrast to the situation in the developed countries. For example, a study by Cloonan (1994) found out that library and information services in tertiary institutions in countries like Britain, France, Germany, Canada, USA and Scandinavian countries offered at least one course in preservation, although, preservation was not a required course. Cloonan (1994) was of the view that preservation topics should be integrated into core curricula and courses in preservation for library school students, and continuing education courses for practitioners.

## **2.8 Summary**

Although, there was no agreement as to what constituted an institutional preservation programme, this chapter discussed the elements that could be used as a framework to establishing and implementing a preservation programme. The review of literature started by giving the purpose of literature review. The chapter went on to look at some previous studies on preservation and conservation of library materials. Previous studies facilitated the identification of "relevant questions" and gaps that were yet to be filled and bridged respectively. Building on the efforts of others it was realised that preservation studies relevant to specific environments were necessary in order to narrow the knowledge gap between what had been written and the actual practice on the ground. The chapter then turned to the causes of deterioration of library materials and the ways of controlling them. Typically, both internal and external causes of deterioration were discussed at this stage. The components of a preservation programme, which included preventive preservation, preservation strategies, and state of training and education in Africa, were also considered.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.0 Introduction**

The research methodology assists in controlling the study, dictating the acquisition of data to address the research questions, arranging data into logical relationships to enable analysis and the drawing of conclusions that can contribute to the expansion of knowledge (Leedy, 1997). There are several research designs and methodologies such as experimental, case study and survey methods that have been applied to LIS research (Yin, 1994). According to Akakandelwa (2000), methodology is a system of explicit rules and procedures upon which research is based and against which claims for knowledge are evaluated. Research methodology can refer to the strategies surrounding the use of multiple methods of data collection as required by different types of attempts to achieve higher degrees of reliability and validity (Leedy, 1997). While research methodologies revolve around two approaches, namely, quantitative and qualitative, this study adopted both approaches. These are discussed in detail in section 3.2 of this chapter.

This chapter aims to describe the methodology that was selected and used in the study. The methodology includes the research design, population of the study, sampling techniques and procedures, the sample size, the instruments for data collection, administration of the research instruments, and the methods for data analysis. It starts by giving an overview of the chapter. Further, the chapter is divided into eleven parts as follows: part one offers an introduction; part two deals with research design; part three looks at the target population under study; part four deals with sampling and sample size; part five discusses reliability and validity in case study measurement; part six covers research instruments for data collection; part seven looks at data processing and analysis; part eight discusses mixed methods in this research; part nine deals with the issue of research ethics; and part ten discusses the evaluation of research methodology, part eleven covers the limitations of the study and lastly a summary is given at the end of the chapter.

### **3.1 Research design**

Research design is considered to be the logical sequence that connects empirical data to a study's initial research questions and ultimately to its conclusions. In order to collect the data for this study, a case study methodology was used. According to Babbie and Mouton (2001),

the methods used in any study are heavily influenced by the aims of the research and the specific questions that need to be answered.

Therefore, the researcher selected the case study methodology so as to maximise what could be learnt in the period of time available for the study. The study was intended to be exploratory in nature, and the aim was to collect as much information as possible to gain an understanding of the nature, process and challenges of preservation and conservation in UNZA Libraries. In this regard, the goal of this study was to describe the context of library materials preservation and conservation and the broad scope of preservation and conservation activities in the University of Zambia Libraries.

A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin, 1994). Further, it usually combines data collection methods such as, interviews, questionnaires and observation (Yin, 1994). A case study research is beneficial in that the focus on one or a few instances allows the researcher to concentrate on a specific instance, for example, in this case the University of Zambia Libraries. Case study approach was appropriate for this study because the researcher intended to focus on understanding the dynamics present within single settings (in this case the University of Zambia Libraries).

Case studies as a research method have traditionally been viewed as lacking rigour and objectivity when compared to other social research methods. Yin (1994) regards this area of research as fraught with danger, primarily due to the problem of subjectivity in interpreting data after it has been written down. Therefore, it is the primary function of the researcher to minimise the bias level in which the researcher is working. In this research, the researcher used multiple sources of evidence to substantially help in improving the validity and reliability of the research. By studying every aspect of the problem from as many angles as possible, and by using various sources of evidence, the case study research method is a powerful research tool (Yin, 1994).

### **3.2 Mixed methods in this research**

Several studies have discussed the values of combining methods in social research as it is becoming increasingly common in recent years (Creswell, 2003). It helps the researchers to 'think outside the box', to theorise beyond the micro-macro divide, and to enhance and extend the logic of qualitative explanations. Each of these two approaches provides a distinctive kind of evidence and when used together they can offer a powerful resource to

inform and illuminate techniques and practices used to preserve and conserve library materials in the University of Zambia Libraries (Creswell, 2003).

This research used both qualitative and quantitative research methods. These methods were integrated in order to provide a full picture of the research. Specifically in this research, the investigation was needed (requiring qualitative methods) for integration processes, accompanied by some measurement of outcomes (requiring quantitative methods). Quantitative data can indicate relationships, which may not be noticeable to the researcher. On the other hand, qualitative data lies in the knowledge it provides the dynamics of social process, change and social context so that it can answer 'how' and 'why' questions in these domain. But the results can be strengthened by quantitative support (Yin, 1994). Therefore, it was hoped that the combination of these techniques could provide comprehensive data on preservation and conservation of library materials in the University of Zambia Libraries. This could reflect a range of perceptions from 'think description' of interviews and quantitative presentation to gain a fuller picture of the topic under study.

Moreover, use of multiple methods increases the robustness of results because findings can be strengthened through triangulation. Triangulation is defined as the combination of methodologies in the study of the same phenomenon (Creswell, 2003). He proposed two common responses improving data validity, namely, data triangulation and respondent validation. Therefore, the results of this study were based on convergence of different sources and methods.

### **3.3 Population**

According to Leedy (1997), the population of a study refers to a set of objects whether animate or inanimate which is the focus of the research and about which the researcher wants to determine some characteristics. For example, a set of records, or an event, or institution, or people could constitute a study population. Depending on the size of the population and the purpose of the study a researcher can study the whole universe or subset of the population, which is referred to as a sample (Leedy, 1997). Although, it is desirable to study the whole population, at times cost and time considerations make it impossible.

The target population for this study were all the 43 library staff at the University of Zambia Library and its two branches, 6 binders from the Bindery Unit, located within the Main

Library and 11 lecturers in the Department of Library and Information Studies (LIS) in School of Education. The total population was 60.

There were nine librarians (excluding the University Librarian) with a minimum of a Masters degree and one Doctoral degree, 14 were assistant librarians with a minimum of a Bachelor of Arts with Library and Information Studies (BALIS) degree. The paraprofessional category included 13 senior library assistants and 4 library assistants who were diploma and certificate holders, respectively. The Bindery Unit was managed by a chief binder with a minimum qualification of a diploma; two senior binders with a minimum qualification of advanced certificate in book repairs, and three binders with a minimum qualification of a certificate in bindery. The department of Library and Information Studies comprised 11 lecturers, out of which 10 possessed a minimum qualification of a Masters degree and one Doctoral degree.

### **3.4 Sampling and sample size**

A sample is defined by Leedy (1997) as the smaller group of examples chosen from the population that you actually measure. According to Leedy (1997), there is no one rule of deriving the most representative sample. Leedy (1997) argued that there is little point in sampling populations that are less than 100. Hence, a census is typically attractive for small populations. A census eliminates sampling error and provides data of all units of analysis in the population. For the purpose of this study, the census approach was adopted because only three units of analysis were identified. An administrative unit was considered to be an identifiable organisational body with the major responsibility of preserving and making library materials available for use by patrons. Therefore, the University of Zambia Libraries were considered as the primary unit of analysis in order to maximise on the experience of preservation and conservation of library materials techniques and practices in the University of Zambia Libraries.

The researcher decided to use purposive sampling technique to determine the sample from the library staff, bindery staff and the academic faculty in the Department of Library and Information Studies. The respondents were initially determined by the researcher based on their job responsibility, position, and involvement in the preservation and conservation of library materials, which was the subject under study. However, respondents were also chosen on the basis of the researcher's individual judgment on the ground that they were able to provide the necessary information needed for the study. Lists of names for librarians and

binders were obtained from the Assistant Registrar's Office in the Library, while a list of names for academic faculty was obtained from the Head of the Department in the Department of Library and Information Studies.

A sample size for this research was 35 library staff, representing 81.4% of the total population of 43 library staff, 5 lecturers in the Department of Library and Information Studies representing 45.5% of the total population of 11 lecturers were studied using questionnaires, while all the 6 (100.0%) bindery staff were interviewed.

### **3.5 Reliability and validity in case study measurement**

Reliability and validity are the major technical considerations that researchers take into account when constructing and evaluating instruments of data collection. Babbie and Mouton (2001) argued that it is difficult to assess the quality of the data that one collects. However, it is possible to assess the accuracy of the case study tools used to collect data about a phenomenon. An assessment of the collected data hinges upon determining the reliability and validity of the case study instruments (Yin, 1994). As for Creswell (2003), in estimating reliability of a test, one would be examining its viability as a measurement device. Thus, reliability is the degree to which a test consistently measures what it sets out to measure while at the same time yielding the same results (Yin, 1994). Creswell (2003) defined validity as the degree to which a test measured what it is supposed to measure. Therefore, reliability is a necessary precondition of validity. For this research, pretesting the questionnaire was used as a tool for content validation. Content validity was also achieved by making sure that questions were related to the problem of preservation and conservation of library materials. Construct validity was achieved by linking the items in the measuring instruments to the theoretical components of the research topic covered in the previous chapters.

Criterion validity was achieved by comparing the instruments of measurement to those published in the literature. Questionnaires were compared with those used by Arnoult (1986), Asiamah (2008), Conway (1990), Clements (1987), Eden and Feather (1997), Olatokun (2008), Owowoh (2010), and Trinkaus-Randall (1990). According to Creswell (2003), reliability of a research tool depends on how other researchers can replicate the steps of the original research and have similar conclusions. Repeating a study in different settings or with different subjects is called replication (Creswell, 2003). Research findings are therefore considered to be reliable if they are repeatable, to the extent that repeated measurement

would yield constant results (Yin, 1994). In order to get consistent answers to consistent questions, questionnaires and interview schedules were designed to collect the data for the study.

### **3.6 Data collection instruments**

According to a number of research methodologists, one of the safeguards against getting unreliable information is ensuring that the respondents are capable of supplying the required information with some degree of accuracy (Creswell, 2003). The librarians, binders and lecturers who were under studied were people who were competent to respond to the questionnaires and interviews. Semi-structured interviews were held with Former Deputy University Librarian, selected professional librarians, Bindery staff and the Head of the Department of Library and Information Studies. Furthermore, other multiple sources of data such as document reviews of institutional reports, minutes, newsletters, etc. and observations were carried out. The use of multiple research instruments in this study helped for triangulation of data that was collected in order to test validity (Creswell, 2003). The survey methodology, therefore, helped the researcher to remedy the weaknesses of bias and difficulty in generalisation associated with the case study approach.

#### **3.6.1 Questionnaires**

Questionnaire surveys are the most commonly used research method in library and information work and can be a rich and reliable source of research data (Slater, 1990). For example, Arnoult (1986), Asiamah (2008), Clements (1987), Conway (1990), Eden and Feather (1997), Olatokun (2008), Ovowoh (2010) and Trinkaus-Randall (1990) used questionnaires to collect data on the state of the preservation of documentary materials. These studies were discussed in section 2.2 of Chapter Two.

In this study, the term questionnaire was used to refer to a technique of data collection in which each respondent was asked to give answers to the same set of questions and statements in a predetermined order in the absence of the researcher. Two structured questionnaires were designed and self-administered to all library staff and academic faculty in the Department of Library and Information Studies (LIS). By presenting all respondents with the same standardised questions a high reliability of response can be achieved. In that sense, questionnaires provide a stable and consistent and uniform measure without variation. Although, on the other hand, they have limitations such as low response rates, reporting

errors, and lack of control over how respondents interpret questions or opportunity to probe or correct misunderstandings.

In this research, survey questionnaires were applied to evaluate propositions about the critical factors in preservation and conservation of library materials to improve access. Quantitative methods in social research are aimed at developing causal propositions between concepts (Babbie and Mouton, 2001). Through being able to quantifying the data, it can help complement or extend the range of evidence, for example, from interview on the topic under study. The major attraction of the questionnaire, when compared with other data collection tools, is that it is relatively inexpensive and it allows a large number of respondents to be surveyed in a relatively short period of time (Creswell, 2003). The impersonal nature of questionnaire survey, for example, standardised wording and sequence of questions, ensures some uniformity from one measurement situation to another, because the most common pitfall in qualitative data collection is an 'bias' in the selection of informants and in the evaluation of statements. In addition, questionnaires allow respondents to answer questions at times that are convenient to them. Self-administered questionnaires also permit the respondents to consult with other persons and records before responding. Thus, questionnaires give privacy in responding as well as affording the respondents the opportunity or time to look up information in cases where they are not sure of the answers.

#### **3.6.1.1 Design of the questionnaires and layout**

Two questionnaires were designed to collect data to answer the research questions. One questionnaire was for librarians; while the second questionnaire was for the lecturers in the Department of Library and Information Studies. Questionnaires were designed to achieve three related goals:

- ❑ to maximise the relevance and accuracy of data collected;
- ❑ to maximise the participation and cooperation of the target respondents; and
- ❑ to facilitate the collection and analysis of the data.

Major tools used for developing the questionnaires found in the literature are semi-structured individual interviewing, qualitative group interviews, observation and scanning the literature for questionnaires used in similar studies (Creswell, 2003). In this study, information obtained through observation and individual interviews was used to ensure that the contents of the questionnaires provided enough information to satisfy the study's objectives and to

help phrase questions that could be understood by the respondents. On the other hand, scanning the literature for questionnaires that have been used by others was important because the purposes of the studies were the same. However, modifications were made to the contents to suit the subject area and the objectives of the study. Therefore, the designed questionnaires were compared with instruments used in similar studies carried out by Conway (1990), Eden and Feather (1997) and Trinkaus-Randall (1990) in order to ensure content validity. The use of documented questionnaire design methodologies as well as tested questionnaires ensured that the questionnaires were clear in their purpose, exhaustive in their elements of inclusion, asked the most appropriate questions to elicit data to answer the research questions, and asked for empirical data.

In order to include all the possible responses that might be expected, closed-ended items had some open-ended options such as: “other, please specify”. Closed questions gave the respondent the chance of choosing from two or more fixed alternatives. The use of the alternative represents an excellent compromise between closed- and open-ended response formats in that it is an open-ended question within a closed-ended format. The coding process often requires that the researcher interprets the meaning of responses. The possibility of misunderstanding the responses and researcher bias cannot be totally ruled out. There is also a danger of getting answers that are essentially irrelevant to the researcher’s objectives. Despite the fact that closed-ended items are likely to limit the possibility of including all expected response categories, the main reason for their continued popularity lies in providing greater uniformity of responses (Babbie and Mouton, 2001).

Questionnaires have basic instructions on completing them at the beginning (Appendices 2 and 4). In addition, some questions have individual instructions to facilitate proper answering. The questionnaires were divided into sub-sections based on the research issues and objectives outlined in sections 1.14 and 1.15 of Chapter One. The aim was to improve the flow of the questionnaire. If questions about the same topic are included in several different places in the questionnaire, a respondent may become confused by perceived redundancy or hostile because of perceived carelessness and treat the study interview with less seriousness than the researcher would like. Furthermore, the questions were consecutively numbered in order to make them easy to follow. Each question was numbered to prevent questions from being omitted in error and to facilitate the use of skip instructions. Questions were only printed on one side of the page in order to avoid cluttering it.

### **3.6.1.2 Pretesting the questionnaires**

Babbie and Mouton (2001) pointed out that in constructing a questionnaire there is always a possibility of an error. In this study, questionnaires were pretested in order to uncover any defects in questions. Pretesting the questionnaires helped to improve the standards of questioning, before they were used in the study. Specifically, evaluation of data collection tools identified questionnaire items that were either not completed or misunderstood, and those that did not obtain the needed information. To this effect, the questionnaires were then tried on a sample of respondents, to check ease of completion and whether the procedure had the desired effect. However, the respondents were selected on the basis of convenience and availability.

This gave the researcher the opportunity to refine the instruments, as a result, maximise reliability and validity of the instruments were achieved (Creswell, 2003). Through the pretesting of the questionnaires, unclear questions and instructions were identified and improved upon by recasting them. Accordingly, technical terms and abbreviations were identified and explained, while double-barrelled questions were unpacked to ensure that one concept or issue was included in the questions. The questionnaires were also modified to remove some ambiguities identified by the pretest (Creswell, 2003).

### **3.6.1.3 Administering the questionnaires**

The questionnaires were self-administered to all the respondents. In line with the objectives of the study the questionnaires included questions on the broad topics. The covering letters described the research topic of the project in order to motivate the respondents to cooperate. It emphasised the importance of the research as well as how the information was to be used.

## **3.7 Interviews**

This study used semi-structured interviews with open-ended questions to collect data. The choice of a semi-structured interview rather than a structured interview was because it was less formal for the interviewer; and could explore issues that emerge by further asking follow-up questions while still covering the same areas of data collection. Interviews are one method by which a phenomenon may be studied. Interviews can be used for verifying, amending and extending data, and gathering facts and explanations. Interviews can provide an in-depth understanding, insights of people's experiences, and help to approach the research questions from different dimensions (Yin, 1994). Such flexibility makes the interview a good technique for exploration.

Interviews have been criticised for being relatively expensive and time consuming. The other limit of using interviews is that it has the common problem of bias in the interview processes; that interviewees can only hear what they want or interviewees give what interviewers want to hear (Yin, 1994). In addition, the outcome of the interview could also be determined by the personality of both the interviewer and respondent.

Despite these criticisms interviews have a number of advantages. Interviews have been characterised as the most effective way of enlisting the co-operation of most populations (Creswell, 2003). The quality of data is usually superior to that obtained by other methods. Therefore, interviews were used to gather supplementary data as well as verifying some points that emanated from some of the responses to the questionnaires. Only personal interviews were used in this study. Even if personal interviews are relatively expensive, they produce a better response rate than the questionnaire (Creswell, 2003).

