Full Length Research Paper

The challenges in the development of academic digital library in Nigeria

Adebayo John Oluwaseye[1] and Adekunjo Olalekan Abraham[2]*

[1]Department of Library Archival and Information Studies, University of Ibadan, Nigeria.
[2]Kenneth Dike Library, University of Ibadan, Nigeria.

This study investigated the development of academic digital library in Oyo State, Nigeria. Attention was committed to the following areas: functionality, usability assessment and challenges. Survey method was employed. The result revealed that digital library is developing in Nigeria, and its functions are evident as it supplements printed information resources. Assessment of the use of digital library should be user centred; facilities and the environment then follow. The results show the challenges associated with the use of academic digital library in Oyo State; it ranges from lack of effective access, sustainability of the resources, unstable power supply and constraints in building the resources. The tool employed for this study was a structured questionnaire consisting of 15 items. 250 University students were sampled, using simple random sampling technique. The overall result suggested that development of academic digital library in Oyo State, Nigeria is making progress, but efforts should be made in finding a durable solution to the challenges that are posing threat to its use. The paper ends with a call to higher institutions in Nigeria, to include library digitization into their policies and plans for effective use and assessment. Meanwhile, recommendations were made for future research.

Key words: Digital information, information user, academic libraries, information communication technology.

INTRODUCTION

Rapid expansions in information and communication technologies (ICT) have brought revolutions to the roles of libraries. The changing nature of information resources had subjected libraries all over the world to face new challenges of meeting information needs of her users. The advent of ICT brought about digital library, which changed the nature as well as job profile of librarians and information professionals.

Essentially, the benefits of computers for library operations cannot be overemphasized, as it facilitates accuracy of record management among others. In spite of these advantages, libraries and other information centres in Nigeria are yet to be fully adopting modern information technology for management of information. To maximise the emergence of ICT facilities in Nigeria libraries, computer literacy is now part of public curricula, though not all people get their training in public schools. One of the efforts made so far is the introduction of computer courses, which are mandatory for students in Nigerian polytechnics, Colleges of Education, and Universities, as part of the general studies requirements for graduation.

Digital library also brings new demands and expectations both from library users and librarians. Its use has seen steady growth in some developed countries like United States of America; whereas in Nigeria, it is at developmental stage. However, as with other new technologies, effective use of digital libraries depends on user acceptance.

The change in information resources has also mandated libraries to redesign their information products as well as services rendered to user community. Today, with the increase in information users, electronic resources will in no doubt supplement the printed information resources. Furthermore, usability of digital

*Corresponding author. E-mail: blessing_adekunjo@yahoo.com. Tel: 2348054063921.

information is a multidimensional construct that can be examined from various perspectives. It is also an elusive concept and is determined by the task, the users, the product and the environment. The term usability has been used broadly and it means different things to different people.

The development of academic digital library in Nigeria is an on-going process with various challenges that require further investigation. In assessing the use of digital library, there are some factors that need to be considered; these factors range from "the users", "the environment", "the facilities" to "the access". Other factors that stem from the aforementioned include computer illiteracy, lack of access to the internet, inadequate web search skills, and unstable power supply. It is on this premise that this study hinges on in order to proffer probable solutions to these challenges.

The objectives of this study are as follows:

- To investigate the extent of development of academic digital library in Oyo State, Nigeria.
- To examine the functions of digital library.
- To determine the most important aspect to be considered during usability assessment of academic digital library.
- To examine the challenges of academic digital library in Nigeria.

Digital libraries offer the potential to greatly improve how individuals search and retrieve information (Borgma et al., 2005). In another development, Trivedi (2010) defines digital library as a library in which collections are stored in digital formats (as opposed to print, microform, or other media) and accessible by computers.

The digital library federation defines digital libraries as: organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily available for use by a defined community or set of communities (Shiri, 2003).

A digital library is not a single entity. It requires technology link to the resources of many collections. The links between digital libraries and their resources are transparent to users. Digital library collections are not limited to document surrogates. They are the actual digital objects such as images, texts, and so on. However, digital libraries provide users with coherent success to a very large organised repository of information and knowledge (Lynch, 1994). The Association of Research Libraries (ARL) has adopted a definition for the digital library that was originally developed by Drabenstott (1994). The definition includes the following:

- The digital library is not a single entity.
- The digital library requires technology to link the

resources to many libraries.
- Digital library collections are not limited to document surrogates: they extend to digital artefacts that cannot be represented or distributed in printed formats.

