



Towards a sustainable automated library operation; the imperatives of digital skills and related factors of digital skills development of university library professionals in Nigeria

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DOI: <https://doi.org/10.47989/ir30iConf47173>

Abstract

Introduction. Research shows that libraries in Nigeria are still grappling with automating their library operations because of lack of skilled workforce. This study has explored the current digital skills and training gaps of library professionals in Nigeria.

Method. This study adopted a survey design using a mixed method strategy of both quantitative and qualitative procedures to collect data through questionnaires and interviews sequentially from 453 respondent.

Analysis. Quantitative data was analyzed using SPSS version 23 and qualitative data was subjected to thematic content analysis.

Results. Findings revealed that the university library professionals in Nigeria lack operational digital skills to carry out tasks especially serials, acquisition, cataloging management etc. Also, found that in-house training is the only pathway for expert training on digital operations while others are ineffective. Personal factors such as financial constraints and gender related issues, alongside management factors such as policy and poor financing were found to impede capacity development of library staff in Nigeria.

Conclusion. The study recommends re-harnessing the existing resources and refocusing the training programs towards expert programs.

Introduction

Library automation involves applying technology to manage in-house library operations such as circulation, cataloging, reference, serials, and acquisitions management (Lawal-Solarin et.al. 2018). While many Nigerian university libraries have adopted library management technologies, they still struggle with effective digital library operations, a challenge that became especially evident during the COVID-19 pandemic when all libraries were shut down (Adetunla et.al., 2023). The International Federation of Library Associations (IFLA) recommended that libraries shift to digital services to continue functioning, but Nigerian universities were unable to transition to virtual operations due to resource limitations. These challenges stem from financial constraints, a lack of workforce capacity, and the excessive costs and technical difficulties of acquiring technology, which have hindered the development of digital library services (Ifejeh &Yusuf,2020; Ameh et.al,2021; Corrado,2023).

Despite various efforts since the 1980s, including external interventions like the World Bank and Carnegie/MacArthur automation projects in technical collaboration with the Mortenson Center; University of Illinois till 2015 (Alabi, 1987; Zubair et.al., 2023), many of Nigeria's library automation initiatives have failed as these efforts became unsustainable after the withdrawal of external technical support caused by the expiration of the agreements and universities struggled to maintain these projects due to a lack of staff expertise. The sustainability of digital information services has been discussed in frameworks such as the one by Chowdhury (2014), which focuses on economic, social, and environmental pillars. He elucidates that economic sustainability of digital information services is to ensure cheaper, easier, and better access to information by reducing direct and indirect costs. Social sustainability of digital information services gives equitable access. As shown in Figure 1, for Nigeria, achieving sustainable automated library services has been linked to embracing open-source technologies, promoting open-access information, and focusing on context-specific skills development for library professionals (Karioja, 2013; Anunobi, 2013; Adetunji & Oladokun, 2020; Onwubiko, 2023).

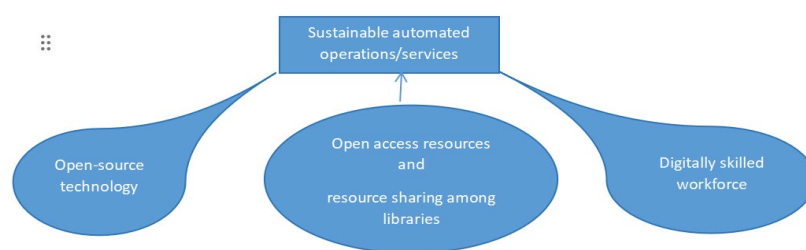


Figure 1. Library automation sustainability chart (self-developed)

