

Multiple Intelligences and Adoption of Digital Library Services by Librarians in Academic Libraries

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Abstract

Digital library services have emerged as essential resources for information access, research assistance, and user interaction in today's academic environment. The success of integrating modern technologies and multiple intelligences into academic libraries will depend on the librarians' capacity and willingness to adopt and use these tools. The article explores how these individual differences influence their engagement with and utilization of digital library technologies. This article examines multiple intelligences and adoption of digital library services by librarians in academic libraries. It went further to discuss concept of digital library services, multiple intelligences theory, multiple intelligence and technology adoption, implications of multiple intelligences for librarians and digital library services and consequence of multiple intelligences on digital library services. Conclusion was reached and suggestions were made which include library administrators should engage in professional development programmes that encourage multiple intelligences and librarians' unique learning styles and strengths.

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Keywords: Digital Library Services, Multiple Intelligences, Librarian, Academic Libraries

Introduction

Academic libraries in Nigerian higher institutions of learning have been making significant contribution to the mandates of their parent institutions. These mandates are teaching, re-search and community services geared towards social, political and economic development of the country (Niigaaniin, 2021). In the words of Ahaiuzu et al., (2024), they opined that academic libraries provide bibliographic, and user services to the staff, students and immediate communities of their respective institutions. These services are significant and crucial to the achievements of their institution's academic, intellectual and other interest of staff and students. In recent time, there has been a paradigm shift in the concept of academic libraries and information centres services delivery because of the fact that library services are in transition from local traditional collections to global resources sharing provided on demand via the most advanced networking technologies Hence, the mandate of academic libraries is to develop collection, resources and services to meet the cultural, informational, educational and recreational demands of their target users, because libraries primarily objective is to satisfy the multiple needs of its target users (Jade & Otto, 2010).

In the contemporary academic landscape, digital library services have become indispensable tools for information access, research support, and user engagement. Our everyday life is changing rapidly due to the technological innovations in all fields of human endeavour. These new technological changes are affecting the field of librarianship just like any other field. It is shifting the role of a librarian from simply being a book keeper to a dynamic agent that brings together information from different sources and makes it available for the clientele (Ramalingam, 2018). Digital library services are revolutionizing access, storage, sharing and dissemination of information resources to the users Osadolor, et al., (2021). Digital library services are also embraced by librarians because it provides wider range of resources including rare or out of print materials that are difficult or impossible to find elsewhere (Auwal, & Maidabino, 2021). Thus, due to advances in information and communication technologies (ICTs), the adoption of digital libraries services provides users with access to vast collection of e-books, e-journals and other e-resources from the comfort of their homes with the strokes of fingertips. Also, this was corroborated by Bala, et al. (2023) who said that the adoption of information and communication technology (ICT) tools such as search engines, smart phones, electronic books and social collaborative tools have made users demand for easy and efficient ways of access for scholarly publications as against the traditional reference desk.

Moreover, the adoption of digital library services over traditional library services enables librarians and users to search, access and utilize resources quickly and easily without physically locating and retrieving them from library shelves. This implies that information can be accessed from anywhere at any time.

Furthermore, in librarianship, librarians should be multi-faceted and have a multiple intelligence to lead a modern library. The present digital environment theoretical knowledge is not sufficient for the librarians, practical exposure is a must to cope with this environment. Apart from ICT skills, librarians should possess personal skills that are multi-faceted like being analytical, creative, technical, flexible, reflective, able to deal with a range of users, detective-like, adaptable, responsive to others' needs, enthusiastic and self-motivated. This is why Howard Gardner's propounded the theory of multiple intelligences, which are some of the types of intelligences that librarians may need in the adoption of digital library services because library is a growing organism, fulfilling the fifth law of Dr. S. Ranganatha.

Hence, the adoption of digital library services encourages personalized recommendations and annotations which enhance experience and facilitate collaboration and knowledge sharing among libraries. However, the level of adoption of digital library services is hugely dependent on the effectiveness of multiple intelligences of librarians in academic libraries.

