Management and Protection of Library Internal with Exceptional reference to Digitization of Rare Materials

Research Scholar: Mr.Santosh Gorawar[1]
Research Supervisor: Dr. J. A Siddiqiui[2]
Chaudri Charan Singh University, Meerut.

Abstract

This paper examines the concept of digitization, it's purposes and the process of digitization of library resources. The cognitive flexibility, relational communication and non-verbal immediacy communication theories were used for illustration. It also discusses the challenges often encountered during digitization and the implications for planning and policy. Digitization implies conversion of documents and art works into digital images. Digital images here mean electronic copies of documents. Digitization is a process in which materials are converted from the hard copies to electronic copies. The major purposes of digitalization are: to enhance access and improve preservation of library materials. A number of challenges are encountered in the process of digitizing library materials. These challenges include human and technical problems, which have implications for planning and policy. It was concluded that digitization is an essential task in modern day libraries, because of the current challenges, and the need to go digital, that is, provide online services.

1. Introduction

Digitisation is the process of converting the content of physical media (e.g., books, articles, manuscripts, photographs, etc.) into digital format. In most of the library applications, digitisation normally results in to documents that are accessible from the website of a library. The contents of digital document can be manipulated and compressed for further storage. This is due to the fact that when analogue information is fed into a computer, it is broken down into 0s and 1s changing its characteristics from analogue to digital. These bits of data can be re-combined for manipulation and compressed for storage. As an example, multi-volume encyclopedias that take-up yards of shelf-space in analogue form can fit into a small space on a computer drive or stored on to a CD ROM disc, which can be searched, retrieved manipulated and forwarded over the network. One of the most important characteristics of digital information

is that it is not fixed in the way the texts are printed on a paper. Digital texts are neither final nor finite, and are not fixed either in essence or in form, except, when it is printed out as a hard copy. Flexibility is one of the main plus points of digital information. An unlimited number of identical copies can be created from a digital file, because a digital file is not destroyed by copying. Moreover, digital information can be made accessible from remote location simultaneously by a large number of users. Optical scanners and digital cameras are used to digitize images by translating them into bit maps. Similarly, it is also possible to digitize sound, video, graphics and animations, etc. Thus, digitisation is the process that creates a digital image from an analogue image and not an end in itself.

In the digitization process, selection criteria, particularly those, which reflect user needs, are of utmost importance. It implies that all the principles that are applicable in traditional collection development are also applicable when materials are being selected for digitisation. However, there are several other considerations related to legal, policy, technical, and other resources that become important in a digitisation project. Digitisation includes one of the three important methods of maintaining digitized collections. The other two methods pertain to provision of access to electronic resources (whether licensed or free) and creation of library portals for important Internet resources. In this module the concept, scope, need, process, and various aspects of computerization required for digitization have been described.

2. Digitisation

2.1 Concept

The word “digital” describes any system based on discontinuous data or events. Computers are digital machines because at their most basic level they can distinguish between just two values, 0 and 1, or off and on. All data that a computer processes must be encoded digitally as a series of zeroes and ones.

The opposite of digital is analogue. A typical analogue device is a clock in which the hands move continuously around the face. Such a clock is capable of indicating every possible time of

the day. In contrast, a digital clock is capable of representing only a finite number of times (every tenth of a second, for example). As mentioned before, a printed book is analogue form of information. The contents of a book need to be digitized to convert it into digital form. Digitisation refers to the process of translating a piece of information such as a book, journal articles, sound recordings, pictures, audio tapes or videos recordings, etc. into bits. Bits are the fundamental units of information in a computer system. Converting information into these binary digits is called digitisation, which can be achieved through a variety of existing technologies. A digital image, in turn, is composed of a set of pixels (picture elements), arranged according to a pre-defined ratio of columns and rows. An image file can be managed as a regular computer file and can be retrieved, printed and modified using appropriate software. Further, textual images can be OCRed so as to make its contents searchable. An image of the physical object is captured using a scanner or digital camera and converted into digital format that can be stored electronically and accessed via computers.

