Research Article

Digital librarianship skills: post-pandemic strategies for academic librarians in a sub-saharan African country

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ABSTRACT

This article investigated suitable approaches and modalities through which academic librarians could be trained to be skillful for post-pandemic digital librarianship in developing countries, which is woefully inadequate in the available literature. A qualitative research design that considers the natural contexts in which individuals or groups function to provide an in-depth understanding of real-world problems was adopted. Data was collected through face-to-face interviews using semi-structured interview questions and focus group discussion. Identified modalities to equip academic librarians for effective digital librarianship were: organised in-house hands-on training workshops or seminars and enrolment in modular academic programmes through both face-to-face and virtual means. The study also ascertained the need for individual staff to avail themselves and make time to utilise training from library associations, and enrol on free online courses. Computer programming, database development, website and webpage development, digital communication skills and skills in all ICT applications in library services were seen to be necessary for inclusion in library school curricula. The study recommended collaboration between academic libraries and library schools where academic librarians could be invited to serve as board members, contribute to curriculum development, and provide consultancy in Information Literacy instructions. There could also be the provision of joint grants for research by academic libraries and library schools.

Keywords: Digital librarianship skills, academic librarians, post-pandemic librarianship, continuous professional development, information technology, upskilling

1. BACKGROUND AND INTRODUCTION

The mission of academic libraries to support teaching, learning, and research has not changed, however, various operations and services have been affected by daily advancements in information technology represented by sophisticated development in hardware and software for performing tasks (de los Ángeles Ortega-Martínez et al., 2021; Lobo & Dhuri, 2021). Academic librarians must embrace these changes to remain relevant to their clients and parent institutions. There is a need for academic

librarians to consider re-skilling and up-skilling as far as technology is concerned. In the view of Thomas and Patel (2008), such training varies significantly in content, focus, and objective. The expectations of stakeholders and clients with diverse needs have also risen in relation to the upsurge in technology. Therefore, academic librarians must acquire basic and advanced skills levels to offer digital library services to their clients.

Digital skills is explained as the ability to use digital tools, communication tools, or networks in computerized environments to efficiently perform tasks such as locating, evaluating, using, and creating, curating and disseminating information

The need for identifying the necessary required training for re-skilling and up-skilling of academic librarians has been reiterated by a number of studies (Edewor, 2020; Nwaohiri & Nwosu, 2021; Onyancha, 2018). This article investigated suitable approaches and modalities through which academic librarians could be trained to be skillful for post-pandemic digital librarianship in developing countries, which is woefully inadequate in the available literature.

1.1 The context
The literature has detailed the need for academic librarians to upgrade their skills to remain relevant in their institutions in the face of the COVID-19 pandemic and other future occurrences. Specific subjects that must be studied have also been identified. However, the suitable modalities to help or train academic librarians to be well equipped and skillful in delivering digital services in the context of a pandemic have not been thoroughly discussed in literature. At Kwame Nkrumah University of Science and Technology (KNUST), academic librarians require increased skills to render effective post-pandemic digital library services. Such services include acquisition and organisation of virtual collections, preparation of online content, virtual information literacy training, virtual training of students in the use of electronic resources, making of video tutorials and virtual research support for lecturers and postgraduate students. There is a need to look into appropriate modalities to equip academic librarians as they may not necessarily have to go back to the classroom for formal education. This lacuna in literature prompted this study at KNUST to ascertain the suitable approaches for training and equipping librarians with skills for effectively delivering digital librarianship. The study seeks to answer the following research questions:
1. What digital skills should academic librarians possess for effective digital librarianship in the the post- pandemic?
2. What are the modalities for acquiring these skills?
3. What challenges are academic librarians likely to encounter as they seek to possess the necessary skills for effective digital librarianship?

2. LITERATURE REVIEW

2.1 Digital skills expected of academic librarians for effective digital librarianship in a pandemic
Lockdowns and restriction during the COVID 19 period affected academic library services in so many ways. The majority of universities libraries were physically closed to students, while their websites and webpages had to be revamped and there was a need for librarians to work from home (Rafiq et al., 2021). These sudden developments highlighted the need for academic librarians to be competent in technologies to deliver digital library services effectively (Appleton, 2022). Saib et al. (2023) also questioned the pedagogical and technological preparedness of academic librarians in the digital age. Leveraging skills and expertise in digital initiatives have been advocated (Murphy et al., 2022; Saib et al., 2023). These digital initiatives include skills for developing and maintaining digital libraries, and for protecting digital content. Effective skills in the use of hardware and software packages, basic principles of computing devices, skills in using computer networks, web development, systems development, and systems applications were also suggested (Hamad et al., 2021; Mbajiorgu et al., 2021). This has become necessary because of the rapid development of tools and software in the digital environment.

