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## Online Learning in Nigerian Universities During COVID-19 Pandemic: The Experiences of Nursing and Radiography Undergraduate Students

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### A B S T R A C T

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 COVID-19  
 Online learning  
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Online education spreads even in the medical field where traditional method of learning is more convenient. This study was designed to evaluate the experiences of nursing and radiography undergraduate students of online learning in Nigerian universities during the COVID-19 pandemic. This was a cross-sectional questionnaire-based study, which included 540 nursing and radiography students. The completed questionnaires were retrieved by the researchers. Both descriptive and inferential statistics were used for statistical analysis with significance level set at  $p < .05$ . Large numbers, 41.3% ( $n = 223$ ) of the respondents perceived the online learning to be slightly stressful, and the least, 7.4% ( $n = 40$ ) perceived the online learning to be extremely stressful. The challenges were financial constraints (29.6%,  $n = 160$ ), no internet access (22.2%,  $n = 120$ ), lack of technical know-how (14.8%,  $n = 80$ ), and poor communication with lectures and peers (5.6%,  $n = 30$ ). This study revealed good and positive attitudes of the students toward the online learning method during the COVID-19. Most of them perceived online learning method to be beneficial to their educational progress. The challenges encountered by the students as revealed in this study included the following: financial constraints, internet access, unstable/slow internet access, lack of mobile data, poor communication with lecturers and peers, and no access to computer device.

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### Introduction

The COVID-19 pandemic significantly affected every aspect of human endeavor, and education is one important sector mostly affected by the pandemic globally. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020), the closure of schools and universities have significantly affected over 1.5 billion students and youths worldwide during the COVID-19 pandemic. In Nigeria, educational institutions suspended their regular activities and students were sent home

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(Simkhada et al., 2020). The radiography students were not left out as practical demonstration sessions on university campuses and hospitals were suspended (Okpalek et al., 2021). Students were also scared of the COVID-19 pandemic due to the lack of personal protective equipment in most health care facilities as documented by Ogolodom et al. (Ogolodom et al., 2020a). According to Adeoye et al. (Adeoye et al., 2020), the rapid spread of the COVID-19 forced the Nigerian government to shut down schools and directed the schools to adopt an electronic learning (online learning) system, which most of the tertiary schools in Nigeria were not used to before the pandemic.

Online learning, also known as electronic learning (e-learning) or digital learning, is referred to as the use of technology and network communication for teaching and learning. It is also referred to as a technology-based transfer of skills and knowledge to the student. This method of learning uses computer and internet devices in its teaching and learning activities; that is, the learning material can be accessed anytime and anywhere as long as the necessary facilities and infrastructure are available. Online learning is one of the growing trends in education. Coogee et al. (Coogee and Floyd, 2015), stated that online learning can be practiced in synchronous, asynchronous, or hybrid learning environments. Synchronous learning environments are those settings where learning occurs in real time. Asynchronous environments are those settings where the students engage in activities that occur independently from the instructor or other peers. Online education spreads even in the medical field where the traditional method of learning is more convenient (Thapa et al., 2021). Students' attitude toward online learning seems to be the most important factor for a successful online learning experience (Akbari et al., 2012). Online learning depends on technological devices and the Internet; therefore, technology is the most pressing challenge of online learning. Some typical technological issues include lack of knowledge of how to use the applications, unstable/slow internet connections, outdated communication devices, and incompatible browsers. As a result of the inadequate finances of some individuals, acquiring the necessary equipment for online learning is challenging. Problems such as poor network connectivity, lack of electricity, and inadequate information and communication technology (ICT) facilities to carry out lectures may negatively impact the successful implementation of online education (Afolabi and Uhomoihi, 2017). According to Linjawi et al. (Linjawi and Alfadda, 2018), previous knowledge of ICT and good internet connectivity are the keys to successful online learning.

The significance and efficacy of e-learning, including ease of use, flexibility, and better control over the environment, have been reported by previous studies. However, regardless of its rewards, there are a few disadvantages or limitations of online learning such as a lack of student-teacher interaction, interaction with other students, and technical connectivity problems (Abbasia et al., 2020). The online system of education is entirely new in our setting and faces several obstacles among which are the ineptitude of the students, lack of basic computer knowledge, and the inability of the students to afford basic computer gadgets for online learning. In nursing and radiography programs where most of the teaching-learning is physical, the pandemic compelled the use of online learning classes to complete the syllabus. The online methods of learning can be more difficult compared to classroom teaching for both the lecturers and students, as it takes time to get used to the new method of learning. In this regard, it is very crucial to evaluate the acceptability, perception, and setbacks of the new approach to learning in Nigeria. This study aimed to assess the attitude and challenges of nursing and radiography students toward online learning in Nigeria during the COVID-19 pandemic.