The adoption of open-source software, particularly KOHA, has provided hope for automation projects in Nigerian university libraries due to its low cost and ease of maintenance (Tella et.al., 2017; Omopupa et.al, 2020). Additionally, there is growing interest in open access resources, with Nigerian libraries promoting Open Education Resources (OER) in line with the National University Commission's (NUC) mandate for universities to host academic publications on institutional repositories (Corrado,2023; Ogunbodede & Cocodia, 2023; Adedoyin, et.al.,2024). However, despite these advancements, only 5% of Nigerian university libraries have fully automated operations, and the overall state of automation is underwhelming. Research shows that a significant challenge is the lack of a skilled workforce, as 78% of Nigerian information professionals are lacking the digital skills necessary to manage modern technologies (Tella et.al., 2022; Owolabi et.al., 2022). This skills gap was highlighted during the COVID-19 pandemic when Nigerian university libraries, despite investments in technology, struggled to provide services due to the lack of digitally skilled staff (Adetunla et.al., 2023).

The essential digital skills required for library staff to function in this epoch, include basic competencies like online searching, word processing, Wi-fi connection and email services, as well as task-based skills for managing automated tasks such as cataloging, circulation, institutional repositories etc. (Okuonghe & Achugbue 2020; Corrado, 2023). This study aims to investigate the current operational digital skills gap in Nigerian university libraries, explore existing digital skills development programs, and identify staff-side and managerial challenges affecting digital skills development for library professionals. The following research questions were raised:

RQ1. What are the task-based digital skills possessed by library professionals for digital operations in Nigeria?

RQ2. What are the existing training programs on digital operations available to library professionals in Nigeria?

RQ3. What are the staff-side factors and challenges of the existing digital skill development programs on digital operations in Nigeria?

RQ4. What are the managerial factors of the digital skill development and training programs of university library staff in the use of library automation in Nigeria?

Methodology

Research design and sampling technique

This study adopted a survey design using a mixed method strategy of both quantitative and qualitative procedures sequentially. A multi-stage sampling technique was used for this study (see figure 2 below). The first stage involved the use of cluster sampling to put the universities to the 3 geopolitical regions in the South of Nigeria. The second stage involved a random sampling technique to select 3 universities from each region to represent the 3 generations of universities in Nigeria and selection of 3 privately funded universities, and in the third stage, a total enumeration technique was used to sample the 453 professionals (all librarians and library officers) of these 12 universities.