Concept of Digital Library Services

Today digital library has improved the library services like electronic journal support service, electronic document delivery, electronic publishing, inter-library loan, full text searching, digital library indexing databases etc. for learning and teaching (Nonthacumjane, 2010). All the information is stored on the computer that will be connected to a personal computer through a network. The terms, which have been in trend at different times, includes the paperless library, virtual library, E-library, online library, desktop library, and polyglot library, a library without boundaries and in recent time digital libraries (Renu, 2018). This is an overall way that allows users to obtain sensible data from the storehouse of data and information in the academic library. Today due to revolutionary changes in the field of technology, the library services are not aloof and untouched from this change (Eneh, et al., 2023). In fact, the frequent uses and application of information and communication technology can be observed in the field of library services, therefore, library services have become more efficient and effective than before. The main objective of digital library is to fulfil the demand of library users with relevant, updated and accurate information at economic cost and at universal norms. Digital library services emanate mainly from digital libraries.

Digital library services are services that libraries or librarians provide through digital libraries or web 2.0 to its community of users. Although, digital library services are usually delivered by leveraging digital library products such as e-book, e-journals e-lecture notes, e-projects, e-theses and e-dissertation notwithstanding, web 2.0 can be leveraged to render digital library services without necessarily using the contents in digital libraries (Horsfall et al., 2021). Such services

could be Selective Dissemination of Information (SDI) and Current Awareness Services (CAS). Digital library services could be delivered through electronic devices such as CD-ROM, computers and or mobile technologies for accessibility. It could also be delivered via online databases like the Proquest, requiring Internet connections. Bhatnagar (2005) identified digital library services as gateways, OPAC, portals, subject portals, subject directories, online databases, and search engines. Digital library services also include document scanning services, SDI, CAS, etc. Although there has been very little reported research on integration of digital library services into blended library environments (Amin & Gerbic, 2010), libraries are providing these services to support blended learning. This is because blended learning has become an inevitable form of learning in the contemporary society. In this light Ahiauzu, (2020) posited that library educators are now required to apply instructional materials in teaching and learning as the talk- chalk-board is becoming boring and students are finding it difficult to retain a long talk by a teacher. To overcome, according to them a system that could merge both traditional and instructional or e-learning which is blended learning emerged.

Theory and Concept of Multiple Intelligences

The theory was propounded by Howard Gardner in 1983 in his book titled *Frames of Mind: The Theory of Multiple Intelligences.*, this posits that human intelligence is not a singular, monolithic construct but rather a constellation of distinct, relatively autonomous intelligences. Gardner identifies different kinds of intelligences based upon eight criteria. His eight criteria for describing something as an independent kind of intelligence include: case studies of individuals exhibiting unusual talents in a given field; neurological evidence for areas of the brain that are specialized for particular capacities); the evolutionary relevance of the various capacities; psychometric studies; and a symbolic formulation of the area treated by each proposed intelligence. Gardner (1993) originally identified seven core intelligences: linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal and intrapersonal. In 1999, he added an eighth, the naturalistic intelligence and indicated that work continues on whether there is an existential intelligence.

The concept of multiple intelligences revolves round the ability of individuals to possess different skills to solve multi-problems. The concept of multiple intelligence was first initiated by Gardner in his book titled- *frame of mind* in 1983. He posited that individuals possess different types of intelligences rather than a single, general intelligence. Each intelligence type represents a unique way in which people process information and solve problems. Gardner identified different kinds of intelligences based upon eight criteria. His eight criteria for describing something as an independent kind of intelligence include: case studies of individuals exhibiting unusual talents in a given field; neurological evidence for areas of the brain that are specialized for particular

capacities; the evolutionary relevance of the various capacities; psychometric studies; and a symbolic formulation of the area treated by each proposed intelligence. Gardner (1993) originally identified seven core intelligences: linguistic, logical-mathematical, spatial, bodilykinesthetic, musical, interpersonal and intrapersonal. In 1999, he added an eighth, the naturalistic intelligence and indicated that work continues on whether there is an existential intelligence.