## Materials and methods

This was a cross-sectional questionnaire-based survey, which involved students from eleven universities (University of Nigeria Nsukka [UNN]), Nnamdi Azikiwe University [NAU], Bayero University Kano, University of Lagos, Lead City University, University of Calabar, University of Maiduguri, Federal University of Technology, Owerri, Ahmadu Bello University [ABU], University of Benin [UNIBEN], and University of Port Harcourt) offering nursing and/or radiography programs in Nigeria at least 2 years before the COVID-19 pandemic era. The purpose of the study was adequately explained to each respondent via the written informed consent form and their consent to voluntarily participate in this study was duly sought and obtained. No information that revealed the identity of the respondent was included in the study and the retrieved information was treated with a high level of confidentiality and used for this study only. This study lasted for a period of 2 months (November 2021–December, 2021).

A simple self-administered questionnaire constructed in the English language was the instrument for data collection. This 35-item questionnaire consists of two sections A and B. Section A—captures questions on the respondent's sociodemographic variables (age, level of study, school, program of study, and gender). Section B—contains questions that evaluated the participants' attitude, utilization or usage, benefits, and challenges of nursing and radiography students toward online learning in Nigeria during the COVID-19 pandemic.

The validity of the questionnaire was computed using the index of Item Objective Congruence (IOC) method used by previous authors (Mbaba et al., 2021; Ogolodom et al., 2020b; Turner and Carlson, 2003). The content validity of the questionnaire was assessed by computing the IOC. Based on the index parameters, an IOC score  $>0.6$  was assumed to show excellent content validity. All the scores obtained in this study for all the items of the questionnaire after IOC interpretation were  $>0.6$ . We obtained a Cronbach alpha reliability value of 0.92 for internal consistency of the questionnaire.

**Table 1**  
Frequency and percentage distributions of sociodemographic variables

Variable	Category	Frequency	Percentage (%)
Age	Less than 20 years	123	22.78
	20 to 29 years	367	67.96
	30 years and above	50	9.26
	Total	540	100.0
Sex	Female	354	65.60
	Male	186	34.40
	Total	540	100.0
Level of study	200 Level	50	9.26
	300 Level	85	17.74
	400 Level	182	33.70
	500 Level	223	39.30
	Total	540	100.0
Institution of study	ABU	4	0.74
	BUK	20	3.70
	UNIPOINT	10	1.85
	FUTO	19	3.52
	Lead City University	8	1.48
	UNIBEN	10	1.85
	UNICAL	21	3.89
	UNILAG	23	4.26
	UNIMAID	10	1.85
	NAU	361	66.85
	UNN	44	8.15
Total	540	100.0	

ABU = Ahmadu Bello University; BUK = Bayero University Kano; FUTO = Federal University of Technology Owerri; UNIPOINT = University of Port Harcourt; UNIBEN = University of Benin; UNICAL = University of Calabar; UNILAG = University of Lagos; UNIMAID = University of Maiduguri; UNN = University of Nigeria Nsukka; NAU = Nnamdi Azikiwe University.

The questionnaire was arranged in line with the objectives of study and was prepared in both electronic (Google form) and hard-copy (paper) versions. The electronic version was distributed electronically to the Whatsapp platforms of the students of the selected universities, while the paper version was distributed to the students by the researchers using the one-to-one method. The completed electronic version of the questionnaire was retrieved electronically whereas the hardcopy version was collected immediately by the researchers. A total of 540 respondents participated in the survey and their responses were collected using data capture sheet.

The data were arranged according to the objectives of the study and were analyzed using statistical package for Social Sciences, version 21 (IBM Corp, Amornk, NY, 2012). Both descriptive (frequency, median, mean, percentage, and standard deviation) and inferential statistics chi-square were used for statistical analysis. The chi-square was used to evaluate the relationship between the challenges encountered during online learning, attitudes, benefits, and usage of online learning and the participant's levels of study. The statistical significance level was set at p value less than 0.05.

