

Preservation of E-Information Resources in Academic Libraries: Special Reference to GFGC, Honnali

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ABSTRACT

The growth in the acquisition of electronic resources emphasizes the need for preservation that is easy to access and available. Information in e-resources can be easily corrupted, copied, and altered with the help of advanced technologies; thus, the preservation process plays an important role in such a scenario.

Preserving electronic resources in current developments is a challenging issue and requires many aspects and areas of expertise in the electronic age. An overview of preservation of different types and formats of electronic resources in libraries, including planning, importance, methods, strategy, threats, and solutions and other factors like storage, media, challenges and requirements, emphasizing the creation, preservation and handling of metadata of electronic resources along with features, types, formats and benefits of electronic resources examining the various steps, procedures, methods and plans for Preservation of electronic resources compared to print resources of libraries along with major threats and challenges in preserving, are discussed. An overview of major projects of preserving electronic resources, drawing attention to handling metadata for e-resources, focusing on storage media, the format and hardware is discussed here.

.KEYWORDS: *Preservation, E-Resources, Digital Storage, Metadata, Migration, Emulation.*

INTRODUCTION

Providing access to library holdings through electronic means is becoming a standard and important practice in evaluating the status of every library. Libraries are in a position to develop a responsibility for maintaining the electronic resources. This provides a platform for the fusion of the traditional and the electronic system. The main focus of the library is to collect and preserve specialized electronic resources of all kinds, such as CDs, DVDs, documents, images, videos, sound files, spreadsheets, datasets, local databases, locally digitized materials, and executable programs. The rapidity of technological change and the nature of electronic resources result in the obsolescence and uselessness of digital data in a very short time. The challenges to preserving these delicate materials are vast due to complexities of ownership and technology. The generations of technology make

transformation possible in the ability to preserve digital content and this will affect the responses of the institutions. Digital preservation can be defined as “Long-term and error-free storage of digital information for the retrieval and interpretation of the same for the future access and use”. It may extend to obtaining the required digital document from the long-term and error-free digital storage without the possibility of alteration.

OBJECTIVES AND IMPORTANCE OF PRESERVATION:

The objectives of preservation of electronic resources are basically

- ✓ To preserve the physical consistency of the data for long time
- ✓ To secure the data from unauthorized access
- ✓ To ensure the continued usability of the data
- ✓ To integrate the data into any other working systems

The importance of preservation exists from several factors associated with the nature of library materials. The growth of electronic resources in libraries of all kinds commands a new system in their development. Preservation is no longer the product of a program, but it is an ongoing process due to the short lifecycle of digital information. The way the data is stored in electronic format is important in ensuring its longevity. The long-term storage of digital information needs the assistance of metadata through its inclusion for immediate access and use.

Nature & Scope of Preservation

Preservation is a continuous process and more than simply maintaining the data of electronic resources. The preservation process includes the preservation of digital information as stream of bits, preservation of metadata, ensuring that data can be found, ensuring that there are possible ways of retrieving and accessing the digital information, and providing ways to re-present the skills of using the digital information. It is necessary to understand that we cannot preserve everything and nothing can be preserved forever. This applies to even the heritage sector but it has a particular significance for libraries.

Selection of Library Materials for Preservation

The growth of production of electronic resources in literate societies makes it hard to consider the selection of materials for preservation and it forces librarians and archivists in making decisions. Librarians select materials for acquisition but their usable life will be short and inconsistent. This is the fact of libraries which have even huge collections of resources. The electronic materials which are consider as special collections are planned for preservation for long term use and will be treated differently. Selectivity of material is exercised at various phases from acquisition to weed out for permanent holding. Librarians have cultivated new concepts to identify and selection of resources, and to designate them for preservation. This includes the technological problems of the irretrievability of digital data, and reliability of the hardware and the software, which make the task possible.

Electronic Resources: Technological Issues

Much of the focus of digital preservation is on technological issues today. There is no system for recording and storing the expressions of human creativity, thought and accomplishments without damage and decay. Preservation process present its own unique challenges beginning from the basic nature of digital information. It is challenging

from the point of view of technological obsolescence of hardware, software, formats and media vulnerability, organizational and legal issues, stake holder interests, and resource requirements.

An extra dimension that needs to be preserved in digital materials is the dimension of access. The human eyes are not helpful when faced with any of the formats or media in which digital data is presented. We cannot use the acquisition data unless we have a separate usable and maintainable access mechanism. The electronic materials acquired to serve a community for years should have a reason for acquiring multiple copies. The reason for preserving the multiple copies has limited purpose. A large quantity of digital information exists in the forms like emails, blogs, social networking websites, government websites, photo albums, and other websites. They change their content as and when they wish. The unique characteristic of digital forms makes the updating task easy to create and modify the data, but it brings many difficulties in the preservation of the content.

