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■ Original Article

Availability of digital resources and institutional compliance with COVID-19 mitigation measures in a Nigerian university: A descriptive study

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ABSTRACT

The state of the availability of digital resources and institutional compliance to COVID-19 mitigation measures was evaluated by the researchers in this study. Informed by the need to answer two research questions, the study adopted the descriptive survey design. A sample of 409 participants was drawn from a population of 2,410 academic staff at the University of Calabar, leveraging the multistage sampling process. "Availability of digital resources and institutional compliance with COVID-19 mitigation measures questionnaire" was used for data collection. After administration, we recovered 397 copies of the instrument successfully. We used descriptive statistics to answer the research questions. Our findings indicated a great extent in the availability of digital resources such as computers (91.18%), human capacity (63.48%), network printers (67.76%), projectors (59.19%), websites (92.95%), and wireless networks (86.65%). There was a low extent in the availability of digital resources such as local area network (5.79%), cloud storage systems (2.27%), digital libraries (7.56%), firewalls (1.26%), Internet service (48.36%), routers (23.69%), and Zoom videoconferencing platform (23.93%). The unavailability of digital resources such as host/servers (0%) and virtual private networks (0%) in the higher education institution (HEI). Further evidence shows a low extent of institutional compliance with COVID-19 mitigation measures generally and specifically for all indicators. In conclusion, there is a high degree of unreadiness to promote e-learning when flexible learning systems should operate in the institution. Among others, we recommend that the management of the HEI should apportion proceeds from internally generated funds to procure digital resources to increase the institution's capacity to respond to COVID-19 or similar cases in the future.

Keywords: availability, COVID-19, e-learning, evaluation, HEI, institutional compliance

INTRODUCTION

The Nigeria Center for Disease Control created new guidelines, which were drafted and passed into law on January 26, 2021, to restore economic, educational, and

social activity in the nation while ensuring safety and limiting the pandemic's spread. Despite these apparent and well-documented mechanisms to promote personal and group safety, how individuals comply with the protocols remains unclear. This suspicion is due to the attitudes of

many Nigerians, notably higher education staff and students. For example, the researchers observed that many staff members and students do not utilize face masks as required at school, lecture rooms, and offices/workplaces. Some only use a face mask while entering or exiting a building, school gates, library, or security checkpoints. Others are often sighted removing or suspending their face masks after leaving such areas. Students are often seen in overcrowded classrooms beyond the allowable limit of 50 students in a restricted area.

Furthermore, the usage of hand sanitizers at regular intervals and the compliance with regular handwashing protocol seem to be a dead culture among some university instructors and students. Some employees and students seem reluctant to follow physical and social distancing norms (such as keeping at least a two-meter distance while engaging with colleagues, super-ordinates, and subordinates). Contrary to the rules, they are often seen conversing, laughing, playing, or embracing themselves at will. One potential reason for these negative sentiments among staff regarding adherence to the COVID-19 preventive measures might be because many individuals believe COVID-19 is non-existent. Some people who think COVID-19 is genuine also claim that the pandemic is not in Nigeria. Furthermore, others regard it as political propaganda to get international help. As a result, they are unwilling to follow any so-called preventative step. Available empirical evidence tends to attest to the negative perception of Nigerians toward the COVID-19 pandemic (e.g., [1-4]). Beyond the perception of staff and students, the researchers contend that the degree of institutional enforcement and practices may promote or hinder staff adherence to the post-COVID-19 precautionary measures.

Given the importance of education and the virus's unpredictable ending, it is imperative that teaching and learning persist. Consequently, many academics continue to argue for a switch to online education and learning [5-8]. However, despite the campaign, the situation in Nigeria does seem to be divergent from the one in other nations, wherein learners and instructors in educational institutions have access to smartphones and e-learning capabilities [9-12]. There is a common problem in Nigeria's educational institutions regarding poor e-learning setups for both group and individual use [13]. So, with the absence of traditional face-to-face classrooms, how can education and training continue in Nigeria? This study evaluated how digital resources are available based on evidence from a public university. The study also determined the extent to which

COVID-19 mitigation measures have been implemented at the public university.