**Table 2**

Frequency distribution of assessment of attitudes of nursing and radiography students toward online learning during COVID-19

Variable	Responses	Frequency	Percentage	
		N = 540	%	
How often do/did you participate during lectures?	Always	37	6.85	
	Never	49	9.07	
	Occasionally	371	68.70	
	Very often	83	15.38	
	Total	540	100.0	
How many hours did you spend each day during online lectures?	1 to 3 hr	416	77.00	
	3 to 5 hr	106	19.63	
	5 to 7 hr	18	3.37	
	Total	540	100	
Where did you mostly partake in online learning?	At work	4	0.74	
	Cyber cafe	78	5.19	
	Home	386	71.48	
	None	5	0.93	
	On the Go	67	12.47	
Total	540	100		
How conducive is/was the environment while learning?	1.0	40	7.40	
	Not conducive	2.0	80	14.8
	Conductive	3.0	270	50.2
	Moderately conducive	4.0	102	18.9
	Very conducive	5.0	47	8.70
Extremely conducive	Total	540	100	
How stressful is/was online learning?	Extremely stressful	40	7.4	
	Not stressful	60	11.1	
	Slightly stressful	223	41.3	
	Stressful	150	27.8	
	Very stressful	67	12.4	
Total	540	100		
How helpful was/were online learning during the pandemic?	Moderately helpful	331	61.30	
	Not helpful	58	10.7	
	Very helpful	151	28.00	
	Total	540	100	
How helpful was/were provided learning materials?	Moderately helpful	343	63.5	
	Not helpful	62	11.53	
	Very helpful	135	25	
	Total	540	100	
How helpful was/were your lecturers?	Moderately helpful	296	54.80	
	Not helpful	128	23.70	
	Very helpful	116	21.50	
	Total	540	100	
Did you enjoy online learning?	No	178	33.00	
	Yes	362	67.00	
	Total	540	100	
Do you think online learning will be helpful for the growth of your career?	No	166	30.70	
	Yes	374	69.30	
	Total	540	100	
	Do you think online learning makes students slaves to technology?	Agree	140	25.90
Disagree		310	57.40	
I don't know		60	11.10	
Neutral		30	5.60	
Total		540	100	

**Table 3**

Frequency distribution of utilization/usage of online learning during the COVID-19 pandemic

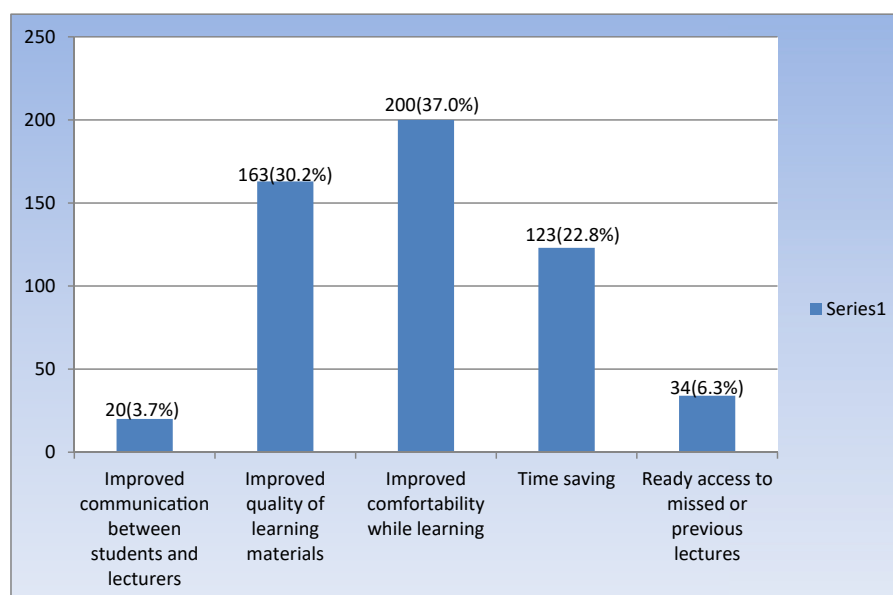
Variable	Responses	Frequency	Percentage
		N = 540	%
Did you use online method of learning during COVID-19?	No	204	37.8
	Yes	336	62.2
	Total	540	100
Do you have access to device for online learning?	No	210	38.9
	Yes	330	61.1
	Total	540	100
What device did you use for learning?	Laptop	154	28.5
	Smartphone	351	65.0
	Tablet	35	6.5
	Total	540	100
Are you satisfied with the technology used?	No	217	40.2
	Yes	323	59.8
	Total	540	100
How do you rate: [The ease of your technology]	Average	153	28.3
	Good	121	22.4
	Poor	266	49.3
	Total	540	100
How do you rate: [The quality of the internet connection used]	Average	94	17.4
	Good	163	30.2
	Poor	283	52.4
	Total	540	100
How do you rate: [The extent to which the courses relied on the use of technology in classroom.]	Average	202	37.4
	Good	281	52.0
	Poor	57	10.6
	Total	540	100
How do you rate: [The quality of technology used]	Average	261	48.3
	Good	189	35.0
	Poor	90	16.7
	Total	540	100