Scope The process of digitisation, however does not stop at scanning of physical objects, a considerable amount of work is involved in optimizing usage of digitized documents. Sometimes, these post- scanning processes are often assumed in the meaning of digitisation. At other times the word “digitisation” is used in restricted sense to include only the process of scanning.

2.2 Need

Digitisation makes the document more useful and more accessible. It is possible for a user to conduct a full-text search on a document that is digitized and OCRed. A reader can create hyperlinks to related items within the text itself as well as to external resources. It may be noted that digitisation does not mean replacing the traditional library collections and services; rather, it serves to enhance them. There are various reasons for converting a document into digital format for example, the objective of digitisation, availability of finances, end user etc. While the objectives of digitisation initiatives differ from organisation to organisation, the main objective is to improve the access.

Other objectives may include preservation, cost saving, information sharing, and keeping up to date with technology. While new and emerging technologies allow digital information to be presented in innovative ways, the majority of potential users are unlikely to have access to sophisticated hardware and software. Further, sharing of information among various institutions is often restricted by the use of incompatible software also.

One of the main benefits of digitisation is to preserve rare and fragile objects by enhancing their access to multiple users simultaneously. Very often, when an object is rare and precious, access is only allowed to a certain category of users. Digitisation can allow more users to enjoy the benefit of access. Although, digitisation offers great advantages for access like, allowing users to find, retrieve, study and manipulate material, it cannot be considered as a good alternative for preservation. This happens because of ever changing formats, protocols and software used for creating digital objects.

There are several reasons for libraries to go for digitisation and there are as many ways to create the digitized images, depending on the needs and uses. The prime reason for digitisation is the need of the user for convenient access to high quality information. Other important reasons are:

Multiple Referencing: Digital information can be used simultaneously by several users at a time.

Wide Area Usage: Digital information can be made accessible to distant users through the computer networks over the Internet.

Qualitative Preservation: In digital preservation, images can be scanned at high resolution and bit depth for best possible quality. The quality remains the same inspite of multiple usages by several users. However, a special care has to be taken while choosing digitisation for preservation of information.

Archival Storage: Digitisation is used for restoration of rare material. The rare books, images or archival material are kept in digitized format as a common practice.

Security Measure: Valuable documents and records are scanned and kept in digital format for safety and security.

2.3 Digitization Process

To begin the process of digitisation, first of all, we need to select documents for digitisation. The process of selection of material for digitisation involves identification, selection and prioritization of documents that are to be digitized. Data can be captured in two ways i.e. data already available in digital form known as "born digital" which can be easily converted into other formats. The second way is to convert the physically available data in the form of print matter from external sources. However, in this case, Intellectual Property Right (IPR) issues may have to be resolved. It may also be required to obtain permission from the authors, publishers and data suppliers for digitisation particularly when the data is not in public domain.

Selection In this step, the IPR issues should be addressed. One may have to get permissions from the publishers and individuals which could be difficult, and very time consuming. It may also involve negotiation and payment of copyright fees, if applicable. Selected documents for digitisation may already be available in digital form. It is always economical and appropriate to buy e-media, if available, rather than their conversion. The type and nature of document, for example, whether the same is in a bad shape, over-sized material, a manuscript, bound volumes of journalistic. would need a highly specialized equipment and skilled manpower. Further, the documents to be digitized may include simple text, line art, photographs, color images, etc. The selection of documents needs to be reviewed very carefully taking in to consideration the various important factors i.e. quality, utility, cost, and security. In selection of material for digitisation, priority should be for rare and much–in-demand documents and images.

Other factors which may be considered for selecting appropriate media for digitisation may include:

Photographs and slides: Selecting photographs is a very crucial process and requires high resolution. The quality, future needs, and copyright issues and aspects are also important and must be taken in to account.

Audio: The sound quality is to be checked and required corrections made together by the subject expert and computer sound editor together.

