

**PRESERVATION OF PRINT AND NON-PRINT LIBRARY MATERIALS: A
CASE STUDY OF THE KWAME NKRUMAH UNIVERSITY OF SCIENCE
AND TECHNOLOGY MAIN LIBRARY, KUMASI, GHANA**

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ABSTRACT

As a result of the emergence of information technology and the associated explosion of information almost all kinds of libraries now have some amount of print and non-print media as part of their stock. Preserving both print and non-print materials at the same time poses a great challenge. This write up therefore examines some of the problems encountered by libraries in their efforts to preserve information. The KNUST Main Library is used as a case study. These challenges as revealed by the study involved physical buildings, storage practices, pollution, light and biological agents, security of, as well as the handling of documents. The best practices to overcome these problems have also been reviewed. Collection surveys and observations were employed for the collection of data. The data gathered was analyzed graphically and descriptively. Findings from the analysis revealed that proper preservation is necessary because documents are susceptible to both inherent and environmental factors; materials in multimedia libraries contain information for entertainment, communication, research and socio-economic growth of a people; external factors such as chemical, biological, physical and disasters can also deteriorate multimedia materials. Finally, caution must be taken when blending the methods of preservation.

Keywords: *Preservation, Libraries, Print, Non-Print*

INTRODUCTION

The consequence of people dying with rich store of knowledge taught mankind the essence of documenting information and preserving it on a particular medium. Ever since, information had to be preserved through print, one of the oldest methods, and non-print media. The longer the information is preserved the better it is for pos-

terity. The Society of American Archivists (S.A.A) defines preservation as the “basic responsibility to provide adequate facilities for the protection, care and maintenance of archives, records and manuscripts.” According to Adock *et al.* (1986), “preservation is strictly, all the steps taken to protect materials that is including conservation and restoration, but often used in reference

to the treatment of materials”. In many respects preservation is also defined as “strictly, the repair and binding carried out on items of essentially remedial nature” (Arbin, 1986). In present general usage; “conservation” and “preservation” tend to be interchangeable. Harrison (2002) states that “preservation includes all managerial and financial considerations including storage and accommodation, provisions, staffing levels, policies, techniques and methods in preserving library and archival materials and the information contained in them”.

Conservation on the other hand denotes those specific policies and practices involved in protecting library and archival materials from deterioration damage and decay. This includes the methods and techniques devised by technical staff. Deductively, preservation includes everything that is conducive to the well being of the collections, not only concerns such as the development of good storage conditions and book handling, but also the administrative procedures. Preservation therefore covers everything that in the end benefits the physical well being of the collections, whereas conservation is the active work carried out on the collection.

Another term found in the literature is *restoration*. This denotes all the recovery activities aimed at bringing back materials as close as possible to their original state. Definitions of conservation and preservation are similar for restoration too, but the National Preservation Office’s (N.P.O) definition of this has one obvious and significant difference. Thus, it does not necessarily include good conservation practice.

Brief overview of collections at KNUST

The KNUST Main Library has six (6) departments; namely Serials, Reference, Lending, Electronic, Cataloguing and Acquisition. The total non-print material come to 673 and is made up of 373 Videotapes and 300 Compact discs (CD-ROM). Other materials stand at 246,046 volumes.

MATERIALS AND METHODS

Sampling and data collection

Information was gathered through physical examination of the print material on the shelves and non-print materials in their respective storage places, that is the Ghana Collection and the Electronic Information Department.

For Serials and all other print materials, in each of the following departments, the first and the last five (5) shelves were selected for the survey. These are Lending, Undergraduate, Research and Reference, and Serials. On each shelf, materials were randomly sampled under the following criteria: brittleness, discoloration, worm infestation, tearing and accumulation of dust.

Out of three hundred and seventy three (373) videotapes housed at the Ghana Collection fifty (50) were sampled for inspection. Similarly, fifty (50) Compact Disks (CDs) out of the three hundred (300) were surveyed from the Electronic Information Department.

Data analysis

The information gathered from the survey were analysed, and form the basis of discussion in the following pages. Table 1 below shows a tabular and a graphical representation of the survey results.

