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Deploying innovative strategies to library and information services in response to Covid-19 pandemic in universities

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Abstract

Purpose: This paper examined the innovative strategies deployed by academic libraries swift measures to cushion the effects on users during COVID-19 pandemic. This study sought to identify innovative library services embraced by university libraries in foremost university libraries in the world.

Design/methodology/approach: Using the purposive sampling method, libraries of ten foremost universities in the world were chosen for this study. The library websites of the selected universities were visited and explored to obtain explicit information in their response to the pandemic. Data was analysed qualitatively using content analysis.

Findings: Findings revealed that, academic libraries of foremost institutions in the world responded to the pandemic through a modification of physical access to library services with little or no physical contact. Also, the study found that, the services by academic libraries provided ranged from conversion of print resources to soft copies, deployment of personalized library services to provision of online library services and resources.

Originality: This study provides insight into best practices taken by academic libraries of highly ranked universities in the world, in response to COVID-19 pandemic.

Research limitations/implications: The limitations of this study are that, it focused on only ten purposively selected universities, therefore generalization of result should be done with caution. Also, the study considered only academic libraries.

Practical implications: The findings provide insight for library and information science (LIS) professionals on sensitive approaches to information service delivery beyond what suffice for day-to-day library services in times of disaster such as COVID-19 pandemic.

Keywords: *Corona virus, university libraries, academic libraries, online services, pandemic.*

Introduction

In November 2019, the SARS-CoV-2 coronavirus pandemic (a variant of COVID-19) began to spread in Wuhan, China (Zhu et al., 2020). By January 2020, more people were infected as a consequence of encounters with droplets emitted by others who were already ill from the outbreak (Kandola, 2020). A pandemic had been characterized and declared by the World Health Organization (WHO) by mid-March 2020 as a result of the disease's frightening rate of spread to neighboring nations and continents (WHO, 2020a). Within three months of the virus's first breakout, it had spread to other African nations, including Nigeria, and caused a worldwide suspension of commercial and educational activity. The COVID-19 index case was discovered in Nigeria around the end of February 2020. Following this, reports of cases brought into the nation by visitors were followed by community transmission by the middle of 2020, which led to the spread of COVID-19 throughout the nation. The initial global response in March 2020 was the immediate closing of all corporate operations and all educational institutions, from primary

to higher institutions, in an effort to slow the spread of the virus (Anjorin, 2020).

The disruption of academic schedules caused by students being ordered to leave different campuses and on-campus housing was one effect of the closure on the education sector, particularly higher institutions. Other social and service organizations were equally engaged in designing new and improved methods of making information available to their respective user communities as the health and medical sector was faced with the challenge of halting the menace and spread of the disease through a series of initial non-pharmaceutical interventions (NPIs). The need for library and information science (LIS) professionals across the continent to make information accessible to diverse user populations (such as students, lecturers, researchers, and the general public) has become increasingly pressing notwithstanding the threat posed by the epidemic. A worldwide health crisis is equivalent to an information crisis, according to scholars (Koplan et al., 2009; Beaglehole in Owusu-Ansah & Van der Walt, 2020), which, in the authors' perspective, calls for immediate action by library and information professionals.

Academic libraries had to make difficult decisions about the kinds of services to provide during this health crisis. Government responded to various strategies, such as ordering the closure of all higher education institutions or letting individual universities—and, implicitly, the libraries connected to them—make their own judgments. Decisions to cut back on services or close the library inevitably became challenging since they required a risk assessment. However, a lot of university libraries were shut down (IFLA, 2020). In order to adopt cutting-edge strategies for interacting with library users, university libraries all around the world were forced to examine their policies. In order to add to the body of knowledge and current literature on academic libraries' responses to crisis management with an emphasis on the COVID-19 pandemic, this study set out to discover novel library services used by the leading university libraries worldwide. This study looked at the many approaches used by academic libraries in top universities throughout the globe to realign and reconfigure their services and advance during trying periods like the COVID-19 epidemic.

