

## Article

# Online Learning Platforms and Covenant University Students' Academic Performance in Practical Related Courses during COVID-19 Pandemic

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**Abstract:** This study examines the effectiveness of online learning platforms (Zoom and Moodle) and their effect on the academic performance of Covenant University, Ota, Nigeria, students studying practical-related courses during COVID-19. This study specifically seeks to determine students' attitudes towards online learning platforms, investigate the effectiveness of these platforms on practical-related courses as well as ascertain the effect of Zoom and Moodle platforms on the students' academic performance during the Pandemic. Data were gathered through a survey of 380 CU students through the purposive sampling technique to pick students offering practical related courses. Results show that due to the effectiveness of the platforms (Zoom and Moodle) and the positive communication between lecturers and students via these platforms, students would like to see online learning continually adopted after the COVID-19 pandemic. Findings further show that students had no difficulties using these platforms. Due to the sheer adaptability of the online learning platforms used during the pandemic, the usage of Zoom and Moodle had a favorable impact on student's academic achievement in practical-related courses. The study concludes that distance learning is a future direction in teaching practical-related courses because of the flexible nature of the platforms. Thus, universities in this part of the world should invest more in online education platforms to maintain academic continuity, especially during times of emergency.

**Keywords:** COVID-19 pandemic; education; e-learning; online teaching; undergraduates



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## 1. Introduction

On 31 December 2019, the World Health Organization (WHO) received many reports of an uncommon pneumonia-like disease that presented as flu in Wuhan City, Hubei Province, China. Thus, COVID-19 was declared a worldwide pandemic by the WHO a month after its first appearance [1]. Before COVID-19, there has been a lot of development and investment in education innovation, with global Ed Tech firms reaching 18.66 billion USD in 2019 and general advertising for online education expected to reach 350 billion by 2025. Since COVID-19, there has been a significant increase in language apps, virtual coaching, video conferencing tools, and online learning programs [2]. From 24,682 (21.3%) in 2008–09 to 61,995 (48.3%) in 2018–19, the number of students taking at least one online course has increased by 151%. Students attending just online classes at universities grew from 7163 (6.2%) in 2008–09 to 18,241 (14.2%) in 2018–19 [3].

Around the world, the use of online learning tools in schools has become unavoidable. Higher education institutions have attempted to use technology to replace in-class time

with online courses and learning experiences to maintain educational continuity despite the influence of the COVID-19 pandemic on the educational process [4]. Countries used a variety of resources to assist students in their studies. They were also unable to access educational materials, radio learning, informative television, and online educational resources since they could not attend school [5]. Online platforms were the most well-known instruments [6].

Educational information was available through online learning tools. Students can explore at their own pace and participate in organized learning programs led by their professors in real-time courses via virtual meeting platforms [7]. The advent of online learning platforms has changed the educational process in an age of turbulence, globalisation, rapid change, and technology. Several factors influence the rise of online learning in the educational process, including the COVID-19 pandemic—generational variations in learning desires and internal and external motivations.

The COVID-19 pandemic has made headlines worldwide—the most devastating impact on the educational system and the students affected [4]. Universities and countries both shut down their operations. As a result of the shutdown, the border has become more porous. In mid-April 2020, it was discovered that 94% of students were afflicted [8]. Furthermore, according to [9], over 91% of students have been affected by the closing of higher education institutions. During the pandemic, remote learning became a lifeline for education, but digital technologies provide far more than that [4]. To avoid “brain drain” and the utter collapse of the economy, Nigeria joined other developed countries in the education sector to adopt online learning as part of their educational systems.