Table 1: Distribution of Damaged Print Materials

Criteria	Departments					Totals	Percentage (%)
	Lending	UG1	Research	UG2	Serials		
Brittleness	15	10	15	10	20	70	16.3%
Discoloration	25	15	20	10	30	100	23.3%
worm-infested	10	3	15	5	15	48	11.2%
Tearing	20	9	20	10	30	89	20.7%
Dust-related	30	10	35	8	40	123	28.6%
TOTAL	100	47	105	43	135	430	

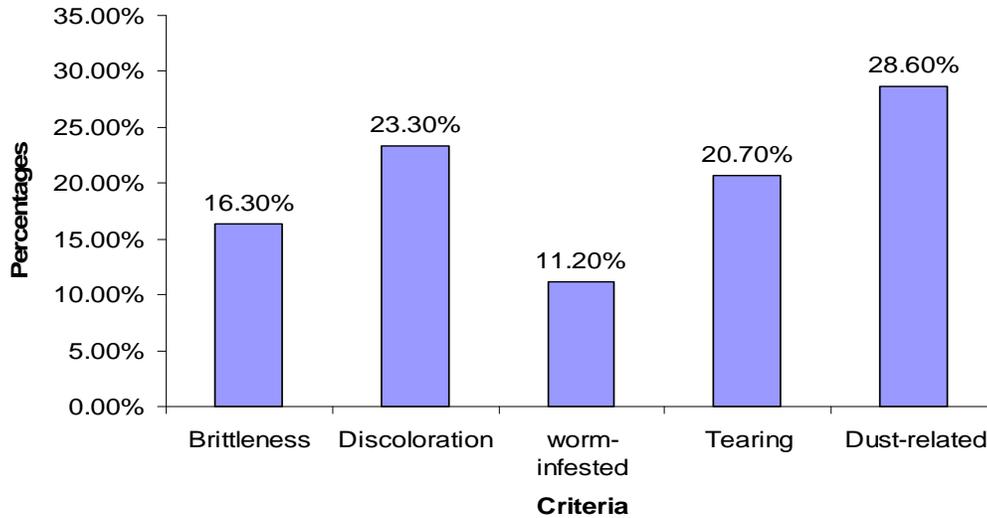


Fig. 1: Distribution of Damaged Print Materials

As evidenced graphically above, dust-related cases constituted 28.6%, which was the highest cause of deterioration from the survey criteria. The louver blades of the reading rooms of the KNUST library are always opened to allow fresh air into the halls. Through this, dust enters the halls and settles on the materials on the shelves. Meanwhile thorough dusting is not done regularly. The dust therefore accumulates and gradually serves as breeding grounds for all kinds of insects and worms that eventually chew up the materials. Dust is also a contributory factor for

browning of the books. This situation when protracted could deface the text of the materials thereby rendering them unreadable. The survey has shown that the KNUST library has pockets of discoloured, brittle, torn and worm-infested materials, which needs to be attended to both table and figure 2 demonstrates clearly that out of the five criteria employed, multiple dropouts affected the video cassettes mostly, thus, 44% out of the total. Multiple dropouts are caused by among other things, fluctuating room environment, absence of winding for long periods and dust infes-

Table 2: Video Cassette (Ghana Collection)

Criteria	Number	Percentage (%)
Excess hypo	5	6%
Banding	15	19%
Dirt/Dust	20	25%
Multiple dropouts blocking	35	44%
Wavy pack	5	6%
TOTAL	80	

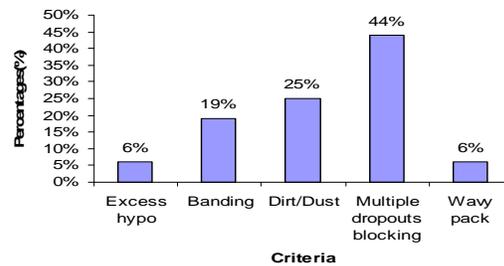


Fig. 2: Video Cassettes (Ghana collection)

tation. All these factors were present at KNUST library at the time of writing. The air condition in the storage room of the videocassettes is put off at 5:00pm every working day. The required constant room temperature is impeded always. Another probable cause might be the fact that these video cassettes are stored with print materials (print collections on Ghana) together in the same room. Professional literature available indicates that, different information media requires different temperature for its preservation. Moreover, the video cassettes have not been wound ever since they were kept there. Regular winding is needed – if possible, the video cassettes could be stored in a separate room.

