

Automation of University Library Operations: An Analysis of the COVID-19 Pandemic Experience in the United Kingdom and Nigeria

Gbenga Adetunla^{1, 2}[0000-0002-1897-7018], Diane Rasmussen Pennington^{1, 3}[1111-2222-3333-4444]
and Gobinda Chowdhury¹[0000-1111-2222-3333]

¹ University of Strathclyde, 26 Richmond Street, Glasgow, UK G1 1XH

² Ekiti State University, Ado Ekiti, Nigeria 362103

³ Edinburgh Napier University, Edinburgh, UK EH10 5DT

gbenga.adetunla@strath.ac.uk

d.pennington@napier.ac.uk

gobinda.chowdhury@strath.ac.uk

Abstract. This study examined how automation systems enhanced the operations of university libraries in Nigeria and the United Kingdom (UK) during the COVID-19 pandemic. It reviewed literature on the extent of automation, effectiveness of the use of automation technology and ascertained the challenges of automation in the operations of university libraries during COVID-19 lockdown in Nigeria and the United Kingdom. Findings revealed that most university libraries in the UK are fully automated while university libraries in Nigeria are either partially automated or not automated. During the COVID-19 lockdown, university libraries in the UK were able to provide services, while Nigerian libraries were unable to render services. UK and Nigeria were both faced with challenges during the lockdown. Some UK libraries could not optimally provide services due to insufficient licenses for digital content. In Nigeria, there were several socio-technical issues such as inadequate staff access to computers and the internet, poor power supply, and a lack of ICT skills. The study concluded that university libraries in Nigeria should embrace more technology if they want to be effective in their operations and be able to compete favourably in the global space.

Keywords: Library Automation, Integrated Library System, University Library Operation, COVID-19 Pandemic.

1 Introduction

A library is an integral organ of a university which functions in line with the university's vision and mission to achieve its goals. A university library is charged with the responsibility of collection, processing, storage, and dissemination of recorded information for the purpose of reading, teaching, life-long learning, and research. The operations of the university library follow through an entire chain from collection development to information dissemination, such as acquisition, cataloguing, and circulation [2].

Acquisition operations involve the selection and purchase of materials or resources, selection of vendors, negotiating consortium pricing, arranging standing orders, and selecting individual titles or resources [10]. Cataloging and classification are core functions of the library, dealing with the organization and arrangement of library holdings for easy location, creating multiple access points for easy retrieval, and creating advanced search terms i.e., title, author's name, publisher, date, and place of publication etc. [16]. Circulation and reference services are the main service points. They provide lending services, facilitate return of loaned items, renew materials, and collect fines [22].

The advent of Information and Communication Technologies (ICT) has influenced the use of technology in the day-to-day operations of university libraries, and this has brought about the concept of library automation. It has transformed library operations from manual processes to the use of computer technologies [29]. University libraries now use Library Management Systems (LMS) to automate their core operations for more efficient service delivery.

COVID-19 halted almost every aspect of human endeavor, shutting down economic, social, and industrial activities across the globe. The education sector was not spared, including universities. University libraries shut down their physical operations.

University libraries in the United Kingdom (UK) and Nigeria have invested heavily in automation systems [10, 35]. Their adoption presumably is to significantly improve the quality of services rendered; services that are limitless in time and space. It therefore became useful to explore how automation enhanced the operations of university libraries in Nigeria and the UK during the pandemic. Resulting from this, our research questions were as follows:

1. What is the extent of automation within university libraries in Nigeria and the United Kingdom?
2. How did automation enhance the operations of university libraries during COVID-19 lockdown in Nigeria and the UK?
3. What were the challenges of automation in the operations of university libraries during COVID-19 lockdown in Nigeria and the UK?

2 Methodology

This study used a literature review to appraise published literature in line with the research questions. The University of Strathclyde Library's discovery layer, SUPrimo, was used to find sources published between 2019-2022. Google Scholar was also used to find other relevant sources. The Boolean keyword approach was used to search, and a set of inclusion criteria was applied on titles and abstracts of located resources. 36 relevant sources were reviewed for this study (Table 1).

Table 1. Breakdown of searches and selection of resources.

Boolean keywords	Search engines and number of resources	Inclusion criteria	Number of resources by inclusion criteria
("higher education library*" OR "university library*" AND "online services" OR "library automation" OR "digital library operation*")	Library and Information Science Abstracts (LISA): 453	Themes:	
("covid 19 pandemic" OR "covid-19") AND ("United Kingdom" AND "Nigeria")	Library, Information Science, and Technology Abstracts (LISTA): 506 Sage: 7 Google Scholar: 64	<ul style="list-style-type: none"> • Library automation • COVID-19/pandemic • Digital library environment • University library operations/services • Nigeria • United Kingdom 	10 5 2
		Language: English	19
		Full text	
Totals	1031		36

3 Literature Review

The review resulted in a general background on library automation, the extent of automation in university library operation, the operations of university libraries during COVID-19 lockdown, and the challenges of automation in the operations of university libraries during lockdown in the UK and Nigeria.