The terms: virtual libraries, online libraries, electronic libraries are often used simultaneously and/or interchanged with the term digital libraries. Resources in digital libraries are available directly or indirectly via electronic or digital means.

FUNCTIONS AND USES OF DIGITAL LIBRARY

The information age is heading towards an era where digital information will be much needed than ever, though it may not wipe away print-based information. The existence of modern day library does not depend on physical form of documents in linking past with the present, to plan for the future, through the use of emerging technologies.

Jebaraj and Deivasigimani (2003) highlighted the following characteristics of digital libraries:

- Contains permanent documents.
- Enables quick handling and ephemeral information.
- Based on digital technologies.
- Used by individuals working alone.
- The physical boundaries of data have been eliminated.
- Support communication and collaboration of information-seeking.

Data stored in a compressed format enables digital information publication and storage. Another instrument that enhances the storage, retrieval, use and exchange of digital resources is telecommunications. However, the functions of digital library are as follow:

- Access to primary information sources.
- Access to large amounts of information to users wherever they are and whenever they need it.
- User-friendly interface.
- Hypertext links for navigation.
- Support multimedia content along with text.
- Network accessibility on the internet and intranet.
- Universal accessibility.

Usability of digital library is a multidimensional construct that can be examined from various perspectives. Grudin (1992), however, considers that usefulness is the issue of whether the system can be used to achieve some desired goal and can be broken down into utility and usability, where utility is the question of whether the functionality of the system can do what is needed, and usability is the question of how well users can use that functionality.

USABILITY ASSESSMENT OF DIGITAL LIBRARY

Evaluation of digital library has to be user centred in order to determine its effectiveness. Borgman (2000)

wrote extensively regarding digital libraries from a user-centric perspective. He provides a multi-disciplinary, holistic, human-centred perspective on the global information infrastructure.

Harless and Allen (1999) utilized contingent valuation methodology (CVM), a subset of multi-attribute, stated-preference techniques, to measure patron benefits of reference desk services. The International Standards Organization (1994) defines usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use".

Usability has user focus. It is different from functionality and is not equivalent to accessibility. Usability is all about making website content available to and usable by users.

Furthermore, Blandford and Buchanan (2002) concluded that usability is technical, cognitive, social and design-oriented and it is important to bring these different perspectives together, to share views, experiences and insights. Indeed, digital library development involves interplay between people, organization, and technology. The usability issue should look at the system as a whole, not as an entity. Among other ways to evaluate usability are: formal usability testing, usability inspection, focus groups, questionnaires, think aloud, analysis of site usage logs, cognitive walkthrough, heuristic evaluation, claims analysis, concept-based analysis of surface, structural misfits, paper prototyping and field study (Askin, 1998; Pearrow, 2000; Synder, 2003).

LIMITATIONS IN BUILDING ACADEMIC DIGITAL LIBRARY

The staff of the National Digital Library program, at the Library of Congress, 2003 had identified ten challenges that must be met if large and effective digital libraries are to be created during the 21st century.

Building the resources

- Develop improved technology for digitizing analogue materials.
- Design search and retrieval tools that compensate for abbreviated or incomplete cataloguing or descriptive information.
- Design tools that facilitate the enhancement of cataloguing or descriptive information by incorporating the contributions of users.

Interoperability

- Establish protocols and standards to facilitate the assembly of distributed digital libraries.

Intellectual property

- Address legal concerns associated with access, copying, and dissemination of physical and digital materials.

Effective access

- Integrate access to both digital and physical materials.
- Develop approaches that can present heterogeneous resources in a coherent way.
- Make the National Digital Library useful to different communities of users and for different purposes.
- Provide more efficient and more flexible tools for transforming digital content to suit the needs of end-users.

Sustaining the resource

- Develop economic models for the support of the National Digital Library.

Other limitations of digital library as stated by Trivedi (2010) are listed below:

- Lack of screening or validation.
- Lack of preservation of "best in class".
- Lack of preservation of a fixed copy.
- Jobs loss for traditional publishers and librarians.
- Costs are spread and many become hidden.
- Difficulty in knowing and locating everything that is available, and differentiating valuable from useless information.