Even though a number of Nigerian universities use online learning to give lectures, this digitisation has not been sufficient to assign assignments to students. Many tertiary institutions across the country have tapped into this resource. During COVID-19, the most widely used tool was online platform [10]. Thanks to instructional technologies, students may access educational content at their leisure while teachers offer courses via virtual meeting platforms [11]. Since the epidemic outbreak in Sweden, post-secondary schools have shifted to primarily distance learning [12]. According to an online review conducted by [13] in South Africa and the United States of America, during the COVID-19 lockdown, 17 of the 21 South African universities and 63 of the 64 US universities migrated to online learning and used Zoom, Canvas, and Blackboard as the topmost online tools and resources.

To mitigate the impacts of the COVID-19 pandemic, the Italian government outfitted schools with digital platforms, trained school instructors on online learning methodologies. It provided digital devices to disadvantaged children in March 2020 [14]. In Nigeria, the number of students attending post-secondary institutions outnumbers the infrastructure of the schools. One of the issues restricting online learning in Nigeria is the high cost of ICT accessories and a lack of qualified resource workers [15]. Many Nigerian institutions are having trouble conceptualising and implementing online learning initiatives. Students become redundant at home as a result of this. According to a report by the Education in Emergency Working Group, the closure of schools affects around 46 million Nigerian children [16,17]. Among the implications of the COVID-19 pandemic in Nigeria as conceptualized by [18] include reduced international education, academic disruption, higher education schedule, cancellation of local and international conferences, teaching and research learning gap, a loss of workforce in educational institutions, and a reduction in the higher education budget.

Education has changed considerably since the outbreak and widespread of COVID-19, with the rise of distance learning, in which students are taught remotely utilising internet resources. According to an editorial by HMC Architects, to combat COVID-19, distance learning was implemented during that period. A significant number of colleges have shuttered and moved away from on-campus learning to online learning platforms [19].

The COVID-19 pandemic wreaked havoc on many facets of people’s life, including the educational sector. As a precaution, several nations enacted restrictive measures to prevent

the spread of the virus and keep the pandemic at a local level. As a result of the global efforts launched, more than 1.5 billion enrolled students of all ages from all over the globe, accounting for almost 90% of the global student population, suffered interruptions in their education [9,20,21]. Many nations have employed online learning platforms to provide education continuity due to school closures caused by the COVID-19 pandemic.

Around 90% of the world's wealthiest nations have moved away from personal tutoring and online instruction. Some advanced nations adopted online learning and teaching approach before the COVID-19 pandemic. On the other side, many countries have never utilised this technique previously but are now being pressured to do so in order to move forward and avoid wasting students' time [22].

This study seeks investigate the usefulness of online learning platforms as well as Covenant University students' educational value during the COVID-19 Pandemic in practical related courses. The study's specific objectives include: to determine the attitudes of students towards online learning platforms; investigate the effectiveness of Zoom and Moodle online learning platforms on practical-related courses; and ascertain the effect of Zoom and Moodle online learning platforms on Covenant University students' academic performance during the COVID-19 pandemic.

## 2. Materials and Methods

The use of the survey research method for this study becomes necessary because the technique allows the collection of information from a representative sample of a target population but because it could also capture group dynamics amongst the various categories of the respondents [23].

The study is limited to investigating university students that partook in practical-related online learning during the COVID-19 pandemic at Covenant University. The university was selected because it was one of the private universities that used online learning platforms to interact with students during the Pandemic. Covenant University is also the top private university and is the first Nigerian University to rank among the top 500 universities in the world. This study would only examine students studying practical-related courses at Covenant University. This study also focused on Zoom and Moodle online learning platforms because that was the primary online learning tool during the Pandemic. The study was conducted from April to June 2021.

A sample of 380 respondents was chosen randomly for the study. The sample size was ascertained using the Taro Yamane statistical formula. Covenant University is divided into four colleges: the College of Management and Social Sciences (CMSS), the College of Leadership and Development Studies (CLDS), the College of Engineering (COE), and the College of Science and Technology (CST). The samples for this study were drawn from two of these colleges, namely the College of Engineering (COE) and the College of Sciences and Technology (CST). This choice is because the research focused on courses that are primarily practical. The researchers dispersed 190 samples to the College of Engineering and College of Science and Technology departments after the purposive sampling approach. The total needed sample (380) was divided by the two colleges chosen, generating 190 samples for the two colleges.

