The Importance of Computerization and Digitization of Museum Collections to Enhance Design, Display and Research

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Abstract

There is an expectation for museums to change from an 'old' to a 'new museology' which is currently shaping museum collections, their functions and roles in the 21st century. In order for museums to cope with current trends of digitization and access to their collections, irrespective of where the audience may be, it becomes compulsory for them to shift in this paradigm towards a change in the methods used in cataloguing and storing of museum collections for the purpose of enhancing Display, Design and Research. Qualitative type of research was used. This study based its contents on previous conducted researches, relating it to present day problems faced in Nigerian Museums. The research therefore discovered the need for Nigerian Museums to fully digitize their collections in order to enhance research and easy access by the audience. The research came up with procedural outlines for easy computerization of museum's collections and the need to train staff in the use of the required equipment.

KEYWORDS: Museums, Computerization, Digitisation, Collections, Preservation.

Introduction

Museums are massive repositories of collections with diverse and versatile information on material culture. Many museums, particularly in developed countries, are already creating large computerized information system for collection management. Yet, if such computerized system is to be used effectively for cultural and scientific research with the aim of dissemination of information and knowledge to the general public, then museums in Sub Saharan Africa must overcome the limitations of computerization in documentation of artifacts (Dallas, 1994). Majority of the museums in the region are yet to fully digitize their collections for easy accessibility and research. Nevertheless, a number of private collections in the region, especially manuscripts have been digitized through the support of governmental and non- governmental agencies.

Digitization implies conversion of documents and art works into digital images (Fabunmi et al, 2006:23). Digitization as defined by UNESCO is the creation of digital objects from physical, analogue originals by means of a scanner, camera or other electronic device. One great advantage of digitization is, it allows collections to be accessed by millions of users over internet simultaneously in different locations.

Today, a museum without a collections database and a Web presence is hardly thought of as "professional." Design, functionality and interactive elements are quite important with users today when working with a computerised system, These aspects should be considered when setting up museum computers, as visual aesthetics is now something users look forward to.

Computerization requires entries of information from collections of catalogs, objects and documents which then allows extraction of data in the form of records, files and database. In figuring this process we typically imagine digital artifacts through manifestations that emphasize their continuity with their physical originals: the digital image resembles the museum object. This fidelity is both functional and reassuring; yet it is also highly questionable. For like all digital artifacts, the objects that emerge from digitization are in fact nothing but data: abstract, structured patterns of difference, shuttling between storage and display media. As data, the digital object has no intrinsic, tangible form. Our encounter with a digital object consists of a particular representation or rendering of that data; but other representations are always possible. This paper presents a check list on issues relevant in the definition of this trend in the museums.

Computer Documentation

Computerization or the use of computers to establish an effective system is currently seen as an opportunity for museums to effectively establish control over the management of its collections, research process and improve communication with visitors. The main purpose of using computers in museums is to make accessible the information held in massive archives of documentary material. Manual records in themselves often contain little data because of lack of control of data entry which results from lack of recording of some relevant information. However, the development of the technology of science has greatly facilitated the extraction of information from what has come down

to us. Computer documentation of collections has the potential of making data available to users on a scale hitherto unimagined. We can also reasonably speculate that in the future the new technologies will enable us to extract even more information. Accurate records will clearly enhance this process. Consequently, we need information systems that can grow not only quantitatively but also qualitatively. The system must also enable different pieces and groupings of data as required for different functions such as exhibition planning, conservation, research acquisition to be accessed. It is, therefore, imperative that museums change over to computer systems which can adapt these increasing demands. Information development and management in museums is a complex process. Often museums not only lack an understanding of computerization systems but their staff may even be prejudiced against them. Consequently, their ability to plan computer information systems may be hindered by one or more of the following factors:

1. Ignorance of the potential of the computer system themselves (Perkins, 1994:7).
2. Because of no. 1 (above) the potential users are unable to specify objectives for the design of the system.
3. There is a lack of perception of the technological contribution to the future growth of knowledge.
4. There is prejudice against computer system.
5. There is a shortage of finance.