### **3.7.1 Administering interviews**

It has been argued that validity is a persistent problem in interviews. For example, validity can be compromised by asking leading questions, and bias on the part of both the interviewer and the respondent (Babbie and Mouton, 2001). One way of avoiding bias was desisting from seeking answers that support any preconceived notions of the interviewer when conducting the interview. Leading questions were also avoided because they tend to influence the answers of the respondent.

### **3.8 Observation**

Observation is a method relying on watching, listening, asking questions, and collecting things. In this study, a structured observation was used because it provides a systematic description and generation of numerical data (Cohen, Manion and Morrison, 2003). Thus, the observation technique was used to gather supplementary data that helped to further interpret findings obtained by the interviews and questionnaires. The technique has the advantage of verifying information that was obtained by other research instruments (Creswell, 2003). Further, observation is independent of people's willingness to report.

Human observation techniques were used to gain some insight into the preservation and conservation of library materials in the University of Zambia Libraries. The observational categories included library building condition, storage environment and handling procedures,

disaster preparedness plans, and policies that affect preservation and conservation. The aim was to identify potential hazards to the collections from the environment or from storage and handling procedures and actions required to ensure the long-term preservation of collections such as improving housekeeping, storage enclosures, fire protection and environmental control. The notes were recorded soon after each observation. In addition to shelves and site visits, the researcher also reviewed documentation such as annual reports, minutes and other policy documents.

### **3.9 Processing and analysis of data**

Data analysis involves the categorising, ordering, manipulating and summarising of data to find answers to the research question. The data that was collected through the questionnaires was evaluated and cleaned before coding (Creswell, 2003). These two activities are sometimes referred to as data editing. The purpose was to check for ambiguity, completeness, comprehensibility, internal consistency, relevance, and reliability (Babbie and Mouton, 2001). Hence data was examined to look for extreme values, conflicting answers, handwritten notes, errors in recording, and other indicators that suggest unreliable measurements. It involved checking whether or not there was an answer to every question. A decision was made during editing to content analyse responses such as “cannot remember” or “unsure”. The uniformity of the interpretation of the questions by the respondents was also checked during the process.

The responses from the interviews were analysed by developing a descriptive framework. Thus, a framework of sections reflecting the themes was developed and evidence was gathered within relevant themes, and analysed and compared in the categories in order to achieve a description that was incorporated from multiple sources of evidence.

#### **3.9.1 Data coding**

Coding involves assigning a label to each question or variable, and a number or value to each response category. As advised by Babbie and Mouton (2001) each completed questionnaire that was received was assigned a unique case number, which was inserted in the space provided on the first page of each questionnaire. Each questionnaire represented a case that was studied, and the code “caseid” was assigned in the first column of the SPSS Data Editor. The identifier “caseid” was used for each responding case to facilitate checking the data for errors. Without the unique number, it would be extremely difficult to tie data back to the original questionnaire, thus, making the task of identifying or correcting data entry errors

complicated. In addition, some data handling and analytical tasks are possible only if there is a way of identifying individual cases (Babbie and Mouton, 2001). The questionnaires were not pre-coded; that was done at the same time as the editing of the questionnaires by the researcher.

However, not all answers to the instruments were reduced to code numbers. Open-ended or verbatim responses were kept as text. Thus, open-ended questions in the questionnaires and interviews were content analysed; and grouped into categories that were tabulated manually. A category is a set of criteria, which are integrated around a theme (Creswell, 2003). The first step in content analysis entailed the construction of categories. Thus, after identifying the categories data was coded. The coded data offered some evidence about the dominant categories and trends. Some of the data was presented in narrative form or was integrated into the quantitative data collected by means of questionnaires and observation for analysis using SPSS.

### **3.9.2 Computer processing**

For the purpose of this study Microsoft Word was used for word-processing and SPSS Version 16.0 for Windows for statistical processing. The researcher directly typed the data into the computer. The major advantage of computer processing is that it speeds up processing and analysis of data as well as saving and eliminating a good deal of tedious and repetitive work (Creswell, 2003). The data output from the computer was examined for statistical outliers or extreme cases caused by recording errors. After the data was cleaned, it was then ready for tabulation and statistical analysis. This means that description of the responses made to each of the questions was done. SPSS facilitated the sorting of data and computing of frequencies, sums and percentages.

### **3.10 Ethical considerations**

Concern about the ethics of research has not always been as intense as it is today (Creswell 2003). One of the problems in social research is conducting the research ethically. The origins of concerns about research ethics are to be found in medical research but this has broadened to include all research with human subjects. Creswell (2003) explained that ethics are key to developing moral standards that can be used in situations where there can be actual harm or potential harm to an individual or a group. Essentially, a sound thesis is a product of ethically obtained and scientifically valid data. There is limited literature devoted explicitly to the ethics of library and information science research. In library and information science

journals there is remarkably little discussion. Although, scandals in library and information science research are rare, ethical, moral and political questions abound. Questions of access, power, harm, deception, secrecy and confidentiality are all issues that the researcher has to consider and resolve in any research context (Creswell, 2003). Informed consent occupies a central place in the ethics literature. In order to address the issue of ethics of research, the researcher decided that the respondents to the questionnaires and those that participated in the interviews were told the purpose of the study so they could make an informed decision as to whether to participate or not. Above all, the study strived to maintain objectivity in gathering and analysing the data.

### **3.11 Evaluation of research methodologies**

Research methods have weaknesses as well as potentials. Research methodologists recognise that both qualitative and quantitative methods have something to offer (Creswell, 2003). The degree to which they are able to serve the desired research purpose largely depends on the researcher's understanding of their strengths and limitations. No one type of research design is universally better or worse than the other. They are different and used for different purposes. Both quantitative and qualitative approaches were employed in this study. The case study research methodology has been used because it is often viewed as a useful tool for preliminary and exploratory research. The purpose of the research was to provide basic information needed to enable staff to both plan and implement sound library materials care programmes and contribute to their preservation and accessibility. The goal was to provide a broad picture of preservation and conservation of library materials, techniques and practices in the University of Zambia Libraries.

The major strengths of a case study as compared with other methods are that evidence can be collected from multiple sources. This is what is referred to as triangulation. Triangulation uses evidence from different sources to corroborate the same fact or finding. However, its major limitation is that it cannot provide information objectively due to the problem of subjectivity in interpreting data after it has been written down. The use of multiple sources of evidence can help substantially in improving the validity and reliability of the research. The use of more than one method in collecting data for the study was aimed at enhancing the validity and reliability of the results. Interviews, documents and observations methods were used in conjunction with questionnaires to collect data for the study.

### **3.12 Limitations**

The limitations of this study are that it only concentrated on libraries at the University of Zambia; as a result, generalisation of the findings to other libraries in Zambia might not be suitable. However, certain experiences might be of benefit to other libraries in the country.

### **3.13 Summary**

This chapter emphasised that research procedures are fundamental to gathering data to address a research question. It outlined the methods and techniques that were used in exploring the preservation and conservation of library materials in the University of Zambia Libraries. It has revealed that research is basically done to describe or understand certain situations. The research process is commonly informed by either the qualitative or quantitative research paradigm. At times, a combination of both models is used, as is the case in this study. The questionnaires were used as the main data collection tools employed by the study. Interviews, documents reviews and observations supplemented the questionnaires. The units of analysis and the methods used for data collection and analysis have also been discussed in this chapter.

## **CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS**

### **4.0 Introduction**

This chapter is divided into fifteen sections. The study sought to examine the preservation and conservation of library materials, techniques and practices employed in the University of Zambia Libraries. Questionnaires, semi-structured interviews and physical examination of library materials were the data collection tools used to collect data for the study. The questionnaires were used to collect data from the library staff and academic faculty staff in the Department of Library and Information Studies (LIS). Interviews were held with a former Deputy University Librarian, selected professional librarians, bindery staff and the Head of the LIS department in the School of Education (also former reprographic officer in the Library). Finally, data was collected through observation techniques. A survey of library materials on the shelves and storage areas, storeroom for damaged library materials, the bindery unit and other facilities that were meant for preservation of library materials such as the defunct reprographic unit and the fumigation facility, air conditioners, dust suckers including controlling of constant room temperature and relative humidity in the university libraries. Also, data was obtained from reviewed documents in the Main Library. Data collected included usage statistics and record keeping of figures on damaged library materials.

### **4.1 Background information of respondents**

This section provides the general information on gender, age, highest academic qualification attained and work experience of respondents.

#### **4.1.1 Response rate**

Forty-three copies of questionnaires (Appendix 2) were self-administered to library staff at the Main Library, Great East Road Campus and its two branch libraries: the Medical Library at School of Medicine, Ridgeway Campus and the Veterinary Medicine Library at the Samora Machel School of Veterinary Medicine. Completed questionnaires were received from 35 library staff, giving an 81.4% response rate. As for academic faculty, only five completed questionnaires were returned out of 11 questionnaires which were self-administered, representing 45.5% response rate. Out of six interviews planned, four were successful which included an interview with a former Deputy University Librarian, former Reprographic Officer who was also the current Head of the Department of Library and Information Studies, bindery unit staff and selected professional librarians. Efforts to

interview the University Librarian and former University Librarian were not successful due to their busy schedules. The completed questionnaires were collected and analysed with the results of the interviews and observation using percentages.

#### 4.1.2 Library staff

Out of a total of 35 respondents, there were 20 (57.1%) male and 15 (42.9%) female respondents from the three university libraries. Table 1 shows age group of the respondents. The data in Table 1 shows that the majority of the respondents, 12 (34.3%) were aged 28-35 years. Another ten (28.6%) of the respondents were aged 36-43 years. This was followed by eight (22.9%) of the respondents who were aged 44-51 years, three (8.6%) were aged 52 years and above, while two (5.7%) were aged 20-28 years. The findings indicate that 22(62.8%) of the respondents were aged 43 years and below.

**Table 1: Distribution of respondents by age group**

Age	Frequency	%	Cumulative %
20-27	2	5.7	5.7
28-35	12	34.3	40.0
36-43	10	28.6	68.6
44-51	8	22.9	91.4
52+	3	8.6	100.0
Total	35	100.0	

Question three (appendix 2) asked respondents to provide information on their highest academic qualification obtained. Out of the total number of 35 respondents, the majority of the respondents, 13 (37.1%) had diplomas and first degrees in Library and Information Studies (LIS), respectively. Six (17.1%) of the respondents were Masters Degree holders in Library and Information Studies, two (5.7%) of the respondents had certificates in Library and Information Studies and only one (2.9%) of the respondent had a PhD degree. The findings suggest that the majority of the respondents had diplomas and first degrees, respectively. This was followed by those respondents who had masters' degree in Library and Information Studies. Therefore, out of the total number of 35 respondents, 20 (57.1%) were professionals, while 15 (42.9%) were paraprofessionals. Table 2 shows academic qualification levels of the respondents.

**Table 2: Respondents' highest academic qualification**

Qualifications	Frequency	%	Cumulative %
PhD	1	2.9	2.9
MLIS	6	17.1	20.0
BALIS	13	37.1	57.1
DipLIS	13	37.1	94.3
CertLIS	2	5.7	100.0
Total	35	100.0	

**Key to abbreviations in the table:**

Cert. LIS- Certificate in Library and Information Studies

Dip.LIS- Diploma in Library and Information Studies

BALIS- Bachelor of Arts with Library and Information Studies

MLIS- Masters' of Library and Information Studies

PhD- Doctor of Philosophy

Table 3 shows work experience of the respondents. In table 3, 13 (37.1%) of the respondents had worked in the libraries for a period of 6 to 10 years, nine of the respondents, representing 25.7% had worked in the three libraries for 16 years and above, while seven (20%) of the respondents had worked in the three libraries for a period ranging from 11 to 15 years. The remaining six (17.1%) of the respondents had worked in the libraries for five years and below. The findings indicate that the majority of the respondents, 13 (37.1%) had worked in the three university libraries for a period ranging from 6 to 10 years, while the least number of the respondents, six (17.1%) had only worked for five years and below in the university libraries.

**Table 3: Respondents' work experience**

Work experience	Frequency	%	Cumulative %
5 years and below	6	17.1	17.1
6- 10 years	13	37.1	54.3
11- 15 years	7	20.0	74.3
16 years and above	9	25.7	100.0
Total	35	100.0	

#### **4.1.3 Academic faculty**

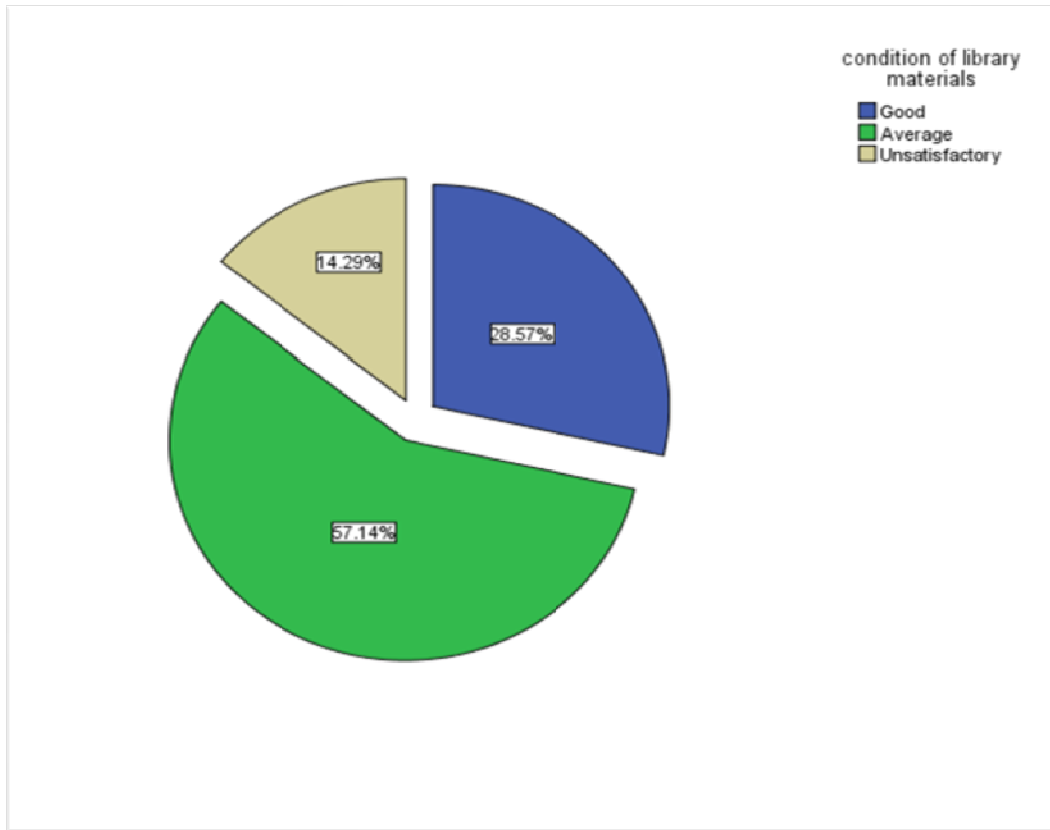
The researcher had targeted to include the lecturers in the Department of Library and Information Studies in order to obtain information on whether the University of Zambia offered training in preservation and conservation. Out of a total five respondents, three of the

academic faculty who had responded to the questionnaire were lecturers grade III, while two were lecturers grade II. Faculty academic at the University of Zambia has six ranks namely; Lecturer III, Lecturer II, Lecturer I, Senior Lecturer, Associate Professor and Professor. The findings suggest that majority of the lecturers in Library and Information Studies were newly employed; and also junior in academic rank.

The lecturers in the Department of Library and Information Studies were also asked to indicate the period of time they had taught at the university of Zambia or elsewhere. The results turned out that one lecturer had been teaching for seven years, while the other lecturer indicated six years. This was followed by another lecturer who indicated that he or she had been teaching for three years. The least periods of teaching indicated by the lecturers were ten months and one year, respectively. The findings suggest that the longest serving lecturer had been teaching for seven years, while the newly employed lecturer had only taught for ten months.

#### **4.2 General conditions of library materials**

All library materials are at risk to deterioration due to their inherent instability, poor handling and poor storage conditions. Virtually everything that happens to the kind of library material from the time it is created has a profound impact on its long term accessibility. For example, the conditions in which it is stored, the way it is handled and the effectiveness of security arrangements. In this regard, the long-term survival the library materials depends on an informed and active management programme put in place. The study probed into the general state of deterioration of library materials in the university libraies using a four point rating scale. This comprised 1= Very good, 2=Good, 3= Average, 4= Unsatisfactory. Figure 1 presents the results of the analysis of the overall condition of the library materials in the University of Zambia Libraries.



**Figure 1: General condition of library materials**

The results show that out of a total number of 35 respondents, 20 (57.1%) of the respondents reported that the general physical condition of library materials in all the three libraries was average. This was followed by ten (28.6%) of the respondents who were of the opinion that the physical condition of materials was good, while five (14.5%) were of the opinion that the general condition of library materials was unsatisfactory. None of the respondents were of the opinion that the general physical condition of materials in the three libraries were in very good condition. This revealed that the general condition of the library materials in the three university libraries was average.

Probing further, respondents were asked whether they had observed any signs of deterioration of library materials in the library collections. Thirty-four (97.1%) of the respondents agreed that they had observed signs of deterioration of library materials in all the three university libraries where they were operating, while one (2.9%) respondent made no observation.

In response to question six (appendix 2) that asked the respondents to identify signs of deterioration they had observed on print library materials in the university libraries, all the 35 (100.0%) respondents identified mutilation. Broken book spines was identified by 34 (97.1%)

of the respondents as being the second major problem to book mutilations, while one (2.9%) respondent made no observation. This was closely followed by 32 (91.4%) of the respondents who identified signs of deterioration caused by rain water (leakages), while three (8.6%) did not. Twenty-three (65.7%) of the respondents identified brittle signs of print library materials, while 12 (34.3%) did not. Twenty-nine (82.9%) of the respondents did not identify signs caused by rats on materials, while only six (17.1%) of the respondents did identify signs of deterioration of library materials that were attributable to rats.