Literature Review

Libraries are important institutions for managing global health emergencies as well as domestic disasters (European Court of Auditors, 2021). In the history of pandemics, the SARS-CoV-2 illness outbreak in November 2019 was unprecedented. It was thought to have come from an animal source, yet within a few weeks it spread from human to person around the globe. As a result, the epidemic quickly had an impact on every sphere of human existence, including politics, the economy, the environment, health, and education (Abulude, 2020). (UNESCO, 2020). It is assumed that libraries' changing environs have an impact on them, and that things outside the library have an impact on its internal processes (Lynch, 2016). Academic library systems were impacted by the pandemic on both the internal and exterior surroundings. While the external environment of the library constantly generates signals, messages, and new challenges that must be regulated to ensure the academic library's existence, the internal environment in this sense consists of organizational structure and the way they are composed to meet specified organizational objectives (Babalhavaeji and Farhadpoor, 2013). As a result, a dynamic strategy was needed to both accommodate the growing user expectations and reposition the academic library within the shifting context.

The pandemic's reality had forced libraries worldwide to adapt how they provided information services (Hunt, 2020). Additionally, the COVID 19 pandemic has caused libraries to reconsider, reinvent, and establish new services to ensure that users continue to get knowledge amid the world

health problems (Chista & Chizoma, 2021). In order to satisfy the operational and service requirements of the crisis period, most libraries quickly changed their management techniques in response to the pandemic's beginning (Hunt, 2020). However, during the initial weeks of the COVID-19 (SARS-CoV-2) epidemic, these services were impacted since many libraries had to close in order to ensure the safety of their staff.

Mbambo-Thata (2021) points out that the National University of Lesotho library closed as a result of the coronavirus outbreak and capitalized on its preparedness to offer digital resources and support digital research at the time. Since their materials are accessible via the library website, signing up for a service called Remotex was done to make it easier for users to access digital resources when away from campus. The library's ICT team helped automate student registration to Remotex so that students could register from anywhere, with a focus on service adjustment that included the usage of personal protection kits and practices like physical distance and hand cleanliness. Additionally, websites with chat handles were created to serve as a platform for online instruction to teach students how to use and access the library's digital resources.

Kosciejew (2020) documents the official comments made by six (6) library and information associations from English-speaking nations during the early phases of the coronavirus in June 2020 using documentary analysis. A comparative thematic analysis was used to analyze the data. Kosciejew compared the themes that emerged from the study's findings and discovered that library associations' statements during times of global health crises supported the provision of information services, proper hygiene, debunking misinformation, and collaborations with publishers and public health organizations. Crowe (year, as quoted by Abulude, 2020) revealed that 98 percent of public libraries in the United States of America have ceased operations and services in a study performed by the Public Library Association. In addition, Oyetola et al. (2023) said that despite the closure, library staff had used social media and other virtual tools to offer a variety of services to customers and adjust to the situation.

Libraries must be ready for disaster of any sort, whether it be health-related, natural, or man-made, based on these situations. This contribution is inferred from China's academic libraries' degree of response. To lessen the spread of the coronavirus and associated health dangers, practically all academic libraries in China immediately adapted to working remotely. This is pretty outstanding. According to Guo et al. (2021), 94 percent (94%) of academic libraries in China were able to stop the coronavirus's spread by posting relevant information about COVID-19 on their websites, adopting online information services, allowing remote access to library materials, offering virtual reference services, offering online services for research assistance, and offering electronic books and other resources. This shows that academic libraries in China are able to assist the academic community continuously and unwaveringly, while operating from homes throughout the devastating coronavirus outbreak. In fact, the Covid-19 epidemic has made electronic learning even more prominent (Zhou, 2021).