Digital Library Services

Digital Library Services During the past three decades, according to Arms (2012), digital libraries have gone from a curiosity to mainstream. Prior to 1990, computing in libraries had concentrated on metadata. MARC cataloguing was at its peak, indexing services such as Medline had transformed significantly into search languages, and Science Citation Index was the state-of-art in linked data, but with very few exceptions the actual collections were physical items such as printed documents (Rose, 2024). During 1990, when computing transited to a level where it became possible to make available large collections online with access over networks, digital libraries and digital library services took a new shape. By the end of the 1990s, digital libraries were no longer a novelty. The DSpace software for managing institutional repositories is an excellent example of a library system from this period (Saha & Das, 2015). The Mercury Electronic Library at Carnegie Mellon University was the first digital library at an American university. When it was released to the campus in 1991 it had a dozen textual databases and a collection of page images of journal articles in computer science (Arms, 2012). In a more recent development efforts include the creating of digital content into digital libraries. The unprecedented use of the Internet, the World Wide Web and the social media has further facilitated digital library services delivery as more libraries move towards offering their types of assistance in a blended environment. Digital library service manages and creates electronic services, the library websites and library staff (Velmurugan, 2023). Digital library services are the services provided by the library be it academic, public, national, schools, or any type of library via electronic channels usually with library electronic products such as e-book and e-journals. It could be via synchronous tools such as video conferencing, chat rooms, or instant messaging or via asynchronous tools such as web, e-mail, subject gateways, FAQs, and electronic libraries, virtual reference desk and ask-me. Such service could be updating new arrivals via the Internet or social media platforms, providing links to other resources via the web, educating the user about the use of library via online, delivering documents to users, providing access to information to users, teaching users information literacy and how to use collaborative technologies in their academic works. White (2001) describes digital library service as an information access service in which patrons enquire answers through electronic means such as email or online forms. It is responsible for the provision of customer

information services and the provision of access to various information resources as well as serving as digital preservation.

Most of the services are rendered digitally and now regarded as digital library services. They are itemized as follows:

Computerized interactive search; IT services; E-library services; Online user education/instruction; Selective Dissemination of Information (SDI); Current Awareness Services (CAS); Referral service. ,Webliographic service Digital reference services., Online document delivery service; Online Public Access Catalogue (OPAC);eb-Based Public Access Catalogue (WEBPAC), Audio-visual Service, Online indexing and abstracting Institutional repositories. .Digital library products are utilized for digital library services. Digital library products include: E-journals, E-newspaper, E-magazine, Electronic Projects, Theses and Dissertations. E-patents; E-government publication; E-standard.

Factors that Influence the Adoption of Digital Library Services in Academic Libraries

Digital library services have transformed the way users' access, retrieve, and interact with information resources in the library. Also, digital libraries provide users with remote access to a vast array of resources, including e-books, academic journals, multimedia materials, and archival content, thereby improving accessibility and convenience. The adoption of these services is influenced by several factors, including technological infrastructure, user perception, institutional support, and digital literacy. According to Park, (2021) the factors that Influence Adoption of Digital Library Services are as follow:

1. **Technological Infrastructure:** The availability of robust technological infrastructure is a fundamental factor in the adoption of digital library services in academic libraries in Nigeria. Hence, adequate internet connectivity, high-performance servers, and efficient library management software significantly impact user engagement. Without these technological enablers in Nigerian academic libraries, users may face difficulties in accessing digital resources, leading to lower adoption rates which may not be good for libraries in the digital age.
2. **User Perception and Acceptance:** User perception, which includes perceived ease of use and perceived usefulness, plays a crucial role in the adoption of digital libraries in Nigerian academic libraries. The reason being that when users find digital library platforms intuitive and beneficial for academic and research purposes, they are more likely to adopt them. Nevertheless, resistance to change and lack of awareness, however, can hinder adoption the adoption of digital library services in academic libraries.

3. *Digital Literacy and Skills*: Digital literacy is another crucial determinant of digital library adoption. Librarians and users with higher digital proficiency are more comfortable delivering, accessing e-books, journals, and databases. Training programmes for librarians focusing on information retrieval, database usage, and citation management can enhance librarians' confidence and promote digital library adoption in academic libraries.

4. *Institutional Support*: Institutions play a vital role in promoting digital library adoption by providing necessary resources and training programmes. Universities and research organizations that invest in digital library infrastructure and conduct awareness programs tend to witness higher adoption rates. Librarians and academic staff also contribute by assisting users in navigating digital resources.

5. *Future Trends*: definitely, the future of digital library services is expected to be shaped by technological advancements, including artificial intelligence-driven search engines environment, blockchain for secure data management, and virtual reality (VR) for immersive learning experiences. These innovations are likely to further enhance the accessibility and efficiency of digital library services in academic libraries.

Multiple Intelligences and Digital Library Technology Adoption

Research suggests that individuals with certain multiple intelligences profiles may be more predisposed to embracing and effectively utilizing technology (Davis & Green, 2022). For instance, individuals with strong logical-mathematical or spatial intelligences may find it easier to grasp the technical aspects of digital library systems and databases, while those with interpersonal intelligence may excel at user education and outreach (Smith, & Jones, 2020). Moreover, individuals with intrapersonal intelligence may be adept at self-directed learning and professional development in the digital realm, which will be healthy for librarians.