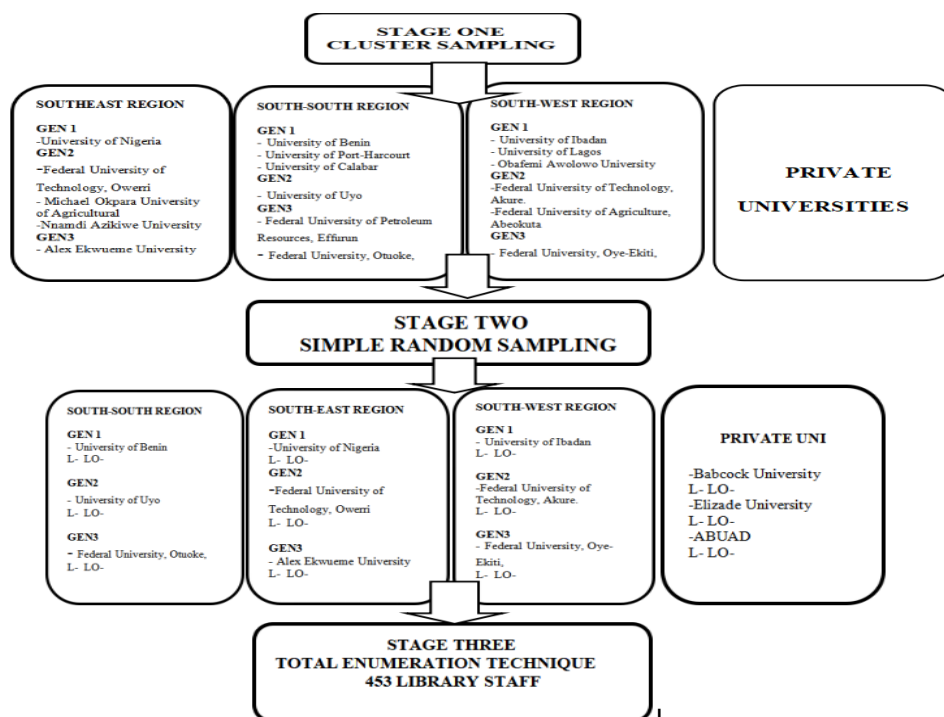


Figure 2. Multistage sampling figure

Data collection and analysis

A mixed method of quantitative and qualitative approach was employed to collect data. Quantitative data was collected using structured questionnaires. 453 questionnaires were directly administered to the respondents across 12 universities in Nigeria. 432 questionnaires were retrieved, and 408 questionnaires were properly filled and found useful for the analysis of this study. Data collected for the study was analyzed using SPSS version 23. In the qualitative phase, data was collected from the senior management staff of the 12 selected university libraries in Nigeria through a digitally recorded interview via zoom. This research set out to interview 12 senior management staff but due to the schedule of the participants, only 10 were interviewed. These 10 senior management staff are within the rank of Principal Librarian to University Librarian. The interview recordings were coded, transcribed, and subjected to thematic content analysis. Research questions 1, 2 and 3 were addressed using the quantitative approach while research question 4 was addressed using qualitative approach.

Presentation of result and discussion

Demographics distribution of respondents

| Institution | FUTA | FUTO | UNN | FU'OVE | FU'OTU | AEU | UN'BEN | UI | UN'UYO | BABCOCK | ELIZADE | ABUAD | TOTAL |
|-----------------|-----------|------|--------|-----------------|-------------------|-----|----------|------|--------|---------|---------|-------|-------|
| Frequency | 17 | 80 | 78 | 10 | 18 | 22 | 32 | 70 | 30 | 25 | 10 | 16 | 408 |
| Percentage | 4.2 | 19.6 | 19.1 | 2.5 | 4.4 | 5.4 | 7.8 | 17.2 | 7.4 | 6.1 | 2.5 | 3.9 | 100% |
| Gender | male | | female | | prefer not to say | | | | | | | | |
| Frequency | 168 | | 226 | | 14 | | | | | | | | 408 |
| Percentage | 41.2 | | 55.4 | | 3.4 | | | | | | | | 100% |
| Designation | Librarian | | | Library Officer | | | | | | | | | |
| Frequency | 164 | | | 244 | | | | | | | | | 408 |
| Percentage | 40.2 | | | 59.8 | | | | | | | | | 100% |
| Education | Diploma | | | Bachelors | | | Masters | | | PhD. | | | |
| Frequency | 159 | | | 156 | | | 65 | | | 28 | | | 408 |
| Percentage | 38.9 | | | 39.0 | | | 15.9 | | | 6.9 | | | 100% |
| Work Experience | 0 – 5 | | | 6 – 10 | | | 11 above | | | | | | |
| Frequency | 83 | | | 202 | | | 123 | | | | | | 408 |
| Percentage | 20.3 | | | 39.5 | | | 40.1 | | | | | | 100% |

Table 1. Analysis of demographics distribution of respondents

Table 1 shows the demographic analysis of the respondents. Based on institutions, Federal University of Technology, Owerri has the most respondents while Elizade University has the least respondents. Result based on gender shows that there is more female representation. Analysis of designation shows that library officers are more than librarians. Based on educational qualifications, it was noted that staff that hold Diploma are more, and few PhD holders. It was noted that most of the respondents had between 6 to 10 years' working experience.