## Results

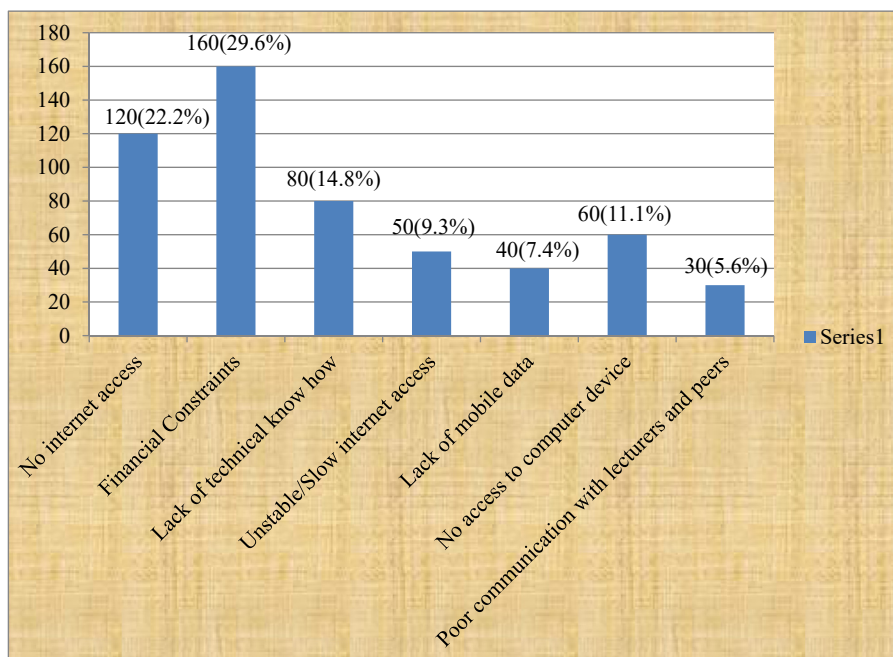
### The Respondents' Sociodemographic Variables

Out 540 respondents, the majority (367, 67.96%) were in the age group of 20 to 29 years and the least 50 (9.26%) of the respondents

were above 30 years of age. A greater number (354, 65.60%) of the respondents were females when compared with their male counterparts (186, 34.4%). A large proportion (223, 39.30%) of the respondents were in their 500 level of study and the least (50, 9.26%) were in their 200 level of study. The highest number (361, 66.85%) were students of the NAU, followed by students from the UNN (44,



**Figure 1.** Bar chart on participant's perceived benefits of online learning during COVID-19 pandemic.



**Figure 2.** Bar chart on participant's perceived challenges during online learning during the COVID-19 pandemic.

8.15%) and the least (4, 0.74%) were students of the Ahmadu Bello University (Table 1).

#### Attitudes of Nursing and Radiography Students Toward Online Learning During the COVID-19 Pandemic

A greater proportion (371, 68.7%) of the respondents occasionally participated during online lectures, and 37 (6.85%) respondents always participated in the lectures. Most of the respondents (416, 77%) spent 1 to 3 hr each day during the online lectures and the least (18, 3.37%) spent 5 to 7 hr each day during the online learning lectures. The majority (386, 71.48%) of the respondents mostly took part in the online lectures at the comfort of their homes. A large number (223, 41.3%) of the respondents perceived the online learning to be slightly stressful and the least (40, 7.4%) perceived the online learning to be extremely stressful. A greater proportion (343, 63.5%) of the respondents perceived the lecture materials to be moderately helpful. The majority (362, 67%) of the respondents enjoyed online learning. The highest percentage of the respondents (374, 69.3%) agreed that online learning will be helpful for the growth of their career (Table 2).