The presence or absence of digital resources determines whether e-learning will occur or thrive. Implementing e-learning is not always easy [14, 15], especially for instructors who are not already experienced with online programs due to a lack of expertise and resources [16]. For example, it was revealed that the closure of schools led to the wide use of ICT for teaching and learning remotely among highly skilled individuals [17-20]. Besides, many scholars have revealed that e-learning is the most effective method of continuing education in the case of a pandemic [21-25]. Despite the challenges of COVID-19, educational measures are being taken to keep students in school. HEIs constantly seek alternative solutions to improve curriculum techniques and make them more responsive to students' learning needs, even outside conventional classrooms [26].

The study [27] found uncertainty and disagreement concerning the content and methods of instruction and the workload of instructors and students. Instructors' inexperience (including uneven learning results generated by teachers' differing experiences), the knowledge gap, and the complicated home environment are all potential challenges for the policy. According to an empirical study [28], the swift shift to online education has been a success, and the expertise acquired may be used. Other nations that have not figured out how to make the shift yet might benefit from the knowledge and expertise gained from this research and experience [29-31]. It has been made possible for students and educators to access educational materials from the Internet [32-34]. Teachers may now utilize applications to connect with students to upload assignments, pre-recorded content, presentations, and voice notes [35]. As well as utilizing video platforms like Zoom/Google Hangout and texting and emailing parents often, some schools are offering virtual lessons [36, 37].

Researchers also tend to admit that the capability of schools and parents to deliver and efficiently utilize these tools is likely to vary significantly [38-41]. Parents who work in retail, supply chain, or healthcare may not have the time or space to devote to their children's education [12, 42]. In contrast, parents who work full-time may not save as much time for their children's education due to time restrictions [35, 43, 44]. As a result, most scholars have concluded that having digital resources available has a beneficial impact on the ways instructional materials are delivered during COVID-19 [45, 46]. Although much research attention has been paid to the role digital resources play in teaching and learning

during the pandemic, the extent to which these resources are available for deployment has rarely been quantified from the perspective of developing nations, where there is the problem of inadequate access to ICT resources [47- 49]. It is essential to understand the extent to which digital tools are available. Understanding the extent of the availability of digital tools could be crucial in determining the degree of institutional readiness to sustain education amidst the COVID-19 pandemic. Along these lines, this study was conducted to bridge the gap in the literature.

Regarding Institutional compliance with COVID-19 mitigation measures, a literature review revealed that most previous studies focused on students' opinions regarding setup processes. For instance, in several studies, students' understanding of COVID-19 was previously high [50-52]. Similarly, it was discovered that virtually all their research participants used masks when they went out [53]. Thus, adhering to the virus's mitigation measures can prevent the infection from spreading. However, it was found that most students did not use a face mask, exercise handwashing/hand sanitizing, or maintain social distance regularly [54]. Comparably, it was found that more than a third of the participants lacked information, attitudes, and preventative actions about COVID-19 illness [55]. Little wonder that law enforcement officials preferred to educate non-mask wearers rather than rely on civil fines imposed by state decrees [56].

Insufficient resources were found by [57] for the implementation of public health and social initiatives. A significant obstacle to reducing COVID-19 transmission is the report's assertion that this is an important issue. The literature review also showed that researchers in other countries had undertaken numerous studies, especially in China (e.g., [58-60]). Only a few studies have been identified in the setting of Nigeria (e.g., [2, 4]). Apart from that, most of the cited literature had focused on medical personnel or healthcare workers' knowledge, attitudes, and practices (e.g., [61, 62]) or the general population's knowledge, attitudes, and procedures (e.g., [53, 63, 64]).