The questionnaire was designed to elicit general information about the study objectives from students at Covenant University. The questionnaire was based on the instrument's effectiveness to obtain diverse opinions and feelings from the sampled respondents. The questionnaire was designed to measure respondents' understanding, knowledge, perception, and opinions. It consists of sections A, B, C, and D, which tapped information on the social and demographic boundaries to elicit the respondents' perceptions, attitudes, and opinions. Section A has five questions that provide demographic information about the respondents.

In contrast, Section B contains seven questions that provide information about the respondents' opinions regarding the online learning platforms they used; Section C consists of five questions to generate information on the effectiveness of the utilised online learning

platforms on practical-related courses. In comparison, Section D consists of five questions to generate information on the effects of online learning platforms' on students' academic performance. The questionnaire contains one open-ended question and 21 closed-ended questions to avoid quantification and categorisation of the responses as presented in Appendices A and B. Each of the domains was measured with many items on a 5 Likert scale of strongly agree (5), agree (4), undecided (3), disagree (2), and strongly disagree (1).

Experts reviewed the content validity of the measuring instrument in line with the research context. However,  $AVE > 0.5$  was treated as additional evidence of convergent validity, and the construct validity of all variables involved in the study was established using Confirmatory Factor Analysis. Cronbach's Alpha and composite reliability were used to assess the reliability of all variables. The reliability test was designed to determine whether the internal consistency of the measures indicated item homogeneity, as well as to eliminate errors and provide consistent data gathering findings. Each of these variables' reliability was determined using a Cronbach's Alpha level of  $>0.70$  and a composite reliability threshold of  $>0.80$  as presented in Appendix C.

For ethical consideration, eligible respondents were given a chance to comprehend the study's goals and ask questions about the research and participants' rights. Each respondent selected has the right to engage in this research voluntarily and withdraw from the study at any point without any penalty whatsoever. This is in accordance with best practices as demonstrated by [24]. Furthermore, respondents were not required to disclose their names or any other traceable identity to ensure that the information they gave could not be traced to them. Thus, informed consent was obtained from all subjects involved in the study. Data gathered were coded using Statistical Package for Social Sciences, while hypotheses were tested using regression analysis and structural equation modeling.

### 3. Results

The data presented are accompanied by analysis and discussions. Analysis in this section is based on a total number of 360 retrieved questionnaires from the total 380 sample size with a mortality rate of 5.26% (not correctly filled and not returned).

#### *Demographic Data*

Table 1 presents the frequency for demographic variables of students studying practical-related courses. The age distribution of respondents from the table above shows that more students in practical-related courses across the five levels are 18–21 years of age. A deduction can be made about the age group of private university students, with most of the respondents ages 18–21 constituting a more significant percentage of 82.8%. This further implies that students within the age bracket of 14 to their early 20s constitute undergraduate students within Nigerian Universities. Thus, they are adventurous and can cope with the academic rigour of undergraduate studies. Additionally, they are expected to be internet savvy and understand the intricacies of online learning.

The table shows that the majority of the respondents are males constituting a more significant percentage of 63.1% and females constitute a smaller percentage of 36.9%. From the table above, a deduction can be made about the ratio of male to female who studies practical-related courses in higher institution; the male gender constitutes most of the student population in practical-related courses compared to the female gender.

Table 2 shows that 66.4% of respondents agree or strongly agree that they had heard of the Zoom platform before the online classes began during the COVID-19 pandemic. Results also show that 36.4% of respondents agreed they had used Zoom for other purposes before the online classes began, while 60.3% disagreed. The above table also reveals that following the outbreak of the COVID-19 Pandemic, a majority of 72.2% were willing to employ Zoom and Moodle online learning platforms for online learning. 62.5% disagreed and strongly disagreed with being reluctant to use Zoom for online learning. 60.9% of the respondents disagreed and strongly disagreed with effectively using the formally adopted online learning platform, Moodle before the online learning started due to the COVID-19.