Video: The video clippings are normally edited on Beta max tapes, which can be used for transferring on to digital format. While editing color tone, resolution is checked and corrected.

Documents: The objective of digitisation is to have increased access to digitized materials including its value addition. The criteria for selecting documents are: more demand, rare availability, and difficulty in handling which should be reviewed and selected for the process. If the correction of literary value demands much input, then documents may be considered for publication rather than digitisation. However, the main consideration for digitisation of documents should be intellectual value and significance of contents i.e. authority, quality, timeliness, uniqueness, and demand. To sum up the main considerations are: the intellectual contents, physical nature of the source materials, and number of current and potential users.

Scanning In the process of scanning, the image is “read” i.e. scanned at a predefined dynamic range and resolution. The resulting file, called “bit-map page image” is formatted (see sec.3.1.4) and tagged for storage and subsequent retrieval by the software package used for scanning. Electronic scanners are used for getting an electronic image into a computer from its original which may be a text, manuscript, and photograph etc. Acquisition of image through a camera, fax card,or other imaging devices is also possible. However, image scanners are most important and most commonly used component of an imaging system for the transfer of paper-based documents.

4.7 Selection of Material for Digitisation and 'Born Digital'

The first and foremost in the process of execution of the project, is to identify, select, and priorities the documents which are to be digitized. If documents are available in digital form, they can be easily converted to other formats. In other case, when the organisation is itself creating contents, strategies are to be laid down to capture 'born digital' data. If the selected material is from external sources, IPR issues need to be resolved. In case the material being digitized is not available in public domain, then it becomes necessary to get permission from the publishers or data suppliers for digitization. Moreover, decision may be taken whether to OCR the digitized images. Documents selected for digitisation may already be available in digital format. However, it is always economical to buy e-media, if available rather than their conversion. Further, bound volumes of journals, manuscripts, deteriorating collections, and oversized material etc., would require highly specialized equipment and highly specialized manpower.

4.8 Placement and Training of Manpower

Since the entire job of developing and or maintaining a digital library is a highly skilled one, there should be no compromise or any lapse in the quality of intake or selection of manpower for the job. It should be noted that even if good quality manpower is employed, they usually need training to upgrade and sharpen their skills for this job which implies that necessary training, should form an integral component of the execution of the project.

4.9 Content Creation

The steps involved in content creation include the following

– Conversion of datasets which are 'born digital', e.g. converting MS Word file into PDF;
– Conversion of the existing printed sections into digital format (digitisation); and
– Identification of vendors in case the digitisation work is to be outsourced.

4.10 Execution of the Project

Once the software, equipment and other infrastructure facilities are installed, and the priorities of the documents for digitisation laid down, the execution of the project is initiated. The library may use digital library software like DSpace, or Greenstone Digital library etc.

5. Challenges and Problems

The most significant challenges in planning and execution of a digitisation project relate to technical limitations, budgetary constraints, copyright considerations, lack of policy guidelines and lastly, the selection of materials for digitisation. Other important issues and problems relate to the selection process, preparation of the materials, cooperation with the publishing sector, the specifications for the digitisation itself, research into improvement of optical character recognition (OCR), research into several file formats to reduce the cost of storage, automatic quality control mechanisms, new language-based techniques for search and retrieval, the digital preservation of the files and the technical infrastructure to support all these aspects.

At the turn of the century a shift in emphasis occurred in digitisation activities. Libraries moved from digitizing highlights to digitizing complete collections. Digitisation projects became larger and therefore project management became a more important issue. Developments in methods and techniques were stabilizing and there was a growing awareness of the problem of long-term preservation of the digital files. Instead of visually attractive materials the libraries started digitizing text materials and audio and video collections. New possibilities for the use of the digitized collections were discovered, such as applications for specific target groups like scientists and students.

In the beginning, a library may have to buy its own scanners and hire its own staff, but it has been discovered that scanning is not the core business of the library. So, digitisation may have to be outsourced. Because high standards are set, it may not be possible to meet high quality

standards of the libraries as per their requirements. The high standards lead to very high quality images, but also produce very high costs for scanning and storage of the large master files.