The study [3], conducted in distance education institutions in Cross River State, seems to be among the few notable research in Cross River State on the managerial enforcement of COVID-19 precautionary measures. The result of the study found a low extent in the enforcement of handwashing, use of facemask and social distancing policies. Furthermore, it was revealed that the degree of institutional compliance with the provision of safe water supply, handwashing facilities and infrared thermometers in tackling the COVID-

19 pandemic was low in public but high in private secondary schools in Calabar South Local Government Area (LGA) [65]. However, the cited study indicates that both private and public secondary schools had a great extent in the enforcement of social/physical distancing, use of face masks, provision of hand sanitizers, operation of alternative learning timetables and sterilizing of school premises). Based on these gaps, this study provided answers to the two questions—to what extent various digital resources are available in HEIs? What is the extent of institutional compliance with COVID-19 mitigation measures in the HEI?

METHODS

This study used a descriptive survey research method to explain its conclusions using data gathered from primary sources. This report aims to accurately represent the status of digital resources and the amount of compliance with COVID-19 mitigating measures at the university. The population of this study comprised 2,410 academic staff distributed across 16 faculties in the University of Calabar, Calabar, Nigeria. The researchers adopted the multistage sampling process to select this study's respondents. In stage 1, the stratified proportionate random sampling technique was adopted by the researchers in selecting 50% of the available Faculties in the university. Hence, eight out of the 18 public faculties were selected. In stage 2, we used the simple random sampling technique in selecting 30% of the available departments in each of the desired faculties.

Consequently, 20 departments were picked across the eight selected faculties. In stage 3, the researchers used an accidental sampling procedure to enumerate only the available academic staff for data collection in the assigned departments. A total of 409 academic staff were selected as respondents for the study. The researchers created a standardized questionnaire for collecting data entitled "Availability of digital resources and institutional compliance with COVID-19 mitigation measures questionnaire (ADRICCMMQ)". The questionnaire was structured into three sections. Section A was dedicated to obtaining the biodata of respondents, such as gender, rank, and years of work experience. Section B was designed with a list of 15 electronic infrastructures for respondents to tick which was available or otherwise in their departments. Two response options (available and not available, were provided for respondents to tick. Section C of the questionnaire comprised 16 items assessing the enforcement of COVID-19 mitigation measures. Respondents were expected to rate the extent of their agreement and disagreement with the items on a four-point Likert scale.

Face and content validity were evaluated by two psychometric specialists at the Department of Educational Foundations, University of Calabar. The instrument's internal consistency was assessed using the test-retest reliability approach. 30 non-sample lecturers from three University of Calabar departments participated in a trial test performed by the researchers. The participants were chosen from the same population as those in the sample because the researchers assumed they would have comparable characteristics. The respondents were given copies of the instrument, and two weeks later, the same respondents were given new copies of the tool. Pearson product moment correlation analysis was used to compare the results from the two rounds of testing. According to the instrument's reliability analysis, the result was 0.89, indicating that the equipment measured what it promised to.

Primary data was obtained in this study by administering copies of the instrument. The researchers contacted the selected respondents based on the scheduled date allocated for each department. The researchers visited the assigned departments and could locate staff offices with the help of some students from each department. Although some staff members were not available in their offices during this process, only those available in their offices were used for the study. Upon contacting available staff, the researchers introduced themselves, stated their mission, and pleaded with the busy change to keep copies of the instrument and respond at their convenience. Some staff members were hectic and could not give the necessary attention. Individuals who agreed to participate in the exercise were fully briefed on its significance and reminded of the necessity to answer the instrument's questions honestly. A guarantee of complete secrecy was also given to those who responded. On a final note, the researchers retrieved 397 of 409 administered copies of the instrument throughout the investigation. Some participants could not return their copies, which resulted in a supply shortfall. It took three weeks to acquire all the data.

In scoring the items, serial numbers were assigned to each of the retrieved copies of the questionnaire for easy identification. Items in section B of the questionnaire were scored nominally, with 1 indicating availability and 0 for unavailability across each digital resource. Section C of the questionnaire has a distinct Likert scale for positive and negative comments. All favorable comments received four points, three points, two points, and one point, respectively, for those who strongly agreed, agreed, disagreed, or strongly disagreed. On the other hand, all negative items were scored using a reversal of the standard approach. After

Table 1. Frequency distribution showing extent of availability of digital resources in a higher education institution