Okike (2020) emphasizes the important roles played by libraries and librarians in aiding scientists and researchers in their efforts to find solutions to movement restrictions brought on by the COVID-19 pandemic through the deployment of innovative, flexible technologies to disseminate pertinent information to various user communitiesIn supporting efforts made by scientists, researchers, and students to employ virtual ways to deliver services to their diverse user groups, Enis (2020) provides evidence that supports Crowe's (2020) study. The strength of academic libraries in overcoming the COVID 19 pandemic's disruptions to teaching, learning, and research, according to research from African scholars on this phenomenon, lies in offering online services,

which includes giving library users access to digital library collections like electronic books, e-journals, and open educational resources while they are off campus (Chista & Chizoma, 2021).

Other admirable actions made by libraries during the Covid-19 pandemic's worldwide health crisis include routinely disseminating information about library services via their websites (Mnzava & Katabalwa, 2021). When the lockdown was lifted, seating arrangements changed to reflect the notion of physical space between library patrons, and wearing face masks was made mandatory in libraries (Condic, 2021). The Fasae et al. (2020) study supported the practice of libraries providing hand sanitizers as long as library patrons follow the rules on face mask use.

De Groote and Scoulas (2021) examined the effects of Covid-19 on academic libraries and discovered a drop in user library visits and an increase in virtual help from users through email queries and chat-based reference services. As disruptive as COVID-19 is to the global economy and society, Kaba (2021) states that collection development, circulation, access to and use of digital resources, quality control, and information literacy are components of the LIS profession that felt the pandemic's impact the most. According to Kaba, Covid-19 features advanced fields like library administration and reference services. According to Martzoukou (2020), the Covid-19 epidemic has given academic libraries a new mission: to embrace digital literacy and give students and library users the tools they need to do so. Martzoukou continued by saying that libraries must adopt tools that support online teaching and learning. According to this submission, university libraries need to improve their information literacy programs to include digital upskilling programs for both students and faculty members utilizing simultaneous delivery and recordings so that participants may watch such recordings later.

It is categorically true that no two (2) libraries handled the coronavirus pandemic's effects in the same way. Academic libraries in China were able to adapt to working remotely more rapidly than their Italian counterparts, according to Zhou (2021). The main benefit of this epidemic for Italian libraries, nevertheless, is that it has accelerated the development of the country's infrastructure and given rise to new digital library services (Zhou, 2021). Academic libraries used behavioral change models to manage their libraries during the global health crisis, and these models were inspired by government policies as well as policies made by their parent institutions (Harris, 2021).

Theoretical Framework

Dynamic Capability (DC) is another term for the procedures and methods that allow organizations to change and adapt to their environment (Culek, 2019). Strategic routines that are generated and modified are referred to as dynamic capability activities (Winter, 2003). According to Soong and Chang (2010), the term capability emphasizes the crucial part that strategic management plays in this trio of phenomena: a) adaptation; b) integration and reconfiguration of internal and external organizational skills; and c) resources and competences that are required to meet the demands of a changing environment. Capabilities stress the crucial role of strategic management in appropriating adaptation, integration, and reconfiguration of internal and external organizational skills, resources, and functional competencies to complement the demands of a changing environment, in other words (Soong & Chang 2010).

The definition of dynamic capacity is based on the diversity of concepts in three categories (Marsden, 2010). The first kind, as described by Griffith and Harvey (2001), links dynamic capabilities to the activity's outcomes, which, in their view, must be investigated through an assessment of quantifiable outcomes linked to dynamic capabilities. The second kind focuses on the idea that in order to develop dynamic skills, a dynamic environment in the form of external conditions must be present. The third category is referred to as the organizational dynamic capabilities. The third

category, which contends that dynamic capabilities are actions that may make the organization dynamic, serves as the foundation for this study. Despite the establishment's existing specialized and external capabilities, Teece et al. (1997) recognize the necessity for an organization to build new capabilities. The necessity for libraries to reposition themselves while embracing the views of quality, service, and value (Q, S & V) as the driving force to fulfill the changing requirements of users has been stressed by Arumuru (year, as stated in Owusu- and Vander Walt, 2021). In light of the theory's application to the field of library and information science, libraries must update their holdings and provide new services to maintain their competitive edge in a setting that is changing quickly (Derrel & Powell, 2016; Furnival et al., 2019). The DC model is strong in describing how organizations make wise decisions during times of instability or calamity (Owusu &Vander Walt, 2021). The DC framework has been utilized in earlier research to examine how academic libraries responded to the COVID-19 epidemic (Owusu & VanderWalt, 2021).