3.1 Library automation

The advent of ICT has shaped our day-to-day activities. ICT could be described as a diverse set of technological tools and resources used for creating, storing, managing, and communicating information in the digital space [11]. Organizations now use ICT to carry out their operations. Libraries are now automating their operations for more efficient service delivery. Library automation is the application of technologies in the day-to-day operations of the library [7]. This term is often interchangeable with library computerization, mechanization, and the use of LMS.

Library automation dates to the 1950's and 1960's in the United States of America and the UK respectively [23, 32]. In 1968, the three major libraries in Birmingham, UK

(Birmingham Public Libraries, University of Aston, and University of Birmingham) came together under a project known as the Birmingham Libraries Co-operative Mechanization Project (BLCMP) to develop an automation system. This laudable project initially gained the attention and funding of the Scientific and Technical Information Office and later the British Library Research and Development Department. Over the years, the BLCMP cooperative cataloguing scheme gained the interest of other libraries, and its membership began to expand. BLCMP was later commercialized, and this gave birth to the first indigenous library management system in the UK. The BLCMP Library System (BLS) incorporated all modules and a database of 7.5 million bibliographic records. By the end of the 1980s, over 50 libraries in the UK had incorporated BLS [31].

Developing countries such as Nigeria began automation in the 1980s. The first known university library automation efforts involved Ahmadu Bello University, Nnamdi Azikiwe University, University of Nigeria Nsukka and University of Lagos [3]. In 1992, the National University Commission attracted World Bank funding to install The Information Navigator Library software in 20 participating federal universities' libraries [6].

Over the years, there has been an expansion of automation systems in the UK and Nigerian university libraries, and it has proven successful operationally. Despite the successes, there was a rise and fall in the use of these automation systems, and this became a concern for the libraries. Studies have examined the issues around automated operations and systems in the UK and Nigeria. In the UK, staff training and inadequate finance were major pitfalls. In Nigeria, lack of technical knowledge, incompetence in software development, and poor hardware maintenance were the issues [3, 14]. In a bid to overcome these challenges, libraries started looking for a better alternative. In the late 1990s, open-source ILS started surfacing, with features that seemed to provide solutions to their problems.

Open-source ILS are non-proprietary software or software made available for free to users [29]. Examples include Avanti, MicroLCS, PhpMyLibrary, Emilda, and Koha. Many libraries in the UK and Nigeria have embraced their use. There have been several efforts to identify which open-source software is most appropriate for library operations. Koha is the most used open-source ILS in university libraries, and the significant justifications for the adoption are user-friendliness, richer features, low cost of purchase, low cost of maintenance, and a support community [21, 26, 33].

3.2 Extent of automation in university libraries' operation.

The automation process of the European Community (EC) libraries in the 1970s involved 12 countries including the UK. They automated their circulation operations first and later their cataloging, while acquisition work was carried out using teleordering systems offered by Whitaker and Blackwell in the UK, and Springer in Germany and Scandinavia. The serial operations were recorded using traditional Kardex. Interlibrary operations were not automated at the local libraries level, but within regional or national networks [36].

By the end of the 1980s, ILS were available for a variety of housekeeping operations, especially with the use of microcomputers. The modules available were Cataloguing, OPAC, Circulation, Acquisitions, Serials, and Interlibrary Loans [31]. By the 1990s, over 50 university libraries in the UK were fully automated. Libraries at Staffordshire University, University of Hertfordshire, University of the Arts London, and Loughborough University eventually operated services in virtual environments: the use of Web 2.0 platforms, provision of downloadable content such as e-books, e-audiobooks, vodcasts, and podcasts, and 24/7 online services such as renewals and reservations [21].

E-learning has become an integral part of higher education in the UK. University teaching operations are heavily reliant on Learning Management Systems which is alternatively known as Virtual Learning Environment (VLE) software. It provides the digital backbone to many university courses and enables institutions to manage administration and deliver courses and exams online. For libraries in the UK to maintain their relevance, library software vendors have developed solutions to support teaching and learning such as reading list software [34]. These include Talis' Aspire, Ex Libris' Leganto, and SirsiDynix's BLUEcloud. They integrate library resources, student registrations, and university bookstores [35].

In Nigeria, university libraries have resorted to various ILS, but Koha has gained much popularity, with over 100 universities using it [33]. Even though Koha captures most operations, usage is low. In one study, only cataloging in the Nimbe Adedipe Library at the Federal University of Agriculture Abeokuta was automated, while the Olabisi Onabanjo University Library had automated only cataloguing and circulation [1]. In an investigation of public university libraries in north central Nigeria, only the cataloging routine was automated [16]. Comparing the extent of automation in a private and a public university library; most operations of the private university library were automated, while the public university only had automated cataloguing and circulation [26]. One assessment found that only 5% of university libraries in Nigeria are fully automated, while the remaining 95% are either not automated or partially automated [19].