In terms of non-print materials, signs of fading of the image in photographic materials were identified by 12 (34.3%) of the respondents, while 23 (65.7%) of the respondents did not identify signs of fading of the image in photographic materials. This was followed by six (17.1%) of the respondents who identified signs of cracking and scratching on a pocket of sound and optical discs materials, 29 (82.9%) of the respondents did not identify signs of cracking and scratching on sound and optical materials in the three surveyed university libraries. Only one (2.9%) of the respondents did identify signs of loss of data on magnetic media, while 34 (97.1%) of the respondents reported no signs of loss of data on magnetic media in the university libraries. Table 4 shows the rankings of the major signs of deterioration of library materials in the three university libraries that were identified by respondents.

**Table 4: Print Materials and non-print materials**

<b>Print materials</b>		
<b>Signs of deterioration</b>	<b>Frequency</b>	<b>Rank</b>
Mutilation	35	1
Broken spine	34	2
Damage by rain water	32	3
Brittle prints	23	4
Rat damage	6	5
<b>Non Print Materials</b>		
Fading images	12	1
Cracking and scratching	6	2

The findings, generally, suggest that a significant number of print library materials had either their pages mutilated or falling book spines. Also, the findings suggest that rain water entered the library through leaking roof, especially in the Main Library (Figure 5); consequently

some paper- based library materials were damaged beyond repair (Figure 6). In terms of non-print library materials, the findings suggest that fading of the image in photographic materials, cracking and scratching on sound and optical discs and loss of data on magnetic media were not identified among the major signs of deterioration of non-print library materials in the University of Zambia Libraries.

In addition, it was observed that materials that had been damaged are taken up to the Bindery Unit for repair. For example, from January to October 2010, 3 580 physically disintegrating books were taken to the Bindery Unit as indicated by records at the circulations desk.

### **4.3 Causes of deterioration of library materials**

The results of the analysis of the various causes of deterioration of library materials in the University of Zambia Libraries show that an overwhelming 33 (94.3%) of the respondents indicated that wear and tear due to frequent use was the major cause of deterioration (Figure 4), while two (5.7%) respondents did not agree. Thirty-two (91.4%) of the respondents indicated that damage due to exposure to rain water was the next major cause of deterioration of library materials, while three (8.6%) respondents reported to the contrary. This was followed by 30 (85.7%) of the respondents who reported that vandalism was the cause of deterioration of library materials, while five (14.3%) respondents reported that vandalism was not the cause. Twenty-nine (82.9%) of the respondents reported that poor handling of print library materials during photocopying was another major cause of deterioration of library materials, while six (17.1%) of the respondents reported that poor handling was not a cause. Twenty-five (71.4%) of the respondents reported that moisture was the cause of deterioration of library materials, while ten (28.6%) of the respondents reported that moisture was not the cause of deterioration of library materials. Twenty-four (68.8%) of the respondents reported that dust was another major cause of deterioration of library materials in the university libraries, while 11 (31.2%) of the respondents reported that dust was not the cause of deterioration of library materials.

However, nine (25.7%) of the respondents reported that excessive light and pests were the least causes of deterioration of library materials in the University of Zambia Libraries. This was followed by bad shelving that was reported by ten (28.6%) of the respondents. The findings revealed that the major cause of deterioration of library materials was wear and tear due to frequent use of materials. However, the findings also revealed that the least causes of deterioration of library materials were excessive light, pests and bad shelving.

### **4.3.1 Handling and care**

It has been observed that humankind is the root cause of the conditions that promote or retard the deterioration of library materials (Ngulube, 2003). Although humankind has little control on the nature of materials on which library materials are created, but much can be done to control the deterioration of library materials. The factors that can accelerate the deterioration of library materials are discussed in more detail in the subsequent subsections.

#### **4.3.1.1 Control of temperature and relative humidity in the university libraries**

Respondents were asked to state whether the University of Zambia Libraries have devised mechanisms to monitor and control temperature and relative humidity. The results of the analysis of checking and controlling temperature, humidity or air pollution in the three University of Zambia Libraries show that 25 (71.4%) of the respondents reported that there were no heating, ventilation and air conditioning in the three university libraries. Ten (28.6%) of the respondents reported that heating, ventilation and air conditioning systems were present in the university libraries. Further, respondents were asked to indicate whether the air conditioning was operational all the times. Thirty-four (97.1%) of the respondents indicated that air conditioning system was not on at all times, while only one respondent indicated that air conditioning system was on all the times. Furthermore, respondents were asked to state whether monitoring of temperature was practiced in the University of Zambia Libraries. All respondents, 35 (100.0%) reported that there was no constant monitoring of temperature in the three University of Zambia Libraries. The findings suggest that there was no proper devised system in the University of Zambia Libraries to monitor temperature levels. This could affect the life span of library materials.

#### **4.3.1.2 Control of light in the university libraries**

Question 13 required the respondents to state whether the libraries at the University of Zambia were turning off lights when not used. A majority 31 (88.6%) of the respondents indicated that lights were turned off when not used, while four (11.4%) did not respond. The findings revealed that there was control of lighting systems in the University of Zambia Libraries.

#### **4.3.1.3 Pest management in the university libraries**

Biological agents (moulds, insects, rodents, etc.) can cause serious and sometimes irreparable damage to library materials. Respondents were therefore asked to indicate whether their libraries had experienced insect invasion or vermin infestation in the past. The results

revealed that 22 (62.9%) of the respondents reported that the three university libraries had experienced insect invasion or vermin infestation at one time or the other. On the other hand, 13 (37.1%) of the respondents reported that the libraries at the University of Zambia had never experienced any insect or vermin infestation. The findings suggest that the university libraries had experienced insect invasion or vermin infestation in the past.

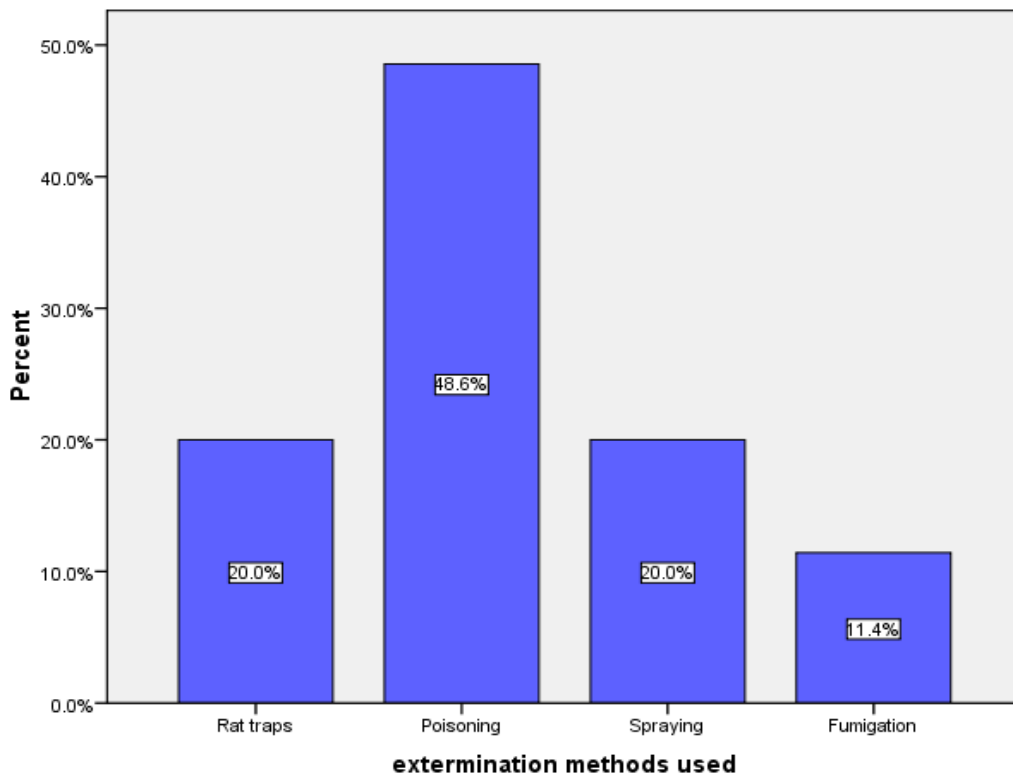
A follow-up interview with one of the bindery staff revealed that the storeroom for damaged books in the Bindery Unit was a breeding place for rodents and insects. This was because the books had been there for a long time and dust had accumulated on the books making it a fertile ground for fungi and cockroaches. Library materials stored in such conditions would be permanently lost. One professional librarian interviewed argued that there was virtue in cleaning and dusting library materials and it did not need extra money apart from what was already paid to the cleaning staff. The responsibility was on the librarians themselves to use the available human resources to clean the storage areas and to dust the library materials. In another interview with a professional librarian, the researcher was told that even the conduct of library staff was not upright, they ate food from anywhere in the libraries, therefore attracting rodents and cockroaches. The solution, first and foremost, lied in changing library staff's mindset to understand and appreciate the importance of library materials and information before other people can do so.

Respondents were also asked to indicate how often the extermination of pests was carried out in the University of Zambia Libraries. Seventeen (48.6%) of the respondents indicated that extermination of pests was rarely done in the libraries at the University of Zambia. This was followed by four (11.4%) of the respondents who either indicated that the extermination of pests in University of Zambia Libraries was done once in a year or twice in a year. Ten (28.6%) of the respondents did not respond. The findings indicate that extermination of pests in the University of Zambia Libraries was done but on an irregular basis. Presented in Table 5 are the results of the analysis of the frequency of extermination of pests in the University of Zambia Libraries using available methods.

**Table 5: Frequency extermination of pests**

	Options	Frequency	%	Valid %	Cumulative %
Valid	Once a year	4	11.4	16.0	16.0
	Twice a year	4	11.4	16.0	32.0
	Rarely	17	48.6	68.0	100.0
	Total	25	71.4	100.0	
Missing system		10	28.6		
Total		35	100.0		

Figure 2 shows that 17 (48.6%) of the respondents reported that poisoning of pests was by far the major extermination method that was used in the libraries at the University of Zambia. Only seven (20.0%) of the respondents reported that the libraries at the University of Zambia were using rat traps to control rodents and insecticides to spray insects, respectively. Four (11.4%) of the respondents claimed that the libraries fumigated the collections against insects and pests. The findings indicate that the poisoning method was used to exterminate pests in the University of Zambia Libraries.



**Figure 2: Extermination methods used**

Interviews with some professional librarians also established that the common methods used to exterminate pests were by poisoning the rodents and insecticides. Insecticides are chemicals used to combat pests and are at the moment the most popular weapon against insect pests.

#### **4.3.1.4 Handling and storage of library materials**

When the respondents were asked if library materials in poor conditions were restricted, 26 (74.3 %) of the respondents reported that they restricted or banned loan of library materials in poor condition, while nine (25.7%) of the respondents reported that they had allowed loan of library materials in poor condition. The findings revealed that loan of library materials that were in poor condition were restricted in the University of Zambia Libraries.

Probing further, respondents were also asked whether they substituted the original copy with a secondary carrier and to indicate the type of a carrier or substitute. Twenty-two (65.7%) of the respondents reported that the damaged library materials due to poor handling and storage were substituted with a secondary carrier. Twelve (34.3%) of the respondents reported that library materials that were in poor condition were not being substituted with a secondary carrier. Thirty-two (91.4%) of the respondents reported that photocopying was the most used type of substitute in the University of Zambia Libraries, while three (8.6%) of the respondents reported that photocopying was not a popular substitute for the damaged original copies. This was followed by microform at (8.6%) reported by three respondents. The findings indicate that libraries at the University of Zambia were substituting library materials that were in poor conditions. The findings also suggest that photocopies were the most popular substitutes of the original copies.

Question 23 (appendix 2) asked the respondents to indicate whether there was adequate space for shelving and storage of library materials in the University of Zambia Libraries. Twenty (57.1%) of the respondents reported that there was adequate space for shelving and storage of library materials in the libraries. On the other hand, 15 (42.9%) of the respondents reported that there was no adequate space in the libraries. Although the findings suggest that there was adequate space in the University of Zambia Libraries, in an interview, one professional librarian mentioned that there was need for constant weeding of library materials in order to accommodate new library materials, especially at the Medical Library.

In order to rate the frequency of general cleaning of the libraries' floors including dusting of shelves and storage areas, respondents were asked to choose from a list of options ranging

from often to never. Fourteen (40.0%) of the respondents reported that floors and shelves in the three libraries were seldom cleaned, while 12 (34.3%) of the respondents reported that floors and storage areas were cleaned often. Only six (17.1%) of the respondents reported that floors and storage areas were cleaned very often; while three (8.6%) reported that floors and storage areas were never cleaned. The results are presented in Table 6.

**Table 6: Frequency of general library cleaning**

Options	Frequency	%	Cumulative %
Often	12	34.3	34.3
Very often	6	17.1	51.4
Seldom	14	40.0	91.4
Never	3	8.6	100.0
Total	35	100.0	

The findings suggest that although all libraries had their floors cleaned almost daily; books and shelves were dusted often but not daily. On the basis of the researcher's observation it was only in two libraries: the Medical Library and the Veterinary Medicine where one could take down a book from the shelves without the need to wash one's hands afterwards. Dusting is the commonest method used to prevent fungi growth.

#### **4.3.1.5 Disaster preparedness and management in the libraries**

The situation regarding disaster preparedness, respondents were asked to indicate whether the University of Zambia Libraries had disaster detection devices such as smoke and fire detectors among many others. All 35 (100.0%) respondents indicated that the libraries had no fire detector devices. Respondents were also asked to indicate the type of fire fighting equipment that was available in the libraries. Thirty-two (91.4%) of the respondents reported that fire extinguishers were the most common equipment found in the libraries. Three (8.6%) respondents did not answer the question. This was reflected as three missing values that were not picked up by the SPSS software package.

Probing further, respondents were asked to state whether fire extinguishers were commonly available throughout the libraries. Twenty-five (71.4%) of the respondents indicated that fire extinguishers were not available throughout the libraries; while ten (28.6%) of the respondents stated that fire extinguisher were available throughout the libraries. Carbon dioxide fire extinguishers were the most common in the University of Zambia Libraries. The findings seem to suggest that fire extinguishers were not available throughout the University of Zambia Libraries. This could be an element of awareness on the part of libraries. Also, the

findings seem to suggest that the libraries at the University of Zambia depended on the use of hand held fire extinguishers.

Question 27 (appendix 2) asked the respondents to state whether they had received training in the use of fire extinguishers. Thirty-four (97.1%) of the respondents reported that they had not been trained to use fire extinguishers in the libraries. Only one (2.9%) respondent had received training in fire extinguishment. The results revealed that the majority of the respondents had little or no capability in fire safety. It is important, therefore that all library personnel without exception should be taught how to operate fire extinguishers for combating accidental fires in the libraries. The researcher also took tours of the university libraries to check on the availability of the fire extinguishers. The results of the tours indicate that there were few fire extinguishers scattered around the libraries and were not inspected annually. For example, in the Main Library, the last time the fire extinguishers were inspected was in March 2006.

#### **4.3.1.6 Security measures in the university libraries**

Without putting in place proper security of the library materials, all that had been acquired in the libraries could be lost within a short period of time. Respondents were asked to indicate the type of security systems that existed in the University of Zambia Libraries. Thirty-two (91.4%) of the respondents reported that electronic security system was used in libraries at the University of Zambia. Three (8.6%) of the respondents reported that electronic security system was not used in the libraries. The findings suggest that majority of the respondents were aware of the use of electronic security systems in the libraries in order to try to address what was obviously a costly and therefore significant problem.

Respondents were asked to specify individual security systems that were used in the University of Zambia Libraries. Twenty-nine (82.9%) of the respondents reported that university libraries depended on human security guards. This was followed by eight (22.9%) of the respondents who reported that intruder alarm system was installed in the libraries. The least used security system in the University of Zambia Libraries was closed circuit television cameras (CCTV). The findings suggest that a human security guard was the most used security system in the University of Zambia Libraries. Therefore, a combination of modern in-house devices and human security guards would assure the library collection a greater protection.

Probing further, the respondents were asked if the university libraries suffered blackouts or power cuts. The responses showed that 28 (80.0%) of the respondents reported that the libraries suffered power cuts. On the other hand, seven (20.0%) of the respondents reported that the libraries did not suffer power cuts. The findings indicate that university libraries sometimes suffer power cuts.

The situation regarding preventive measures in case of power cuts, the respondents were also asked to state whether the libraries had standby generators that supplied power in times of power cuts. Thirty-one (88.6%) of the respondents reported that the libraries had standby generators for use in case of power cuts; while four (11.4%) of the respondents indicated that the libraries had no standby generators. The findings suggest that not all the three university libraries, which suffered regular power cuts, maintained standby generators. A follow-up tours of the university libraries by the researcher revealed that only the Main Library had a standby generator. Security, like disaster control planning is an integral part of any preservation policy.

#### **4.4 Preservation and conservation techniques and practices**

The respondents were asked to identify techniques and practices that the libraries at the University of Zambia have adopted to preserve and conserve library materials. The results of the analysis of various preservation and conservation techniques and practices used in the University of Zambia Libraries are presented here. Out of a total number of 35 respondents, 34 (97.1%) of the respondents indicated that binding was the most popular preservation and conservation technique in the University of Zambia Libraries, while one (2.9%) respondent indicated “No”. Twenty (57.1%) of the respondents ranked provision of adequate security as the second most used preservation and conservation technique of library materials in the University of Zambia Libraries. On the other hand, 15 (42.9%) of the respondents did not rank the provision of adequate security as a preservation and conservation technique. This was followed by photocopying, which was reported by 18 (51.4%) of the respondents, while 17 (46.8%) of the respondents reported that photocopying was not one of the preservation and conservation techniques used in the university libraries. Sixteen (45.7%) of the respondents reported that cleaning and dusting and proper shelving of library materials were some of the preservation and conservation techniques used by the university libraries at the University of Zambia. However, the least techniques of preservation and conservation of

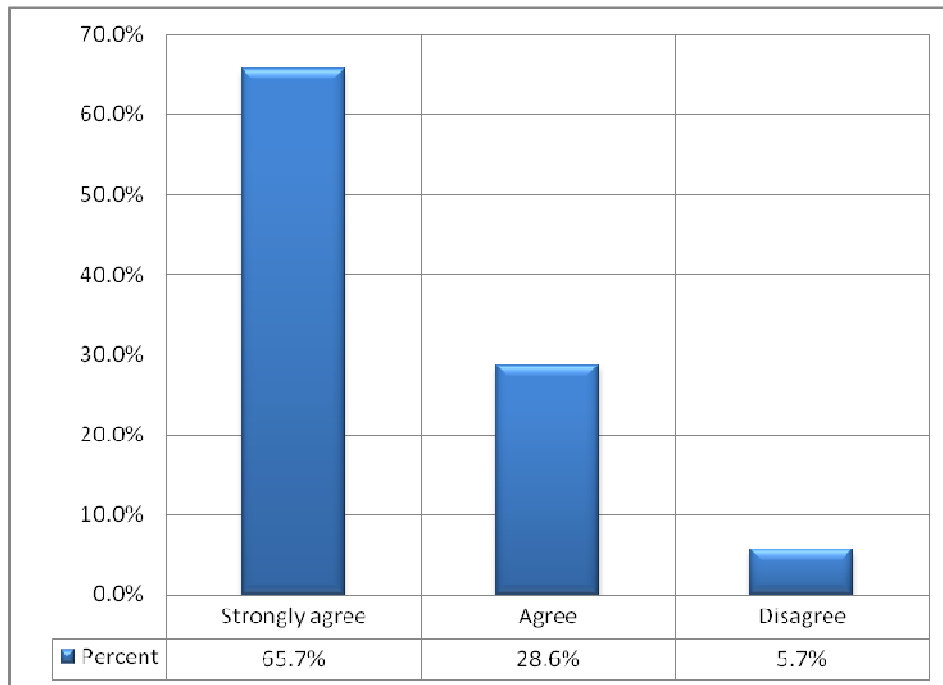
library materials reported by the respondents were digitisation (8.6%) and microfilming (8.6%), respectively.