Methodology

To achieve the study's aims, a qualitative research technique was adopted. The Times Higher Education global ranking index of universities for the year 2021 was utilized to compile the list of universities for this study. The justification for adopting Times Higher Education was because it provides a distinct performance indicator in terms of teaching, research and knowledge transfer. Ten (10) universities were chosen purposively selected for the study using the list of institutions included on the Times Higher Education rating for 2021. To learn explicitly about the top 10 institutions' responses to the epidemic, the researcher visited and looked through their libraries' websites. Ten (10) university websites and library websites were used to collect the data (**see figure 1**). The four researchers divided up the tasks of gathering qualitative data from the understudied websites, such as identifying and collecting the most popular services from university websites, identifying and collecting services from library websites, and initially importing collected data into Word and then converting it to Microsoft Excel. Between April and July 2021, information on the reactions of the chosen university libraries to the COVID-19 epidemic were gathered. The most appropriate technique of analysis is a manual content analysis approach. The justification for the usage of manual content analysis approach was because it majorly enables the researchers to gain a deeper understanding of the content by considering its context, subtleties and nuances. In so doing, this approach includes a critical assessment of the textual data and categorization of the emerging codes into five (5) themes due to the sizeable but manageable textual dataset. These themes include (a) physical access to library services; (b) conversion of print resources to electronic copies; (c) reserve a study space/outdoor reading room services; (d) innovative solutions/personalised services and (e) provision of online services.

Figure 1: Selected institutions for the study

S/n	Institution	Institution library	Library Website	Continent
1.	University of Oxford	Bodleian Libraries	https://www.bodleian.ox.ac.uk/	UK
2.	Stanford University	Stanford Libraries	https://library.stanford.edu/	US
3.	Harvard University	Harvard Library	https://library.harvard.edu/	US
4.	California Institute of Technology	Caltech Library	https://www.library.caltech.edu/	US
5.	Massachusetts Institute of Technology	MIT Libraries	https://libraries.mit.edu/	US
6.	University Cambridge	Cambridge University Library	https://www.lib.cam.ac.uk/	UK
7.	University of California, Berkeley	UC Berkeley Library	https://www.lib.berkeley.edu/	US
8.	Yale University	Yale Library	https://library.yale.edu/	US
9.	Princeton University	Princeton University Library	https://library.princeton.edu/	US
10.	University of Chicago	University of Chicago Library	https://www.lib.uchicago.edu/	US

Findings

Out of top ten (10) universities sampled in the United States and United Kingdom, only nine (9) university libraries provided data on their reaction to Covid-19. The findings showed that the data from the study could be grouped into five primary topics. According to the study, university libraries implemented two basic forms of support services in response to COVID-19, namely: (1) regulated access to physical library services and (2) provision of online services and resources. The following is a discussion of the recognized themes:

Theme 1: Physical access to library services
Libraries are affected by the pandemic's interruptions, which also include the shutdown of businesses and educational institutions. For registration, book loan/return services, renewal of book loans, reference assistance, individual or group reading and studying, inter-library loans, photocopying and reprographic services, document delivery, etc., library users utilize libraries. After the lockdown, most academic libraries require the display of a valid student ID or library card for physical access and admittance.

In the light of pandemic, all library users are welcome to use the reading rooms of the University of Oxford's Bodleian Libraries, and reservations are not necessary as long as the person possesses a valid University or Bodleian identity card. Bodleian Health Care Libraries, which include Cairns Library, Girdlestone Memorial Library, and Horton Hospital Library, do have some access, though. Students with official Harvard University identification are allowed entry to the library, but they must have filled out the online access request form and the health form at least two days in advance. The Cambridge University Library stopped accepting in-person registrations and switched to remote registration; as a result, registration is now open to anybody who has requested to utilize the library's in-person services via email.