Therefore, Davis, and Green, (2022) explain libraries, as community hubs of learning and information centres, can leverage the concept of multiple intelligences to enhance their technology adoption strategies and improve user experience through the following:

Linguistic Intelligence: Libraries can adopt e-books, audiobooks, and podcasts that cater to readers and listeners, promoting access to information for those who are strong in linguistic intelligence. Users with strong linguistic intelligence excel in language-based tasks, such as reading, writing, and searching for textual information. They are more likely to adopt digital libraries that offer robust search functionalities, advanced filtering options, and extensive textual resources.

Logical-Mathematical Intelligence: Libraries can integrate tools like data analysis software, coding platforms, or robotics kits to attract users with an aptitude for logical problem-solving. Also, Individuals with logical-mathematical intelligence prefer structured, analytical approaches

to problem-solving. They may favor digital libraries with logical organization, clear metadata, and advanced query systems that allow them to retrieve information efficiently.

Spatial intelligence: Spatially intelligent users are adept at visualizing and interpreting graphical information. They are drawn to digital libraries with rich visual interfaces, including infographics, visual search tools, and interactive maps.

Interpersonal Intelligence: Social spaces or collaborative platforms, such as group study rooms, video conferencing tools, or online forums, can encourage collaboration and social learning. Also, libraries can use social media platforms, like Google Docs or Slack, and community-based apps to foster interaction and collaborative learning.

Intrapersonal Intelligence: Libraries could offer digital tools for self-reflection, journaling, or mindfulness, as well as self-paced learning resources that cater to those who excel in introspection and personal growth. Likewise, personalized recommendations through AI-driven tools can encourage users to explore topics or resources that align with their personal interests and introspective learning.

By applying the principles of Multiple Intelligences to technology adoption, libraries can provide more personalized, accessible, and effective services to their diverse users. Understanding and addressing the different ways people learn and engage with technology ensures that libraries remain relevant and inclusive in an increasingly digital world.

Implications of Multiple Intelligences for Librarians and Digital Library Services

Multiple intelligences theory in the context of academic librarianship can offer invaluable insights into the factors that influence the adoption of digital library services. The following are the implications of multiple intelligences for librarians and digital library services in academic libraries:

a). *Linguistic Intelligence:* there is need to be linguistically sound enough to communicate orally and verbally both with the management and the users of the library. Hence, librarians need know how to source for different information materials inside the database of the library to server the information needs of the diverse users from different disciplines.

b). *Logical-mathematical Intelligence:* there is need for librarians to be logically and mathematically strong so as to be able to execute better library budgeting; do cost benefit analysis and bibliometric studies; handle user statistics with software with the help of adoption of digital library.

c). *Spatial visual intelligence:* librarians in this era of IT need to be spatially conscious so as to select 3D colours design for library building, assist the architect; do interior decoration, design library layout/sketch.

d). *Bodily-kinaesthetical Intelligence*: kinaesthetically, librarians have to be knowledgeable and physically strong so as to replace books, arrange computers for digital services infrastructure and furniture, arrange books for exhibitions, do shelf rectification etc. for the adoption of digital library services in academic libraries.

e). *Musical Intelligence*: there is need for librarians to be musically resourceful so as to deal with music related information sources available in the digital library so as to disseminate the e-resources digitally– collecting, classifying, preserving and uploading musical pieces, do things rhythmically, play music etc.

f). *Interpersonal Intelligence*: librarians need to possess interpersonal skills so as to deal with users in a social manner that will make them feel at ease in this digital age, etc. because the paradigm of service delivery has changed totally.

g). *Intrapersonal Intelligence*: Need to have intrapersonal skills so as to work alone, use personal experience, know one's capacities and limitations learn from errors made during surfing for the digital resources, understand readers' information needs separately etc.

h). *Existential Intelligence*: in this contemporary world librarians need to be emotionally strong enough to handle queries, share novel ideas, respect others' feelings, tackle typical situations, touch the feelings of authorities, control anger, share happiness, keep one's cool etc.