The findings clearly suggest that the common strategy used in preservation and conservation of library materials in the University of Zambia Libraries was binding, while the least used techniques were digitisation and microfilming. The findings imply that though some techniques are available in the University of Zambia Libraries, not all of them had been adopted. Therefore, the libraries at the University of Zambia have still a lot to do in the aspect of ICTs adoption and utilisation. This means that digital preservation techniques are not effectively in use in the university libraries.

#### **4.5 Written preservation and conservation policy**

Question 31 (appendix 2) required the respondents to state whether the University of Zambia Libraries have a written preservation and conservation policy. The majority 33 (94.3%) of the respondents reported that the university libraries at the University of Zambia had no written policy on preservation and conservation of library materials, while only two (5.7%) of the respondents agreed. The findings suggest that the university libraries at the University of Zambia have no policy on preservation and conservation of library materials.

Probing further, the respondents were asked to confirm whether it was necessary for the University of Zambia Libraries to have a written policy on preservation and conservation of library materials. Thirty-three (94.3%) of the respondents strongly agreed or agreed that it was necessary for the University of Zambia Libraries to have written preservation and conservation policies. Only two (5.7%) of the respondents disagreed or strongly disagreed that it was not necessary to have a written preservation and conservation policy. The findings in Figure 3 suggest that it was necessary to have a written preservation and conservation policy in the university libraries.



**Figure 3: Written policy on preservation and conservation necessary**

Data collected from an interview with a former library administrator revealed that there was no written preservation and conservation policy for the University of Zambia Libraries. Similarly, one professional librarian interviewed mentioned that if such a policy was there it was supposed to spell out the percentage of the budget to be used for preservation and conservation programme.

Follow-up interviews with bindery staff revealed that they were not aware of the existence of a written policy on preservation and conservation of library materials in the University of Zambia Libraries. There was, however, evidence that elements of a preservation policy may be found in other policy documents such as those dealing with collection development. Notwithstanding, a written policy on preservation, made known to and understood by all library staff including bindery staff would constitute a considerable step towards achieving preservation and conservation goals.

To attempt to assess the effectiveness of the conservation and preservation practice and policy, respondents were asked to state whether the current library preservation and conservation practice or policy was successful in achieving the library's preservation and conservation goals. A four point rating scale was used. This comprised 1= Very successful, 2= Moderately successful, 3= Of limited success, 4= Unsuccessful. Eighteen (51.1%) of the respondents indicated that the current library preservation and conservation policy and

practice was unsuccessful. Thirteen (37.1%) of the respondents said that the current library preservation and conservation policy and practice was of limited success, while four (11.4%) of the respondents reported that it was moderately successful. None of the respondents indicated that the current library preservation and conservation policy and practice were very successful. The findings suggest that the current library preservation and conservation policy and practice in the University of Zambia Libraries was unsuccessful; as it was not based on policy.

When the respondents were asked to rank the factors that had influenced their answer to (question 33), 22 (62.9%) of the respondents mentioned funding, while 13 (37.1%) of the respondents reported that their response was not influenced by the funding factor. In terms of commitment from the administration and library staff, 14 (40.0%) of the respondents reported that commitment from both the library administration and library staff was a factor. Twenty-one (60.0%) of the respondents claimed that commitment was not a factor that affects the preservation and conservation policy in the University of Zambia Libraries. Similarly, respondents were asked to state whether key personnel (trained staff) had an effect on the preservation and conservation policy of library materials in the University of Zambia Libraries. Twenty-seven (77.1%) of the respondents denied that key personnel had any effect on the success of preservation and conservation policy. Only eight (22.9%) of the respondents indicated that trained personnel were a major factor to the success of preservation and conservation policy in the University of Zambia Libraries. The findings suggest that respondents in all the three libraries at the University of Zambia regarded funding as the major constraint to effective preservation and conservation of library materials. It was also observed that majority of the library staff who reported that funding and commitment was lacking were those who had served in the University of Zambia Libraries for 16 years and above. To the contrary, majority of the library staff who had served in the university libraries for five years and below constituting 34 (97.1%) of the respondents denied the assertions.

A follow-up interview with the bindery staff revealed that inadequate funding to the library at the University of Zambia had greatly affected the operations of the bindery unit, the only preservation facility available. One of the interviewees in the bindery unit lamented that:

“The Bindery Unit is as good as a dead Unit; it’s not funded at all. Look at the type of tools that we are using, nails, hammers.... Here we are without book binding materials, no paper glue; we are using wood glue for paper glue.

Damaged books keep on coming and piling up. This storeroom for damaged books has now become a final resting or burial ground. The situation is not good in the Bindery Unit.”

#### **4.6 Library staff trained in preservation and conservation of library materials**

Objective five of this study sought to establish the level of skills and experience in preservation and conservation management. Therefore, respondents were asked to establish whether they had received training and the type of training they had received in preservation and conservation of library materials. The majority, 20 (57.1%) of the respondents reported that they had not received formal training in preservation and conservation of library materials, while 15 (42.9%) of the respondents claimed to have received formal training in the preservation and conservation of library materials. Probing further, the respondents were asked to state the type of training they had claimed to have received. It turned out that 22 (62.8%) of the respondents received training in general librarianship, while 12 (34.3%) of the respondents did not. One (2.9%) respondent did not respond to the question. The findings suggest that the major issues concerning preservation and conservation of library materials in the University of Zambia Libraries were availability of properly trained personnel. It is important, therefore, that new qualified librarians should learn the basic principles of preservation and conservation management in their professional education programmes.

Academic faculty in the Department of Library and Information Studies were asked to state whether courses in preservation and conservation of library materials were offered in library schools in Zambia. The responses in relation to offering courses in preservation and conservation revealed that four (80.0%) of the respondents answered “No”, whereas one (20.0%) said “Yes”. The findings suggest that there was no courses in preservation and conservation were offered in library schools in Zambia.

In terms of institutions, which offered training programmes in preservation and conservation in Zambia, four (80.0%) reported that there were no institutions in Zambia that offered training programmes in preservation and conservation. One (20.0%) academic faculty respondent reported that Evelyn Hone College and the University of Zambia were offering training programmes in preservation and conservation of library materials. Academic faculty respondents were also asked to indicate whether the Department of Library and Information Studies at the University of Zambia was offering training programmes in preservation and conservation of library materials. Four (80.0%) of the respondents answered “No”, while only one (20.0%) of the respondents answered “Yes”.

One academic faculty commented:

“There is only a short topic in Collection Development on preservation and conservation of library materials. The Department should design and introduce a course on the subject and offer it as an elective at 3<sup>rd</sup> and 4<sup>th</sup> year.”

This comment was an indication that many academic faculties would like the Department of Library and Information Studies to revise the curriculum to include a course on preservation and conservation of library materials.

Academic faculty respondents were asked to indicate how the course in preservation and conservation was taught in the Department of Library and Information Studies at the University of Zambia. Three (60.0%) of the respondents reported that the course was taught as part of another course, while two respondents reported that it was taught as an elective course. The findings suggest that in the Department of Library and Information Studies at University of Zambia, preservation and conservation was not generally taught as a full course at the university level.

On the other hand, in an interview, the Head of Department of Library and Information Studies pointed out that the current training of librarians took a general approach to librarianship. A topic in preservation and conservation of library materials was not even taught as an elective course but was offered as a component in two elective courses, namely Records Management and Archives Administration.

Drawing from interview data with one of the professional librarians who was also a part-time lecturer in LIS mentioned that preservation and conservation in LIS courses was just taught superficially. The interviewee further mentioned that the course could have been best taught practically, but the Department of LIS at the University of Zambia did not have facilities. Without the presence of properly trained staff; preservation and conservation programmes cannot be planned and put into practice. Therefore, incorporation of preservation as a core course of study would ensure that librarians recognise preservation as a key activity in librarianship rather than a fringe part of the management of all types of library and information services.

#### **4.7 Findings from physical examination of materials in UNZA Main Library**

The Main University Library was purposively selected for the physical examination of library materials because it is the oldest and largest, in terms of size and collection, among the three

university libraries surveyed. In addition, the Library has the largest collection of 300 000 volumes. Furthermore, the Main Library is also a recognised legal depository centre and a national reference library in Zambia (Univesity of Zambia, 2009b). Therefore, the decision that made the researcher to conduct the damage survey in the Main Library at the University of Zambia was based on the fact that, in the view of the size, diversity and representative nature of its collections, the Main Library offers the best opportunity for extrapolating the results of the survey to the two branches collections in the university libraries.

Information was gathered through physical examination of the print material on the shelves and non-print materials in their respective storage places in the Main Library. For books, the first and the last five (5) shelves were selected for the survey on each deck (section). The decks covered by the survey included the Specials Collections, Reference, Library sciences, Law and Political science. Others are sections for agriculture and related sciences, natural sciences and sub-sections for humanities and social sciences. On each shelf, materials were randomly sampled under the following criteria: brittleness, discolouration, worm infestation, tearing and accumulation of dust. Similarly, non-print materials were sampled for inspection. These included videotapes and Compact Disks (CDs) were surveyed from the Special Collections Department. The information gathered from the survey were analysed, and formed the basis of discussion in this section. The survey was carried out in the Main Library from 26<sup>th</sup> October 2010 to 12<sup>th</sup> November 2010.

**Table 7: Distribution of damaged print library materials**

<b>Criteria</b>	<b>Dk 2</b>	<b>Dk 7</b>	<b>Dk 8</b>	<b>Dk 9</b>	<b>Dk 10</b>	<b>Dk 11</b>	<b>Dk 12</b>	<b>Dk 13</b>	<b>Dk 14</b>	<b>Total</b>	<b>%</b>
Brittleness	6	-	-	-	-	-	-	-	600	606	1.4%
Discolouration	404	-	832	2350	2300	1440	2150	2040	1730	13246	31.2%
Worm infested	-	-	-	-	-	-	-	-	-	-	-
Tearing	372	2472	672	135	1985	1962	1845	1770	1235	12448	29.3%
Dust related	651	1989	1233	1700	2500	1990	2130	2130	1880	16203	38.1%
<b>TOTAL</b>	<b>1433</b>	<b>4461</b>	<b>2737</b>	<b>4185</b>	<b>6785</b>	<b>5392</b>	<b>6125</b>	<b>5940</b>	<b>5445</b>	<b>42503</b>	

**Key:** Dk- Deck (Sections)

Presented in Table 7 are the results of the analysis of the various causes of deterioration of print library materials from the survey. Dust related cases constituted 16 203 (38.1%), which was the highest cause of deterioration of print library materials. The damage caused by dust was a contributory factor for browning of 16 203 print library materials in the Library. This situation when protracted could deface the text of the materials thereby rendering them unreadable. Discolouration (31.2%) of print library materials was next, while wearing and tearing (29.3%) of the print library materials followed. The least nature of deterioration of the print library materials was brittleness (1.4%) of library materials. The findings from the survey suggest that dust was one of the greatest enemies of print library materials in the University Library. The findings also showed that the University of Zambia Library had some print library materials that were discoloured, torn and to a lesser extent brittle, which needed the attention of the librarians.

In terms of non-print library materials, Compact-Disc Read On Memory (CD-ROM), tape cassette, microforms and microfiche were physically examined. The CD-ROMs were found in Collection Development section, Cataloguing and Classification section and in the Special Collections. Tape cassettes, microforms and microfiche were stored in the Special Collection section. The findings revealed that most of the non-print materials suffered from dust due to poor storage conditions and multiple dropouts blocking (a flaw in a recording medium). For example, out of approximately 75 audiovisual tapes, 35 (46.7%) were affected by multiple dropouts blocking. Multiple dropouts were caused by among other things; fluctuating room temperatures, absence of winding for long periods and dust infestation. All the above factors were present in the Main Library at the time of conducting this study. The air conditioners and dust suckers in the whole Library were not functioning. The required constant temperature of between 18 and 22°C and humidity below 55% (Reilly, Nishimura and Zinn, 1995), especially in the Special Collections where most of the non-print library materials were stored was not maintained. Moreover, the findings indicated that video cassettes had not been wound ever since they were kept there. It was also questionable whether they were being used.

CD-ROMs that come together with printed library materials as accompanying materials were not being made accessible to the patrons. It was not only the policy on the use of these library materials, which was lacking, but also the University of Zambia Library had no preservation policy on digital library materials. CD-ROMs in the visited storage areas could not be read

smoothly due to banding because of heat. Out of the total of 150 sampled CD-ROMs, 65 (43.3%) could not be read smoothly. At the time of conducting this study the CD-ROMs were still packed in boxes in the Collection Development Section, Cataloguing and Classification Section and at the Issue Desk.

The findings revealed that the major deterioration factors that affected most of the non-print library materials in the University of Zambia Library were dust and heat due to non-dusting and uncontrolled temperatures. This was followed by improper handling and scratches resulting from poor packaging, which had rendered some of the materials unreadable. Further, the findings suggest that although the microforms and microfiches were packed in the dust proof boxes, lack of microform readers had made the information contained in them to die together with the technological obsolescence. Therefore, knowledge about these materials, their qualities, characteristics and composition must be grasped by all library staff to be able to adopt the best preservation and conservation techniques and practices to prolong their lifespan.

The total number of shelves sampled was 42, representing approximately a total collection of 186 044 volumes (Table 8). On the whole the following picture emerged: approximately, 42 503 (22.9%) of the sampled total collections of 186 044 library materials were found to be damaged. The apparent damage of library materials could be attributable to a number of causes such as dust related, discolouration and books with boken spines and torn covers.

**Table 8: Estimates of collections on sampled sections**

<b>Section</b>	<b>Approximate total collections</b>	<b>No of damaged materials</b>	<b>%</b>
Special collections	15 170	1 433	9.5
Reference	6 250	4 461	71.4
Library sciences	4 592	2 737	59.6
Law	5 185	4 185	80.7
Political sciences	8 567	6 785	79.2
Agriculture, engineering, technology and mines	9 640	5 392	55.9
Life sciences	8 624	6 125	71.0
Natural (pure) sciences	7 216	5 940	82.3
Humanities and social sciences	120 800	5 445	4.5
Total	186 044	42 503	514.1

In the findings presented in Table 8, apparent discrepancies in totals were usually due to the size and nature of the collections housed in different sections. Further, at the time of conducting this study the materials in the collections were also being borrowed and returned by the users.

The results in Table 8 show that section for natural sciences was the most affected section with 82.3% of damaged books. This was followed by the law section pegged at 80.7%, while the section for political sciences was next at 79.2%. The reference section recorded 71.4% of the damaged library materials, while the section for life sciences closely followed with 71.0%. The other sections which recorded the high numbers of damaged print library materials were library sciences with 59.6% and agriculture, geology, engineering technology recorded 55.9%. The sections with the least numbers of damaged books were the humanities and social sciences (4.5%) and Special Collections (9.5%). According to the findings of this study, the section for natural sciences text books had the highest number of damaged books. Further, the findings revealed that the section which houses humanites and social sciences text books had a least number of damaged books followed by the Special Collections section.

#### **4.8 Findings from documentary reviews and observations**

##### **4.8.1 Circulation Desks**

The figures from the Main Library's Circulation Desk indicated that January to October 2010, not less than 3 580 damaged books were collected through the issue desk and routed to the Bindery Unit. Figures of damaged library materials from the Medical Library and Veterinary Medicine Library were not made available to the researcher on request. However, the researcher identified a number of inadequacies in the recording system used at the circulation desk. The records did not show the number of books that were taken for binding on monthly basis (the researcher had to count the cards on which each item was recorded), the date when the books were taken for binding and the nature of damage. Further, there was no library staff who was assigned to record the details of the damaged books on a daily basis as a result some books were taken to the Bindery Unit without being recorded at the Circulations Desk. The findings suggest that figures might not reflect the true statistical picture of books that were damaged during a given period of time and were taken to the Bindery Unit. Also, the findings suggest that the librarians in university libraries had not

prepared inventories or sample counts, at least in valuable or vulnerable areas of the collections in order to assess loss.

#### **4.8.2 The Short Loan Section**

The Short Loan Section was another service desk that was visited by the researcher. The Short Loan Collection was established to provide copies of recommended reading materials, which were in short supply for a relatively large membership. A collection of 6 000 volumes had recorded 112 damaged books and other related paper materials in the second semester of 2008/2009 academic year and first semester of 2009/2010 academic year. The nature of damage of these books ranged from damaged book spines, mutilation of pages after a material had been given out for photocopying, and wear and tear of materials due to frequent use and poor handling. Although the recording system was much detailed in the Short Loan Section, the records fell short of showing the specific figures of materials with damaged spine and mutilated pages including those that had gone missing from the collection.