The majority of libraries reconfigured their circulation services, also known as book request/book check-out or pick-up/borrowing services, to include automatic renewal of books. The University of Chicago Library automatically extended the borrowing periods for books. Print materials might be picked up and dropped off with no touch. A few libraries now accept book returns through mail or alert patrons when their books are ready. While Yale University, University of California, and UC Berkeley Library implemented contactless pick up services, Stanford Libraries and Princeton University offered book request and pickup services. The

University of Chicago accepted book renewal on an automatic basis. The self-service kit was available for users to check out at the Cambridge University Library.

Requests for physical interlibrary loans from the Bodleian libraries were denied, while requests for electronic copies of print items were fulfilled. At Bodleian libraries, late charges were waived, and items on loan may also be returned through Royal Mail tracking service. The University of Chicago Library offered book return services by mail, but required payment for postage. Students who are homebound can also borrow and return books from the Bodleian libraries via a proxy or by emailing the library their information. The Fairchild Library has been designated as the pickup location for book requests and equipment returns by the Caltech Library of the California Institute of Technology. The Cambridge University Library offers the option to "borrow a book online," with pickup taking place at the library's front door.

Regardless of whether a user has received a COVID-19 vaccine, the Caltech Library at the California Institute of Technology has made the wearing of N95 or KN95 masks by students within the library mandatory. The Yale University Library, on the other hand, sanitized books and other library materials. This study implies that, in the face of the coronavirus pandemic, academic libraries in top schools were able to operate key services, such circulation/book lending and return services, remotely or through the use of internet media. This study implies that during the coronavirus outbreak, libraries took steps to minimize physical contact at the problem desk.

Theme 2: Conversion of print resources to electronic copies

To maintain continuity throughout the coronavirus pandemic, notably in circulation and lending services, paper materials had to be converted to electronic versions by scanning. Scan and deliver services, which entail scanning specific pages of print books and transmitting through email, are evidence-based methods used by several libraries. Mediated copying requires the use of scanners or 3D printers. In so doing, only four (4) academic libraries—the Bodleian Libraries, Caltech Library, Cambridge University Library, and University of Chicago Library—have converted print materials to electronic versions under the scan and deliver project. The Bodleian libraries developed remote and low-contact services including mediated copying, special collections, and scan and deliver services. The Caltech Library features a Tech Lab for mediated 3D printing, as well as mediated paper printing, which allows users to make print requests, pick up their printed materials, and utilize Docuserve to scan and transmit papers and book chapters to other users. The Princeton University Library offers an Article Express service. Users are able to obtain a digital scan of print resources from Cambridge University Library.

Theme 3: Reserve a study space/outdoor reading room services

In accordance with guidelines established by the World Health Organization (WHO, 2020) and the Centers for Disease Control (CDC, 2020), this theme discusses the specific measures taken to minimize physical contact between individuals and large groups of people. The goal is to lower the rate at which the deadly coronavirus spreads. For users who might desire to visit the library for reading reasons, two out of the nine institutions have adopted the space reservation program. Both the Caltech Library and the Cambridge University Library have access reservations for study spaces. For on-campus study, the Caltech Library offers reserved outdoor reading areas with Wi-Fi and secluded tables and chairs. To maintain compliance with the social-distance protocol of the WHO and limit the number of readers who have physical access to the library, the Cambridge University Library offers the "book a study seat" project, made possible with the use of an app called Library's SpaceFinder.

Theme 4: Innovative solutions/personalized services

Some libraries such as Yale Library, Berkeley Library, Harvard Library, Standford Libraries used consultation or just contacting a librarian for guidance or support in a virtual setting to offer novel services or personalized services. A few of the efforts used to address consumers' reference inquiries include the Chat-a-Librarian service, online consultations through zoom or e-mail, and cell phones. On the websites of the institutions, information was also disseminated regarding library services and resources. For academics seeking for literature on Covid-19 throughout social science fields, Yale University Library compiled research themes. For academics and students, the UC Berkeley Library offered in-person research appointments as well as online research consulting through the Zoom, email, and chat-with-a-librarian services. Users who have put such materials on hold via the Caltech Library catalog may consult the archives and special collections of the California Institute. The Harvard library finds support for online learning through "Teaching in Virtual Classrooms," where virtual services and resources are offered by Liaison librarians. The Harvard University library also offers curators and archivists the chance to participate in and run online classes. Along with offering a "Remote Media Help team," Harvard also offers online tools like OpenRefine for data mining or photogrammetry for 3D photos. Yale University offered remote services that included cleaning books and other collections, while Stanford University offered online workshops and events.