#### Usage of Online Learning During COVID-19 Pandemic

Out of 540 respondents, 336 (62.2%) respondents used online method of learning during the COVID-19 pandemic, while 204 (37.8%) respondents did not use the online method of learning during the COVID-19 pandemic. The majority (351, 65%) of the respondents used the smart phone for the online learning during the COVID-19 pandemic. Most of the respondents (283, 52.4%), perceived the quality of the internet connection to be poor. The majority (323, 59.8%) of the respondents were satisfied with the technology they used (Table 3).

#### Respondents' Perceived Benefits of Online Learning During the COVID-19 Pandemic

The respondents' perception of the benefits of online learning is captured in Figure 1 as follows: improved comfortability while

learning 200 (37%) respondents, improved quality of learning materials 163 (30.2%) respondents, and time-saving 34 (22.8%) respondents.

#### Challenges of Online Learning Encountered by the Respondents During the COVID-19 Pandemic

The challenges encountered by the respondents while using online learning during the COVID-19 pandemic as presented in Figure 2 out of which, 160 (29.6%) respondents revealed financial constraints, 120 (22.2%) respondents had no internet access, 80 (14.8%) respondents lacked technical know-how, and 30 (5.6%) respondents had poor communication with lectures and peers.

#### Relationships Between Studied Variables

There were statistically significant relationships between the respondent's attitude and some of their sociodemographic variables such as their age ( $\chi^2 = 67.462$ ,  $p = .000$ ) and institution ( $\chi^2 = 122.796$ ,  $p = .000$ ) (Table 4). There were no statistically significant relationships between the respondent's attitude and the level of study and how often the respondent participated in online lectures ( $\chi^2 = 14.805$ ,  $p = .096$ ), how many hours they spent each day during online lectures ( $\chi^2 = 6.292$ ,  $p = .391$ ), where they mostly partake in online learning ( $\chi^2 = 12.126$ ,  $p = .436$ ), how conducive the environment was while learning ( $\chi^2 = 14.576$ ,  $p = .265$ ), and how stressful is/was online learning ( $\chi^2 = 13.987$ ,  $p = .302$ ) (Table 5). There were statistically significant relationships between usage or utilization and level of study and access to devices for online learning ( $\chi^2 = 12.476$ ,  $p = .006$ ), the devices used for online learning ( $\chi^2 = 16.890$ ,  $p = .010$ ), satisfaction with the technology

**Table 4**

Chi Square showing relationship between attitudes and sociodemographics

Variable	Chi square	Df	p value	Remark
Age	67.462	6	.000	Significant
Sex	18.521	3	.604	Not significant
Institution	122.796	5	.000	Significant

Table 5

Chi-Square showing relationship between level of study and their attitudes

Questions	Chi square	Df	p value	Remark
How often do/did you participate in online lectures?	14.805	9	.096	Not significant
How many hours did you spend each day during online lectures?	6.292	6	.391	Not significant
Where did you mostly partake in online learning?	12.126	12	.436	Not significant
How conducive is/was the environment while learning?	14.576	12	.265	Not significant
How stressful is/was online learning?	13.987	12	.302	Not significant
How helpful was/were: [Online learning during the pandemic]?	7.852	6	.249	Not significant
How helpful was/were: [Provided learning materials]?	14.571	6	.024	Significant
How helpful was/were: [Your lecturers]?	16.905	6	.010	Significant
Did you enjoy online learning?	4.994	6	.545	Not significant
Do you think online learning will be helpful for the growth of your career?	3.484	3	.323	Not significant
Do you think online learning makes students slaves to technology?	13.651	9	.135	Not significant