Storage System: Library professionals are worried about the fact that they have lost digital information from the early history and now it is of real secured interest. It is in complaining on information technology professionals that still they are looking for the solutions. The records which we are creating these days are born digital and can be of vital long-term importance. The key to the long term endurance of digital data is, to find it, to keep it when time comes to access it, to convert it to a required format, and to read the medium in which it is written. The digital data storage components take care of the data and encapsulate it. Also these store primary data of the object, preservation description information, representation information, etc.

Hardware: There are plenty of hardware devices or components which are available in present scenario. When time comes to appropriate reader hardware for its unavailability then all media becomes difficult to read and are unreadable. The component itself gets physically deteriorated in the long run. The digital data which is conveniently presented in a digital file can be copied easily and accommodated within all of the today's technology and for the future use. A digital file may be preserved forever by copying it to current technology media as its previous storage medium becomes outdated. A digital data or files like audio compact diskette which cannot be copied in its original format, and they need to be converted into other format to preserve their original properties. The digital data when it is in the form of a stream of bytes can be copied to other media as we like for many times.

We may view the data stored on microfiche, film, opaque, etc. on the monitor of the computer systems with real time viewing experience. Latest touch screen technology easily brings the information stored on any format in the digital world. It is an easy to use and time saving performance in latest devices like computer, scanner, etc. The current technology contributes to identifying new methods and planning for preserving digital data. The generation path of technology takes us to development, to implementation, and to mainstream use of preservation process to work best in an organization and for particular digital materials.

Software: All digital data need a software program to make it readable by human beings and without which there is no value in retaining the digital data. It needs an indexing system in our long-term data store, metadata to describe each digital data, information on its purpose, origins, etc., and technical details on the format. There is also a need of expectation of being able to do useful things with digital information we have stored over the decades. The risks of media obsolescence and decay are avoided by copying stored data onto newer technology media. There are three possible ways to do this. First way is, to repeatedly keep converting the data. In this case authentication is an

unsolved problem. Second way is, to store the data as byte for copy of the original with having metadata which tells us the software to use to convert the format when we access the data. This way is the best concerning the risk and allows authentication using digital signatures. The third way is in which everything is stored in some format that is correctly representing every type of data that we retain. This approach is costly in designing a format and revising the design to take on digital data.

The other concern relating to the software is repository software which is an advanced content management system and typically not storage technology but it sits on top of storage devices. This permits the holding of multiple occurrences of content and implements effective preservation services and moderates the risks of technological obsolescence. It is difficult to say for when the presence of software is necessary in digital preservation infrastructure. Libraries which have a large collection of electronic resources with complex privacy, technical and security requirements may encounter problems with achieving the goal.

Format: There are various file formats are available to store digital data. Namely DOC, PDF, TIFF, HTML, SGML, XML, JPEG, etc, these formats are widely used by the both commercial and non commercial publishers and users. The digital data or documents which are in libraries such as e-books, e-journals, e-reports, etc may be stored in theses formats. The format in which the information is presented should not influence its selection. A format that cannot be easily handled may be converted to another format which the library can easily handle. Sometimes this seems to be problematic but the time and effort should be spent to achieve it. The data which is transferred to another format will be accommodated easily. It is left to any institute to consider that only a certain set of formats of data will be taken into long term storage.

Preservation Model

It is better to discuss archiving and preservation within a framework. The framework is provided by a reference model and which should be used extensively by the digital preservation community. The Open Archival Information System Reference Model is the one and most popular model to provide high level data and functionality. It has a reliable terminology for discussing preservation of electronic resources. This model was developed in 2002 and consider at international level as a recognized standard to describe digital repositories in preservation point of view. This Reference Model was developed to standardize digital preservation practice and provide a set of recommendations for preservation programs and their implementation. The model has been in use by a wider group of information professionals particularly the research library communities. It would be premature to consider that this model can solved all digital preservation problems. But it has helped to a certain extent to manage digital library and archives.

This model is concerned with the technical aspects of the life cycle of digital objects. It is useful in the matter of storage in a preservation infrastructure, accessibility, data management, and distribution. This model deals with metadata issues and makes some recommends to attach metadata elements to a digital resource like reference information, preservation history, context, formatting, authenticity indicators, and file structure. In general, this model provides a framework for discussing the key areas that impact on digital preservation. They are the acquisition and policies of resources to archive, formats, planning, and access to the contents.