Because of the growing scale of digitisation projects some of the old basic assumptions have to be reconsidered. There is now a preference for digitizing from microfilm which mostly delivers lower quality images but is cheaper than digitizing from originals. Also, research is being done into alternative file formats for TIFF like jPeg2000, which decreases the amount of necessary storage capacity. For the same reason the use of only one format for both access and preservation is being considered. For a library to be able to outsource its scanning activities, it is necessary to introduce quality standards that commercial companies can handle. While outsourcing all scanning activities, expertise in the area of imaging techniques may still be held within the library. Further, because of the high standards for digitisation, quality assurance of the digital files is automatically on a high level as well. From the beginning quality control managers have to check everything that is digitized. Sometimes, in the first small-scale projects, every file is to be checked and scanned again if the quality is not perfect

It may be concluded that a better balance between quality, quantity and costs has to be struck if libraries wish to digitize on a large-scale. Digitisation processes have to become more efficient and the only way to do this is to limit expectations and not try to be perfect at all costs.

6. Summary

Defines the concept and scope of digitisation as the process of converting the content of physical media including the basic approaches of the same as practiced in libraries. Digitisation not only includes scanning equipment, process, digital library software, file formats and media types etc., but also covers the most important aspect i.e. identification and selection of material to be digitized. The salient features of various digital library software e.g. DSpace, E-print, and Greenstone digital library etc. have been discussed. One of the most important aspects i.e. planning and management for digitization is the area where librarian has major role to play. Some of the important tips in this area are provided which are useful in digitization projects initiated by many libraries. These include: Feasibility study, Library Automation Hardware and

Software Planning, Human resource planning, Placement and Training of Manpower, Financial planning, Content creation, Selection of Material for Digitisation and 'Born Digital', and Purchase of hardware and software. Among the challenges and problems faced by the librarians, technical limitations, budgetary constraints, copyright considerations, and lack of policy guidelines are worth mentioning. It is concluded that a better balance between quality, quantity and costs has to be struck if libraries wish to digitize on a large-scale.

Regional ecology and indigenous peoples of Southwestern Oregon and Northeastern California (McCook, 2004). The project was funded by a grant from the Institute of Museum and Library Services. It contains more than 1,500 fully searchable documents, books and articles. Hirtle (2002) argued that the biggest benefit of digitization is the tremendous increase in the use of digitized material. He used the cases of the Cornell University and the University of Michigan as examples. In Cornell, prior to digitization, a few volumes of the hard copies circulated each year. However, with digitization, the views per month are above 4,000 web pages. Michigan has over 5,000 web page views per day. Michigan started earlier than Cornell.

- **Process of digitization of library resources**

The setting up of a digital library entails the following stages:

(i) Policy enactment: A policy is a guiding statement. The top management should enact a policy on the project. Such a policy will serve as a reference point and guide for implementing the project. The policy should contain the goals of the digitization project.

Good goal setting is important for any new initiative, and digitization is no exception. The goal 'To make our materials more accessible on the web' is not specific enough. There is a need to be specific, particularly on the categories of users that will access the collection, the type of material they may be interested in, how they will use it, how many people are envisaged to use it, the planned procedure for it's advertisement, and the benefit of the material to users and institutions. Contacting current and potential users is an excellent way of having clues to all these issues. One may consider sending out a survey to the project's intended audience in order to learn how they are currently using the material, and how they might use it differently if it was digitized. It may be helpful to contact other institutions that have digitized similar collections and learn from their successes and failures.