90.6% effectively used the Moodle platform during the online learning; likewise, a higher percentage of 81.3% effectively used the Zoom platform during the online learning.

**Table 1.** Frequency for Demographic Variables of Students Studying Practical-Related Courses.

AGE	%
14–17	6.7
18–21	82.8
22 and above	10.5
Total	100.0 n-360
GENDER	%
Male	63.1
Female	36.9
Total	100.00 n-360

**Table 2.** Respondents' Attitude toward Zoom and Moodle platform during COVID-19.

	SA	A	U	D	SD	Total
I have heard of Zoom before the online classes started during the COVID-19 Pandemic.	39.2%	27.2%	3.9%	19.2%	10.6%	100%
I have used Zoom for other activities before the online classes stated during the COVID-19 Pandemic.	21.7%	14.7%	3.3%	30.0%	30.3%	100%
I was ready to make use of Zoom and Moodle for online learning	23.9%	48.3%	15.6%	8.3%	3.9%	100%
I was reluctant to make use of Zoom for online learning	7.5%	16.4%	13.6%	45.8%	16.7%	100%
Before online learning, I effectively used the Moodle platform.	6.1%	18.6%	14.4	37.8%	23.1%	100%
During online learning, I effectively used the Moodle platform	47.7%	42.9%	2.0%	5.3%	2.1%	100%
During online learning, I effectively used the Zoom platform	47.7%	33.6%	4.6%	8.5%	5.6%	100% n-360

From the results, it can be deduced that the respondents were aware of a platform called, Zoom but never used it before the online learning began. Almost three-quarters of the participants (72.2%) showed they were prepared to be taught via these platforms (Zoom and Moodle). They felt the need of these platforms because it is meant to help them get a different learning experience irrespective of the barrier brought about by the COVID-19 pandemic. The findings also revealed that prior to the COVID-19 pandemic, respondents did not effectively use the Moodle platform, which was the only online learning platform adopted by the population of this study (Covenant University), but saw the need to effectively use the formally adopted online learning platform before COVID-19 (Moodle and Zoom).

Table 3 shows that the majority of respondents agree and strongly agree that the Zoom platform was suitable for their course during the COVID-19 pandemic online learning,

with a total of 40%. 55.9% agreed that the Moodle platform was adequate for their course during the COVID-19 pandemic; likewise, 59.3% communicated well with their lecturers via Moodle and Zoom. A majority of 64.8% disagreed that they learnt as much as they would have learnt in a face-to-face class via Zoom and Moodle online platforms. The above table also shows that a majority of 46.1%, would like to see online learning continually adopted after the COVID-19 pandemic.

**Table 3.** Effectiveness of Zoom and Moodle platform on Respondents Learning Process.

	SA	A	U	D	SD	T
Zoom platform was very effective for my course during COVID-19.	9.7%	30.3%	21.9%	25.3%	12.8%	100%
Moodle platform was very effective for my course during COVID-19.	16.7%	39.2%	18.9%	16.9%	8.3%	100%
The communication between me and my lecturer via Zoom and Moodle was very good during the online learning.	33.3%	26.1%	29.4%	5.8%	5.3%	100%
I learnt as much as I would have learnt in a face-to-face class via Zoom and Moodle online platforms.	5.0%	17.8%	12.5%	33.1%	31.7%	100%
Online learning should continue to be incorporated after the COVID-19 Pandemic.	18.3%	27.8%	18.3%	18.1%	17.5%	100% n-360

From these results obtained, it can be said that the respondents would like to see online learning continually adopted after the COVID-19 pandemic. This can be due to the effectiveness of the platforms (Zoom and Moodle) and the positive communication between lecturers and students via these platforms.

