



Review Article

Digital Literacy Skills and Digital Reference Services in Nigerian University Libraries: Opportunities, Challenges, and Implications for Sustainable Academic Information Service Delivery

Susan Omolade Ademilua*, Arinola Oluwatoyin Gbotoso, and Taye Olawale Oloruntoba

College Library, Federal College of Agriculture, Akure, Ondo State, Nigeria

***Corresponding author: ademiluasusan@gmail.com**

Abstract

The development of ICT has revolutionized the way library services are offered all over the world. Digital literacy is becoming a core competence among academic librarians. This review highlights the contribution of digital literacy skills in improving digital reference services at the university libraries in Nigeria. The review focuses on digital literacy skills, digital reference services, the use of digital information resources, and challenges of delivering library services with the aid of technology. From past studies, it is evident that a librarian with a high level of digital competence can easily offer prompt, accurate, and customer-oriented reference services via electronic media such as emails, online databases, institutional repositories, web communications, and virtual reference systems. Despite the use of ICT in higher education institutions, there are many challenges in delivering library services using ICT in the university libraries in Nigeria. These challenges include: lack of ICT infrastructure, unstable electric power supply, inadequate funding, lack of professional training, poor maintenance culture, and inadequacy of skilled human resources in web technologies. This results in poor delivery of the digital services, limiting users from accessing quality information sources. This review demonstrates the importance of continuous professional development, strategic investments in digital technologies, favorable institutional policies, and sustainable sources of funding in improving the delivery of the digital services. It also emphasizes the importance of improving the digital skills of librarians to foster innovation, improve user experience, teach and conduct research, and ensure the sustainability of the libraries in the digital environment. This paper offers valuable insights to library managers, university administrators, policymakers, and researchers on how to improve the digital transformation efforts in academic libraries in developing nations.

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Introduction

University libraries are the bedrock upon which any university is built because it occupies a unique position as it manages the intellectual product of the university. The university library is a repository of resources and an integral part of the educational system whose primary function is to serve users (Puala, 2025). According to Oriogu, Chukwuemeka and Oriogu-Ogbuiyi (2018), the primary goal of the university library is to promote the tripartite objectives (teaching, learning and research) of education through the provision of adequate and relevant information resources and sendees in both print and non-print format. Within an academic library, several departments handle different functions that help oversee the realisation of the goals of the educational institutions. Such departments include, but are not limited to, the acquisition department, cataloguing department, circulation department, reference department, bindery/reprographics department, etc. (Okoli, Ukwedeh, & Idah, 2021). Academic libraries can achieve these feats successfully by adopting information and communication technology (ICT).

ICT has revolutionised how people live, work, play, and learn. Since information technology affects all works of life, university librarians are not in any way exempted as they must embrace it to handle complex work and enhance their digital skills (Nwankwo & Seimode, 2020). Sinha and Ugwulebo (2024) observed that digital literacy skills are librarians' ability to use digital tools and work in computerised environments. According to Dašić, Kostadinović, Vlajković and Pavlović, (2024)., digital literacy is the ability to use digital technology, communication tools, or networks to locate, evaluate, use and create information. Digital literacy includes reading and interpreting media, reproducing data and images through digital manipulation, and assessing and applying new knowledge gained from digital environments (Okeji, Tralagba, & Obi, 2020). It also entails the capabilities and competencies required by an individual to fit for living, learning and working in a digital society. It is the ability to locate, organise, understand, evaluate, analyse and present information digitally while appreciating the essence of new technologies and managing digital identities (The Chartered Institute for Information Technology, 2013).

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Digital literacy skills are necessary for university librarians to function effectively in the digitised and globalised learning environment. Digital literacy skills are essential in accessing and utilising electronic information resources (Udoh, Ekpenyong, & Olowookere, 2020). Academic librarians who acquired these skills are undoubtedly more equipped for social networking, blogging, surfing the net, instant messaging, resource sharing, and other digital-oriented activities. Competence in digital literacy skills would also be helpful to librarians in information management (information generation, storage, retrieval, utilisation, dissemination/communication, and evaluation), and in doing this lawfully and ethically (Udoh, Ekpenyong, & Olowookere, 2020). Okeji, Nwankwo, Anene, and Olorunfemi (2020) argued that since these skills can be learnt, there is no justification for any academic librarian who fails to acquire digital literacy skills to boost digital reference service.