S/N	Digital resources	Status			
		A	%	NA	%
1	Local area network	23	5.79	374	94.21
2	Cloud storage systems	9	2.2	388	97.7
3	Computers	362	91.1	35	8.8
4	Digital library	30	7.5	367	92.4
5	Firewalls	5	1.2	392	98.7
6	Host/servers	0	0.0	397	100.0
7	Human capacity	252	63.4	145	36.5
8	Internet service	192	48.3	205	51.6
9	Network printers	269	67.7	128	32.2
10	Projectors	235	59.1	162	40.8
11	Routers	102	25.6	295	74.3
12	Virtual private network	0	0.0	397	100.0
13	Website	369	92.9	28	7.0
14	Wireless network	344	86.6	53	13.3
15	Zoom videoconferencing platform	95	23.9	302	76.0

Note. A: Available & NA: Not available

the scoring, a computer spreadsheet software was used to code all the scored items on a person-by-item matrix. Descriptive statistics (such as frequency counts, basic percentages, and the mean and standard deviation) were utilized for the study.

RESULTS

Research Question 1

To what extent are digital resources available in the HEI? The answer to this research question was provided using frequency counts and percentages about the availability of digital resources in HEIs.

The result in **Table 1** shows that computers (91.18%), human capacity (63.48%), network printers (67.76%), projectors (59.19%), websites (92.95%) and wireless networks (86.65%) are the digital resources that are available to a great extent. The availability rate is greater than the 50% average benchmark. Contrarily, digital resources such as local area network (5.79%), cloud storage systems (2.27%), digital libraries (7.56%), firewalls (1.26%), Internet service (48.36%), routers (23.69%), and zoom videoconferencing platform (23.93%) are available to a low extent in the HEI. Furthermore, host/servers (0%) and virtual private networks (0%) were unavailable in the HEI.

Research Question 2

What is the extent of institutional compliance with COVID-19 mitigation measures in the HEI? **Table 2** shows the indicators and measurement of institutional compliance to

Table 2. Mean rating & standard deviation of extent of institutional compliance with COVID-19 mitigation measures in the HEI

S/N	Indicators	EC	
		M \pm SD	R
1	Provision of sufficient water for handwashing	1.83 \pm .33	L
2	Provision of borehole water supply	2.04 \pm .43	L
3	Implementation of 2-metre sitting arrangement	1.61 \pm .61	L
4	Implementation of classroom shifting structure	1.76 \pm .47	L
5	Full enforcement of "no mask, no entry" order	2.13 \pm .61	L
6	Punishing staff/students caught without use of face masks	1.28 \pm .37	L
7	Constant provision of hand sanitizers at school entry points	1.42 \pm .45	L
8	Consistent provision of hand sanitizers at lecture halls' entrances	1.32 \pm .69	L
9	Provision of antiseptic at all handwashing locations	1.87 \pm .25	L
10	Provision of mobile handwashing basins at strategic locations	1.33 \pm .41	L
11	Organizing COVID-19 sensitization campaigns for personnel	2.25 \pm .37	L
12	Checking temperature of individuals entering/leaving school	1.43 \pm .63	L
13	Setting up an internal COVID-19 task force/patrol team	2.41 \pm .59	L
14	Disinfection of lecture halls through weekly fumigation	1.12 \pm .21	L
15	Posters promoting use of face masks are pasted/distributed	2.37 \pm .27	L
16	Provision of designated drop-off/pick-up points outside the school entrance for visitors	1.73 \pm .15	L
	Average	1.74 \pm .43	L

Note. EC: Extent of compliance; M: Mean; SD: Standard deviation; R: Remark; L: Low; & Criterion mean=2.50

COVID-19 mitigation measures. In interpreting the results in **Table 2**, all mean values greater than the criterion mean of 2.50 suggest a great extent of institutional compliance with the indicator. In contrast, the mean values below indicate a low degree of implementation of the indicator. The criterion mean of 2.50 is derived from finding the average of all response probabilities on the four-points Likert scale in the instrument used for data collection.

As shown in **Table 2**, there is generally a low extent of institutional compliance with COVID-19 mitigation measures in the HEI. Specifically, **Table 2** shows a low degree of institutional compliance with implementing all the indicators.