you used ( $\chi^2 = 13.675$ ,  $p = .003$ ), and the quality of technology used ( $\chi^2 = 14.284$ ,  $p = .027$ ). However, there were no statistically significant relationships between usage or utilization and the level of study and the extent to which the courses relied on the use of technology with ( $\chi^2 = 8.534$ ,  $p = .202$ ) (Table 6). There were statistically significant relationships between statement on benefits and level of respondent's studies ( $\chi^2 = 120.952$ ,  $p = .005$ ) and online learning makes learning interesting ( $\chi^2 = 25.014$ ,  $p = .003$ ). However, there were no statistically significant relationships between benefits and levels of study in enhancing learning experiences ( $\chi^2 = 15.028$ ,  $p = .090$ ), confidence is an important feature of online learning ( $\chi^2 = 16.049$ ,  $p = .066$ ) (Table 7). There were statistically significant relationships between challenges and levels of study of the participant, challenges encountered during online learning ( $\chi^2 = 206.327$ ,  $p = .007$ ), and perceived enjoyment while studying educational technology courses ( $\chi^2 = 19.181$ ,  $p = .024$ ). However, there were no statistically significant relationships between the levels of study and challenges statements, such as online learning promotes social isolation ( $\chi^2 = 16.034$ ,  $p = .066$ ), acquisition of significant information is difficult through the internet ( $\chi^2 = 10.130$ ,  $p = .340$ ), and online learning is difficult ( $\chi^2 = 11.738$ ,  $p = .228$ ) (Table 8).

## Discussion

We found that the respondents in our study showed good and positive attitudes toward the online learning method during the COVID-19. This could be associated with the fact that most students did not want to have extra years in the university and, so they were ready to adopt the new learning method. This finding is consistent with the findings of the studies conducted by Thapa et al. (Thapa et al., 2021) on nursing students' attitudes toward the practice of e-learning amid COVID-19 in Nepal, Adewole's (Adewole-Odeshi, 2014) the study on attitudes of students toward e-learning, in South-West Nigerian Universities, Sharma and Jeba (Sharma and Jeba, 2021) study on the perception of nursing students toward online classes in selected nursing colleges at Jammu, which also reported favorable attitudes of their respondents toward online learning. In Thapa et al. (Thapa et al., 2021) study, out of 470 nursing

students, 58.9% had a favorable attitude regarding e-learning, and Sharma and Jeba (Sharma and Jeba, 2021) in their study, reported a mean perception score of  $73.5 \pm 9.72$  among nursing faculty. However, Barzani and Jamil (Barzani and Jamil, 2022) in their study, which was conducted to evaluate the student's perception toward online education during the COVID-19 among 200 students of University Kurdish EFL in Iraq, reported a contrary finding in which majority of their respondent's showed negative attitudes toward online education as they preferred and saw on-campus education more effective. The differences in our findings could be attributed to the different sample sizes used in our various studies as well as the geographical variation of our different studies.

The majority of our respondents used online learning method during the COVID-19 pandemic in Nigeria. This is in agreement with the findings of the studies conducted by Boca (Boca, 2021) on the evaluation of the factors influencing student's behavior and attitude toward online education during the COVID-19 at the University of Cluj Napoca, Romania, and Thapa et al. (Thapa et al., 2021) on nursing student's attitude on the practice of e-learning avoid COVID-19 in Nepal, reported high usage of online method during the COVID-19 pandemic. However, the respondents in Thapa et al. (Thapa et al., 2021) study preferred the traditional face-to-face learning to the online method, which they attributed to practical issues and introduction of new phenomena of learning.

The challenges encountered by the respondents in our study include but are not limited to financial constraints, internet access, lack of technical know-how instable/slow internet access, lack of mobile data, poor communication with lecturers and peers, and no access to a computer device. These findings are in keeping with the findings of the studies carried out by Thapa et al. (Thapa et al., 2021) and Barzani and Jamil (Barzani and Jamil, 2022), which also reported similar challenges encountered during the use of online methods of learning.

In this study, we found that our respondents perceived online learning methods to be beneficial to their educational progress. Some of the benefits of the online learning method identified in our study include improved quality of learning materials, improved comfort ability while learning, time saving, and ready access to missed or previous lectures. This is in harmony with the findings of

Table 6

Chi-square showing association between level of study and their usage of online learning

Questions	Chi square	Df	p value	Remark
Did you use online method of learning during COVID-19?	8.658	3	.034	Significant
Do you have access to device for online learning?	12.476	3	.006	Significant
What device did you use for online learning?	16.890	6	.010	Significant
Are you satisfied with the technology you used?	13.675	3	.003	Significant
How do you rate: [The ease of your technology]?	15.148	6	.019	Significant
How do you rate: [The quality of the internet connection used]?	12.714	6	.048	Significant
How do you rate: [The extent to which the courses relied on the use of technology in classroom]?	8.534	6	.202	Not significant
How do you rate: [The quality of technology used]?	14.284	6	.027	Significant

**Table 7**

Chi-square showing association between level of study and the benefits of online learning