To the contrary, it was observed during site visits to the Medical Library and Veterinary Medicine Library that the rate at which the library materials was deteriorating was much lower compared to the Main Library. Further, it was observed that the damages caused by dust related cases, discolouration and wear and tear was more pronounced in the Main Library. The floors were regularly mopped with wet cloths to prevent dust from the floors to settle on the library materials. It was also discovered that there was regular removing of dust from the materials using mutton cloths thereby lessening abrasion on the surface of materials. However, the researcher came across a significant number of tapes and CDs in the Veterinary Medicine Library which were malfunctioning. This could be attributable to dust since they were not properly stored in dust proof boxes or containers. As discussed in sub-sections 1.8.3.1 and 1.8.3.5 of chapter one, the Main Library carries a status of a National Reference Library and is as such open to the general public apart from serving the university community. Therefore, its varied collections attract heterogenous users who constantly consult the information materials and in the process materials wear and tear.

#### **4.8.3 Bindery Unit**

On a site visit by the researcher to the Bindery Unit, which was the only remaining preservation and conservation facility in the University of Zambia Library, it was discovered that the facility was almost non operational. At the time of conducting this study, most of the key machines such as guillotine machine (Figure 7) and stitching machine were not

operational; while the blocking press was partially working. Further, materials used in binding books and paper glue were not available, instead the binders were using wood glue for binding books. The findings suggest that the Bindery Unit was unable to cope with the restoration of damaged library materials including the backlog of past examination papers waiting to be bound. In addition newspapers were not being bound.

One professional librarian interviewed pointed out that the Library had not been allocated acquisitions budget. Similarly, in an interview with one of the bindery staff, it was revealed that there was nothing at all to spend on preservation. It shows that there was in general, low level of expenditure on preservation and conservation.

#### **4.8.4 Condition of a storeroom for damaged materials in the Bindery Unit**

All the damaged books from the Main Library and its two branches were kept in the storeroom found in the Bindery Unit in the University of Zambia Library (Figure 4). At the time of conducting this study, the researcher found that the storeroom was in a deplorable state and with library materials exposed to more deterioration agents. The storeroom showed a whole range of storage related problems including dust, inadequate storage space, humidity levels, overheating in the room and visible signs of insects and rodents infestation.

The library materials had been piling for number of years due to inadequate binding materials. An interview with one of the staff in the Bindery Unit revealed that even if the binding materials were made available today, it would be impossible to restore some of the materials due to damage caused while in the storeroom attributable to dust and pests.

Although no library staff, including those working in the Bindery Unit had correct figures and dates when damaged materials were placed in the storeroom, one of the staff in the Unit revealed that some library materials had been in the storeroom for over 10 years. The findings suggest that little attention had been paid to restore the damaged library materials that were piled in the storeroom. Further, the findings revealed that the damaged library materials were the most valuable and were heavily used.

#### **4.8.5 Disinfection and fumigation services**

A physical examination of preservation and conservation facilities in the Main Library revealed that the Library was equipped with a fumigation facility. Fumigation is the process of exposing documents to chemical fumes known as fumigants in order to arrest biological infestation of microorganisms such as fungi, insects and rodents. This implied that at a time

when the Library was being designed, different techniques and practices of preserving and conserving of library materials were included in the planning of the Library.

However, in an interview with former library staff who worked in the defunct Reprographic Unit in the Main Library, it was revealed that a fumigation facility was among many preservation and conservation facilities such as the Bindery Unit, Reprographic Unit, air conditioners and dust suckers just to mention a few that were installed in the Main Library, as earlier discussed in subsection 1.9 of chapter one. Unfortunately, it was revealed that the fumigation facility had never been used since its installation and the major problem had been lack of trained personnel to operate the facility. Fumigants had been discovered to be very effective means of controlling pests, which were inside the pages of books in most university libraries.

#### **4.9 Summary of respondents' comments**

Question 37 on the library staff questionnaire and question 8 on the academic faculty questionnaire were optional and were intended to gain an insight into the understanding of preservation and conservation of library materials techniques and practices in the University of Zambia Libraries by soliciting free comments from library staff and academic faculty respondents about their awareness, attitudes, knowledge, perceptions and skills in the preservation and conservation of library materials. Respondents were asked to give suggestions, opinions, ideas and criticisms about the preservation and conservation programme in the University of Zambia Libraries.

The library staff suggested that the University of Zambia Libraries must develop a preservation and conservation policy and follow it, train staff in conservation and employ a qualified conservationist. Further, the library staff suggested that there was need for preservation and conservation of library materials to be recognised and treated as an essential and integral aspect of library management and one believed that it should be a matter for the library as a whole. Furthermore, they suggested that preservation issues should be made known to, and understood by all library staff. Preservation and conservation should be the responsibility of all levels of staff.

In terms of funding of preservation and conservation programmes, the library staff suggested that the university libraries should establish a separate budget for preservation and conservation of library materials. For example, one professional librarian pointed out that,

while the relative importance of the other factors would vary from time to time, the overriding importance of finance remained the only constant factor.

An academic faculty suggested that the Department of Library and Information Studies at the University of Zambia should revise the curriculum to include a course on preservation and conservation. In terms of handling of the library materials, the majority of the respondents suggested that there was need to recognise how to handle all media with care and hence there was need to instruct both staff and users in the handling of materials such as CD-ROMs, hardware, microform readers and photocopiers. Therefore, there is need to improve the condition of the library materials in the university libraries; orientation for staff, everyday care of library materials and staff training in preservation and conservation. In this regard, preservation and conservation should be routine activities.

#### **4.10 Summary of the findings**

The research has revealed that the University of Zambia Libraries had diverse formats of library materials, both print and non-print materials. Although the University of Zambia Libraries were committed to preserving and conserving library materials for current and future use, the preservation and conservation programme was not well spelt out and encountered a lot of challenges.

Many of the challenges and problems reported in the findings were common in all three university libraries because they share resources to a large extent such as human and financial. Among the major challenges that the university libraries were facing were preservation and conservation planning and policies, handling and use of library materials, security of library materials and properties, awareness in preservation and conservation of library materials, preservation techniques and practices, disaster preparedness and conducting preservation surveys were not adequately addressed by the University of Zambia Libraries.

Library materials had deteriorated due to poor handling by both library staff and users, dust contaminated shelves and storage areas and poor air conditioning. Preservation strategies such as microfilming had discontinued mainly due to poor maintenance of equipment and the technology was no longer supported by industry. Further, the Library had no capacity of carrying out microfilming projects, while digitisation was in its infancy.

The other major problems the university libraries were facing were under funding and lack of properly trained library staff to effectively implement preservation and conservation

activities. It was established that it was not clear as to how and what degree, preservation and conservation was funded in the University of Zambia Libraries. The problem of preserving and conserving library materials in the university libraries was compounded by the absence of a written policy and lack of conservation equipment in the Bindery Unit.

The problem of skills development was compounded by the fact that the provision of library education in Zambia in preservation and conservation was grossly inadequate. Almost the entire library staff was not trained in preservation and conservation activities, except for those who did their industrial attachment at the National Archives of Zambia. Therefore, there were inadequate skills and knowledge about basic preservation techniques like environmental control, care and handling, reformatting, preservation planning, disaster management and security. Methods of training favoured by respondents varied from on-the-job training to graduate courses in preservation and conservation.

Hand fire extinguishers were available in all three university libraries, but were not regularly inspected and serviced. Chemicals were chiefly used to control biological agents in the university libraries. The chemical products used were not injurious to human beings. However, preservation standards were not applied consistently.

Binding and photocopying were widely used to preserve and facilitate access to library materials in the university libraries. Users carried out photocopying frequently without staff supervision.

Disaster planning, which was one of the corner stones of preservation and conservation programmes, was lacking. The University of Zambia Libraries did not have a written disaster preparedness plan dealing with print and non-print materials. This made it very difficult to escape from concluding that if the University of Zambia Libraries had a written preservation and conservation policy, then it was quite very scant and adhoc.

Although electronic resources were increasingly becoming a big part of the libraries' collections in the University of Zambia Libraries, there was no policy in place to preserve and conserve such materials. Further, there was a lack of trained staff in the preservation of electronic materials, which was likely to render such materials inaccessible to the users in future. Technological obsolescence was one of the greatest threats to preservation of electronic records. Migration strategies were not widely used in the University of Zambia Libraries. The preservation programme in the University of Zambia Libraries was generally

reported to be of limited success. In short, preservation and conservation had not yet received the attention it deserved over the years.

## **CHAPTER FIVE: INTERPRETATION AND DISCUSSION OF FINDINGS**

### **5.0 Introduction**

The discussions are presented according to the themes of the objectives of the study and sub-problems posed as part of the research questions in section 1.12 and 1.13 of chapter one. The general purpose of the study was to explore the preservation and conservation of library materials, techniques and practices used in the University of Zambia Libraries, problems and challenges affecting library materials in order to provide direction or guidance on preservation and conservation issues. The specific objectives of the study were to:

1. Explore the existing state of library materials;
2. Investigate the causes of deterioration of library materials
3. Assess the activities and techniques used in preservation and conservation of library materials;
4. Establish the impact of information technology and its implications for preserving and conserving library materials and making them accessible over time;
5. Identify and discuss existing policies on preservation and conservation of library materials; and
6. Establish the level of skills and experience in preservation and conservation management.

The discussion of the salient points was based on the questionnaires analysis, semi-structured interviews with selected stakeholders such as Library management, professional librarians and bindery staff, academic faculty in the Department of Library and Information Studies and observations conducted in the Main Library, the Medical Library and the Veterinary Library. In addition, a review of the literature related to preserving and conserving library materials so as to make them accessible to the readers was done.

### **5.1 Background information of respondents**

The first four items of the questionnaire for library staff sought background information of the respondents. The information which was sought included the ages, sex, academic qualifications as well as work experience. This information was essential because understanding the nature of preservation and conservation of library materials depends upon knowing academic qualifications and work experiences of the library staff.

According to the findings of this study in sub-section 4.1.2 of chapter 4, there were slightly more male (57.1%) than female (42.9%) in the three university libraries. The majority of the respondents, representing 34.3% of the respondents were aged between 28 and 35 years. Further, among the respondents, there were 20 (57.1%) professionals and 15 (42.9%) paraprofessionals. In terms of work experience, the majority of the respondents 37.1% had worked in the three libraries for a period ranging from six to ten years.

In this study, it has been observed that most of the older librarians, constituting 31.5% appeared to be well disposed towards preservation and conservation of library materials as compared with the younger librarians. The most of the professional librarians whose work experience range from six to ten years (37.1%) and are aged between 28 and 35 years old (34.3%) might not have been trained at Evelyn Hone College where courses in preservation and conservation are being offered. The findings of this study in sub-section 4.6 of chapter 4 showed that the majority of the respondents 57.1% had no formal training in preservation and conservation of library materials. They had some training in general librarianship. Kanyengo (2009) observed that there was no conservation training at degree level in Zambia. The age and the work experience of library staff could have direct implications on the level of knowledge, skills and experience in preservation and conservation management in the University of Zambia Libraries. The job of preservation and conservation of library materials cannot be left in the hands of only few library staff because awareness and concern for preservation is the responsibility of all librarians at all levels. Therefore, the younger librarians will require some basic training in preservation and conservation of library materials.

## **5.2 General conditions of library materials**

The study probed into the state of damage or deterioration of library materials in the university libraries and came out with the following results. Figure 1 in chapter 4 showed the ratings of the general physical conditions of library materials in the university libraries. Out of the 35 respondents, 20 (57.1%) of the respondents reported that the general physical condition of library materials was average, while ten (28.6%) of the respondents reported that the general physical condition of the materials in the university libraries was good. However, five (14.5%) respondents reported that the general physical condition of library materials was unsatisfactory. These findings are in line with the findings of the National Library of

Australia (2004) that deterioration of library materials is one of the major crises facing libraries throughout the world.

A follow-up observation confirmed that the rate of deterioration of library materials in the university libraries is dependent upon the external influences such as the handling procedures, storage conditions, environmental factors and the chemical stability of the materials making up the materials. In addition, abuse and mismanagement as well as damages from water leakages, to a large extent have also caused untold damage to library materials. It should also be emphasised that the larger parts of the university collections are on the open-shelves. These materials are exposed to various agents of deterioration such as mutilation and vandalism, damage from water leakages, excessive temperature and relative humidity, poor handling during photocopying and so forth. This has been supported by the available documentations and photos of the damaged library materials captured in the Main Library (Figures 4 and 6).

The records at the circulations desk showed that from January to October 2010, up to 3 580 physically disintegrating books were taken to the Bindery Unit for repairs. This was just a small fraction of damaged library materials; there were still many more disintegrating books on the shelves that had not been identified. A follow-up physical examination of print library materials at UNZA Library revealed that 42 503 print library materials were damaged due to various deterioration agents shown in Table 7. According to sub-section 4.7 of chapter 4, the most affected subject area with the largest number of damaged print library materials was deck 9 housing political sciences and law text books, while deck 2 which houses the special collections had the least damaged print library materials. These findings seem to suggest that library materials on open shelves are more vulnerable to agents of deterioration, especially those related to mutilation and vandalism than those housed in the closed access areas.

When the respondents were asked to state whether they had observed signs of deterioration of library materials, 34 (97.1%) of the respondents reported that they observed signs of deterioration of the collections, while one (2.9%) reported no observation. This finding corroborates Rosenberg (1993) who has a strong conviction that everyday care of library materials should be given a special emphasis in preservation and conservation measures taken by libraries. This conviction is derived from the fact that the quality of care and handling ultimately contribute to the longevity of the material. This assertion, it is believed, goes for care and handling of library materials in university libraries at the University of Zambia.

Therefore, it is imperative that librarians at all levels in the university libraries should realise that the primary function of any service charged with the management of information is to provide the means of access to that information. Knowledge about these materials, their qualities, characteristics and composition must be observed by all librarians at all the levels to be able to adopt the best preservative and conservative strategies to prolong their life expectancy.

Probing further, it was realised that most of these damages were related to mutilation. This was reported by all the 35 (100.0%) respondents. There were 34 (97.1%) respondents who reported that they observed damages related to broken book spines, while one (2.9%) reported no observation. Out of 35 respondents, the majority 32 (91.4%) respondents reported observing damages caused by water leakages, while three (8.6%) reported no observation. Out of 35 respondents, 23 (65.7%) of the respondents observed damages related to brittleness of library materials, while 12 (34.3%) reported no observation. However, it was observed by the respondents that rodents had caused the least damage to the library materials in the university libraries.

In terms of non-print library materials, the findings revealed that fading of the image in photographic; cracking and scratching of sound and optical discs loss of data on magnetic media were not the highest deterioration of non-print library materials in the university libraries. Although there was changing of colour images, surface blemishes leading to fading of the information in non-print library materials, there was less record of a total loss of data, permanent deformation and distortion of non-print materials.

The condition of library ranged from average to unsatisfactory in the university libraries. Unless the existing situation is reversed, access to library materials in the University of Zambia Libraries will diminish. However, at the time of conducting this study, the university libraries had started to formulate coherent preservation and conservation activities in order to avert further loss of vital or valuable library materials. For example, an institutional repository database had been constructed and operational as earlier discussed in sub-section 1.9.3 of chapter one.

### **5.3 Causes of deterioration of library materials**

According to the findings of this study in sub-section 4.3 of chapter 4, the results showed that 33 (94.3%) of the respondents reported that wear and tear was the major cause of deterioration of library materials, while two (5.7%) of the respondents reported that wear and

tear was not a cause of library materials deterioration. This finding corroborates Olatokun (2008) who also found that wear and tear, and excessive light and dust were responsible for the deterioration of library materials. There is need to preserve and conserve library materials in university libraries because materials are susceptible to both inherent and environment factors, which combine to deteriorate such materials.

A follow-up observation of materials in the libraries confirmed that books on the shelves and non-print materials in the storage areas were dusty, had falling spines and torn covers. This negligent approach by librarians exposes library materials to agents of deterioration making long-term preservation an up hill task in the university libraries.

When the respondents were asked if university libraries have been experiencing water leakages, the majority 32 (91.4%) of the respondents reported that water from roof leakages had soaked and damaged print library materials (Figure 6), while three (8.6%) of the respondents reported no damages caused by water leakages. This finding is supported by Ojo-Igbinoba (1993) who noted that when books are soaked by water from leakages, it could lead to tearing and crumbling of book pages, the running or bleeding of ink, the disintegration of adhesives, warping of book covers and finally the likelihood of library materials made of coated paper sticking together. Also, there is the possibility of mould growth on wet and damp library materials after 72 hours of being so affected.

A follow-up observation confirmed that the University of Zambia Main Library has been experiencing rain water leakages annually due to flat roofs which are susceptible to leakages and thus permitting the incursion of water or rain more than ridged roofs (Figure 5). These flat roofs have also allowed dirt and debris to accumulate and vegetation to grow on them thus encouraging water retention, which has led to cracks. One of the most visible consequences of leakages is soaking of books every rain season, especially on deck 14 or topmost floor (Figure 6). Unfortunately, the University Library has no equipment for soaked paper treatment, thus making these books permanently inaccessible to users.

Probing further into the causes of deterioration of library materials, the majority 30 (85.7%) of the respondents reported that theft and vandalism were other major causes of deterioration of library materials, while five (14.3%) of the respondents reported that theft and vandalism was not among the major causes of deterioration of library materials. This finding is supported by Bello (1998) that book theft is a major security issue in libraries, particularly in academic libraries, with special collections being the most targeted materials.

A follow-up observation revealed that in the university libraries, vandalism of library materials takes many forms, ranging from underlining and highlighting text, tearing and or removing pages and tampering with the content. Therefore, vandalism of library materials occurs when users knowingly tear, mark or otherwise damage or destroy materials. It is the view of the researcher that regular patrols of the decks and reading areas combined with vigilant security guards and library staff may help to combat the vices.

Photocopying has been reported by 29 (82.9%) of the respondents in this study as constituting a major preservation problem, while six (17.1%) of the respondents reported that photocopying was not a major cause of deterioration of library materials. This finding agrees with the findings of Eden and Feather (1997) that photocopying places serious strain on already fragile library materials.