Cassell and Hiremath, (2023) observed that reference service is assistance rendered by librarians to individual users to facilitate the effective utilisation of library resources. It serves as a bridge between library resources and users. It ranges from simply directing users toward sources of information to the retrieval and synthesis of the data to meet the information needs of a particular user. Reference service is as old as the library itself, as librarians have always found it necessary to provide expert support to library users in one form or the other (Adeoye, Oladokun, & Opalere, 2020). However, the traditional method of delivering reference services involves utilising various reference materials such as encyclopedias, dictionaries, almanacs, yearbooks, handbooks, gazetteer, abstracts, indexes, and a host of others. While this was adequate and useful before the Internet era, the advent of the Internet has seen the introduction of web-based digital reference services, which have eased the hassles faced by librarians and clientele. The librarians can now access current resources for their patrons on the web with ease and in a short period (Tofi, Agada, & Okafor, 2020).

Digital reference services involve providing orthodox library services to library users in a computer-based environment whilst exploiting the various technological mediums (Okoli et al., 2021). Agada, Tofi and Makinde, (2021) revealed that library digital reference services available in the university libraries in Nigeria include Compact Disc Read-Only Memory (CD-ROM), databases, videotapes, cassettes, diskettes, magnetic disks, Internet/email, microfiche and microphones, among others. Digital literacy skills possessed by university librarians would enable them to serve users effectively using digital reference services. Sahabi, Elvis and Bukar, (2021) posited that digital literacy skills allow librarians to recognise when information is needed and the different kinds of

information library users need. Hence, digital library skills are a sine qua non for every university librarian to succeed in the technologically advancing world.

The ever-quickenning transformation into digital environment for the higher education system have also altered the traditional method and mechanism through which the academic library can be responsible in the purchase, processing, security and diffusion of information. Hence the responsibility has become so significant to expect university librarians acquire advanced level of digital literacy skills and provide effective and efficient user-centred digital reference service in the acquisition of information, support for virtual teaching and learning system and meeting the growing needs for information of students, scholars and educators. However, several challenges in the operationalisation of the effective digital reference service exist in some of Nigerian university libraries despite growing significance of information technology in the academia.

The review literature has demonstrated that the challenges to the effective implementation and operation of the digital reference service in many Nigerian university libraries include: poor ICT infrastructure; irregular electricity supply; inadequate funding; limited access to reliable internet services; lack of qualified professional with sufficient advanced digital competencies; poor maintenance; and inadequate and inappropriate library management. These issues in turn has reduce the efficiency, usability and effectiveness of the library service as well as librarians capability to meeting service users requirement in the new era. Though studies have investigated either digital literacy or digital library service separately; a review work integrating present knowledge has been identified to a less significant extend, on how digital literacy has influenced the effectiveness of digital reference service in Nigerian University libraries and further identified the needs for further integrated work in other to fill the existing knowledge gaps, develop policy and strategies to be implemented in the Nigeria university libraries; this study, reviews the relation between digital literacy skill competencies and digital reference service, and further discussed about challenges, opportunity and future of Nigerian university libraries on this topic.

Digital technology is now a central feature of present-day library and information services and thus digital literacy is becoming an important professional skill in academic library environments. Given the recent move of university to the area of digital scholarship, online learning, and on-line library service use, librarians, and information specialists have had to acquire new technical and other digital skills. It is a critical need, at this point, to conduct a literature review to comprehensively cover what knowledge

and competencies are required to successfully render digital reference service in universities.

The literature review of knowledge and competencies required to be successful in digital reference service is justified by the need to have one authoritative publication that will gather the result from published studies and allow library policy, and managers to develop strategies and make decisions on the basis of evidence. It is hoped that the paper will offer guidance to university administration, library administrators, policy makers, professional library associations and library education programs for decision regarding personnel and technological infrastructure, digital service developments and innovation in the universities. Moreover the paper offers guidance to the readers interested in the growing body of knowledge on the digital transformation within the academic libraries in especially from developing countries with its' technological and infrastructural limitations. The study offers practical suggestions for the improvement of the librarians' digital skills, strengthening of the support structures in libraries and improvement of service to be provided to the libraries in a wider context and also helps to highlight issues on the best practice, enabling factors and barriers to effective implementation of digital reference services which may lead to improving user's satisfaction, enhancing researcher productivity, and supporting effective learning and teaching practices in university environment, it can also serve as a base for any future research related to digital literacy, library automation, and information service provision in the African university libraries.