Result of quantitative analysis of research questions

Research question 1: what are the task-based digital skills possessed by university library professionals in Nigeria?

| OPERATIONAL TASK DIGITAL SKILLS | | | | | | |
|---------------------------------|----------------------------|-------------------------------------|---------------------------------|--------------------------|--------------------------------------|----------------|
| Acquisition operation | Manage vendors | Manage budget | Create purchase order | Manage order/receipt | Handle purchase suggestions | |
| \bar{X} | 1.79 | 1.84 | 1.82 | 1.79 | 1.71 | |
| SD | .578 | .607 | .719 | .661 | .746 | |
| Remark | unskilled | unskilled | unskilled | unskilled | unskilled | |
| Cataloging | Edit bibliographic records | Manage OPAC | Generate call mark/accessioning | General cataloging | OCLC importing | Z39.50 tool |
| \bar{X} | 3.50 | 3.48 | 3.45 | 3.43 | 1.83 | 1.75 |
| SD | 1.337 | 1.345 | 1.401 | 1.418 | .684 | .728 |
| Remark | skilled | skilled | skilled | skilled | unskilled | unskilled |
| Serial | Manage subscription | Create new issues/Manage collection | Check subscription expiration | Manage numbering pattern | Claim late issues & manage frequency | |
| \bar{X} | 3.43 | 1.87 | 3.50 | 1.91 | 1.82 | |
| SD | 1.416 | .650 | 1.343 | .661 | .656 | |
| Remark | skilled | unskilled | skilled | unskilled | unskilled | |
| Circulation | User registration | Charge & discharge | Renew & prompt due dates | Inter-library operations | Generate reports | Hardware usage |
| \bar{X} | 3.37 | 3.46 | 3.43 | 3.47 | 3.46 | 3.46 |
| ---SD | 1.439 | 1.362 | 1.400 | 1.355 | 1.402 | 1.366 |
| Remark | skilled | skilled | skilled | skilled | skilled | skilled |
| Patron | Create new user category | Register new patron profile | Manage/edit patron account | Staff/patron permission | | |
| \bar{X} | 3.42 | 3.40 | 3.43 | 3.42 | | |
| SD | 1.408 | 1.423 | 1.393 | 1.391 | | |
| Remark | skilled | skilled | skilled | skilled | | |

Table 2. Analysis of task-based digital skills of university library professionals in Nigeria

Table 2 shows university library professionals in Nigeria lack digital skills for acquisition and serials operation. While they possess some skills for cataloging operation, it is evident they are not skilled in using the Z39.50 tool and OCLC. However, they are skilled in the circulation and patron operation. The extent of automation in the university libraries in Nigeria shows the level of contact the professionals have with the various operations of their library management systems; hence the reason for an average level of skill in cataloging and circulation routine and a low level of skill in the other library routine they are less exposed to such as acquisition and serial routines (Ajani & Buraimo, 2021).

Research question 2: what are the existing training programs on digital library services available to library professionals in Nigeria?

| TRAINING PROGRAMS ON DIGITAL LIBRARY SERVICES | | | | | | | |
|---|-------------------|------------------------|-------------------|---------------|---------------|--------------|------------------|
| Training programs | In-house training | Workshop & conferences | Train-the-trainer | Short courses | Training tour | Online tools | Self sponsorship |
| \bar{X} | 3.34 | 2.34 | 1.72 | 1.85 | 1.64 | 1.73 | 1.66 |
| SD | 1.498 | 1.007 | .565 | .617 | .649 | .672 | .680 |
| Remark | agree | disagree | disagree | disagree | disagree | disagree | disagree |

Table 3. Analysis of the training programs on digital operation

Table 3 indicates that most library professionals in Nigerian universities have participated in internally organized training programs on digital library services. These programs are often conducted by vendors when new technologies are deployed in libraries, fulfilling contract obligations (Tella and Akande, 2018; Igbokwe, 2023). However, other training programs were found to be ineffective in enhancing digital skills. Previous research shows that many library professionals in Nigeria have not attended specialized training in digital skills, instead relying on generic conferences, workshops, and courses that do not address the specific expert skills needed for digital library services (Akintola et.al., 2022; Ikolo and Nongo, 2022; Obuh, 2019).