Table 4 shows that most respondents disagree with the usage of Zoom and Moodle negatively influencing their academic performance during the COVID-19 online learning, with a total percentage of 63.9%. 41.4% agreed and strongly agreed that the use of Zoom and Moodle affected their academic performance positively. A higher percentage of 37.2% were undecided about if the use of Zoom and Moodle affected their academic performance positively or negatively during the COVID-19 online learning. The above table also shows that a majority of 48% disagreed with having challenges using Zoom and Moodle for online classes. Finally, a majority of 38.6% were unsure whether they would have comprehended online learning better if a different online learning platform had been utilised during COVID-19, as seen in the chart above.

Based on the findings, it can be concluded that the respondents had no difficulties using online learning platforms. Due to the sheer adaptability of the online learning platforms used during COVID-19, the usage of Zoom and Moodle had a favorable impact on student's academic achievement in practical-related courses. It is also fair to say that the respondents are familiar with online learning platforms.

**Table 4.** Effects of Zoom and Moodle Platform on Respondents Academic Performance.

STATEMENTS	SA	A	U	D	SD	T
The use of Zoom and Moodle affected my academic performance negatively during the COVID-19 online learning.	3.9%	9.7%	22.5%	40.8%	23.1%	100%
The use of Zoom and Moodle affected my academic performance positively during the COVID-19 online learning.	13.9%	27.5%	36.1%	15.6%	6.9%	100%
The use of Zoom and Moodle did not affect my academic performance positively or negatively during the COVID-19 online learning	12.2%	18.3%	37.2%	21.4%	10.8%	100%
I had challenges using Zoom and Moodle for online classes.	14.4%	28.6%	8.9%	36.9%	11.1%	100%
I would have understood better if a different online learning platform was used during COVID-19 online classes.	8.9%	15.0%	38.6%	26.9%	10.6%	100% n-360

#### 4. Discussion

##### 4.1. Attitude of Covenant University Students towards Zoom and Moodle for Online Learning

Findings from the study show that 66.4% of respondents affirm that they had heard of the Zoom platform before the online classes began during the COVID-19 pandemic. In keeping with the findings of this survey, 92% of respondents were familiar with e-learning platforms such as Moodle, Microsoft Teams, and Zoom [25]. 36.4% agreed they had used Zoom for other purposes before the online classes began during the COVID-19 pandemic, while 60.3% disagreed.

After the breakout of the COVID-19 pandemic, a majority of 72.2% were ready to employ Zoom and Moodle online learning platforms for online learning, according to the table. 62.5% disagreed or strongly disagreed with the statement that they would be hesitant to utilize Zoom for online learning. Due to COVID-19, 60.9% of respondents disapproved or strongly disagreed with successfully utilising the formally chosen online learning platform (Moodle) before beginning online learning. 90.6% were successful in using the Moodle platform for online learning, whereas 81.3% were successful in using the Zoom platform.

According to the findings, respondents were aware of the Zoom platform but had never utilised it prior to online learning. Their study [26–28] remarked that it was quite similar to this result and premise. Neither the instructors nor the students had any prior knowledge or expertise in the video-conferencing programs that were used (Zoom). On the other hand, the institution appointed competent personnel to respond to any technical issues and to answer concerns about the e-learning platform made by professors and students [29]. Almost majority of the participants (72.2%) indicated that they were ready to be taught via these platforms (Zoom and Moodle). They saw the value on these platforms since they are designed to let people have a varied learning experience regardless of the COVID-19 pandemic's barrier.

The findings also revealed that 60.9% disapproved or strongly disagreed with utilising the formally accepted online learning platform (Moodle) successfully before online learning began owing to the COVID-19. 90.6% were successful in using the Moodle platform for online learning, whereas 81.3% were successful in using the Zoom platform.