Theme 5: Provision of online services

Almost all academic libraries, except MIT libraries, offer remote and internet services so that patrons may access library materials despite the Covid-19 pandemic's unusual nature. In response to COVID-19, many publishers made "open access resources" available for temporary and free use at Harvard University Library. These liaison librarians are also in charge of helping faculty members locate digital library resources, developing course materials, and supporting virtual library visits in the spring of 2021. The digital borrowing service (DIBS), "online carpentry workshops," and streaming video services are all encouraged by the Caltech Library. These resources include e-books, e-journals, and databases, as well as e-research and e-reference consultation via email to library@caltech.edu or archives@caltech.edu. Electronic materials are available at the Bodleian Library and Stanford University Library from anywhere. Stanford University Library also provides online workshops and events. With the HathiTrust Emergency Temporary Access Service, a digital repository made up of more than forty (40) research libraries for emergency e-book service, the UC Berkeley Library gives users access to millions of e-books. Additionally, the library makes millions of physical volumes of library materials available across its ten campuses available in digital form, and it offers online research consultations via zoom appointment or via email with the subject librarian, chat with a librarian, and electronic course resources. Additionally, the University of Chicago Library provided a Chat with a Librarian and Ask a Librarian service. The "Article Express" program of the Princeton University Library delivers electronic documents. Overall, this research shows that majority of the libraries of the first ranked ten universities in the world (based on THE) responded to the COVID-19's effects by restricting access to physical library services and stepping up their delivery of online services and resources.

Discussion

The COVID-19 epidemic brought to light the importance of libraries as a social service delivery system. Academic libraries responded to the COVID-19 tragedy with a variety of innovations and proactiveness in terms of operations and services. The study discovered that both physical library services and internet services and resources were available with regulated access. This result suggests that, in accordance with the Time Higher Education ranking of 2021, the first ranked ten university libraries in the world

responded to the COVID-19 epidemic in a suitable manner. Controlled access to physical library services, according to the study, includes contactless print resource pickup and delivery, automatic book renewal, the use of masks, suspension and automatic cancellation of fines for overdue books, and completion of access request and health forms online prior to visiting campus. The results of this study support those of Temiz and Salelkar (2020), whose research on university libraries in Sweden responded to COVID-19 by limiting work hours, physically closing the library to users, and offering online tools and services. The conversion of print resources to electronic copies and document delivery was one of the study's further results. This conclusion is in line with those of Begum and Elahi (2022) and Ayeni et al. (2021), who discovered that document delivery is one among the services provided in response to the Covid-19 pandemic's effects in university libraries. As part of cutting-edge new services in response to the global health problems, the study by Ayeni and colleagues also supports the purchase of electronic resources and the digitization of print materials. Additionally, one of the libraries discovered that people used postal services to return goods they had borrowed, which supports Tolppanen's research (2021).

In several of the libraries used for this study, there were reservations for study space. This data supports the claim made by Murphy et al. (2021) that the space reservation effort helped libraries from exposing staff and users to any hazards related to the epidemic. Additionally, the libraries chosen for this study used creative approaches and tailored services like Chat with a Librarian as one of the creative methods to mitigate the effects of COVID-19. This observation is consistent with those of earlier researchers (Radford et al. 2020; Decker, 2021; Fruehan & Hellyar, 2021; Hervieux, 2021; Omeluzor, et al., 2022).