Therefore, it can be said without hesitation that the launching of an automation project in a museum needs breaking into strategic phases in order to realize the appropriate objectives. UNESCO has broken down this strategy into the following steps in its Fundamental Principles of Digitization of Documentary Heritage:

1. The planning process
- Identification of material to be digitized and rights related thereto.
- Assessment of resources needed.
- Discussion of standards.
- Definition of methods and timing of quality control.
- Assessment of risks, including current and future draw backs.

2. Pre-digitization process
- The selection of materials to be digitized.
- Quality control of the objects to be digitized- an assessment of their state of preservation and need of cleaning.
- Priotization of digitization.
- Any treatment that may be required or possible.
- The collection of metadata (especially descriptive and structural metadata). Metadata simply means information that describes digital objects and enable users to find, manage and use digital objects. It represents the total historic record of the digital objects and the totality of information about the object (Asogwa, 2011 http://unllib.unl.edu/cppl).
- Bibliographic and archival preparation.

3. Digital conversion process
- Digitization.
- Availability of professional equipment.
- Quality control.
- The creation of digital masters from which access copies are made

4. Post digitization process
- Control of metadata related to long term preservation.
- Submission of information to delivery and repository systems, data collection and management.
- Making digitized copies and metadata available online.
- Assessment and evaluation of the project.
- Quality control.

A museum computer system should give necessary information to the end user and at the same time provide tools for working with such information (Rumyantsev and Rudov, 2016). Another effective way of making museum computerization effective is by providing a virtual exhibition, virtual tour or

a unique service in content personalization alongside the obligatory service of data preservation and presentation. Scholars such as Sylaiou's (2010), Hemminger, Bolas and Shiff (2014) all stress the importance of digitization of cultural content and describe a technique that is based on three dimensional graphics which allows the user to not only get the requested information from a museum archive but also to take a virtual tour of exhibition rooms in the said museum. Such an approach in the digitization of art produces a high resolution of digital imaging, while maintaining the smallest details on art works (Ben-Ezra, 2011).

New developments in information technology, such as semantic information systems and object oriented, structured text encoding mechanisms, hypermedia and telemetric can help in museums in a seamless assimilation into the use of information and communications technologies. Parry (2007) posit that digitality has helped to support a realignment of museography that is taking place, from object centred to experience-centred design. Bearman (1994) and Duff et al, (2009) argued saying new technologies are fundamentally changing the ways in which museums communicate. He further stated that since the late 1980s, computer based interactive programs have delivered more varied and exciting information on the museum floor than traditional mechanical interactive or static signage (Duff et al, 2009).

It is important to note that Pallud (2014) further stressed that museums should be aware and comply with all the latest trends in information technology and web design. The latter is interested in the end user mostly, which causes high competition leading to an improvement in the computer functionality, design and interactive elements for the consumer of such services. An important role in museum resource system makes studying the peculiarities of design, construction and evaluation of its effectiveness very important.

Benefits of Computerization

Computerization in museums provides local and global benefits. The local benefits are those concerned with the greater efficiency of curation and research. The global benefits which results from the worldwide adoption of compatible computer systems (IBM, Macintosh, etc.) and standard information access procedures opens up the networking potential for researchers to network the information of overseas museums. The networking potential for researchers is only now beginning to be utilized and will greatly enhance comparative research in ways which was unimaginable. Therefore, we can optimistically look forward to a universal network of data. In order to attain a certain level of universal access to information, standardization of data entry and classification is a necessary prerequisite in museums.

Although it is difficult to reach such standards, many organizations and scholars are devoted to developing museum information standards. The International Council of Museums (ICOM) committee known as the International Committee for Documentation (CIDOC) has two working groups at the international level, the Data Model Working Group and the Data Terminology Standards Working Group. The Canadian Heritage Information Network (CHIN) is another institution that is devoted to this task at the national level. The Museum Documentation Association (MDA) is the sole body responsible for setting museum documentation system standards in the UK and which many museums in the UK now follow. It is therefore imperative for the Museum Association of Nigeria (MAN) to take up the challenges for developing documentation system standards which can adapt to the global system. The process of computerization in itself is a complete research work which will greatly enhance the standard of the museum. Unlike manual records where relevant information on objects are not properly recorded, the computerized system enables us to enter all relevant data on each into the database system. Classification of museum collection is very necessary in order to standardize the data for research purpose. Although there is a standard universal taxonomy of natural specimens, we are yet to reach an internationally accepted classification of man-made objects. Nevertheless, it is particularly important to standardize category, type, object name, material, technique and geographical location of objects in museums at the local level to enhance research. The classification and standardization of data will greatly facilitate data entry and access and will also enable us to develop a thesaurus to avoid repeated mistakes. It also helps in retrieving information and avoids redundancy. With the classification and standardization of data and their subsequent feeding into the computer, we can retrieve information through the computer's query facility. Depending on the choice of the keywords used to initiate the search, we often find that there is much material to use. For example, a computer can provide a researcher with comprehensive listings of objects, photographs, publications and reference materials on hand.