Research question 3: what are the staff-side factors that impede the existing digital skills development of library professionals towards library automation in Nigeria?

| Challenges of Digital Skills | N | \bar{X} | SD | Remark |
|---|-----|-----------|-------|----------|
| Personal factors | | | | |
| I have phobia for computers and technology | 408 | 1.40 | .583 | Disagree |
| My age affects the use of computers and technology | 408 | 1.66 | .532 | Disagree |
| My religious belief is averse to the use of computers | 408 | 1.70 | .561 | Disagree |
| I have health challenges that requires me to avoid technology | 408 | 1.70 | .568 | Disagree |
| I am not financially buoyant to afford training | 408 | 3.86 | .621 | Agree |
| My formal LIS training excluded training on digital technology | 408 | 3.65 | .624 | Agree |
| Gender related factors | | | | |
| Family commitments give me little time for training | 408 | 3.67 | .649 | Agree |
| My marriage reduces my digital skills training opportunity | 408 | 3.65 | .670 | Agree |
| My gender provides little opportunity for digital skills training | 408 | 3.41 | 1.422 | Agree |
| Organizational factors | | | | |
| My rank in the office reduces my training opportunities | 408 | 1.66 | .672 | Disagree |
| I am rarely promoted and there is no need to attend any digital skills training | 408 | 1.39 | .581 | Disagree |
| My library management does not encourage digital skills training | 408 | 3.67 | .649 | Agree |

Table 4. Staff-side factors that impede digital skill development programs

Table 3 highlights several personal and organizational factors that hinder the development of digital skills among library staff in Nigerian universities.

Personal factors: library staff reported that their prior formal library school education lacked courses on digital library technology, creating a significant gap in skills development. Many library schools offer outdated curricula, and even when digital courses are available, they are often

theoretical due to insufficient practical resources and qualified instructors (Ikolo and Nongo, 2022). Additionally, many staff members cannot afford self-sponsored digital training, particularly international programs that require travel and foreign currency, a challenge exacerbated by economic factors in developing countries like Nigeria (Aregbesola et.al, 2019). Gender-related issues also affect women more than men, as care-giving responsibilities (e.g., childbirth and family care) lead to career interruptions and fewer opportunities for digital skills development (Adjah & Walt, 2019; Akhtar & Soroya, 2021).

Organizational factors: on the organizational side, library staff perceive a lack of commitment from university library management to support digital skills development (Akintola et.al., 2022). Financial constraints and low budget allocations for staff development result in limited funding for training programs. The non-payment of salaries also negatively impacts staff morale, discouraging participation in training opportunities. Economic challenges in Nigeria and other developing countries further exacerbate the situation, leaving university management struggling to meet their obligations for staff development and salary payments (Mapulanga, 2014; VanguardNewspaper(<https://www.vanguardngr.com>)).

Result of qualitative analysis of research questions

Research **Question 4:** what are the managerial challenges of the digital skill development and training programs of university library staff in the use of library automation in Nigeria?

Theme 1: policy on digital skills development of university library staff in Nigeria

Arising from the discussion from the senior management staff of the libraries, it was gathered that at the library management level, there is no specified capacity development policy, they operate within the university-wide policy framework which does not take into consideration the context base need of the library staff. The following interview excerpts illustrate this point.

The university has a policy on skill training for library staff, but I am not sure there is any policy specifically stating digital skills, but I know, the university has a document on the general training of staff which also includes the library staff (Participant no. 7).

There is no strict document on digital skills training, but management deems it fit and necessary to organize training from time to time when the need arises, especially when they look at the trend of things, when there are system upgrades, and it looks as if it is getting difficult for library staff to get along with the operational dimension of that software. Most of the time, they organize training when the need arises (Participant no. 1).

Presently there is no writing policy on digital capacity development in my university as at now. But informally, most of the staff in the library are expected to be digitally literate (Participant no. 4).

Theme 2: funding of training towards digital skills development

In terms of funding sources to the library, the Statutory 10% annual allocation from the parent institution, which is supposed to be the major source of funding to the library only exists on the policy document, is not made available to the libraries due to dwindling budgetary allocation to the parent institution. However, the parent institution assumes the responsibility of funding the library for purchases and staff training based on available resources. Furthermore, the libraries benefit from external funding, especially from the federal government. This shortfall in direct funding of library staff for capacity development is sometimes made up for by external bodies such as TETFund (Tertiary Education Trust Fund). TETFund is a federal government establishment

which among other functions, make funds available for capacity development in Nigerian universities. The following interview excerpts illustrate this.