This paper is an attempt to examine the significance of digital literacy skills in the provision of digital reference services by university libraries in Nigeria. Digital literacy, digital information resources, digital reference services and librarians' competencies in technology-enabled higher educational settings were reviewed in the article. Opportunities that digital technologies can be utilized to transform the quality of library services as well as some of the challenges encountered were discussed. Besides these factors, a closer look at the institutional factors such as ICT facilities, electricity, funds, bandwidth access, computer literacy/staff training, maintenance culture and management commitment to the effective delivery of the services were discussed. Some related foreign literature was reviewed for global perspectives and comparative purposes but attention was placed on Nigeria university libraries. This paper restricted itself to a narrative review of published academic sources and does not cover any research based on empirical research or case studies. The discussion in the paper will be based on the information provided in the previous studies.

This paper is aimed at assessing the contributions of digital literacy skills in improving the provision of digital reference services in Nigerian University Libraries. The study focused on the opportunities, challenges, and strategies needed to enhance service delivery in the changing digital information era.

The review specifically aimed to:

1. Investigate digital literacy skills as they relate to the definition and importance for Nigerian university librarians.
2. Explore various digital information resources and tools in support of the academic library services.
3. Ascertain the extent to which digital literacy skills contribute to effective and efficient digital reference services delivery in the study libraries.
4. Identify factors (e.g., organisational, individual, and infrastructural) which influence the adoption and usage of digital reference services in Nigerian university libraries.
5. Explore institutional and infrastructural factors which inhibit effective exploitation of digital resources in Nigerian university libraries.
6. Identify professional competences needed by Nigerian university librarians in a new digital era.
7. Suggest possible recommendations for the enhancement of digital literacy skills and the effective digital reference services in Nigerian university libraries.

Literature Review

Concept of Digital Literacy

Hariati, (2021) defined digital literacy as the set of attitudes, understanding, and skills to handle and communicate information and knowledge effectively in various media and formats. Nwankwo, Seimode and Ismaila, (2020) opined that digital literacy is an “individual’s ability to use digital technology, communication tools or networks to locate, evaluate, use and create information.” Digital literacy includes individuals’ ability to read and interpret media, reproduce data and images through digital manipulation, and evaluate and apply new knowledge gained from digital environments (Ikenwe, Aiyebilehin & Adjarho, 2022.). Digital literacy is marrying the two terms digital and literacy; however, it is much more than a combination of the two terms (Msurshima & Tor-Akwer, 2025.). Digital literacy is the ability to effectively and critically navigate, evaluate, and create information using various digital technologies. It requires one “to recognise and use that power, to manipulate and transform digital media, to distribute

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pervasively, and to easily adapt them to new forms”. A digitally literate person possess a wide range of digital skills. They include knowledge of the basic principles of computing devices, skills in using computer networks, ability to engage in online communities and social networks with adherence to behavioural protocols (Gomathy, 2018).

Digital Resources and its Use in University Libraries

Digital resources are those information resources that can only be accessed by using computers and other ICT devices. These materials may require using a peripheral device directly connected to a computer, such as a CD-ROM drive or a connection to a computer network, such as the Internet. There are different digital/electronic resources such as Compact Disc Read-Only Memory (CD-ROM), Internet, Online Public Access Catalogues (OPAC), electronic books, electronic journals and electronic index. The use of digital resources has given rise to new modes of organising the educational environment in tertiary institutions, most especially in the libraries. Offei, (2021) opined that digital resources are convenient to use since users can access information from the library, offices and private residence at any time of the day or night. The low computer skills of librarians is another factor influencing the use of digital resources.

Problems Affecting the Use of Digital Resources in Nigerian University Libraries

The non-accessibility of digital resources hinders librarians’ and library users’ use of the library’s digital resources. This contradicts the easy accessibility of the internet search engines like google, yahoo and others where a single keyword search could result in thousands of hits, no matter the topic. In the library, students have to choose a particular database and be more selective in the search words they use. Oseghale (2023) found that the effective utilisation of electronic resources among university students was constrained by irregular internet access, inadequate training on electronic resource use, inadequate staff support, poor awareness of available electronic resources, discontinuity in database subscriptions, and limited local digital content. The study emphasised that improving ICT infrastructure, providing regular user training and strengthening library support services are essential for enhancing the utilisation of electronic resources. Wada, Bitagi and Abubakar (2022) found that the adoption and use of digital information resources in Nigerian federal university libraries were hindered by inadequate ICT infrastructure, lack of awareness of available digital resources, insufficient digital competencies among users and limited institutional support. The authors concluded that strengthening ICT facilities, improving awareness programmes and enhancing users' digital literacy are essential for increasing the utilisation of digital resources. According to Bentil, Liew, and Chawner (2022) observed that electronic resources have become indispensable to teaching, learning, and research in academic libraries, complementing