The need to learn new communication tools to be able to engage in online virtual communities and social networks were indicated by Gotschall et al. (2021) and Hamad et al. (2021). This is because the majority of the services delivered by academic librarians, such as Information Literacy sessions which were mostly conducted through face-to-face workshops, seminars or one-on-one reference services, are now conducted online or through virtual means. Hamad et al. (2021) and Read and Cox also (2020) highlighted critical thinking skills and a favorable attitude towards technology.

2.2 Acquiring digital librarianship skills in a pandemic

Academic librarians are expected to be inquisitive and innovative, identify options, ascertain suitability and adapt to new ways of interacting with users (Ciccone & Hounslow, 2019). Again, the value of information professionals is seen in their capacity to respond to events that require immediate action (de los Ángeles Ortega-Martínez et al., 2021). This assertion stemmed from the fact that COVID 19 pandemic has resulted in:

> "implementation of various plans and programmes in relation to digital ways of offering library services to improve user safety" (de los Ángeles Ortega-Martínez et al., 2021: 8).

The need to prepare and train librarians for technology-related library work has been pointed out by Mbajiorgu et al. (2021) and Yoon et al. (2021). Such training can be given through workshops, seminars, and conferences (both virtual and physical) (Mbajiorgu et al., 2021). On-the-job training through communities of learning was also identified by Read and Cox (2020). On-the-job training for academic librarians to be effective in digital librarianship was described as training programmes offered by library associations, in-house training, use of online tutorials, and training offered by skilled professionals (Khan & Bhatti, 2017). The training was categorised into: formal, non-formal, and informal (Arteaga et al., 2017). Formal training is training that follows a specific curriculum and given by institutions. Non-formal training has no curricular value and can be supplementary or additional training on the job. The third one, informal training, is seen as the education received every day through daily regular activities.

Cunningham et al. (2017) proposed a Digital Liaisons Virtual Uncommons (DLVU) where leaders in digital libraries would be present through virtual chat sessions to respond to questions from information professionals who need to acquire specific digital skills or reskill to provide effective digital services. These sessions can include hands-on training on specific topics in digital librarianship.

2.3 Challenges of acquiring skills for effective digital librarianship

Ortega-Martínez et al. (2021) are of the view that every librarian has to possess good practices and essential skills for the success of digital library services. However, lack of curriculum coverage, updated courses, and training workshops were identified as challenges for librarians in acquiring digital skills (Baro et al., 2019).

Financial constrains are seen by Hamad et al. (2021) as the main challenge facing librarians in their quest to obtain the required skills. Dwindling budgets is one of the challenges facing libraries worldwide. In the view of Saunder (2015: 285) "No library can respond to every new trend in the field, nor should they; decisions about how to prioritize and allocate resources should be aligned with the mission and goals of the library's parent institution". This may imply that in their quest to manage finances, management may have to priortise library resources or materials over the issue of staff development.

Samah et al. indicate that the competency development of academic librarians largely depends on self-directed learning or the initiative of individuals (2021). They add that library professionals can develop themselves through independent learning to be able to make themselves relevant in their institutions. Samah et al. (2021) is of the view that library professionals have the capacity to develop their competencies through independent learning processes but Akinola and Ngeme (2021) pointed out librarians inability to make time out of the various library routines for up-skilling. Meanwhile, an argument is made that the availability of information technology tools can also affect academic librarians' interest in upgrading their digital librarianship skills (Ramzan et al., 2021). Ramzan et al. (2021) believe that librarians must first be exposed to and experience the latest technologies to enhance their technology-related decision-making.

Samah et al. (2021) explored library management support for enhancing self-directed learning and concluded from their respondents that their library management provides research-support librarians with a self-directed learning environment to enhance their competencies as academic librarians. In the view of this paper, although this category of staff maybe just a handful, they still require adequate digital skills if they have to be effective.

3. METHODS

This study adopted a qualitative research design that "takes into account the natural contexts in which individuals or groups function to provide an in-depth understanding of real-world problems" (Korstjens & Moser, 2017).