(ii) Policy approval: The policy should be approved by appropriate authorities before project implementation. For instance, a university library may need the approval of the university management and other funding agencies before any digitization project can be embarked upon.
(iii) Planning, budgeting and monitoring: This is a very essential stage. It is desirable to set up a planning committee that will draw the plan and budget for the digitization exercise. Budgets for digitization projects should include the following categories: (a) salaries, wages and benefits (likely to be about 50% of the project cost); (b) staff training; (c) equipment and supplies; (d) services, contracts and legal fees; (e) overhead and indirect costs (including offices and workspace); (f) maintenance, licenses, and communications charges; and (g) contingency (setting aside about 10% of the total project budget for unexpected expenses).

The purposes of the digitization project, the source of fund and the amount available for the project should also be taken into consideration. At the regional or national level, effective planning for digitization can bring together all types of libraries, museum, academic/professional societies, historical societies and archives to take advantage of the exercise. In USA, the planning for digitization in the Central New York brought together all types of libraries, museum, historical societies and archives which took advantage of expertise and content. The Central New York digitization project was supported by a Library.

Services and Technology grant provided by the New York State Library.

(iv) Acquisition of appropriate technology: The plan drawn for the project will determine the appropriate technology to acquire. Technology here refers to all the equipment/hardware and software that are needed.
(v) Administrative decision on the procedure to be adopted: Decision has to be made on the mode of operation, whether to just establish links with existing digital libraries or to digitize in-house or to contract it out. There is a need to establish time limit for the project.
(vi) Sensitization, psychological preparation and retraining of staff: In most places the staff will like to resist the digitization project. It is a common thing for people to resist change, just for the fear of the unknown. The library staff may fear that the success of the project may affect their jobs adversely. Those who are not computer literate may not be willing to adjust. All these

categories of people have their genuine reasons to resist. It is the responsibility of the library management to educate them and allay their fears.

(vii) Copyright permission: Violation of the copyright laws should be avoided. It is not necessary to obtain copyright permission for materials published before 1922. Copyright permissions have to be obtained for materials to be digitized, particularly those that are not available in the government domain. When the copyright permission is granted, it is essential to enter the date of approval and the name of the person who granted the permission into the database. If an item is still under copyright, it can be digitized for in-house use only. Usually, copyright statements permit educational and non-commercial usage. Seeking copyright permission may even be another way of establishing collaborative and cooperative relationships. McCook reported how copyright permission was obtained for every material that was digitized. Even materials which some tribes held the copyright, permission for such was obtained from the Confederated Tribes of Warm Spring Reservation of Oregon. An introductory note was inserted in the database for this showing the source of the material and the person who granted the permission.

(viii) Implementation and trial testing: At this stage it good to start with trial testing, using a few materials as samples. This will enable us to know whether the format and fields are flexible and suitable. Adjustments can be made. A pilot digitization project should start with a manageable collection. Focusing on items with consistent or standard formats (photographs of all one size or type, documents from one collection, etc) provides the best chance of success. If the trial testingis successful, the project can be commenced. Data entry is rigorous, time consuming and very expensive. Existing materials can be scanned.

Modification of scanned and digitized documents is very essential, so as to minimize errors.

This will enable developers to put them in appropriate formats.

(ix) Evaluation of project: The top library management needs to be making periodic evaluation of the project. This will reveal lapses that have to be addressed. Evaluation is an oft-neglected aspect of digitization projects. Project evaluations should not just be easily quantifiable figures or an attempt to determine program's impact on the user. Several digital projects are judged by the number of items they digitize. This is really one of the least useful measures of a project's success. The number of images digitized means nothing, if they are of low quality, hard to locate in a database, or not interesting to the public. Assessing how users are using digital materials provides a more effective evaluation tool. At the bare minimum, projects should be formally

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Conclusion

This paper has established that digitization is an essential task in modern day libraries. If a library is to live up to current challenges, it has to go digital, that is, provide online services. This will enable it to preserve endangered library resources, improve the efficiency of information search mechanisms and enhance access to library resources. It is essential for the library

management to provide policy guidelines and articulate plans for the exercise. Digital library, otherwise known as virtual library, has grown to a special field of study. Courses of instruction and research opportunities are now made available in this area of specialization by some university.

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