A museum computer system should give necessary information to the end user and at the same time provide tools for working with such information (Rumyantsev and Rudov, 2016). Another effective way of making museum computerization effective is by providing a virtual exhibition, virtual tour or a unique service in content personalisation alongside the obligatory service of data preservation and presentation. Scholars such as Sylaiou's (2010), Hemminger, Bolas and Shiff (2014) all stress the importance of digitization of cultural content and describe a technique that is based on three dimensional graphics which allows the user to not only get the requested information from a museum archive but also to take a virtual tour of exhibition rooms in the said museum. Such an approach in the digitization of art produces a high resolution of digital imaging, while maintaining the smallest details on art works (Ben-Ezra, 2011).

To successfully cope with this development in the computer age, museum must have a realistic, reasonable and manageable plan in proportion to the scope of the project and the size of the institution (Perkins, 1994:7).

Museums are public institutions where the local community, researchers and the general public should have access to information on the collections. The definition of a museum as "a non- profit making, permanent institution in the service of the society and its development, and open to the public which acquires, conserves, researches, communicates and exhibits, for purpose of study and enjoyment, material evidence of man and his environment" (Statutes of ICOM Article 2) makes it clear that whatever system of information management and dissemination a museum undertakes, it should be accessible to the public (Chieze, 1994: 31). Though, in most cases museum automation is initiated to address in-house needs and requirements, a flexible system should be chosen to accommodate future system developments, information standards (Robert, 1994:4-5) and the growth of knowledge. If museum professionals and scholars should expedite computerization of collections documentation in museums, there would be a network of information easily accessible to everybody. However, the implementation of an automation system in museums should be taken with great caution. The museum is non-profit making organization and the acquisition of the computers involves huge amounts of money that museums cannot afford. It is therefore important for financial and personnel reasons, that museums should breakdown the automation project into phases. Over a period of time, it should be able to come up with a comprehensive network system. In order to have a balanced system of information management, museum professionals should learn from other institutions that have already automated their systems. This could be partly achieved by attending conferences, meetings with colleagues and participating in discussions about appropriate issues (Sledge, 1994: 42).

From this study it is possible to broadly identify the major characteristics required by a museum for an information system. Lists of characteristics have been prioritized according to their importance for information management and its future in a museum.

Characteristics of Museum Automation

These characteristics are:

1. Defining the data to be computerized.
2. Classification of data.
3. Thesauri of terminologies.
4. Hardware and software specifications and
5. Personnel.

1. The first issue to be addressed by a museum when automating itself is to define the information to be computerized. It is necessary for a museum to classify the areas it will computerize in order to plan adequately. The museum for instance, can be divided into different sections such as collections management, museum management and administration for efficiency and gradual computerization. Collections management is an object-centered information management which could be computerized as the first priority. The section will include areas of object acquisition, documentation, exhibition, conservation, storage, security, loans and insurance. Museum management and administration (education, marketing, etc.) can then follow.
2. Consequently, the classification and standardization of data structure, syntax and terminology and potential implications (as a result of the knowledge) for data retrieval and manipulation will follow (Spergeon, 1994:15). The classifications of category types, cultural groups and geopolitical regions will ease data entry, control and retrieval which are needed to network data of the rapidly growing level of computer usage among museums (Robert, 1994:4).