The above listed intelligences are very much required in the present-day library management for optimal adoption of digital library services in academic libraries. The library professionals need to be multi-faceted, multi-talented and multi-tasking. They should be able to thrive in all spheres of modern library organization. Hence, they need to be linguistically, mathematically, spatially, interpersonally, intrapersonal, emotionally, technologically, managerially, communicatively and kinaesthetically strong enough to adopt the digital library services that lead a modern technology-driven 21st century library and information centres.

Challenges of Digital Library Services

Digital library services have significantly transformed the way information is accessed, stored, and shared. They offer numerous advantages, including remote access, cost-effective resource management, and a vast collection of digital materials. However, despite these benefits, digital libraries face several challenges that affect their adoption, efficiency, and sustainability.

According to Obi and Adeola, (2021) they opined that despite the potential of digital libraries, users with different intelligence profiles face challenges that may hinder adoption:

➤ *Assessment of multiple intelligences Profiles*: Accurately assessing individual multiple intelligences profiles can be challenging, as there is no universally accepted standardized assessment tool.

- *Individual Differences:* While multiple intelligences theory provides a general framework, it is important to recognize that individual differences within each intelligence category can vary significantly.
- *Technological Fluidity:* The rapid evolution of technology necessitates ongoing professional development and adaptation, requiring librarians to continuously expand their knowledge and skills.
- *User Adoption and Resistance to Change:* Despite the benefits of digital libraries, some users—especially those accustomed to traditional print resources—may resist transitioning to digital platforms. Lack of awareness, preference for physical books, and unfamiliarity with digital tools can slow down adoption rates. Hence, effective training programs and awareness campaigns can help bridge this gap and encourage wider acceptance.
- *Sustainability and Long-Term Preservation:* Ensuring the long-term sustainability of digital library services is a challenge, as technological advancements require continuous updates and preservation efforts. Digital obsolescence, where outdated file formats and software become unusable, can lead to the loss of valuable digital content. To address this, libraries need to implement digital preservation strategies, such as migration to newer formats and cloud storage solutions.
- *Cybersecurity and Data Privacy Risks:* Digital libraries face security threats such as data breaches, hacking, and unauthorized access to sensitive information. Institutions must implement strong cybersecurity measures, including encryption, secure login credentials, and regular system updates to protect users and digital assets. Additionally, user privacy concerns related to data tracking and personal information collection need to be addressed.
- *Financial Constraints:* The maintenance and expansion of digital library services require significant financial investment. Institutions often struggle with budget constraints that affect their ability to upgrade technological infrastructure, subscribe to high-quality digital content, and train staff in digital literacy. Many libraries rely on external funding or government support, which may not always be sustainable.
- *Information Overload and Content Management:* With the vast number of digital resources available, users often experience information overload, making it difficult to locate relevant materials. Poorly organized databases, inefficient search algorithms, and a lack of metadata standardization can hinder the discoverability of digital content. To address this, libraries must implement effective content management systems and provide user-friendly navigation tools.
- *Cybersecurity and Data Privacy Risks:* Digital libraries face security threats such as data breaches, hacking, and unauthorized access to sensitive information. Institutions must implement strong cybersecurity measures, including encryption, secure login credentials, and regular system

updates to protect users and digital assets. Additionally, user privacy concerns related to data tracking and personal information collection need to be addressed.

The integration of multiple intelligences into the adoption of digital library services plays a crucial role in enhancing the efficiency and effectiveness of librarians in academic libraries. By recognizing and leveraging individual cognitive strengths, librarians can better navigate the complexities of digital library systems, improve user engagement, and optimize information service delivery.

Suggestions

- Library administrators should engage in professional development programmes that encourage multiple intelligences and librarians' unique learning styles and strengths.
- Librarians should be encouraged to identify their own multiple intelligences strengths and explore learning resources that align with their preferred learning styles.
- Library management should promote collaborative environments where librarians with diverse multiple intelligences profiles can leverage their strengths to support each other in the implementation and adoption of digital library services.
- There should be a conduct of empirical research to investigate the relationship among multiple intelligences profiles, learning styles, and technology adoption behaviors among librarians.

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LEAD CITY INTERNATIONAL JOURNAL OF LIBRARY, INFORMATION &
COMMUNICATION SCIENCES

[LCIJLICS]. ISSN: 3027-0022, eISSN: 3027-0901

VOL 3. ISSUE 1. JANUARY, 2026 (DOI: <https://doi.org/10.63741/lcijlics.2026.0301.17-j>)

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