Data collection was done through face-to-face interviews and focus group discussions. A Master's degree in Library or Information Science is required to qualify as a professional librarian in Ghana. All the twenty-two (22) professional librarians in the KNUST library system were selected as the population. However, only ten (10) were interested in participating in the study. Out of these participants, six (6) were Junior Assistant Librarians who agreed to join a focus group discussion. The others were three (3) Senior Assistant Librarians and one (1) Deputy Librarian who were interviewed at different times at their convenience using semi-structured interview questions. Respondents have been represented as R1, R2, R3, R4, R5, R6, R7, R8, R9 and R10.

A thematic approach that places qualitative data under common themes (Byrne, 2017) was used to analyze data. The one-on-one interviews and focus group discussions were recorded and analysed manually, taking into consideration the themes and ideas that emerged. The questions sought for respondents' current work status, digital skills needed by academic librarians for effective digital librarianship in the pandemic, modalities for equipping librarians with skills in digital librarianship and challenges in the pursuit of digital librarianship skills.

4. RESULTS AND DISCUSSION

4.1 Digital skills needed by academic librarians for effective digital librarianship during the pandemic and post-pandemic

Digital skills needed by academic librarians for effective digital librarianship during the pandemic and post-pandemic were sought for. Finding out such information was relevant because many academic libraries were closed to users during the heat of the pandemic and remote services were offered to meet users' information needs. Other academic libraries are currently offering hybrid services. Table 1 is a presentation of the responses. The skills have been classified under themes generated from statements made by respondents from the one-one-one interviews and focus group discussions.

Table 1: Post-pandemic digital skills needed by academic librarians for effective digital librarianship

Post-pandemic digital skills for effective digital librarianship		
Theme	**Interviewee(s)**	**Responses**
Skills in various computer programming	R1, R2, R5, R10	Academic librarians need skills in programming for applications, data curation, and skills in handling data on the web.
Database design	R1, R2, R4, R6	Academic librarians should possess skills in database design, metadata, information architecture, collection development, database searching skills, information retrieval systems and knowledge in computer applications in information systems.
Website and Webpage design	R1	"skills in web design is critically needed by academic librarians for effective digital librarianship"

Online Reference Services	R3, R7, R9, R10	Effective digital librarianship requires skills in online reference services, online collection management and knowledge in electronic resources.. Digital librarianshp skills also include the development, organisation and management of digital collections and remote library services. Skills for online information literacy and computer literacy are also needed. Online reference services requires good communication skills.
ICT skills pertaining to librarianship	R2, R5, R8, R9	Skills in various library technology systems, and general ICT skills pertaining to librarianship are all needed for digital librarianship

In table 1, post-pandemic digital skills needed by academic librarians for effective digital librarianship must include skills in various computer programming, database design, online reference services and ICT skills pertaining to librarianship. Each skill had four respondents. Website/webpage design had 1 respondent. These skills are in agreement with the suggestions of Hamad et al. (2021) and Mbajiorgu et al. (2021) who mentioned competency in hardware and software packages, skills in using computer networks, web development, systems development and systems applications as post-pandemic digital librarianship skills needed by academic librarians.

4.2 Equipping librarians with skills in digital librarianship
Respondents were further asked about how practicing librarians and future ones in schools could be trained to provide effective digital librarianship in the post-pandemic. Table 2 represents their responses.

Table 2: Equipping librarians with skills in digital librarianship

Equipping librarians with skills in digital librarianship		
Theme	**Interviewee(s)**	**Responses**
Organised in-house hands-on training workshops or seminar	R2, R3, R7, R10	Regular hands-on or practical training should be emphasised in in-house training workshops and seminars. This can effectively equip staff to provide effective digital librarianship. There should be emphasis on computer applications.
Enrolling in modular academic programmes	R6, R8	Sponsorship for staff to participate in continuous professional development programmes is key. Short courses in the necessary topics on digital librarianship that can help in service delivery could be pursued by staff. Although in-service training is very important, staff could also enrol on free programmes on the internet themselves.
Through formal education	R1, R5	Current trends and needs of the academic libraries related to digital librarianship could be integrated into library schools curriculum for up-coming professional librarians. Courses to equip academic librarians for digital librarianship should include data on the web, metadata, information architecture, web design and data curation. Staff should be sponsored to pursue PhD in Digital Librarianship or various CPD programmes"

Preparing librarians with skills in digital librarianship in the view of respondents R2, R3, R7 and R9 in table 2 is mainly through organised pratcial, in-house training workshops or seminars. This could be delivered through both face-to-face and virtual sessions. This is in line with the ways presented by Mbajiorgu et al. (2021) to include training through programmes offered in-house, use of online tutorials, training offered by skilled professionals, and training offered by library associations.