traditional print collections by providing timely, remote, and seamless access to scholarly information. The authors noted that electronic resources have transformed library services and significantly enhanced access to academic knowledge for users. Its advantages include access to information that might be restricted to the user due to geographical location or finance and access to more current information. However, van Deursen (2022) found that age and educational attainment continue to be significant determinants of digital inequality and internet skills, whereas gender differences have become less consistent and are increasingly mediated by factors such as digital experience and access to technology. Siddiq, Gochyyev, and Wilson (2024) found that while young people generally demonstrate strong operational and technical digital skills, including the ability to navigate digital platforms and access online information efficiently, they often exhibit lower levels of information evaluation, critical thinking, and the ability to assess the credibility and reliability of online content. The study emphasises that critical digital literacy remains an important area for educational intervention.

Concept of Digital Reference Services

The term digital reference services can be defined as a provision of reference services that involves the reference librarian and the library user in a digitalised format. It has to do with both parties coming together to tackle a query brought by the client; librarians provide users with referrals to other online and print sources of information (Umaru, Aghadiuno, & Nano, 2018). Noh (2023) defines digital reference service as the provision of reference and information services through digital communication technologies that enable librarians to interact with users remotely using platforms such as email, live chat, web forms, social media and other online communication tools. This approach extends traditional reference services beyond the physical library and enhances users' access to information irrespective of location. These services can utilise various media, including email, web forms, chat, video, web customer care centre software, voice over internet protocol (VoIP), etc. It can provide support for users who find online tools and resources unfamiliar, difficult to learn or insufficient to answer their information needs. Asemi, Soltani, and Ramezani (2021) defined digital reference service as a web-based information service through which librarians provide professional reference assistance and respond to users' information requests using various online communication technologies, thereby linking users with subject experts and reliable information resources irrespective of geographical boundaries. The National Information Standards Organization (NISO) (2001) defines digital reference service, virtual reference service and online reference as using either synchronous reference technology like chat or asynchronous tools such as emails to provide and assist in the retrieval and use of information.

Digital Reference Services also refers to a network of expertise, human intermediation and resources placed at users' disposal in an online environment. Whenever possible, it employs automated tools, allowing human experts to concentrate on hard questions. In addition to answering questions, experts may also provide users with referrals to other online and print sources of information.

This paper is an attempt to provide a literature survey of the digital literacy skills and their implications on the digital reference service delivery of the University Library, focusing specifically on the Nigerian higher education landscape. It encompasses a review of the literature on: the definition of digital literacy; digital information resources; digital reference services; the challenges militating against digital reference services. Even though examples from some other countries of the world will be included where appropriate, to aid a deeper insight, the focus is, however, on the Nigerian universities. There is no collection and analysis of data or empirical research, and therefore, the study uses previously documented scholarly works and findings of field studies as the source materials.

Challenges Faced in Provision of Digital Reference Resources and Services

- (i) Iwhiwhu and Eyekpeggha (2023) observed that many academic libraries in Nigeria continue to face significant challenges, including inadequate funding, outdated and insufficient information resources, poor ICT infrastructure, inadequate technological equipment, limited library space, and shortages of skilled personnel. These challenges have negatively affected the quality of library services and the ability of academic libraries to effectively support teaching, learning, and research.. These are some common challenges faced in academic libraries in developing countries like Nigeria.
- (ii) Another major challenge is the availability of Wide Area Network (WAN) and a Local Area Network (LAN): To a large extent, the availability of a university WAN/LAN within the library determines the success of computerisation of library services. This is a major challenge to many universities in Nigeria. There is no reliable LAN in most universities. Where this exists, it is achieved through surface cabling, which exposes the cables to the effects of fire, storm, vandalism.
- (iii) Computer Literacy/Education: Many university library staff are not computer literate. This is a great setback in computerisation and digitalisation. Many of the staff are reluctant to jettison their old mindset which resists change. Many are conservative and traditional, and suffer from phobias. Okonkwo, Ukangwa, and Odikpo (2026) found that information literacy and digital competencies significantly improve librarians' job satisfaction, confidence, technological