METHODOLOGY

Survey method was adopted for the study whereby self-structured questionnaire titled 'Expansion of Digital Library in Nigerian Academic Libraries: Functionality, Usability assessment, and Challenges (EDLNAL)' was designed to elicit information from the respondents. The participants were drawn from 6 higher institutions of learning in Oyo state, Nigeria. Out of 250 copies of questionnaire that were distributed, 220 were returned and found usable for the study due to the fact that they were appropriately completed. A simple random sampling technique was used to represent the sample of the study because of the homogeneity of the population.

Table 1 shows that University of Ibadan had 40 (18.2%) respondents, Ladoke Akintola University of Technology, Ogbomoso had 33 (15%) respondents; Emmanuel Alayande College of Education, Oyo had 31 (41.1%) respondents; Lead City University had 35 (15.9%) respondents; The Polytechnic, Ibadan had 43 (19.5%) respondents, while the Federal School of Survey had 38 (17.3%) respondents.

From the data collected and administered, 185 (84.1%) respondents wrote about the functions of academic digital library, while 35 (15.9 %) respondents did not write.

Table 2 shows that 25 (11.4%) respondents used library website, 45 (20.5%) respondents can search

Table 1. Respondents by institutions.

Item	Frequency	%
University of Ibadan, Nigeria	40	18.2
Ladoke Akintola University of Technology, Ogbomoso	33	15
Emmanuel Alayande College of Education, Oyo	31	41.1
Lead City University, Ibadan	35	15.9
The Polytechnic, Ibadan	43	19.5
Federal School of Surveying	38	17.3
Total	**220**	**100**

Source: Field Survey (2013).

Table 2. Usage of electronic resources.

Item	Frequency	%
I always visit the library website	25	11.4
I am comfortable searching virtual library	45	20.5
I can use online catalogue	15	6.8
I love to read electronic books	65	29.5
I frequently use e-journals	70	31.8
Total	**220**	**100**

Source: Field Survey (2013).

Table 3. Focus of usability assessment.

Item	Frequency	%
The tasks	3	1.4
The users	139	63.2
The products	23	10.4
The environment	55	25
Total	**220**	**100**

Source: Field Survey (2013).

Table 4. Frequent use of digital library.

Item	Frequency	%
Very often	29	13.2
Often	47	21.4
Not often	144	65.4
Total	**220**	**100**

Source: Field Survey (2013).

virtual library, 15 (6.8%) respondents can use online catalogue, 65 (29.5%) used electronic books, and 70 (31.8%) used e-journals.

Table 3 reveals that the main focus of usability assessment was "the users" with 139 (63.2%) respondents. It was followed by "the environment" with 55

Table 5. Challenges of Digital Library use.

Item	Frequency	%
Computer illiteracy	45	20.5
Lack of access to Internet	54	24.5
Intellectual property	26	11.8
Inadequate web search skills	40	18.2
Electricity instability	55	25
Total	**220**	**100**

Source: Field Survey (2013).

(25%) respondents; the product had 23 (10.4%) and 3 (1.4%) respondents indicated "the tasks".

Table 4 shows that 29 (13.2%) respondents use digital library very often, 47 (21.4%) use it often, and 144 (65.4%) respondents picked "not often".

From Table 5, 45(20.5%) respondents indicated that they were computer illiterate; lack of access to internet was the challenge of 54(24.5%) respondents, 26 (11.8%) respondents picked intellectual property; 40 (18.2%) respondents indicated that they had inadequate web search skills, while 55 (25%) respondents went for electricity instability.

RESULTS AND DISCUSSION

This study revealed that there is availability of digital

libraries in higher institutions in Oyo State, Nigeria. However, low usage of academic digital libraries across higher institutions in the State was noticed. Aside this, most students had challenges using online catalogue, which is one of the functions of digital library; many do not visit their library's website. Some of the reasons attributed to this are linked with inadequate awareness on digital library use for students, insufficient orientation for users, attitude of the patrons to the use of digital library, inadequate computer-use skill and lack of web searching skills. Nonetheless, these challenges do not eradicate the fact that academic digital library is developing. This finding is in line with the submission of Anunobi and Okoye (2008) "A well established library is essential for any academic institution". As a focal point for teaching, learning, and research, it is expected to provide standard information resources. Digital technology has revolutionized not only the way information is packaged, processed, stored, and disseminated, but also how users seek and access information. Academic libraries no longer restrict themselves to print services such as collection development, cataloguing and classification, circulation and reference services, current awareness, selective dissemination, and other bibliographic services, but have extended their efforts to interdisciplinary concepts and computer software and hardware and telecommunication engineering and technology.