Table 3: CD-ROMS at Electronic Information Department

Criteria	Number	Percentage (%)
Scratches	60	31%
Dust Related	20	10%
Wavy Pack	40	21%
Banding	75	38%
TOTAL	195	

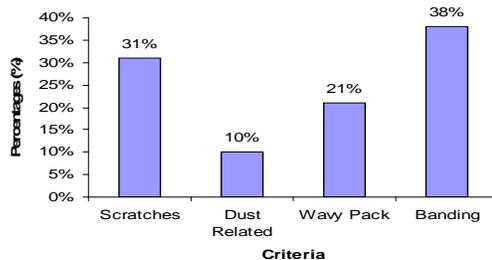


Fig. 3: CD-ROMS at Electronic Information Department

Due to heat and tight-packing of the CD-ROMs in paper boxes, 75 constituting 38% of the total sampled could not be read smoothly; they suffered from *banding* problems. As at writing the CD-ROMs were still packed in the boxes in the Electronic Information Department.

Methods of preservation

There are several methods of preservation employed by multimedia libraries. A critical study of these methods reveal that, while some of the methods aim at preventing the materials from going bad, others aim at repairing or restoring the materials to as close their original state as possible. In addition, there are other methods, which seek to transfer the information content on to another media in order to make them last longer and to make them easily accessible. Gaye (1991) describes the first method as indirect, preventive, protective and pre-establishment planning activities undertaken to ensure that deterioration does not set in at all. These cover areas such as buildings, storage practices, environmental management, regulation of temperature, humidity, pollution, light and biological agents, security, and handling of documents. Sitts (1990) described the second method as direct, repair, restoration, curative and treatment activities. The terms “substitution”, “transfer” and “salvaging” are also used in some literature to refer to the same method. Examples of direct methods include fumigation, lamination, backing, deacidification, encapsulation, leaf, casting, stain removal, joining, winding, substitution, copying, re-recording and binding.

Best practices/recommendations

Ideally, archives and libraries in tropical countries should follow the international standards for the storage of print and non-print library materials. The standards demand that:

- A constant storage temperature of 20⁰C with fluctuations not exceeding +- 10C daily and + - 20C annually;
- A relative humidity of 30-40% with minimal fluctuations (+-50%);
- The absence of dust particles.

Dust

Dust is one of the greatest enemies of all library materials. With CDs, it causes in addition to improper handling, scratches, which may render the disc unreadable. If the lower surface of the CD,

the polycarbonate body, is scratched the laser beam is dispersed and may not be able to trace the pits. As a consequence, anything between short dropouts and total muting can occur. Scratching the protective varnish of the upper side of the disc will possibly render the reflective layer unusable, leading also to playback problems, (Leary 1988). Several deterioration processes are autocatalytic: the chemical process that produces substances that act as catalysts for further decay, thus exponentially accelerating the process. This is well known with the vinegar syndrome that affects acetate cellulose and is also suspected with binder hydrolysis. Wittich and Schuller (1962) observed that, autocatalytic process also creates a microclimate where elevated humidity may be trapped or accumulated in closed environments causing chemical decay and fungus growth with all its disastrous consequences.

Air conditioning temperature and humidity

Air conditioning equipment that is able to effectively cool and dehumidify the air must be chosen. If compromises have to be made, temperature must be kept to a maximum of 25°C with the humidity not above 60% RH. If the level of both parameters cannot always be simultaneously achieved, it seems more important to keep humidity within the given limits than temperature. A stand-by generator must be provided to ensure a continuing power supply in case of failure of the public supply. The conflicting demands for airy storage and for dust preventive can only be met satisfactorily and simultaneously by preventing a good air exchange, using appropriate air-conditioning equipment in combination with the following radical dust proofing measures:

Tightening windows to ensure a good seal;

- Installing air locks at all entrances;
- Having terrazzo-type floors. These are easily cleanable. The dark coloured, ones are more preferred to the coloured because they make dirt visible and annoying;

- Air conditioners must be equipped with effective dust filters, which must be regularly be maintained.