- adaptability, creativity and overall work performance. However, the study also revealed that inadequate technological skills and insufficient opportunities for continuous professional development can reduce librarians' effectiveness in delivering digital library services, highlighting the need for regular ICT training and capacity building.
- Poor State of Power Generation:** Regular power generation remains a problem in Nigeria. Frequent power outages constitute a serious bottleneck to automation. The cost of running generative plants is prohibitive.
- (iv) **Poor Maintenance and Update Culture:** There is a poor maintenance culture in Nigerian academic universities, particularly. The size and complexity of the task have almost completely eroded maintenance in most academic universities. This erosion is manifested in the frequent computer and network breakdowns or failures.
- (v) **Poor Funding of Library Services:** Poor funding is a major challenge to academic libraries in Nigeria. Academic libraries in Nigeria derive their funds from the government. Although the federal budget provision has moved from 5% of the approved recurrent budget for library development to 10%, the budget of many academic libraries continues to dwindle. A high rate of inflation, low and unpredictable national income, the effects of global economic depression and local currency devaluation continue to water down whatever budgetary provision is made for academic libraries in Nigeria.
- (vi) **Education and Training:** Most staff in academic libraries in Nigeria were trained in traditional librarianship. They are finding it difficult to cope with the requirements of the electronic age. Staff training and retraining have not been given a pride of place. These challenges have far-reaching effects on the implementation and sustenance of the automation of library services in academic universities in Nigeria.
- (vii) **Lack of Web Technology Skills:** Web technology skills are needed to maintain web servers that host locally digitised materials and other digital resources hosted remotely, as well as maintaining proxy access to restricted resources. Aregbesola and Hur-Yagba (2025) observed that many academic libraries in Nigeria continue to experience shortages of librarians with advanced digital and information technology competencies required to implement, manage and sustain modern library technologies. The study identified inadequate ICT skills, insufficient technical training, and limited institutional capacity as major constraints to the successful deployment and management of digital library systems and emerging technologies. The erratic nature of electricity power supply in Nigeria is a major problem. Digital libraries cannot exist in this situation because web servers that host locally digitised content and proxy servers that provide authentication and

remote access to subscribed electronic resources need to be on twenty-four hours a day.

- (viii) Acquisition of New Skills: It is obvious that librarians need more than basic ICT skills to be able to cope with the challenges of globalisation in libraries. This has placed greater demand on their ability and the need to rise to this challenge. This brings to the fore the issue of subject background as a pre-requisite for a career in librarianship. Librarians need to be well grounded in some disciplines other than librarianship. For developed countries, these issues pose little problem whatsoever as they can be overcome anytime. However, this is not the case with underdeveloped countries like Nigeria with unfavourable exchange rates and high inflation rates.

Conclusion

It can be concluded from this review that there have been significant changes in the skill sets of academic librarians, in response to the shift from traditional library functions to digitally-based information services. Digital literacy has become an indispensable tool for the adequate delivery of digital reference services to patrons in university libraries. Academic librarians who possess well-developed digital competencies can effectively retrieve, evaluate, organise, share, and communicate information via diverse digital resources on various electronic platforms to improve knowledge accessibility and to enhance the teaching, learning, and research needs of users.

Although there has been some integration of ICT in the delivery of information services in academic libraries, there are numerous challenges to the successful deployment and implementation of digital reference services in Nigerian university libraries. These include lack of ICT facilities and poor maintenance of existing infrastructure, unstable power supply, limited financial and budgetary resources, lack of opportunities for further professional development, and inadequate supply of digitally competent staff. A concerted effort should be made by the government, university authorities, library administrations and relevant professional bodies to overcome these problems. Continued professional development and training and investment in the current and relevant digital infrastructure and facilities (internet, power supply etc) is vital for the capacity building of academic librarians to enable them to acquire robust digital literacy skills and provide effective and accessible digital services. The enabling role of management through institutional support and appropriate policy development, along with sustained investment in training and sustainable financial mechanisms, is necessary for enhancing

digital literacy for improved service delivery and effective digital transformation in higher education and the Nigerian information space in the 21st century.

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