3.3 University libraries operations during COVID-19 lockdown.

COVID-19 created a worldwide health crisis. The World Health Organization pronounced the emergency as a pandemic on March 11, 2020, which propelled the United Nations Education and Scientific Council to advise that academic activities across the globe should be closed, and most governments yielded to this. Libraries were closed to avoid physical contact but attempted to provide services through online and virtual/remote approaches [17]. According to a 2020 report by the National Authorities of Public Libraries in Europe (NAPLE), which consists of twenty European nations including the UK, most of the libraries in these nations were shut down and focused on online services. Most staff worked from home while some were made to report to work under strict social distance monitoring. Libraries in the NAPLE countries provided services such as click and collect and home delivery. Librarians focused on e-services with the use of the library's software and social media platforms by providing all essential infor-

mation through these [24]. In one UK example, the University of Edinburgh made operations on Microsoft Teams compulsory. Necessary training and support were given to staff. All library staff were subjected to at least one new digital skill course which formed a key indicator in their annual performance reviews [20].

However, the International Federation of Library Associations (IFLA) advised that even though the decision to close a library must be adhered to following assessment of the relative risks, the closure of libraries in almost all countries of the world implied redundancy. IFLA further advised that libraries should go virtual [9]. This was timely advice as it was the best alternative to get the libraries running so they could meet their expected purpose. Unfortunately, Nigerian libraries were yet to fully go digital, making it difficult to function during the lockdown. They had no time to plan for a transition of operation. Their traditional methods of rendering information services became redundant during the pandemic. Most libraries in Nigeria were shut down due to the fast spread of the virus, especially in public universities, with very few providing information on their websites or via social media while they complied with the “work from home” order by the federal government [4, 8, 15, 18].

3.4 Automation challenges in the operations of university libraries during COVID-19 lockdown.

Libraries around the world made significant effort to stay relevant and keep operating during lockdown. UK libraries were mostly able to respond to the call of this crucial time, but despite their efforts, their operations faced challenges. Some libraries expressed frustration as most part of their traditional operations which were supplementary to their digital services needed to be reinvented. These include reference services, e-book acquisitions models, vendor relationships, liaison services, etc. [5].

Also, the situation at the time required that all services be rendered online. The demand for e-resources increased and libraries struggled to meet the demand. Libraries suddenly found their existing licensing arrangements insufficient. As such, more funding was required to purchase licenses for more online content and increase access to titles for popular materials. This adaptability created serious pressure on budgets [28].

In Nigeria, libraries were not able to go virtual during the lockdown due to the issues surrounding technology emergence. Even though most university libraries had automation installations, managerial and technological problems existed. Before the pandemic, studies exposed some of the factors impeding the functionalities of their automation systems. Amongst many were poor internet access, poor funding, inadequate ICT skills, unreliable power supply, lack of trained personnel and inadequate training facilities [12, 13, 25]. The inability of library management and staff to explore and use the right technology to provide virtual services efficiently was caused by poor technology infrastructure, lack of retooling opportunity, and poor expertise in handling technology during the lockdown [22].

Other challenges identified were issues associated with the process of learning to work remotely and the inadequacies of working from home. Most homes in Nigeria do not have internet access unlike in the UK. This meant there was no internet service provision for library staff to work from home and in most cases, they were subjected to

pay for data/broadband access themselves. Also, a lack of technological infrastructure such as computer systems and other hardware were impeding factors; most library staff did not have personal computers at home [10].

4 Findings

Automation systems are holistic and run on a complete operation circle. As far back as the 1990s, most university libraries in the UK have been fully automated while even now, most university libraries in Nigeria are either partially automated or not automated. By implication this means the status of university library automation in Nigeria is more than three decades behind the UK. This assertion was corroborated in [27] by concluding that most libraries in developing nations are under-automated.

During lockdown, university libraries in the UK were able to appreciably leverage automation to provide services. Also, management encouraged and provided training to staff where required. Unfortunately, Nigerian libraries were unable to go digital, making it difficult to render services. The best decision by their management was to shut down operations.

University library operations in the UK and Nigeria were both faced with challenges during the lockdown. Some UK libraries could not optimally provide services due to insufficient licenses for digital content. In Nigeria, there were several socio-technical issues such as inadequate staff access to computers and the internet, poor power supply, and a lack of ICT skills. For university libraries to stay relevant and overcome the challenges of operations in a digital environment, they must embrace and be more conscious of technology [22].

5 Conclusions and Recommendations

The COVID-19 lockdown was a challenging time for university libraries across the globe. The pandemic exposed the wide dearth of socio-technical infrastructure and library automation worldwide. It is obvious that the way forward is to be up to date with technology, increase digital service provision, and embrace remote operations. The transition from traditional library services to operating in the digital environment is indispensable. The digital environment in UK university libraries is commendable as they were able to leverage technology to keep their operations running during the lockdown. On the other hand, university library operations in Nigeria halted because they lacked adequate technological infrastructure and expertise that could function in that epoch.

The world has started a new work-life pattern: a hybrid operation which is a blend of physical and virtual/remote operation. It has therefore become necessary for university libraries in the UK to put substantial effort in purchasing more digital content licenses and embrace the SCONUL initiatives of promoting content creation through open access and open education research in their universities. On the other hand, university library management in Nigeria should fully embrace the use of technology and

provide basic infrastructure that will allow operation in a digital environment. Primary attention should be placed on fast internet bandwidth, computer systems/hardware and digital training of staff on emerging automation technology.

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