This study also found a substantial majority of 84.1% respondents that gave functions of academic digital library. Some of the functions they gave include: access to primary information sources; access to large amounts of information to users wherever they are and whenever they need it; user-friendly interface; hypertext links for navigation; support multimedia content along with text; network accessibility on the internet and intranet; and universal accessibility. Also, these findings are similar to the functions of academic digital library as stated by Alasa and Kelechukwu (1998): "quick and convenient information exchanges; access to experienced and expert individual in thousand fields; access to regular updates on topics of interests; enhancement of team work across geographical distance; access to archives information worldwide; transfer of data between machines and provision of a great platform to have fun and be entertained. As a reference tool, the digital library provides wealth of up-to-date resources unavailable in bound volumes."

Furthermore, the results of this study established the opinion of the respondents on the focus of usability assessment. It was evident that 'the users' are the major focus while evaluating the use of digital library. Although other factors like the products, facilities and the environment should also be put into account, the users should be at the centre (the first factor to be considered). This result is in line with the finding of previous research as stated by Shackel (1986) "usability has the criteria of effectiveness, learn ability, retain-ability, advanced

feature usage, first impression, and long-term user satisfaction. Usability has user focus. It is different from functionality and is not equivalent to accessibility. It is all about making website content available to and usable by users". Blandford and Buchanan (2002) also concluded: "usability is technical, cognitive, social and design-oriented and it is important to bring these different perspectives together, to share views, experiences and insights. Indeed, digital library development involves interplay between people, organization, and technology."

In addition, results obtained shows low usage of academic digital library by the users in Oyo State, Nigeria. This is due to lack of access to the internet, inadequate web-search skills, computer illiteracy and power instability. Parts of these challenges are the responsibility of state government and school management; the other side to it is user-centred. These challenges were also highlighted by Uzuegbu (2012) "One major challenge to open access to scholarly publication in Nigeria is the fact that intellectual property rights are required to facilitate the creation of content as well as access to digital information in our libraries. Another related challenge to the above is that of privacy and security. Furthermore, notwithstanding the growth in Internet usage in Nigeria, the speed and reliability of the Internet connections still poses a great deal of challenge to most of the institutions that have digital libraries in them. Another major situation of open access to knowledge in Nigeria is on the issue of infrastructure. The problem of electricity power supply is a major infrastructural problem associated with open access to scholarly journals in Nigerian academic institutions."

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

- Library management should ensure that communication gap between library staff and users are bridged for effective dissemination of information on new trends in the library.
- Management of higher institutions in Oyo State, Nigeria should provide training for library staff, so as to help update their knowledge in the application of new technology.
- The use of digital library should be given more attention by the library management during orientation for library users.
- Library management should organize more training programs to educate users on the use of computers and basic web search skills.
- Nigeria government should speed up in the on-going improvement of power supply.
- Management should make both human and technical resources that are up-to-date available in academic libraries so as to encourage patrons to use the resources

for research and information acquisition.

- Academic libraries in Oyo State, Nigeria should increase their internet bandwidth and online journals' subscription. This will improve access to and use of information.

- Oyo State government should make personal computers available to students in higher institutions within the state at a subsidized cost, so that information users (patrons) will be able to access the internet in their comfort zones.

- Higher institutions in Oyo State should incorporate library digitization into their policies and plans to maximize its effectiveness.

Conclusion

Digital library initiative in Nigerian academic institutions is on the increase; in recent time, academic libraries are experiencing various transformations along with challenges which have drastically affected information delivery and services. These challenges could be solved with improvements in infrastructures, solid users' orientation programme, as well as improvement in computer literacy programme for users.

Professional librarians who are skillful in the application of modern technologies in information access, sharing and management will also be needed in tackling these challenges. Witten (1999) opines that a key problem with information distribution via the Web is that it disenfranchises developing countries. Librarians in academic libraries in Nigeria must endeavour to be updated and well trained in the use of new technologies, bearing in mind the fact that it is the tool that supports users' information task, knowing that users are looking for an information system that is easy, friendly and natural to use.

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