Accordingly, classification of category type for a hat will, for example, be in the following order:
1st category type: Artifact;
2nd category type: Clothing;
3rd category type: Headwear;
Object name: Hat

The expansion of the categories will provide more opportunities for sorting objects under different classifications. Alternatively, the use of object name provides a basis to describe the object in description field that should be indexed to allow retrieval of data where category type is doomed (Abell-Sheddon, 1987: 127). Up till today, there is no internationally accepted classification of cultural groups (Gathercole, 1984: 37). However, the more such step is taken at the local level, the more it will provide opportunity to reach an international standard. The classification of cultural groups is of utmost importance to ethnographic museums and also facilitates research potentials in the museums. The geographical classifications provide the basis to sort artifacts according to their places of origin and association in order to interrelate them for research purpose.

3. The classification of information standards will provide the basis for building of terminology thesauri. The thesauri will provide the linkage between the terms and co-ordinate the internal structure of vocabulary. For example, the category classifications and manufacturing techniques of artifacts can be efficiently linked to aid correlations and other criteria for sorting.
4. The careful analysis of hardware and software requirements is equally important for proper management and security of data. The hardware specifications should be able to accommodate the growing data of the museum. The computer should have a hardware specifications and Hard Disc of at least 2GB. This is, of course, dependent on the size of collections and data requiring entry.
5. There is need to organize and encourage staff during computerization, especially by training them to familiarize themselves with computers. An employed or trained staff will help in-house training of staff members to overcome the equilibrium of computer literacy.

Conclusions

It has severally been suggested that museums are being changed by their societal context through the proliferation of information technology (IT) in our contemporary age. Parry (2007) argues that digitality has helped to support a realignment of museography that is taking place, from object-centered to experience-centered design. Bearman and Gerber (2008) posit that new technologies are fundamentally changing the ways in which museums communicate.

The main reason for computerizing museums is to provide easy manipulation of data and make it possible for researchers worldwide to access and retrieve information in a virtual appealing environment. The automation of museum information will promote interaction, communication and co-operation among the staff of the museum through the computerized management of collections, accounting and finance. Museum collections contain a growing body of knowledge that is communicated by means of exhibitions and publications. Technology has provided us with the means to capture, utilize and distribute the growing body of knowledge to ever wider audience (Spergeon, 1994:19). The global networking of museum information as a result of the new technology will enhance research potentials and encourage comparative analysis of the data worldwide. The application of some of the digitization methods mentioned in the article has shown that computerization and virtual digital technology is becoming increasingly important as a tool for learning about the world of culture, by accurately and convincingly presenting its value for study, research and reference.

Museums in this age continue to face challenges of competing with commercial and private outfits that have advanced in digitization and online access of their products and services. Museums as non-profit making institution have difficulties in leaving up to the standard of such financially buoyant outfits, but can produce a remarkable digital documentation and platforms of their collections with the current information, communication technology available to them. For example, the importance of museums having an online presence cannot be over emphasised, as they are in direct competition with commercial companies that provide the same services, such as in sports, tourism and entertainment. It is important to note that they should be aware and comply with all the latest trends in information technology and web design, (Pallud, 2014). The latter are interested in the end user mostly which

cause's high competition leading to an improvement in the computer functionality, design and interactive elements for the consumer of such services. An important role in museum resource system makes studying the peculiarities of design, construction and evaluation of its effectiveness very important.

Funding remains the major challenge of museums in sub Saharan Africa being an institution that solely relies on subventions and charity. Embarking on a digitization project is very expensive hence, museums need a lot of support from both governmental and non- governmental agencies. Governments can support government owned museums for national identity and tourists' attraction not necessarily for revenue but also to create awareness on the rich cultural heritage. These finances will also go into the training of personnel for the preservation and maintenance of digital formats and sites as well as sustainability of the project.

We shall continue to see this over growing trends and potentials of computerized information management systems and their subsequent universal networking being fully explored by museologists and scholars alike. It is, therefore, left for us to also take this challenge by encouraging our scholars and museologists to work towards attaining a unified computer management system in Nigerian museums. The Museums Association of Nigeria, like its counterparts elsewhere, should consider setting up a committee that will look into the possibility of establishing a body that will be mandated to set standards in museum documentation in Nigeria. The body, when established, should liaise with similar organizations and institutions with a view to standardizing the system in Nigeria comparing to the global system being developed.

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