A follow-up observation confirmed that there was a lot of unsupervised photocopying of library materials in the university libraries. Used incorrectly, photocopying could cause severe damage to the structure of the document, but careful handling could prevent potential problems. The spines of books are easily damaged when placed face down on a photocopier platen. It is evident from the foregoing that excessive photocopying of information materials by users contributed to deterioration of print library materials in the university libraries. Therefore, to minimise on the damage of original materials, copying should be carried out by staff only and not be self-service. If it is a self-service photocopying facility, it should be supervised adequately by library staff. Also, a record must be kept of any items that are copied regularly so that if necessary a substitute can be reproduced.

Moisture had also been identified by 25 (71.4%) of the respondents as the root cause of various types of physical, chemical and biological deterioration of library materials in the university libraries. However, ten (28.6%) of the respondents reported that moisture was not the cause of deterioration of library materials. This finding is supported by Shuhaimi (1986) that high relative humidity provides the moisture necessary to promote harmful chemical reactions in materials. He also observed that moisture works for and against the preservation of library materials.

It is important to realise that temperature and relative humidity are interrelated; a change in one will bring about a change in the other. A certain amount of moisture is necessary for flexibility in paper-based library materials. Too little moisture makes paper brittle while excess moisture encourages mould growth. Mould spores are in the air and can only establish

colonies on a surface when moisture is present. Therefore, the most effective treatment is to control the moisture, which is necessary for their growth.

Dust was reported by 24 (68.6%) of the respondents as another major cause of deterioration of library materials in the university libraries. On the other hand, 11 (31.4%) of the respondents reported that dust was not one of the causes of deterioration of library materials. This finding of this study is in line with Ojo-Igbinoba (1993) who identified dust, water and insects as the factors that affect book and non-print materials. Dust and dirt have been known to be sources of both physical and chemical deterioration of library collection. Dust acts as a nucleus around which moisture collects and this moisture provides the necessary humidity for the growth of fungus and chemical reaction, which lead to formation of acids (Shuhaimi, 1986). Therefore, the researcher proposes that bookshelves and storage areas be cleaned regularly to remove dust, kept away from water, which cause the materials to corrode and kept away from insects. It also goes without saying that reduced dust levels make for a more pleasant working environment for patrons and staff. In addition, patrons take their cues from the environment they find: a collection that is clean and well kept promotes general respect and care for library materials.

Although light, pests and bad shelving were reported to be the least causes of deterioration of library materials in the University of Zambia Libraries; it is still worthwhile to briefly discuss them in this study.

According to Patkus (1999), light can cause some paper to bleach and others to yellow or darken; it can also cause media and dyes to fade or change colour, altering the legibility and appearance of documents. Source of lighting in the university libraries is fluorescent tube light. Artificial light like fluorescent tube lights also radiate a high percentage of ultraviolet rays which cause deterioration by yellowing the paper (Patkus, 1999). However, the amount of damage by light depends to a large extent on the intensity of light. As the intensity of light increases, the rate of deterioration of library materials also increases. Also, duration of exposure of library materials to light is directly proportional to its deterioration. The university libraries are open for not less than 16 00 hours daily in a year, except during long vacations and holidays. Ideally library materials should be exposed to light only while in use (Patkus, 1999).

The most common pests seen around in the university libraries are rodents such as rats and insects such as cockroaches. These pests are attracted into the university libraries due to food

leftovers thrown in the bins. Though there were no signs of deterioration caused by rats in the collections as already reported in sub-section 5.1 of this chapter, the presence of rats was observed.

A follow-up observation confirmed that rats and cockroaches were present in the storeroom in the Bindery Unit. It was discovered that rats were attracted to the storeroom because the place was dark most of the times and the books were infrequently handled. Rats have destroyed materials for nesting purposes, urinating and defecating on the materials. Ojo-Igbinoba (1993) noted that cockroaches are found in all libraries in the tropics and they bring about destruction of library materials in their insatiable demand for food. Therefore, such environments as found in the storeroom in the Main Library provide ready food source where rats and cockroaches can feed and populate silently.

### **5.3.1 Handling and care of library materials**

Library materials need protection from deterioration agents. Storing library materials in appropriate library buildings, monitoring and controlling temperature, humidity, light and proper handling are key to protection of library materials. Findings of the study in relation to these factors are discussed in this sub-section.

#### **5.3.1.1 Control of temperature and relative humidity in the University Libraries**

According to the findings of this study in sub-section 4.3.1.1 of chapter 4, the majority 25 (71.4%) of the respondents reported that the university libraries had no heating, ventilation and air conditioning (HVAC) system. Only ten (28.6%) of the respondents reported that heating, ventilation and air conditioning were available in libraries. This finding agrees with the findings of Mazikana (1993) that most libraries and archival buildings are not equipped with air conditioners to stabilise the temperature and humidity of the storage areas. Patkus (1999) submitted that air conditioning systems, such as heating, ventilation and air conditioning were the most effective means of caring for library materials.

When the respondents were asked to confirm whether the air conditioners were operational all the times, the majority 34 (97.1%) of the respondents reported that air conditioning system was not operating round the clock. This finding contrasts Ngulube and Magazi's (2006) findings that air conditioning of the stack area round the clock is an ideal example of maintaining optimum temperature and humidity of the storage of library materials.

A follow-up interview revealed that the air conditioning system in the Main Library was more than 30 years old. Further, the air conditioning system was not regularly maintained due to lack of expertise and technological obsolescence. Therefore, it should be noted that all air conditioning systems have an in-built obsolescence with a life span that need to be replaced after some years.

When the respondents were asked if the monitoring of temperature was carried out in the university libraries, all 35 (100.0%) respondents reported that temperature was not controlled in the university libraries. This finding contrasts with Patkus' (1999) findings that the control of temperature and relative humidity levels should be the concern of any preservation programme.

Shuhaimi (1986) acknowledged that extreme temperature and relative humidity contribute significantly to the deterioration of library materials. Reilly, Nishimura and Zinn (1995) made similar observations that the major problems of brittle of print library materials and deterioration of audio tapes were as the result of chemical reactions that were heavily influenced by storage temperature and relative humidity. The storage environment is greatly affected by temperature and relative humidity. It has been established by (Patkus, 1999) that lower temperatures and a lower relative humidity greatly extend the life expectancy of documentary materials. Uncontrolled temperature puts the information materials in bad shape in the university libraries and in the not too distant future, some of the materials may not be available for access by the users. It is evident from the foregoing that environmental control is key to preventive preservation strategies in the management of of library collections.

Monitoring the environment where library materials are kept appears to be a worldwide problem. In the case of the Massachusetts libraries and records repositories, Trinkaus-Randall (1990) quoted by Ngulube (2003), revealed that 70% of the institutions could not maintain a constant climate throughout the whole year and most respondents knew very little about the effects of the environment on their collections. Therefore, temperature monitoring is the most dependable tool for decision-making and it holds the most promise for providing conditions favourable to the long-term survival of library materials.

### **5.3.1.2 Control of light in the storage environment in the university libraries**

When the respondents were asked if light was controlled in the storage environment, the majority 31 (88.6%) of the respondents answered in the affirmative, while four (11.4%) of the respondents reported that it was not. These findings showed that light was controlled in

the university libraries. This finding is supported by Shuhaimi (1986) that it was important to monitor light in the storage environment because light damage was irreversible. The rate of damage to paper depends on the intensity of the light and the length of exposure. Light levels must be kept as low as practically possible in storage, reading and display areas.

According to Patkus (1999), light in all its forms, especially in the presence of atmospheric pollutants, leads to a weakening and embrittlement of organic materials that constitute paper, photographs, magnetic tapes, films and other forms of materials found in the libraries. He pointed out that ultraviolet (UV) radiation was the most energetic and destructive form of light. It accelerated photochemical deterioration and was extremely damaging. The physical damage on paper is not only seen but is quantifiable in that the paper becomes brittle, breaking into pieces on handling.

A follow-up observation confirmed that 600 books were brittle on deck 14 (uppermost floor) in the Main Library. This could have been attributed to glass covered roof that might be permitting a direct sun rays producing heat on deck 14. As Shuhaimi (1986) pointed out that the effects of ultraviolet rays in sunlight and fluorescent light on the print library materials were seen on faded covers and discoloured pages. He added that ultraviolet light is the most deleterious. The invisible ultraviolet component of sunlight, daylight and fluorescent lighting was relatively the most harmful of all and should be eliminated. Fluorescent lights used for viewing and reading in the libraries were also a powerful source of ultraviolet radiation. All these, cumulatively, had a devastating effect on books and documents. Therefore, artificial lighting should be provided by diffused lighting of varying intensity as desired in the various areas of libraries.

### **5.3.1.3 Control of pest management in the university libraries environment**

The findings of this study in sub-section 4.3.1.3 of chapter 4 revealed that the majority 22 (62.9%) of the respondents reported that the university libraries had experienced invasion of pests. On the other hand, 13 (37.1%) respondents reported that the university libraries had not experienced pests' invasion in the past. This finding is in line with Plumbe's (1964) findings that tropical countries swarm with insects and pests. The finding was further supported by a follow-up observation that confirmed that the Main Library was infested with rodents and cockroaches.

When the respondents were asked how often the extermination of pests was done in the university libraries, 17 (48.6%) of the respondents reported that it was done rarely. This was

followed by four (11.4%) of the respondents who indicated once, while another four (11.4%) reported that it was done twice. There were ten (28.6%) respondents that did not respond to the question. In view of the prevalence of pests in the tropics generally and in Africa in particular, it is necessary for the university libraries to take measures against them. Failure to control rodents and cockroaches in the university libraries could result in the loss of vital or valuable library materials.

Probing further, it was revealed that poisoning was the popular method used in the university libraries to exterminate pests (Figure 2). This was reported by 17 (48.6%) of the respondents. The use of rats traps and spraying was reported by seven (20.0%) of the respondents, respectively, four (11.4%) of the respondents claimed to fumigate the collection against insects and pest. This finding is supported by Ojo-Igbinoba's (1993) findings that the commonest measures taken against insect and pests by the responding libraries in Nigeria were the use of insecticides.

Although there are many chemicals that can be used to deal with pests, care must be taken to ensure that the ones used do not have destructive effects on library materials and that they do not pose harmful to the health of library staff and users (Patkus, 1999). In view of the foregoing, the researcher proposes that the libraries be regularly inspected all around against the presence of insects and rodents and if necessary rat traps could be used to kill rodents. Rodent bait could also be used to control rats but the use should be restricted to the outside of the library buildings because carcasses of rats if not detected early would breed large insect population; and also cause a terrible smell for users. The university libraries should also utilise the fumigation facility in the Main Library to control pests, which are inside the pages of books. Insects that are already present often lay eggs in printed materials, which are often hard get to rid of and are a source of re-infestation if there is any slack in control.

However, the best practice to control insects and rodents in libraries can be accomplished by following and adhering to good housekeeping practices. These practices include keeping food away and killing any insects or rodents found in the university libraries (Ojo-Igbinoba, 1993). It is, therefore, the view of the researcher that maintenance of clean environment and strict regulations on non-eating in the libraries should be observed by all staff. Adequate lighting in the university libraries should be observed by all staff. Adequate lighting in the university libraries should also be improved to ensure that insects and rodents are not attracted into the libraries.

#### **5.3.1.4 Handling and storage of library Materials**

According to the finding of this study in sub-section 4.3.1.4 of chapter 4, the results showed that 26 (74.3%) of the respondents reported that they restricted loan of library materials in poor conditions, without providing an alternative, while nine (25.7%) respondents reported that they did not. This finding contrasts with Ojo-Igbinoba's (1993) findings that some librarians considered that to restrict or ban materials to circulate because they were in poor conditions was self-defeating. He suggested that where library materials were in heavy demand and the materials were frail or fragile and conservation was not immediately possible, substitution must be made. The substitute could be of different kinds: a duplicate of a book, a photographic reprint (offset), a photocopy or microform, which could be offered so that the original could be preserved.

It has been established from the literature reviews that worldwide, a serious cause of deterioration of library materials often is the casual attitude of the library staff as well as the users of the library towards library materials as physical objects (Arnoult, 1986; Asiamah, 2008; Clements, 1987; Conway, 1990; Eden and Feather, 1997; Olatokun, 2008; Owowoh, 2010; and Trinkaus-Randall, 1990). Improper storage, faulty repairment, rough handling, deliberate abuse, vandalism were all examples of deterioration of library materials by human beings. Proper storage and handling of library materials can be relatively inexpensive, with several handling practices and storage measures costing little or nothing (Ojo-Igbinoba, 1993). Librarians in charge of the library collections are directly responsible for the overall conservation and preservation of the collections. But they are not always aware how to handle, store and use collections carefully to minimise damage and help preservation.

When the respondents were asked if original copies in poor conditions were duplicated or substituted with a secondary carrier, 23 (65.7%) of the respondents reported that the university libraries were substituting the damaged library materials with secondary carriers. On the other hand, 12 (34.3%) of the respondents reported that substitutions of damaged original copies were not made. The finding disagrees with the findings of Olatokun (2008) that there was a generally low awareness about preservation issues especially on the corruptible tendencies of information materials and what could be done to prevent their deterioration. However, it is the researcher's view that a lot of work still needs to be done in this area because these university libraries will have little or no information materials to fall back on when the original documents are destroyed. This again points to absence of

preservation and conservation policy in the university libraries and as a result, there is neither a preservation plan nor a programme to ensure keeping of library collections.

On the substitution methods that were used in university libraries, 32 (91.4%) of the respondents reported that photocopying substitution method was the most common method used in the university libraries, while three (8.6%) respondents reported that photocopying substitution was not popular. Out of 35 respondents, only three (8.6%) respondents reported that the libraries used microfilm substitution method and no respondent reported digitisation as a substitution. This finding collaborates Ojo-Igbinoba (1993) findings where it was found that (81.5%) of the surveyed libraries substituted photocopies of damaged or restricted library materials. However, caution should be taken against using acidic paper for photocopying when making substitutes; and the photocopying should not infringe copyright regulations.

The findings in this study showed that 20 (57.1%) of the respondents reported that there was adequate space for shelving and storage of library materials in the university libraries. But 15 (42.9%) of the respondents reported that there was no adequate space. The choice of suitable shelving and storage is fundamental to the preservation of library materials. Shelves used in the storage of library materials could contribute to deterioration of the collections they house. The university libraries use metal shelves to accommodate print library materials. According to Rosenberg (1995), the major advantages of metal shelves are that they are adjustable to fit various sizes of library materials, durable and fire resistant. Similarly, high levels of acidity in storage boxes could be detrimental to the life span of library materials. These findings agree with the findings of Reilly, Nishimura and Zinn (1995) that storage conditions in the libraries offer many opportunities to prolong the life span of library materials because they contribute the materials physical well being.

When the respondents were asked how often the general cleaning of shelves and storage areas was done in the university libraries, 20 (34.3%) of the respondents reported that it was done often, 14 (40.0%) of the respondents reported that it was seldom done, while six (17.1%) of the respondents indicated very often and only three (8.6%) of the respondents reported that it was never done. These findings contrast with Rhys-Lewis' (1996) findings that cleanliness offers many benefit because clean surrounding discourage fungi, insects and pests. During the cleaning of shelves and storage places, library materials are supposed to be physically examined. Physical examining of library materials is key to identifying any damages such as

biological or chemical on library materials in order to provide early warning. Library materials could also be examined during stocktaking.

Follow-up observation and interviews confirmed that although the floor in the University of Zambia Libraries were cleaned on daily basis, the shelves and storage places were irregularly cleaned and dusted. It was also of major concern that this study established that library materials were hardly ever examined and that the annual stocktaking of library materials was no longer conducted in the University of Zambia Libraries.

#### **5.3.1.5 Disaster preparedness and management in university libraries**

No library is exempted from the devastations that can occur as a result of natural or man-made disasters. The results in this study showed that all 35 (100.0%) respondents reported that there was no fire detector devices installed in library buildings. This finding contrasts with Feather (1996) who pointed out that a disaster plan was central to the preservation strategy and was a key element in preservation policy making. From the foregoing, it is imperative that disaster planning in the University of Zambia Libraries is regarded as an essential part of any preservation and conservation programme (Conway, 1990).

A follow-up observation and interviews confirmed that despite the fact that a disaster preparedness plan allows a library to plan and make decisions about emergency responses and recovery, the University of Zambia Libraries had not yet made it part of preservation strategy. Disaster planning involves the taking of certain purposive actions to prevent disaster and if it does occur to have ready made plans for salvaging and coping. It is therefore, the view of the researcher that in the event of the fire or indeed any other disaster, the university libraries are supposed to have made some preparatory works. Further, the library buildings should be equipped with modern fire detector devices and alarm systems that are directly connected to the Central Fire Brigade Office.

Probing further, respondents were asked to indicate the common fire equipment available in the university libraries. It turned out that 32 (91.4%) of the respondents reported that carbon dioxide fire extinguishers were the most common fire equipment found in the surveyed university libraries. Three (8.6%) respondents reported that carbon dioxide fire extinguishers were not common equipment found in the university libraries. This finding is in line with the findings of Ojo-Igbinoba (1993) findings in the survey of libraries in Nigeria that all 27 surveyed libraries (100.0%) depended on the use of hand held fire extinguishers. Therefore, a combination of modern in-house devices and human security guards would assure the

university libraries collections greater protection. Above all, the library buildings and their contents should also be insured.

Concerning the use of fire extinguishers, 34 (97.1%) of the respondents reported that they had no training in fire extinguishment. This finding agrees with the findings of Ojo-Ighinoba (1993) that majority of the libraries have little or no capacity in fire extinguishers. This simply means that libraries seem to depend entirely on the fire department. The situation in the University libraries is not different from what was found in libraries in Nigeria.

Ojo-Igbinoba (1993) argued that all library personnel without exception should be taught how to operate fire extinguishers for combating accidental fires. Also, there should be fire drills, which the university libraries do not take seriously at present. The drills are meant to train personnel on how to react to an actual fire outbreak. The importance of such drills is to put library personnel in state of combat readiness physically and psychologically. Fire drills should take place several times a year to familiarise library personnel with emergency exists, evacuation of records and shelf lists and communication with the fire station for outside help.

Ngulube (2003) observed that disaster preparedness as a document preservation strategy was also a neglected area in England, Wales and Northern Ireland. According to Feather (1996) quoted by Ngulube (2003), surveys of disaster planning in libraries and archives in these countries showed that only 6.6.% of the institutions surveyed had disaster control plans in use and that a further 3.7% had plans under preparation (Feather, 1996). The situation was slightly more positive in the United States where Conway (1990) found that 56% of the respondents had disaster plans or were in planning stages.