DISCUSSION OF FINDINGS

This study discovered a low extent in the availability status of digital resources in the HEI. This result is because only a handful of e-learning infrastructures are available reasonably in the HEI, whilst the availability of many digital resources was negligible. This result implies a low degree of resource commitment and willingness to promote e-learning in the HEI. This result also suggests that the HEI under scrutiny is not fully ready to sustain teaching and learning should other waves of the COVID-19 or similar pandemics occur. The result of this study agrees with the development of [27] that online education infrastructure flaws, instructor inexperience (including uneven learning results due to teachers' differing levels of expertise), e-learning growth are hindered by a lack of knowledge, a complicated home setting, and more. With the backing of public schools and the availability of alternative options (such as Zoom, Slack, Google Meet, or Edu Page), virtual learning and live interaction may be aided by the government.

The second finding of this study generally reveals a low extent of institutional compliance with COVID-19 mitigation measures in the HEI. This finding is not surprising since the institution recorded a low extent in providing sufficient water supply, hand sanitizers at school/lecture halls entry points, mobile handwashing basins at strategic locations, and antiseptic at all handwashing locations. The institution also recorded a low extent in providing designated drop-off/pick-up points outside the school entrance for visitors. The result is that the institution complied poorly with implementing the two-meter sitting arrangement, classroom shifting structure, "no mask, no entry" order, and setting up an internal COVID-19 task force/patrol team. Other areas, where the HEI failed to comply with the established COVID-19 mitigation measures were punishing staff/students caught without the use of face masks; organizing COVID-19 sensitization campaigns for personnel; checking the temperature of individuals entering/leaving the school; using posters to promote the use of face masks and disinfection of lecture halls through weekly fumigation.

The poor institutional compliance may be due to the cost of maintaining the protocols or lack of interest among institutional leaders to promote a safe learning environment. This finding aligns with the study of [3], which also found a low extent in the enforcement of handwashing, use of facemask and social distancing policies. The finding partly corroborates the results of [65], which earlier revealed the extent of institutional compliance in the provision of safe water supply, handwashing facilities, and infrared

thermometers in tackling the COVID-19 pandemic to be low in public secondary schools. However, there is a point of disagreement between the result of [65] and the present study. The cited study found that both private and public secondary schools enforced social/physical distancing, use of face masks, provision of hand sanitizers, operation of alternative learning timetables and fumigation of school premises to a great extent. The disparity between the cited and present studies is evident due to the differences in both studies' areas. While the cited study evaluated public secondary schools, the current study analyzed the situation in an HEI. Secondary schools and universities' nature, design, and structure are different, resulting in variations.

CONCLUSION

The outcomes of this investigation led to the conclusion that both the availability of digital resources and the compliance of the HEI in following post-COVID-19 protocols are low. This implies that there is a high degree of unreadiness to promote e-learning at a time when flexible learning systems are being operated in highly developed nations. This study also implies that the HEI management pays little or no attention to implementing all the COVID-19 mitigation measures. This ugly narrative puts the institution in a state of high health risk. The safety of both staff and students is not guaranteed, especially if there are any unknown active cases of COVID-19 in the institution. It is recommended that:

1. The management of the HEI should apportion proceeds from internally generated funds to procure digital resources such as computers, projectors, wireless networks, running websites and host/servers, and so on, to increase the institutional preparedness to respond to COVID-19-similar cases in the future.
2. The Federal Government of Nigeria should try as much as possible to allocate at least the 26% advocated by UNESCO of its budget to the education sector to raise the level of proceeds received from the government. This can help make adequate funds available to procure needed resources to provide a sound e-learning system and implement all COVID-19 mitigation measures.
3. Private philanthropists, foreign donor agencies and non-governmental organizations should supplement the government's efforts by providing funds or supplying electronic and other facilities needed to enforce COVID-19 mitigation measures in universities.

4. Both staff and students should see all the COVID-19 mitigation measures to mitigate the spread of the virus and make efforts to adhere to them. This will help keep them safe for quality teaching and learning in the HEI.

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