Variable	Chi square	Df	p value	Remark
What are the benefits of online learning?	120.952	8	.005	Significant
What are your opinions on the following statements? [Online learning provides an opportunity to acquire new knowledge]	11.989	9	.214	Not significant
What are your opinions on the following statements? [Online learning enhances learning experiences]	15.028	9	.090	Not significant
What are your opinions on the following statements? [Confidence is an important feature of online learning]	16.049	9	.066	Not significant
Online learning makes learning interesting.	25.014	9	.003	Significant

the studies carried out by Thapa et al. (Thapa et al., 2021), reported that the respondents in their studies found online learning beneficial. Even when students found that online learning was stressful, they also found it beneficial especially in terms of evaluation of their assignments.

There were statistically significant relationships between the respondent's attitudes and some of their sociodemographic variables such as their age and institution. This finding implies that the attitudes of our respondents toward online learning during the COVID-19 pandemic in Nigeria were significantly influenced by their age and institutions. Based on these findings, we think that some institutions had already introduced e-learning platforms to their students before the outbreak of the COVID-19 pandemic.

We found that there were no statistically significant relationships between the respondents' level of studies and the attitude statements such as how often the respondent participated in online lectures, how many hours they spent each day during online lectures, where they mostly partake in online learning, how conducive the environment was while learning, and how stressful is/was online learning. This means that the respondent's attitude toward online learning during the COVID-19 era was not influenced by their level of studies. This we think could be attributed to the fact that all students were seriously affected by the pandemic, and so they took decisions toward the new learning platform personally, which could have resulted in our findings.

There were statistically significant relationships between levels of study and usage or utilization statements such as access to devices for online learning, the devices used for online learning, satisfaction with the technology you used, and the quality of the technology used. These may be ascribed to the fact that many parents usually buy electronic gadgets, such as smart phones and laptop computers, for their children as they advance in the levels of their studies. Also, those who have these devices responded to the adoption of the online learning method during the COVID-19 pandemic. Nevertheless, there were no statistically significant relationships between levels of study and usage or utilization statements such as the extent to which the courses relied on the use of technology.

There were statistically significant relationships between levels of study and benefits statements such as online learning makes learning interesting. However, there were no statistically significant relationships between levels of study and benefits statements such as enhancing learning experiences; confidence is

an important feature of online learning. There were statistically significant relationships between challenges and level of study of the participant, challenges encountered during online learning, and perceived enjoyment while studying educational technology courses. Nonetheless, there were no statistically significant relationships between the level of study and challenges statements such as online learning promotes social isolation, acquisition of significant information is difficult through the internet and online learning is difficult.

### Limitations

The major setback of this study is the small sample size of the respondents and also, students from most of the private universities were not captured in this study. Therefore, the findings can not be generalized. In addition, how the strategies used by the respondents to overcome some of the challenges encountered during the online learning during the COVID-19 pandemic were not captured in this study.

### Conclusion

Attitude and perception are important predictors of acceptance of a new system of learning. The success of the system will be based on appreciation and continued adaptability of the system in line with the challenges faced by the users of the system. This study revealed good and positive attitudes of the students toward the online learning method during COVID-19. Most of them perceived online learning methods to be beneficial to their educational progress. The challenges encountered by the students as revealed in this study included, financial constraints, internet access, unstable/slow internet access, lack of mobile data, poor communication with lecturers and peers, and no access to computer device. To ensure the success of e-learning in our setting, we recommend that the identified constraints should be considered in educational strategy and planning.

### CRedit authorship contribution statement

All authors contributed to the design of the work, the acquisition and analysis of the data. All authors were involved in drafting and commenting on the paper, and approved the final version.

**Table 8**

Chi-square showing association between level of study and the challenges of online learning

Questions	Chi square	Df	p value	Remark
What challenges did you encounter during online learning?	206.327	15	.007	Significant
What are your opinions on the following statements? [Online learning promotes social isolation]	16.034	9	.066	Significant
What are your opinions on the following statements? [Acquisition of significant information is difficult through the internet]	10.130	9	.340	Not significant
What are your opinions on the following statements? [Online learning is difficult]	11.738	9	.228	Not significant
What are your opinions on the following questions? [Perceived enjoyment while studying educational technology courses (PE)]	19.181	9	.024	Significant
What are your opinions on the following questions? [Perceived useful while studying technology]	15.238	12	.229	Not significant



## Ethical approval

Informed consent was obtained from the participants.

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