The study's findings also show that online services were made available to library customers and that information on the library website was regularly updated in order to inform library users throughout the coronavirus-related global health crisis. The study's findings support those of Mbambo-Thata (2021), who examined how an African university responded to COVID-19 using the library at the National University of Lesotho as a case study. Mbambo-Thata discovered that the library switched from providing face-to-face library services to providing digital library services. This conclusion is consistent with that of De Groote and Scoulas as well (2021). It is important to continue offering digital library services beyond COVID-19 so that students enrolled in online courses may continue to have uninterrupted access to online materials (Tsekea & Chigwada, 2020). This research adds to the body of literature already written about the quick service changes academic libraries in industrialized countries undertake during times of a global health emergency.

Of course, when institutions closed their doors to in-person instruction, worries about how libraries would support online learning became evident (Mbambo-Thata, 2021). The COVID-19 epidemic has forced librarians to take on additional responsibilities and increase their responsibilities by developing more digital services and resources as a means of evolving into smart libraries. As a result of the COVID 19 epidemic, libraries now have additional duties, such as offering their neighborhood's residents emotional and psychological help (Temiz & Salelkar, 2020). In fact, the coronavirus pandemic provided academic libraries with an opportunity to reevaluate and clarify their professional goals, especially with regard to providing online learning assistance for students (Martzoukou, 2020; Tsekea & Chigwada, 2021). Notably, the COVID-19 epidemic has driven many institutions, particularly those in industrialized nations, to adopt online learning as a style of instruction rather than the more conventional face-to-face mode of instruction (Dhawan, 2020, Atayero, 2020). The current global health crisis is a "turning moment" for library directors and managers to

boost subscriptions to electronic databases in order to more easily offer digital library services (Kaba, 2021).

Additionally, the pandemic's arrival has reflected a widespread instance of a critical situation demanding prompt intervention among libraries. The study's dynamic management of external influences and pressure brought on by the health crisis to alter the internal environment in response to the current situation is a key finding. As a result, academic libraries must continue to work toward sustainable relevance even after the wave of the COVID-19 epidemic must have faded. This is a logical and obvious course to take (Iwu-James et al., 2020). This study has produced insightful data that shows libraries urgently need to be more comprehensive in their deliberate focus to the creation of technology infrastructure and staff for digital libraries as a means of disaster preparedness.

Conclusion and recommendations

The study looked at academic libraries at top-ranked colleges throughout the globe as reported by Times Higher Education in 2021. According to the results, the bulk of universities are found in the United States. Nine (9) university libraries provided information on the Covid-19 pandemic-related worldwide health emergency. Five (5) themes emerged from the thematic analysis of the study's data, according to the analysis's findings. The purposefully chosen academic libraries used two primary types of support services in response to COVID-19: regulated access to physical library services, and solely offering online services and resources. The topics that arose from the study are: accessibility to library services in person; conversion of print materials to electronic versions; services for reserving a study place or outdoor reading room; creative solutions/personalized services; and online services.

The study comes to the conclusion that libraries of all kinds must be creative in their use of preventative measures for disaster preparedness, especially during major public health crises like the COVID-19 pandemic. Additionally, library stakeholders should improve and broaden their disaster planning and management strategies to cover those dealing with international health emergencies. The overall finding is that academic library stakeholders must lead the way in installing and implementing best practices and innovations that can assist the library in evolving towards providing virtual library services online and remotely.

Stakeholders in libraries should learn from the worldwide health issues brought on by the coronavirus pandemic by entering a period of serious evaluation of their performance during the lockdown and in the new normal. The evaluation should concentrate on (1) staff adaptation and ICT proficiency and (2) technological infrastructure and technical support for resource visibility and accessibility outside of the library's four walls. The only ten (10) colleges that were purposefully chosen for this study were its limits, therefore results should not be generalized lightly. It's also probable that as of the time of this study, not all of the creative solutions used as emergency measures in university libraries were disclosed on their websites. Additionally, the survey only took into account academic libraries and left out other kinds of libraries. The only way to reproduce the study is to use university libraries in other nations or regions.

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