The need for staff to be sponsored to enroll on short courses or modular academic programmes related to digital librarianship was also identified. The need to prepare and train librarians for technology-related library work was pointed out by Mbajiorgu et al. (2021) and Yoon et al. (2021). In addition, courses such as data on the web, metadata, information architecture, web design and data curation mentioned by respondents as needful for post-pandemic digital librarianship skills could be suggested to library schools for inclusion in curriculum.

4.3 Challenges with up-skilling
Participants were also asked to mention their challenges while attempting to reskill and retool themselves. Their responses are presented in table 3.

Table 3: Challenges with up-skilling

Theme	Interviewee(s)	Responses
Inadequate ICT Infrastructure	R1, R2, R3	Lack of modern technology or tools and equipment to work with also hinders our service delivery during the pandemic. Obsolescence of software and hardware for preservation and storage of data is a very big issue. Sometimes it takes a long time before a software is updated to match modern technologies needed for staff training and usage by library users. Inadequate ICT infrastructure, lack of modern technology and equipment coupled with unreliable internet facilities are also some of the challenges for reskilling staff
Financial constraints	R1, R4, R7, R8	Financial constraints are also a hindrance for both the institution and individual staff. There is a lack of financial support from parent institution for staff to pursue further studies to acquire needed skills to master modern technologies. Most of the staff do not have the capacity to use their monthly salaries to support further studies..
Inadequate ICT Skills	R2	"There is evidence of inadequate computer skills among most library staff, meanwhile there is limited training opportunities on the job. This is a very big challenge."
Lack of institutional policies	R3, R6, R4	There are no clear policies on library-staff development. Library management do not put in place plans for staff to upgrade themselves, unless a member of staff decides to do so personally.
Lack of time and interest	R5, R6, R9	Staff themselves do not make time out of their schedule for further studies or even webinars and workshops. I see this to be lack of time and lack of interest in digital issues. "Sometimes staff should be encouraged and not be allowed to remain at the same level of skills for a long time." There is also the problem of moving away from family to pursue further studies. Most of the staff find it difficult to attend CPD programmes outside the work place.

In table 3, challenges of up-skilling and reskilling could be seen in five areas: inadequate ICT infrastructure (3 respondents), financial constraints (4 respondents), inadequate ICT skills (1 respondent), lack of institutional policies (3 respondents) and lack of time and interest (3 respondents).

The financial constraint element was therefore identified as the major challenge academic librarians encounter to acquire effective skills for digital librarianship. Hamad et al. (2021), in their study on the effect of librarians' digital skills on technology acceptance in academic libraries, also identified financial challenges as the major constraints to acquiring needed skills. Lack of financial assistance from parent institutions for up-skilling and re-skilling by professional librarianas in Ghana seems to be lingering for many years. This is seen in earlier studies by Osei (1996) at KNUST and Adanu (2007) in state-owned universities in Ghana.

Inadequate infrastructure was seen in the mentioning of obsolete software and hardware for preservation and storage of information. Therefore, this could hinder effective digital library services. A suggestion that librarians must be exposed to and experience latest technologies to enhance their technology-related decision-making is made by Ramzan et al. (2021). Respondents in this study also claimed that most staff have inadequate computer skills for many digital librarianship services. This study believes technology decision-making for up-skilling is necessary for every professional librarian.

The inability to make time for further studies or even webinars and other workshops as shown in table 3 may be due to busy work schedule or the fact that the librarians have just decided not to bother themselves with any further training. The inability to take time out of the library routine for up-skilling is reiterated by Akinola and Ngeme (2021). Samah et al. (2021) noted that the competency development of academic librarians largely depends on self-directed learning, so it is necessary for academic librarians to take initiative. On the part of the staff who show disinterest in training, a call has been made by Ramzan et al. (2021) for academic librarians to be open-minded to learning. The absence of an institutional policy can also affect management's interest in creating the right environment for staff to upgrade their digital librarianship skills.

4.4 Suggestions on modalities for acquiring post-pandemic digital librarianship skills

Some of the respondents had suggestions as to the suitable approaches and modalities for academic librarians to be well equipped and skilful in delivering digital librarianship in the post- pandemic. Their suggestions have been categorised and presented in table 4.