#### **5.3.1.6 Security measures in the University of Zambia Libraries**

According to the findings of this study in sub-section 4.3.1.6 of chapter 4, the results showed that 32 (91.4%) of the respondents reported that electronic systems were used in the university libraries, while three (8.6%) respondents reported the use of human security guards. The finding is consistent with Bello (1998) that librarians have realised that information technology can enhance collection security. Similarly, the University of Zambia Libraries employ technology to ensure the security and safety of their collections. This implies that library materials are protected by an electronic theft detection system. Use of the library implies consent to the use of this equipment and gives the library the right to detain and search a user when the equipment indicates probable cause for belief that a misuse of library materials has occurred. In this study, collection security refers to a process designed to

protect library collections against unauthorised removal or loss. This involves protecting resources against disaster as well as thieves or intruders. Bello (1998) considered collection security breaches as formidable obstacles to information access and use. He identified major security issues in libraries to include: theft and mutilation; vandalism; damages and disaster; over borrowing or delinquent borrowers and purposefully displacing arrangement of library materials.

Follow-up observation and interviews revealed that the university libraries have installed electronic gadgets in order to combat theft of library materials, except for Samora Machel Veterinary Medicine Library. For example, all library materials are charged with a disc or metal strip slipped into the materials, which then sounds an alarm when attempts are made to smuggle them through the gates unless they have been desensitised by proper checking out. Further, all persons entering or leaving the library use one gate and other gates are used only in emergencies. In addition, large bags are not allowed in the university libraries. However, it has been revealed that not all thefts are committed by patrons. Some library staff take materials from the university libraries without checking them out. This kind of theft, according to Bello (1998), is one of the hardest to prevent, since library employees know how to defeat the security systems.

When the respondents were asked to indicate the types of security systems that were put in place in the libraries, 29 (82.9%) of the respondents reported that human security guards was the most popular system. This was followed by intruder alarm system, which was reported by six (17.1%) respondents. The least used security system in the University of Zambia Libraries was closed circuit television cameras (CCTV). The finding of this study was not surprising because the university libraries used the combination of electronic systems and human security guards to protect the buildings as well as the library collections. Therefore, the application of information and communication technologies (ICTs) in university libraries would increase collection security.

Follow-up observation and interviews confirmed that in all the three university libraries there was a written collection security policy used for collection security management. The present policy mainly dealt with eating, drinking and improper use of collection, furniture and equipment as well as misuse of computer and other library facilities. It should be noted that a written collection security policy was a pre-requisite for handling collection security problems effectively and its practices should be supported with sound implementation. Such

policies were very important in the governance or management of collection security issues in libraries. But there was need for evaluation of these policies and that library staff or committee members could become involved in formulating the policies evaluating their usefulness (Mazikana, 1993).

It was reported by 28 (80.0%) of the respondents that the university libraries usually suffer blackouts. In response to a further question that sought to find out whether preventive measures have been put in place by the university libraries to protect the loss of library materials during power cuts, the majority 31 (88.6%) of the respondents reported that the university libraries have acquired standby generators. However, four (11.4%) of the respondents reported that university libraries have no standby generators. This finding should give hope to all librarians in the University of Zambia Libraries concerned with the security of collections. But, even where there are standby power generators, it takes some minutes for them to come on; as a result this could still lead to the loss of library materials. In this regard, security guards together with library staff should be well trained in collection security and be vigilant at all times.

Examples from comments in this study suggest that thousands of books are lost yearly through the activities of human agents, especially through theft and vandalism. Therefore, university libraries should come up with a system of holding exhibitions of vandalised library materials and publicising the names of the culprits on the official notice board in order to call attention to practice.

#### **5.4 Preservation and conservation techniques and practices**

In this study, a technique is the day-by-day application of skills in protection of library materials against agents of deterioration, while a practice is a succession of acts of similar kind such as repair and shelving and other housekeeping activities.

According to the findings of this study in sub-section 4.4 of chapter 4, the results showed that 34 (97.1%) of the respondents reported that binding was the most popular preservation and conservation technique used in the University of Zambia Libraries, while one (2.9%) respondent disagreed. This finding is supported by Kanyengo's (2009) findings that the preservation of all library information resources, except for electronic information in the university libraries was delegated to the Bindery Unit. In Zambia, as in most developing countries, infrastructure is still lacking in handling large preservation and conservation of

library materials, especially resources that are in electronic form. As a result, the Bindery Unit concentrates on library materials that are in a paper format.

When commenting on the state of preservation and conservation at the University of Zambia Library, Kanyengo (2009) argued that although binding and repairs of books and journals was extremely important, this service had been hampered by financial, materials and labour constraints. She added that the talk of modern preservation and conservation methods in the University of Zambia Library using the latest equipment was really not on the agenda. It is evident from the foregoing that library binding requires both skills and modern technology in the university libraries.

Follow-up observation and interviews confirmed that the Bindery Unit was not fully operational as most of the machines were not working. Machines such as a cleat sewer, blocking press machine, guillotine and stitching machine were constantly breaking down due to old age (Figure 7). Some of the machines were even out of model and that made it difficult to find any spares parts as preservation and conservation machinery had advanced elsewhere. In most cases bindery staff had to improvise their tools in order to continue with the work. A tool such as a nail was used for making holes in a book while using a hammer and pliers. This was coupled with lack of binding materials and paper glue. The general decline in funding to the University of Zambia Library has negatively impacted the operation of the Bindery Unit (Simui and Kanyengo, 2003).

Provision of adequate security was reported in this study as the second popular preservation and conservation technique used in the University of Zambia Libraries. This was reported by 20 (57.1%) of the respondents, while 15 (42.9%) of the respondents reported that security was not one of the popular techniques. This finding contrasts Ngulube and Magazi (2006) who found that public libraries in Kwa-Zulu Natal were not prepared to handle disasters and theft in their libraries.

However, going by the number of respondents who disagreed that security was being used as a preservation technique, it was evident that although security was provided in the university libraries it was inadequate. The threat to intellectual property through theft and mutilation, alteration of electronic records and documents in a library database, hacking of automated catalogues from integrated library management system among many other vices has posed a tremendous challenge to the library profession worldwide. Therefore, the security of library collections should be of a growing concern to all librarians in the university libraries. The

magnitude of the problem is a matter of conjecture in the University of Zambia Libraries in particular and other Zambian libraries in general.

To minimise crimes in the university libraries, particularly book theft and mutilation, the researcher proposes the following measures: making photocopying machines available in the university libraries and the granting of an amnesty on regular basis to encourage the return of over-due library materials.

In this study, 18 (51.4%) of the respondents reported that photocopying was one of the preservation and conservation techniques used in the university libraries; while 17 (48.6%) of the respondents reported that it was not. This finding contrasts Ngulube's (2001) findings that photocopying was not generally considered as a preservation strategy. Photocopying in most cases in the university libraries at the University of Zambia was primarily done for user convenience. It was also done to make some additions in the collections. However, photocopies lack permanence if they were not done on acid free paper using a machine that produces a thermoplastic image by heat and pressure fusing through electrostatic charges (Ngulube, 2001).

Probing further, it was revealed that cleaning and dusting was not among the major preservation and conservation techniques and practices in the university libraries. This was reported by 19 (54.3%) of the respondents, while 16 (45.7%) of the respondents reported that it was among major techniques and practices.

A follow-up observation confirmed that although cleaning and dusting was in fact an extension of good housekeeping practices, thorough cleaning and dusting of shelving, storage areas and materials was not done regularly in the university libraries. This finding was supported by Rhys-Lewis (1996) who stated that dust, debris and untouched areas become sources of insect or rodent infestation. Therefore, it was important that an overall policy of cleaning and tidying was maintained.

It is the view of the researcher that in a situation like the University of Zambia where cleaning firms are contracted to clean, any contracted cleaners receive basic training from professional staff in the libraries on how to carry out the cleaning programme without damaging the materials and order in which they are arranged. In addition, clear instructions should be given to all library staff from a cleaner to professional librarians, banning eating and drinking from undesignated areas in the university libraries. It would be ideal that a

cleaning supervisor is backed-up by a competent member of staff who is available to monitor standards and performance. It is also imperative that a programme is established to monitor the places of high risk such as the kitchen and that tours of inspection are regularly carried out. This will ensure that remedial action is undertaken well before a problem gets out of control.

In this study, the least used preservation and conservation techniques and practices of library materials were digitisation (8.6%) and microfilming (8.6%), respectively. This finding is supported by Lee et al (2002) that technological knowledge on digital elements of electronic documents is largely lacking among staff that are in preservation departments. This lack of knowledge extends to deficient know-how on the equipment and software that is required for preservation of digital library materials. According to sub-section 4.2 of the previous chapter, the condition of library materials ranged from average to unsatisfactory. Notwithstanding this somewhat gloomy scenario, at the time of conducting this study, the plan to use digitised copies as backups for works that go out of print, deteriorate, or are lost and damaged started with the creation and setting up of electronic institutional repository.

In terms of microfilming as a preservation technique, it was evident that microforms were once upon a time widely used to provide a secure backup for originals in case of loss and to replace originals that were already threatened by instability or technological obsolescence. During an interview with a former reprographic officer who worked in the defunct reprographic unit in the Main Library, it was revealed that microfilming was abandoned because the Library had no capacity to carry out microfilming activities. In addition, it was revealed that microfilming was ceased in the University Library due to lack of chemicals, poor equipment, and lack of trained staff. In this regard, the researcher proposes that microfilming is no longer necessary for the University of Zambia Libraries, what is needed as of now is to migrate the information in microfilms into digital format so that it becomes accessible to scholars, academicians and researchers who need to use it.

### **5.5 Preservation and conservation policy**

According to the findings of this study in sub-section 4.5 of chapter 4, 33 (94.3%) of the respondents confirmed that the University of Zambia Libraries had no written preservation and conservation policy in place. Only two (5.7%) respondents reported that the university libraries had a written policy on preservation and conservation of library materials. This finding is in line with the findings of Mazikana (1993) that most African countries have no

policies on handling information, be they in print, let alone in electronic format. Ngulube (2003) also made similar conclusions that most African countries do not have preservation and conservation policies in their libraries and information centres. From the foregoing, it is imperative that enabling policy framework would allow libraries to implement various preservation and conservation techniques and practices that are in line with their own parent institutions but operate within the overall country framework. However, the situation regarding the Libraries Act in Zambia was more alarming. One would be interested to know that 46 years after independence, libraries were still struggling with enacting a Libraries Act and as a result most libraries in the country operate within a no policy framework (Kanyengo, 2009; Phiri, 1981). A written policy could serve as a binding contract between the the University of Zambia Libraries and the stakeholders and could also be used as a tool for staff training and evaluation.

Lack of preservation policies was also highlighted in the United Kingdom as a factor that hindered effective preservation management (Eden and Feather, 1997). A study carried out in the United Kingdom in 1996 discovered that only 32 (16%) of the 167 respondents had written preservation policies (Eden and Feather, 1997). Although the existence of preservation and conservation policies does not guarantee their implementation, the Pan-African Conference on the Preservation and Conservation of Library and Archival Materials strongly recommended that each country establish a committee to develop a national preservation policy for implementation by government (Ngulube, 2001).

When the respondents were asked to indicate factors that they thought affected the effective implementation of coherent preservation and conservation activities in the university libraries, the majority 22 (62.9%) of the respondents reported that funding was the major factor, while 13 (37.1%) of the respondents did not agree. This finding corroborates Simui and Kanyengo's (2003) findings that over the years the funding to the University of Zambia Library from the University Central Administration had been dwindling.

From observation and follow-up interviews, it became clear that the greatest constraint against effective preservation and conservation of library materials was inadequate funding. Budget allocation for preservation and conservation of library materials will remain limited due to underfunding being experienced at the University of Zambia. This trend in funding has affected all areas of library operations including money that could be allocated for preservation and conservation of scholarly information materials (Simui and Kanyengo,

2003). As a result, preservation and conservation of library materials in the university libraries had not received the attention it deserved.

Respondents were asked to indicate if commitment had any bearing on effective preservation and conservation programmes in university libraries. The majority, 21 (60.0%) of the respondents refuted the assertion, while 14 (40.0%) of the respondents answered in the affirmative. Such a finding from this study did not come as a surprise because this again points to the absence of preservation and conservation policy in the university libraries. However, this finding contrasts with Ngulube (2001) that the rate at which things get done is a function of money, whether or not they are done at all is a function of people. Therefore, it is unlikely that preservation efforts can succeed if it has no support from the University Management, the Library Administration and library staff.

When respondents were asked if trained personnel was a contributing factor to having an effective preservation and conservation programme in the university libraries, 27 (77.1%) of the respondents reported that it was not, while eight (22.9%) of the respondents agreed. This finding contrasts with Ngulube's (2001) assertions that knowledge of preservation and conservation techniques and practices is fundamental to implementing and promoting preservation and conservation activities. First and foremost, for library staff to implement preservation and conservation programmes, they need knowledge of preservation and conservation issues and their importance in the management of their collections. Ngulube (2001) observed that knowledge in preservation is essential for making critical decisions about human and financial resources. Lack of financial resources may hamper preservation and conservation efforts, but some experts in preservation have argued that the real impediment is not resource, but lack of preservation knowledge. Therefore, it is evident from the foregoing that without dedicated commitment from the Library Administration and library staff, funding and personnel with expertise, the implementation of preservation and conservation policies would be extremely difficult, if not impossible.

#### **5.6 Training of staff in preservation and conservation techniques and practices**

The study sought to find out the level of training of library staff in preservation and conservation by asking questions relating to preservation and conservation training. It turned out that 20 (57.1%) of the respondents had no formal training in preservation and conservation of library materials, while 15 (42.9%) of the respondents claimed to have received formal training. It should be clarified here that some library staff who had claimed to

have received formal training in preservation and conservation could have confused the training they got in general librarianship to mean formal training in preservation and conservation. Nevertheless, this finding agrees with the findings of Kanyengo (2009) that there was no conservation training at a degree level in Zambia. Further, she argued that the curriculum at the University of Zambia that offered a degree programme in library and information studies did not include training in conservation methods, although they were mentioned in theory. Furthermore, she pointed out that the only training in conservation in Zambia was a two-and-half year course offered at Evelyn Hone College of Applied Arts and Commerce. It is evident from the foregoing that for the successful implementation of conservation and preservation programmes in the university libraries, there should be adequate and trained manpower who are information professionals that understand the physical and chemical nature of the materials in the library holdings.

Respondents were also asked to indicate the type of training they had received. Findings of this study showed that 22 (62.8%) of the respondents had received training in general librarianship, while 12 (34.3%) of the respondents did not. One (2.9%) respondent did not respond to the question. This finding is in contradiction with Akussah (1991) and Alegbeleye (1999) who recommended that the library, archival and information schools should provide formal education and training on conservation and preservation of library materials. This is important because library staff must be available to keep watch to intervene when harmful practice is noticed. It is also important that local bred training could be carried out through in-house and continuous education programmes such as workshops and seminars. In addition to training staff, there is also the need for the regular training of users on proper handling methods. This is important for the attainment of a win-win situation because there must be inculcation of a preservation culture in both staff and users. Therefore, staff and management should consider the preservation of library materials as an integral part of library practice.

The findings of this study showed that 80.0% of the respondents from academic faculty in the Department of Library and Information Studies at the University of Zambia also confirmed that preservation and conservation programmes were not offered at the institution. This finding contrasts with the American Library Association (1992) accreditation standards that preservation and conservation is one of the core elements of any professional library and information science programme. In this regard, all information professionals should receive preservation education and training so that they are to effectively manage the university collections and indeed any other collections in other libraries.

According to Ngulube (2003), in some developed countries, professional associations, such as the American Library Association (ALA), determine education programmes for librarians. He added that the obvious advantage is that training and education criteria are formulated with specific reference to the needs of the profession, both quantitatively and qualitatively. But in the situation of the Zambia Library Association (ZLA), although it has been in existence since 1968, the association has no direct influence on or effective control of library training and education (Kanyengo, 2009; Phiri, 1981). In the 1960s and 1970s, the Zambia Library Advisory Council, which was the overall professional watchdog, nominated a Professional Board of Library Studies to monitor library education. It had limited success in co-ordinating curricula and its influence disappeared in the 1980s (Mwacalimba, n.d). It is evident from the foregoing that as long as the main emphasis of many education and training programmes in Zambian schools of library and information studies continues to be on the traditional generic skills of information management, preservation and conservation of library materials remain neglected.

#### **5.7 Findings from physical examination of materials, documentary reviews and observations.**

The purpose of the survey was to gather information concerning the management of library materials in UNZA Main Library. The physical examination of materials revealed that all library materials were at risk to deterioration due to their dust related cases, poor handling and poor storage conditions. Table 7 showed that dust (38.1%) was the highest cause of deterioration of print library materials. Apart from causing print library materials to change colour to brownish or yellowish and brittle, dust exerted abrasion on the surface of books and other related materials. This situation, if remain uncontrolled through regular cleaning could deface the text books of the materials thereby rendering them unreadable. Similarly, dust has exerted abrasion on the surface of tapes, CDs and other media which has caused irreversible soiling and /or sratching. Therefore, dust related cases have caused multiple dropouts or malfunctions in non-print materials. Probing further, the findings revealed that discolouration (31.2%) of print library materials was as well attributable to dust. In addition, the other notable cause of damage to print library materials was wear and tear which needs the attention of librarians.

Table 8 showed that the approximately total collections of 186 044 volumes of materials was sampled. Out of the total estimated number of 186 044, 42 503 (22.85%) volumes of books

were damaged. All the sampled collections were on open shelves, except for the Special Collections section. The findings revealed that the most affected sections were natural sciences (82.3%), law (80.7%) and political sciences (79.2%), while the Special Collections (9.5%) which is a closed section reported one of the least damages of print library materials.

From the foregoing, it is evident that the print library materials on the open shelves were more vulnerable to damages such as mutilation and vandalism compared to those in the closed areas. Further, the sections which housed reference materials that could not be borrowed were more exposed to human abuse. These findings have been supported by the documented figures that were made available at the circulations desk and the Short Loans Section in the Main Library and observations. For example, just from January to October 2010, the circulations desk (that hands materials from the open shelves) recorded not less than 3 580 damaged books compared to the Short Loans section (closed section) that recorded 112 damaged books in the second semester of 2008/2009 academic year and first semester of 2009/2010 (sub-section 4.8, chapter 4).