Preservation Needs & Challenges

The electronic archiving of e-resources is an important issue for libraries. The basic requirement for the preservation of electronic resources is to ensure that data is not lost, to ensure the data can be interpreted, and the costs involved. Certain challenges have to be faced in the process of preservation and they are:

- The digital materials are at high risk to loss the data. Because they are stored on magnetic or optical media which can be suddenly deteriorate. The data cannot be extracted and interpreted correctly for the future use.
- If the playback devices become obsolete or if the software is no longer available then the digital materials become unreadable and inaccessible.
- The electronic resources are easier to illegal copying and distribution. It is complex to make policies to prevent this and enforcing copyright in the electronic environment is difficult for publishers, institutions, and governments. As a result of this, libraries have only limited rights to make copies for preservation.
- Electronic resources can be viewed and read only with equipment such as a computer, internet connection, and the required software. This needs the financial and technical assistance for the institutions.
- The hardware and software used to do the interpretation of data and make the data usable to human beings are constantly superseded.
- Libraries usually have no authority to convert the printed item to electronic formats unless publishers agree. Because of this ownership legality most of the items remains in printed format.
- Selectivity is inevitable due to the explosion in quantity of digital data. In the digital environment non-selection of the item for preservation is always means loss.
- It is sometimes impossible to exchange documents among different file editors due to the incompatibility of the file formats.

It is specified as follows for the better understanding of the threats such as deterioration and digital obsolescence. The digital contents stored on a media are likely to deterioration and catastrophic loss. The digital media can deteriorate rapidly than the printed document and once it starts the digital data almost considered to be as lost. This attribute of digital media gives short time duration to take decisions and actions for the preservation of the resources. The current digital technology is developing so quickly that the retrieval and playback technologies will become obsolete in just a few years. In a short time, faster, more capable and less expensive storage and processing devices are developed. So, older versions have to be quickly replaced. The software technology is discarded and a hardware device is not in the production, in such cases the records created are at the risk of loss. Because the records are cannot be accessible.

Preservation Planning & Methods

The planning of the preservation process is just like a connection between the archival storage decisions and future access and user needs. There is no general concurrence on the definition of long term preservation. But some people says that as being long enough to be concerned about changes in technology, changes in the user community, short for just two to five years for all data types, and it becomes unreliable because of software features.

Migration and Emulation

The migration is the function of transferring data to newer system and updated environments. This includes conversion of resources from one file format to another file format, from one operating system to another operating system, and from one programming language to another programming language. The resource remains fully accessible and functional if these conversions implemented. Sometimes resources which are migrated from one environment to another environment face the risk of losing some functionalities and features. Because the newer formats may be incapable of capturing all the functionalities and features of the original format, and sometimes the converter itself fails to convert the original format as it is. A migration system can preserve any type of digital documents created on any application or platform and delivered to any type of digital media depends on the need of the libraries and archives. XML, ASCII and UNICODE are some of the standards available for some type of conversion of digital data. In such a system files are translated into flexible formats. They will be accessible by advanced technologies in the future. The migration steps may be fully automated through performed by programs.

The emulation is the process of replicating or repeatedly copying or duplicating of functionalities and features of an outdated or superseded system which contains digital data. Emulators are built for applications, operating systems and hardware platforms. This is a popular strategy for retaining the functionality of old systems when converted to a newer system.

Refreshing and Replication:

The refreshing is the process of transferring data between two types of format in the same storage medium and device. This ensures that there is any bit rate changes and alteration of data, just like transferring institute information from an old preservation compact diskette to a new one. This method works better when it is combined with migration in case the required software or hardware to read the data is unavailable or is unable to recognize the format of the data. This method is always necessary due to the deterioration of physical media for long term preservation.

The replication is the process of creating duplicate copies of data on one or more systems. This is slightly a similar method to emulation process. The need of this method is when the digital data that exists as a single copy in one location of a system is vulnerable and deteriorate to software or hardware failure, alteration, fire, physical damage, etc. The digital data may survive only if it is replicated in several locations. The disadvantages of this method are that it is difficult to refresh, migrate, and access the replicated data as the data is located in multiple locations.

Metadata

The metadata is a data about data and it is used describe a resource. Metadata is another term as a traditional cataloging record and provides a mechanism for searching across textual data files. There is always a need to preserve the electronic resources for users in the future to find and access it. Metadata helps in data organization, preservation and long term access. The preservation process needs metadata elements to find and keep a track on digital resources. Metadata describes the details and characteristics of document in order to reproduce it on future technologies.

In present development of metadata standards and its element sets of bibliographic or access descriptors for electronic files can be embedded in the digital file. This metadata file may be searched for identification and

retrieval purposes. This file consists of searchable and descriptive data describing the digital resource might be embedded in a file. All major preservation projects have their own set of metadata element which is important for preservation. There is similarity among the elements set of different metadata standards for preservation like information on creation, access rights, restrictions, preservation history, and rights management. The metadata embedded in a digital file may be affected by its format obsolescence. The ASCII, UNICODE, SGML and XML formats are durable and popular in the use for this purpose. They retain information and contain tags that denote structure and format. They formats are well suited for storing metadata of the contents to handle the documents. The major metadata standards which are in use today are RDF, Dublin Core, MARC21, CIMI, etc. The librarians and archivist may use any of these standards depending on their needs, collection and resource types.