Table 4: Suggestions on modalities for acquiring post-pandemic digital librarianship skills

Theme	Interviewee	Responses
Shift in focus from traditional to digital libraries	R1	"Tools and resources to build digital collections should be provided by the institution; there is a need to acquire and adopt modern technology for library services. I suggest a shift in focus of many traditional library services to digital."
Clear institutional policies and sponsorship for staff development	R2, R3, R4	currently, there is no written document on continuing professional development for staff in this library; we need to think about that. Staff who do not have the necessary skills to manage digital libraries should be sponsored to enrol in courses to help them acquire such skills. The academic library should sponsor staff for workshops or seminars on ICT skills. The need for post-pandemic roles and responsibilities for digital librarians must be documented in institutions.. These roles will determine or guide in selecting tailor-made ways of equipping librarians with skills in digital librarianship in individual institutions.

Collaboration with library schools	R3, R4	Academic libraries could also propose to library schools the related digital-librarianship courses they wish to be included in their curriculum. Academic librarians could be invited to serve as Board Members in Library schools and contribute to curriculum development as well as provide consultancy in Information Literacy instructions. There could also be provision of joint grants for research by academic libraries and library schools. The relevance of subjects such as information architecture and web design, data curation, data on the web, metadata design, digital preservation, database design, information retrieval systems and programming for web application should be made known to library schools in developing countries for their inclusion in curriculum.
Enrolment in online courses	R2	"It may not be necessarily sending the staff to pursue a full-time studies but it can be sponsorship to enrol in online courses and attend workshops."

The themes generated from the responses in table 4 were a shift in focus from traditional to digital libraries, clear institutional policies, sponsorship for staff development, collaboration with library schools, and enrolment in online courses. Respondents suggested adequate provision of tools and resources to build digital collections; the need to acquire and adopt modern technology for library services; training required to equip staff to be critically looked at by management as well as individuals; and sponsoring staff to acquire the necessary skills to manage digital libraries. In the view of this article, supporting staff to equip themselves in computer and information technology would give them the confidence to participate fully and handle digital librarianship effectively. All these observations from respondents are in agreement with the view that COVID-19 pandemic and the post-pandemic have placed online blended or hybrid library provision as the "new normal" in academic libraries (Lobo & Dhuri, 2021; Martzoukou, 2020; Mbajiorgu et al., 2021).

5. CONCLUSION

This study revealed the necessity for academic librarians to identify their digital librarianship needs in the post- pandemic and draw policies for training staff to meet such needs. It was ascertained that basic ICT skills must be emphasised in all staff training for effective digital librarianship. Competence in computer programming was ascertained to be the most needed digital librarianship skill in the face of the pandemic. The next skill was database development, followed by others such as skills in website and webpage development, all ICT applications in library services, information retrieval systems, data curation, and digital communication skills. Identified modalities to equip academic librarians in a sub-Saharan country for effective digital librarianship were: organised hands-on training, workshops or seminars. Such training through both face-to-face and virtual means could use the services of in-house resource persons or collaboration with university departments where experts abound. The study also ascertained that there is the need for individual staff to devote time for training from library associations, enroll on free online courses that can help meet digital librarianship needs or consult identified experts for training and guidance in areas they need to upgrade. Suggestions for institutional policies on staff development, sponsorship from management, and a shift from traditional to digital librarianship were made.

The findings of this study are helpful for libraries and information professionals in developing countries to formulate policies on staff development and continuous professional development. The study has also outlined, as a guide for academic libraries in developing countries, some effective modalities to adopt for acquiring digital librarianship skills to meet institutional needs in the post-pandemic.

6. RECOMMENDATIONS

Based on the revelations made in the study, the following recommendations have therefore been made:

- Every academic library staff should endeavour to possess basic computing skills and the ability to engage in online communities (virtual communities).
- Academic libraries in developing countries are being urged in this study to develop policies and plans based on their specific local needs and ensure adequate support and opportunities for training. In this study, computer programming has been identified.
- Library management and parent institutions should identify the needs of staff who do not have the necessary skills to provide effective digital library services and sponsor them. Academic libraries must develop long and short-term training programmes and put in place implementation and evaluation of the effectiveness of the programme.
- Individual librarians could also present their training needs to library management so that the necessary training modality could be identified and provided.
- The academic library should sponsor staff for workshops/seminars on computer/ICT skills
- The needed infrastructure to aid digital librarianship should be identified and provided. For example, acquiring modern technological equipment to replace obsolete ones and training staff to perform effectively.

Declaration of Conflicting Interests
The authors declare no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

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