A great deal has been written about temperature and humidity control. All chemical reaction that affects library materials is speeded up by heat and takes place in the presence of humidity. It is therefore important that the temperature should be kept at low as is practicable. On the other hand a too low humidity level (at too high a temperature) causes materials to dry out and will result in brittleness. Temperature and humidity are closely related and cannot be considered separately and it is particularly important that sharp fluctuations are kept to a minimum. Moreover the amount of use the materials get is also significant. Cold storage is suitable for materials that are not very used, but if such materials need to be accessed, very carefully controlled re-conditioning to the ambient temperature and relative humidity is necessary. The damage caused by light is cumulative. Intensity, duration and spectral distribution need to be considered. Ultra-violet filters and diffusers are recommended. As a general rule, a repository should not be illuminated more than is necessary for the retrieval and replacement of documents. Such guidelines are on the whole applicable to archival collections that need to be retained in the longer term. But collections are not static. They expand and they may change their functions. Collections primarily for lending may become reference collection (and vice versa), while today's open-access material may become part of the closed access archival stock. Changes in usage and changes in function bring with them the need for different storage space and condition. This may mean that material will have to be moved from time to time, within the building in which it is used or from such a building to a remote location. Materials could as well be moved from a less secured area to greater security or even for those who move their library or repository altogether from one set of storage area and condition to another. That such moves can pose a threat to the safety and security of the collections need

hardly be stressed. Any upheavals, extra handling, or change in conditions carry risks to the collection. For instance the fluctuating nature of air conditioners and the constant cycling of power supply results in excess hypo, wavy pack and blocking damages. If it becomes incumbent to minimize such risks, or forestall them, planning and preparation for any move cannot be too careful or too detailed. Whatever measures are to be taken, it is imperative that the temperature and RH values be recorded daily (or move frequently) in order to assess the risk and to take action.

However, if funds are lacking to provide the ideal "first world" conditions, thermal insulation and dust proofing can be provided at relatively low cost with little or no continuing energy requirement. These should therefore be at the center of all endeavours. As to temperature and humidity, it must be mandatory to control both parameters simultaneously. To this end, the availability of a hygrometer is an essential prerequisite. With these measures in place, discoloration and brittleness of print materials will be a thing of the past.

Compact disc

CDs must be handled with utmost care and should never be placed anywhere except in a player or in their cases, the so-called jewel boxes. Placing them on an obviously sandy table may lead to their swift destruction (Example from electronic Section 300, CDs)

General preservation skills

Basically, all archivists and librarians must learn preservation skills so that these skills can be integrated into all aspects of processing and referencing. Cataloguing and reference staff should routinely make note of problems since they handle the records more extensively than anyone else. They must also follow the general guidelines for careful handling of multimedia materials. For example wearing cotton gloves, keeping the records away from food, drink, or smoke,

writing on the back of photographic prints only with a graphite pencil, using pressure-sensitive labels or tape on records, and removing extraneous objects such as paper clips, rubber bands, staples, or acidic paper (After extracting any useful information they contain) etc.

Cooperation

It must be clearly understood however that ideal climate conditions will inevitably lead to shortened life expectancies for the carriers. To improve the situation in the medium and long term, the following strategies should be intensified:

- Development of cooperation on a national, or even regional basis to establish central archival storage vaults with ideal storage conditions, which can serve as repositories for several archives, libraries and other institutions.
- Development of international cooperation to establish large-scale storage areas in cold climate zones, which can serve as long term, archives for the holding of tropical countries.
- Intensifying, in cooperation with the manufacturers of multimedia materials, research into measures to retard the decay of such products and to improve their long-term stability even under unfavorable condition.
- Testing the potential of digital mass storage systems for assisting in the preservation of and access to multimedia materials. Going 'solo' to preserve library materials is not the best.

Tape cassettes

Tape cassettes are acceptable and convenient as reference copies, but multimedia libraries should use only good quality cassettes of the C60 length. By using cassettes with screw fittings, the cassettes can be dismantled for repair. Digital compact discs are the latest innovation in sound recording and are still too new to be recommended with full confidence. Because of their impressive trouble-free quality, however, they may become

the standard audio preservation format in the near future. The preservation requirements for videotapes are comparable to that of audio magnetic tape. The best approach to safeguarding them is to store the archival original property and use only a copy for reference. Periodic inspection and careful rewinding of the tapes are also recommended.