Preservation Projects

It is believed that digital preservation will ensure that library materials remain accessible for future generations. Libraries have responsibility forever for their materials and an obligation to archive their digital materials. Libraries plan to use digitized copies as backups of materials in case they become out of print, deteriorate, lost, and damaged. The major institutions and companies which are doing this digitization process in a large scale are Google Books, Open Content Alliance, Million Book Project, Hathi Trust, etc. The Library of Congress, British Library, and National Archives of UK have also leaded the way with various initiatives in the field of digital preservation.

The various other initiatives of the digital preservation are as follows. The JSTOR archives the scholarly journals. The PANDORA project preserves its electronic national record of Australia and article written by its citizens. The Royal Swedish Web Archive represents the entire Swedish web. The Internet Archive has announced its Wayback Machine which is a free internet tool that enables access to more than ten billion cataloged web pages of the past decades. The CAMiLEON is a joint project of the University of Michigan and the University of Leeds. The Cedars is sponsored by the Joint Information Systems Committee in the UK and was established to determine the feasibility of distributed digital archives.

The ERPANET is funded by the European Commission to provide a knowledge base to all sectors on issues of archiving and preservation of electronic resources. The EVA is a project of the National Library of Finland at the University of Helsinki and uses a series of automatic tools including robots, harvesters, and metadata creation tools. The Inter PARES is a global project among archiving institutions of Asia and Europe. The LOCKSS is a project of the Stanford University Library. The NEDLIB project was funded by the European Union. The OCLC Digital Archive is a service of OCLC. The OCLC/RLG Preservation Metadata Working Group is a joint project to establish a standard element set for preservation metadata.

FINDINGS

There are many findings to be made and strategies to be noticed as an outcome of the above study. Any strategy for the long term preservation of digital resources should consist of evaluate the threat for loss of content caused by technology variables, assessing the digital contents, determining the suitable metadata, and providing access to the content. There are various strategies that organizations may use to defense the loss of digital information. The goal for any digital preservation strategy should be on to achieve consistency in the management of digital records. This strategy may include a way of accepting documents, a secure process for transferring documents into storage media,

processes to confine the descriptive information, providing the content of the records to users in the appropriate format, and monitoring the preservation activities. The emulation for long term preservation of digital documents is attractive for various reasons. The digital document has to be ready for long time preservation through emulation method should possess its character stream, specification, interpreting software, and metadata. Regular refreshing of these items is to be done to preserve the document for long term. The information necessary for preservation through emulation has to be stored in computer hardware. The original data stream is never affected by any changes with this approach, its authenticity, and hardware specifications.

The preservation strategy may also consider some factors and challenges into account. It needs incorporation with a data management strategy and includes the relationship between preservation and distribution. The training opportunities and development exposures to staff are essential to the success of an organization. The library and archiving professionals are assumed that there is no one single strategy to achieve long term preservation and access for digital data. Hence, the development of different, problem solving and advanced strategies should be encouraged with the little more focus on its research by considering the factors like evaluating strategies and methods for preservation and planning. The frequently used preservation strategy is the bit level preservation and it means providing secure storage, procedures for backup, and refreshment. The libraries have to accept the format what the publisher choose to his publication of digital documents. It is the time for publishers and libraries to prefer a specific format by cooperating each other. The metadata included in the publication itself of the digital document is also an important issue. This helps to achieve a standardized form for use of the digital data for long term access. Libraries and other institutions have to take initiatives to spent time on partnership development, testing and implementation.

CONCLUSION

Preservation issues are presented here in a concise manner and many issues are just summarized here as preservation work needs lots of issues to be emphasized for a better understanding of the concept. Several typical digital preservation projects, which are actually the future directions and the impetus behind digital preservation technologies, are introduced here. With the further application and advancement of digital technologies in the library and archives field, digital technologies will be applied more in preservation work and play an increasingly important role in improving working efficiency.

Digital preservations are considered a serious national initiative/ undertaking, especially in developed countries and the need for digital preservation is emulated in specific programs. These serve as standards for institutions in the world to design their preservation strategies. The roles of libraries in information management are well considered. Libraries, archives and other information centers in developed countries must be prepared with the required skills to handle digital resources and their preservation. Institutions of various interests could initiate the role by adopting and implementing policies and practices using current technologies and expertise. Digital preservation remains experimental, with the risks associated and with the methods that are followed. It is still an area characterized by uncertainty in which testing and finding are working in the investigation for preservation solutions.

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