## **5.8 Summary**

Generally, library materials in the University of Zambia Libraries are exposed to various agents of deterioration. The major agents of deterioration identified in this research were mutilation and vandalism, damage from water leakages, excessive temperature and relative humidity, poor handling during photocopying among many others. To this effect, librarians at all levels should possess knowledge about the materials, their qualities, characteristics and composition to be able to adopt the best preservative and conservative strategies to prolong their life span. This is important because library staff must be available to keep watch to intervene when harmful practice is noticed. The research also identified funding as another major constraint to preservation and conservation activities in the University of Zambia Libraries. There should be consistent ongoing institutional support. The amount of money meant for preservation and conservation activities should be clearly defined. For the University of Zambia Libraries to be abreast with preservation challenges, the university libraries should design a preservation survey instrument to use in assessing their preservation needs.

## **CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS**

### **6.0 Conclusions**

The study was carried out to investigate the preservation and conservation of library materials, techniques and practices used to preserve and conserve library materials in the university libraries at the University of Zambia. The university libraries faced a lot of challenges in the areas of preservation and conservation of library materials. The state of library materials in the University of Zambia Libraries ranged from average to unsatisfactory. Unless the existing situation is reversed, access to library materials will diminish. The study has given an overview of various causes of deterioration of library materials, especially paper-based, which is still the predominant carrier of recorded information in the three university libraries. The highest nature of deterioration of print library materials was wear and tear. This resulted from poor handling and excessive photocopying by users. Though it is not possible to eradicate all the causes of deterioration agents, monitoring the temperature and relative humidity of libraries environment, good air conditioning system /ventilation, good housekeeping and hygiene and purchasing acid free paper library materials could prove to be effective prevention measures. It also highlighted various possible techniques and practices that could be applied to curb the detrimental effects of deterioration factors. Prominent among the techniques was binding as a preservation strategy. This study has shown that even if preservation and conservation techniques and practices are recognised in the University of Zambia Libraries, other techniques and practices such as digitisation are not fully practiced due to some factors notably inadequate funding. However, there is need to migrate digital library materials such as microforms to new media due to technological obsolescence. But lack of funds, expertise and equipment in digital preservation has hampered the project. This shows that the University of Zambia Libraries still have a huge task ahead to do in the area of ICTs adoption and utilisation.

The study revealed that there were no written policy on preservation and conservation in the three university libraries studied. The implication of this situation is that it is not easy to plan and implement preservation and conservation programmes in the absence of a written policy in the university libraries at the University of Zambia. Without such a policy, it would be difficult to improve the conditions of the library materials in the university libraries because introducing intervention measures such as user education for staff and users, everyday care and staff trained formally in preservation and conservation need policies. Therefore, there is

urgent need for university libraries at the highest and largest learning institution in Zambia to have a written policy for preservation and conservation of library materials and to spearhead the formulation of a national policy on preservation and conservation of library materials as at present such policies are non-existent in most libraries in Zambia.

The lack of training in preservation and conservation of library materials in the University of Zambia Libraries has resulted in non-committal to preservation and conservation activities among the majority of library staff. Only a small number of library staff was committed and conversant with preservation and conservation management, while the majority of the staff militated against any comprehensive preservation such as good housekeeping and hygiene. This has been pointed out in the study to be among the major contributing factors to the rate of deterioration of library materials in the university libraries.

The study's conclusions are that the University of Zambia Libraries should allocate more resources to preservation and conservation activities, store library materials under suitable conditions, reformat heavily used library materials and those in a poor conditions, undertake conservation treatment, formulate disaster management plans and preservation and conservation policy, formulate adequate preservation strategies, research and disseminate information on preservation and conservation activities, train and develop staff skills in preservation and conservation techniques and practices and raise awareness of the importance of preservation and conservation.

## **6.1 Recommendations**

Taking into account the results of the study, the identification of the main features characterising the preservation and conservation of library materials throughout the world, a number of recommendations are made to the University Management, Library Administrators, Library and Information Studies Department at the University of Zambia and Zambia Library Association. The study clearly shows that:

1. The general physical condition of materials in the three university libraries was average. Accordingly, it is recommended that the university libraries should consider various possible techniques and practices that could be applied to curb the detrimental effects of deterioration factors.
2. Wear and tear due to frequent use was the major cause of deterioration of library materials in the University of Zambia Libraries. Accordingly, it is recommended that

appropriate instructions be developed for monitoring good housekeeping practices, the proper use of storage facilities, discouraging inappropriate use of photocopiers and encouraging careful handling by staff and users.

3. The lack of formal training in preservation and conservation of library materials in the University of Zambia Libraries has affected the successful implementation of preservation and conservation programmes. Accordingly, it is recommended that there should be adequate and trained manpower in the libraries for preservation and conservation programmes and activities to succeed. It should be therefore, noted that preservation and conservation activities are specialised that require information professionals who understand the physical and chemical nature of the materials in their library holdings. Further, it is recommended that the department of Library and Information Studies at the University of Zambia should revise its curriculum and encourage the inclusion of preservation and conservation in national library education and training programmes at both professional and technical levels.
4. University libraries surveyed lack preservation and conservation policies to use to set out guidelines for preservation and conservation of library materials. Accordingly, it is recommended that the attention of Library Administration in the three University of Zambia Libraries be drawn to the urgent need to develop coherent preservation and conservation policies in order to counter deterioration of library materials.
5. The study revealed that there was lack of disaster preparedness and recovery that cover the potential risks from fire, problems of water damage as well as theft, mutilation and vandalism in the university libraries. Accordingly, it is recommended that the university libraries should be made to provide for issues relating to disaster planning since a preservation plan helps to ensure that limited resources are used consistently and economically. It also helps in raising awareness of libraries' preservation problems as well as the institutionalisation of the preservation process and increasing knowledge among staff.
6. The study revealed that funding was the major constraint that affected the operations of libraries at the University of Zambia. This problem of financial constraint has affected preservation and conservation activities and programmes in the university libraries. Accordingly, it is recommended that extra budgetary provision be sought for the establishment and development of in-house infrastructure for preservation and conservation activities.

7. The study revealed that at the national level, information on preservation and conservation is lacking. Accordingly, it is recommended that a joint expert consultation on the needs and prospects for research in preservation and conservation be initiated.

It is hoped that this study might give university libraries at the University of Zambia the strategic direction they require to initiate any preservation and conservation measures for the protection of their holdings. It might also assist the university libraries at the University of Zambia to understand the physical needs of library materials and to meet or extend nationally and internationally agreed standards for their preservation and conservation. Knowledge generated from the study forms an important component in the decision-making process. It is evident that there is very little researched-based information in Zambia on preservation and conservation of library materials. Thus, suggestions given in the study are likely to inform the decision-making process and the allocation of funds for better preservation and conservation activities and programmes. Training and education of library personnel in preservation and conservation techniques and practices in Zambian libraries could be influenced by the results of the study provided in the recommendations are pursued with the necessary actions they require.

## **6.2 Further Research**

This was the first study to be carried out on a large scale on the preservation and conservation of library materials, techniques and practices in the university libraries in Zambia. Therefore, it has brought to the fore several issues that require further research that would provide indepth understanding of the issues critical to the preservation and conservation of library materials in all libraries Zambia.

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## **Appendix 1: Covering letter for library staff questionnaire**

Dear respondent,

I am carrying out research on the preservation and conservation of library materials techniques and practices in the University of Zambia Library towards a Master of Library and Information Studies degree to be awarded by the University of Zambia. The information that will be collected is purely for research purposes only and will be used as such. Please spare a few minutes to answer this questionnaire.

Thank you.

**Kimbo Lemmy Shameenda**

## Appendix 2: Questionnaire for Library Staff

Please complete this questionnaire by either ticking [] in front of the response that depicts your opinion or by writing the answer in the given space.

### Section A: Personal information

1. Age:

- (a) 20 to 27 [  ]
- (b) 28 to 35 [  ]
- (c) 36 to 43 [  ]
- (d) 44 to 51 [  ]
- (e) 52 and above [  ]

2. Sex:

- (a) Male [  ]
- (b) Female [  ]

3. Highest academic qualification attained?

- (a) PhD [  ]
- (b) MLIS [  ]
- (c) BALIS [  ]
- (d) Dip.LIS [  ]
- (e) Cert. LIS [  ]

4. For how long have you been working in the library?

- (a) 5 years and below [  ]
- (b) 10 years and below [  ]
- (c) 15 years and below [  ]
- (d) 20 years and above [  ]

### Section B: Condition of library materials

5. What is the overall condition of the library materials in the libraries?

- (a) Very good [  ]
- (b) Good [  ]
- (c) Average [  ]
- (d) Unsatisfactory [  ]

6. Have you observed/noticed any signs of deterioration of library materials in the collections?

- (a) Yes [  ]
- (b) No [  ]

7. Which of the following signs of deterioration have you noticed/observed on library materials? (Please tick as many as possible).

- (a) Mutilation of pages [  ]
- (b) Book broken spines [  ]
- (c) Fading of the image in photographic materials [  ]
- (d) Cracking and scratching of sound and optical discs [  ]
- (e) Loss of data on magnetic media [  ]
- (f) Eaten by rats [  ]
- (g) Damaged by the rain [  ]
- (h) Brittle library materials [  ]

**Section C: Causes of deterioration**

8. Which of the following do you think is the cause of deterioration of library materials? (Please tick as many as possible).

- (a) Frequent use [  ]
- (b) Photocopying [  ]
- (c) Dust [  ]
- (d) Water from roof leakages [  ]
- (e) Pests [  ]
- (f) Moisture [  ]
- (g) Excessive light [  ]
- (h) Vandalism [  ]
- (i) Bad shelving [  ]

**Section D: Preservation techniques and practices**

9. Which of these methods/techniques below have the libraries adopted to preserve and conserve library materials? (Please tick as many as possible).

- (a) Binding [  ]
- (b) Photocopying [  ]
- (c) Microfilming [  ]
- (d) Digitisation [  ]
- (e) Cleaning and dusting [  ]
- (f) Shelving of library materials to allow for free flow of air [  ]
- (g) Installing of air-conditioners in the library [  ]
- (h) Provision of adequate security systems [  ]
- (i) Use of insecticides or rodenticides [  ]

**Section E: Handling and care**

10. Do your buildings have a heating, ventilation and air conditioning (HVAC) system?

- (a) Yes [  ]
- (b) No [  ]

11. Are the HVAC systems on at all times?

- (a) Yes [  ]
- (b) No [  ]

12. Do you monitor temperature levels in the libraries constantly?

(a) Yes [ ]

(b) No [ ]

13. Are lights in the libraries turned off when not in use?

(a) Yes [ ]

(b) No [ ]

14. Do you control light from the windows in your storage areas?

(a) Yes [ ]

(b) No [ ]

15. Do you control artificial lighting in your storage areas?

(a) Yes [ ]

(b) No [ ]

16. Have the library buildings ever experienced any insect invasion or vermin infestation?

(a) Yes [ ]

(b) No [ ]

17. Do the libraries carry out routine extermination of vermin infestation (insects, rodents, etc.)?

(a) Yes [ ]

(b) No [ ]

18. If the answer is yes, please tick the answer that applies to the frequency that the extermination is done:

(a) Once a year [ ]

(b) Twice a year [ ]

(c) Once in two years [ ]

(d) Rarely [ ]

19. What method (s) of extermination do the libraries use? .....

20. Do you restrict or ban loan of materials in poor condition?

(a) Yes [ ]

(b) No [ ]

21. Do you substitute the original copy with a secondary carrier?

(a) Yes [ ]

(b) No [ ]

22. What type of a substitute or carrier is it?

- (a) Photocopy [  ]
- (b) Microform [  ]
- (c) CD-ROM [  ]
- (d) Other, please specify.....

23. Do the libraries have adequate space for shelving and storage of library materials?

- (a) Yes [  ]
- (b) No [  ]

24. How often do you think the general cleaning/washing of the libraries floors including stack and storage areas are done?

- (a) Often [  ]
- (b) Very often [  ]
- (c) Seldom [  ]
- (d) Never [  ]

**Section F: Disaster preparedness and management**

25. What disaster detection devices do the libraries have?

- (a) Smoke detectors [  ]
- (b) Fire detectors [  ]
- (c) Fire extinguishers [  ]

26. Are fire extinguishers available throughout the decks and the buildings in general?

- (a) Yes [  ]
- (b) No [  ]

27. Has staff been trained to use fire extinguishers?

- (a) Yes [  ]
- (b) No [  ]

28. What security systems exist in the libraries? (Please tick all the applicable options).

- (a) Electronic security system [  ]
- (b) Closed circuit television cameras (CCTV) [  ]
- (c) Intruder alarm system [  ]
- (d) Human security guards [  ]

29. Do the libraries suffer from blackouts or power cuts?

- (a) Yes [  ]
- (b) No [  ]

30. Do the libraries have standby generator that supplies power in times of power cuts?

(a) Yes [ ]

(b) No [ ]

**Section G: Preservation and conservation policies**

31. Do the university of Zambia libraries have a written preservation and conservation policy?

(a) Yes [ ]

(b) No [ ]

32. Do you think a written policy on preservation and conservation is necessary for UNZA Libraries?

(a) Strongly agree [ ]

(b) Agree [ ]

(c) Disagree [ ]

(d) Strongly disagree [ ]

33. If the answer is Yes, how successful do you consider the library current Preservation policy/practice to be in achieving library's preservation goals?

(a) Very successful [ ]

(b) Moderately successful [ ]

(c) Of limited success [ ]

(d) Unsuccessful [ ]

34. What factors influenced your answer to the previous question? (Please tick all the applicable options).

(a) Funding [ ]

(b) Commitment [ ]

(c) Key personnel (staff) [ ]

**Section H: Training in preservation and conservation**

35. Have you been trained on how to preserve and conserve library materials?

(a) Yes [ ]

(b) No [ ]

36. If the answer is yes, what type of training did you receive?.....

37. What do you think should be done in order to have an effective preservation and conservation programme in the University of Zambia Libraries?.....  
.....

Thank you for your time and cooperation

### **Appendix 3: Covering letter for academic faculty questionnaire**

Dear respondent,

I am carrying out research on the preservation and conservation of library materials techniques and practices in the University of Zambia Library towards a Master of Library and Information Studies degree to be awarded by the University of Zambia. The information that will be collected is purely for research purposes only and will be used as such. Please spare a few minutes to answer this questionnaire.

Thank you.

Kimbo Lemmy Shameenda

## Appendix 4: Questionnaire for academic staff

Please respond to the following items by either ticking [√] in front of the response that depicts your opinion or by writing the answer in the given space.

### Section A: Personal information

1. What is your academic rank?

- (a) Professor [ ]
- (b) Associate professor [ ]
- (c) Senior lecturer [ ]
- (d) Lecturer I [ ]
- (e) Lecturer II [ ]
- (f) Lecturer III [ ]
- (g) SDF [ ]

2. How long have you been teaching at the University of Zambia or elsewhere?.....

### Section B: Training in preservation and conservation

3. Do you know any institutions that offer courses in preservation/conservation of library materials in Zambia?

- (a) Yes [ ]
- (b) No [ ]

4. If the answer is yes, what are the names of the institutions that offer courses in preservation/conservation in Zambia?.....

5. Does the Department of LIS at the University of Zambia offer training programmes in library materials preservation and conservation?

- (a) Yes [ ]
- (b) No [ ]

5. If the answer is yes, how is the course offered in the Department of LIS at the University of Zambia?

- (a) Core course [ ]
- (b) Elective course [ ]

6. What are the areas of concentration of this course?

- (a) Preservation of print materials [ ]
- (b) Preservation of digital materials [ ]
- (c) Both of the above [ ]

7. Do you think that the department of LIS at the University of Zambia has played its role in preservation/conservation of library materials in libraries in Zambia?

(a) Yes [ ]

(b)No [ ]

8. Do you have suggestions on how best the LIS Department could teach the course on the preservation and conservation of library materials?.....

Thank you for assistance and cooperation.

## **Appendix 5: Interview guide for library administrators and professionals**

1. Does UNZA Library have a written preservation policy for managing both paper and digital materials?
2. What practices and techniques are used for preserving and conserving library materials in UNZA Libraries?
3. How is the Library staff made aware of preservation and conservation activities in the libraries?
4. What would be the best methods for providing additional training to library staff in preservation of library materials?
5. Do you think that the preservation and conservation programme is well funded in UNZA Libraries?
6. Do UNZA Libraries control temperature and relative humidity in the stack areas?
7. Have the library buildings in the past ever experienced any insect invasion or vermin infestation?
8. What pest management control mechanism is used in UNZA Libraries?
9. What type of disasters do UNZA Libraries experience?
10. Is there a written disaster preparedness and recovery plan for the libraries?
11. What security systems exist in UNZA Libraries?
12. What do you think should be done in order to have an effective preservation and conservation programme in UNZA Libraries?

## **Appendix 6: Interview guide for bindery staff**

### **Section A: Work experience**

1. Highest qualification attained?
2. What type of training did you receive in preservation and conservation of library materials?
3. For how long have been working in the Bindery Unit?
4. Do you repair books and journals on daily basis?
5. On average, how many books and journals do you repair per day?
6. What mechanical devices do you use to repair library materials?
7. Do you think that the current tools that you use are adequate to support your workload?
8. Are the adhesives that use acid-free?
9. What is the cause of damage to the library materials that come to the Bindery Unit?

### **Section B: Preservation and conservation policy**

10. Are you aware of any written policy on preservation and conservation of library materials in UNZA Library?
11. How successful do you think is the current preservation and conservation policy/strategy to be in achieving library conservation goals?

### **Section C: Constraints**

11. What challenges do you encounter in your work?
12. What do you think should be done in order to have a satisfying service for UNZA Library and other clients?

Thank you for your time and cooperation.

**Appendix 7: Various photos of damaged library materials**



**Figure 4: Some of the damaged books waiting to be repaired pending procurement of binding materials in the Main Library**



**Figure 5: Falling ceiling board due to rain water leakages in the Main Library**



**Figure 6: Some of the soaked library materials in the Main Library**



**Figure 7: Old model guillotine machine in the Bindery Unit**