Dealing with space problems

Expansion of the collections will frequently result in a total re-thinking of the way they are housed. If a library or archive is situated in the center of a large town where space is at a premium and land prices and rents soar, it may be necessary to link storage to use. Housing the less-used or virtually unused materials elsewhere, possibly compactly stored at relatively low temperature in a remote area, will be the ideal thing since storage costs will be reduced. Most libraries and archives struggle with their growing collections as a result of a lack of space. There will never be enough space to keep and store everything, even in the unlikely event that there were ever enough money to preserve everything. Decisions will therefore have to be taken not only on remote compact storage, but also on reformatting and discarding of originals, or simply on discarding. The balance between on-site and remote storage is not easy to reach and needs a great deal of experience and knowledge of the way the collections are used. Information from the users themselves is indispensable. Reformatting whether to microfilm or fiche or to digital format, may seem an obvious way to cope with lack of storage space. But the decision on whether or not the original should be retained once a surrogate had been made is by no means cut and dried.

Once surrogates are available, the original may be dispatched to cool and remote compact storage, but the moment may come that even the remote space is no longer available and hard and difficult decisions as to what to discard and what to retain will become imperative. Such decisions

need to be based on the nature of the material itself, on the likely use and purpose, but this is not an easy task. But such judgment is necessary when decisions have to be made to discard any material. The idea of packing materials too tightly because of lack of space results in scratches and other forms of chemical deterioration. This will not easily occur to any librarian, but could be avoided when the above recommendations are followed. This was one of the major problems found at the Ghana Collection.

Lamination

Lamination is the process of strengthening or restoring weak fragile brittle paper documents through the use of special tissue paper and acetate film materials. The weak document is normally sandwiched between a set of tissue paper and acetate film, which are then fused together either chemically or mechanically. Mechanical means make use of heat while the chemical means uses organic solvents.

Preservation policy

The storage policy of a library or archive is determined by the aims, purpose and functions of the library or archive. Once such a storage policy has been formulated it will need to be carried out and the resources that can be devoted to it will to a large extent determine its success. Human resources, in the form of human intellect, understanding knowledge, common sense, time and energy are all vital, but without sufficient funding no storage policy or programme, however carefully conceived and well thought out, stands a chance of being implemented. Storage, although a vital and basic function, is not the only activity to lay claim to library and archive funds. One must look at how it relates to other library and archive functions, before determining how much should be allocated for the purpose.

Winding

This is the process of causing something to move in a specified direction by rolling a tape or a disk. Video and radio cassettes can be wound back and

forward to make them loosed. This process also rids the cassettes of all particulate pollutants. Frequently used cassettes need not be wound at regular intervals but those that are not frequently used need to be wound at regular periods.

Fumigation

Fumigation is the process of exposing documents to chemical fumes known as fumigants in order to arrest biological infestation of microorganisms such as like fungi and insects and rodents. There are different types of fumigants. However the choice of one type depends on the kind of infestation the librarian or the archivist is dealing with. When this method is applied the respiratory organs of insects and rodents are stifled, which results in their death. For effective fumigation, there is the need to have a compact chamber: a vacuum chamber where there would be no in-flow or out-flow of air. The fumes are then injected to circulate and infiltrate the documents to kill the micro and macro organisms.

CONCLUSION

Preservation is a key within multimedia libraries in that the materials present great challenges, if collection managers are to maximize the life of the materials and their contents. The need to preserve materials in multimedia libraries is imperative because documents are susceptible to both inherit and environment factors, which combine to degrade such materials. So far as the materials in multimedia libraries contain information for entertainment, communication, research and socio-economic growth of a people, they must be professionally preserved to be able to meet the purposes for which they were acquired. Attention must be given to the fact that, apart from the inherit qualities of print and non-print materials that naturally subject them to decay, there are other external factors such as chemical, biological, physical conditions and disasters which, can act on these materials to

weaken and eventually destroy them. Therefore knowledge about these materials, their qualities, characteristics and composition must be grasped to be able to adopt the best preservative strategies to prolong their lifespan.

Generally, print materials are preserved through temperature regulation and humidity control. Non-print materials undergo more rigorous preservation and storage condition, in addition to proper handling and disaster management controls. Wickhen (1956) in multimedia libraries where both print and non-print materials are preserved, caution must be taken as to how to blend the methods of preservation.

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