In Nigeria, the principle of the statutory 10% annual budgetary allocation from the institution for library operations is only on paper. It is what the usual standard should be, but it is more of a document issue than a reality (Participant no. 3).

We usually write to the University management for sponsorship of any library staff going for training (Participant no. 7).

My university sends library staff to conferences provided a request for financial commitment was made early enough for the conference and approved. However, the University does not release funds for staff skills development except when it is being pushed by the Librarian, where only selected staff will attend such conferences while others will be in their duty post (Participant no. 9).

TETFund has done a lot in the library area of digital skills acquisition. Most of the technological devices in our library were purchased with funds made available by TETFund. TETFund had always contributed to library staff training, digital skills, and upscaling. (Participant no. 5).

Theme 3: library management efforts toward digital skills development

There is a mixed reaction to effort, as some have taken several initiatives towards training library staff after the COVID-19 pandemic while others remained nonchalant. Libraries that have made concerted efforts to improve the digital skills of library staff did so through internal training approach by bring resource expert to training library staff in form workshops, seminars etc. Most university libraries in Nigeria claim to have the facilities to organize training on digital library operations or services. The availability of internet and computer hardware is also an issue. However, some university managements do not prioritize their library needs when it comes to the issue of training library staff while some library heads do not even make necessary case from the parent institution for training to improve the digital skills of their staff on digital operations or services. The following interview excerpts illustrate this:

The Covid era changed library operations. We have done more training and workshops on improving library staff. We are now better than before the pandemic (Participant no. 9).

The University management brought some experts for training and seminars to teach and practically demonstrate the use of technology within the library (Participant no. 7).

We have some facilities to organize digital training skills but insufficient, like in the aspect of low internet connectivity, to participate in training. Also, hardware is minimal (Participant no. 2).

The school management rarely thinks about organizing training for the library staff unless the Librarian pushes it. The only time the management takes the library seriously is when course accreditation is on the radar (Participant no. 10).

Conclusion and recommendation

University libraries play a vital role in supporting teaching, research, and lifelong learning by providing access to up-to-date scholarly content. In the post-COVID era, libraries have become more digitally focused to meet user needs. However, if Nigerian university libraries fail to adapt towards global trend, the quality of education and research could suffer. A digitally skilled workforce is essential for libraries to meet the demands of the digital age. This study identifies significant gaps in digital skills, particularly in areas of in-house operations like serials, acquisition, cataloging, etc., and highlights the challenges hindering capacity development. These include gender-related factors, lack of expert training programs, and managerial issues such as inadequate policies and funding.

Addressing these challenges will not only improve the quality of the library workforce but also ensure the effective use of technology, positively impacting the quality of education and research in Nigerian universities. Globally, this will contribute to the achievement of the United Nations Sustainable Development Goals 4, 5, 8, 10, and 17. Based on the findings, the study emphasizes the urgent need for a comprehensive digital skills development intervention for library professionals in Nigeria. The following recommendations are made:

Institutional-level action: university libraries should conduct a thorough, context-based analysis of the digital skills needs of their staff and implement targeted training to address gaps. Special support should be provided for female professionals to overcome gender-related barriers to skills development.

Policy development: Nigerian universities without a digital skills development policy for library staff should create one. The policy should define who should be trained, the types and methods of training, and the frequency and location of these training programs.

Focused training programs: university library administrators should prioritize expert-focused training programs that address specific operational needs rather than sending staff to generic, non-specialized training.

Partnerships and funding: libraries should collaborate with internal and external stakeholders, including national and international organizations, to secure funding for training programs that enhance digital skills.

National-level action: professional bodies and stakeholders in the information science sector should develop context-based, timely training plans to address the current digital skills gap in Nigerian libraries.

Acknowledgements

The authors would like to thank the participants of this study for their time and cooperation.

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