This means that prior to the COVID-19 pandemic, the respondents did not successfully use the Moodle platform, which was the only online learning platform that the population of this research (Covenant University) used before to the COVID-19 pandemic, but saw the need to utilize these online learning platforms during the pandemic effectively. Additionally, the findings of [30–32] demonstrate students' positive attitude with previous

computer knowledge, and students in the fields of new technologies to e-learning were very optimistic about their academic performance.

#### *4.2. Effectiveness of Learning via Zoom and Moodle on Covenant University Students Offering Practical-Related Courses*

Findings show that respondents believe the Zoom platform was appropriate for their course during the COVID-19 pandemic online learning. The majority of respondents (55.9%) said the Moodle platform was suitable for their course during the COVID-19 pandemic, and 59.3% said they interacted successfully with their lecturers via Moodle and Zoom. This conclusion is in line with the findings of [33]. Additionally, 80.1% of respondents affirmed to the effectiveness of these platforms in practical-related courses. This conclusion is consistent with prior study findings, indicating that students can effectively manage their time [34,35]. Surprisingly, 73.9% regarded online learning platforms to be more convenient than conventional learning since they can attend classes from the comfort of their own homes and have complete control over course materials.

During the COVID-19 crisis, ref. [36] evaluated the academic performance of science and social science students at Turkish universities. The authors discovered that while scientific students had no trouble interacting with their professors via the adopted online learning platform (49.1%), they still prefer face-to-face lectures over online ones (75.4%). Regardless of their preferences, science students (54.7%) want to see online learning become more widely used [37].

The findings of [38,39] are quite similar to this study. Results show that 64.8% of respondents affirmed that they learned as much as they would have in a face-to-face class using Zoom and Moodle online platforms. According to the table, a majority (46.1%) would like to see online learning continue to be accepted beyond the COVID-19 pandemic. Due to the efficacy of the platforms (Zoom and Moodle) and the excellent contact between lecturers and students via these platforms, students pursuing practical-related courses would want to see online learning continue to be utilised after the COVID-19 pandemic.

#### *4.3. Effects of Using Zoom and Moodle Platforms on Covenant University Students' Academic Performance*

Table 4 answers the research question, which tries to determine the effect of Zoom and Moodle platforms on respondents' academic performance. Table 4 shows that most respondents disagree and strongly disagree with the usage of Zoom and Moodle negatively influencing their academic performance during the COVID-19 online learning, with a total percentage of 63.9%. 41.4% said that using Zoom and Moodle positively impacted their academic achievement. During the COVID-19 pandemic, a greater number of 37.2% were unsure whether using Zoom and Moodle positively or negatively impacted their academic achievement. Finally, a majority of 38.6% were unsure whether they would have comprehended online learning better if a different online learning platform had been utilised during COVID-19, as seen in the chart above.

This survey shows that respondents had no problems using online learning systems. As a result of the adaptability of the online learning platforms used during COVID-19, the usage of Zoom and Moodle had a favorable impact on student's academic achievement in practical-related courses. It's also fair to say that the respondents are unfamiliar with online learning platforms. In a similar line, students consider e-learning connectivity on campus very efficient. The positive attitude of students with previous computer knowledge and students in new technologies to e-learning was very optimistic. Their self-studying and academic performance were significantly affected by e-learning platforms during the COVID-19 pandemic [6,40].

Due to the nature and scope of the study, only students studying practical related courses engaged for this research. This did not, however, affect the quality of the data that was generated because it was confirmed that students offering practical related courses were engaged online during the pandemic. In addition, the researchers stratified the



departments in the selected colleges. These departments from the colleges selected to give the researcher the desired coverage and to ensure even distribution for the study.

The study underscores and analyses the usage of Zoom and Moodle online platforms for learning practical related courses. This study is timely as it serves as an additional resource to online learning and pedagogy in general. Various studies have demonstrated the useful role of online learning platforms in the academic performance of students. The focus has always been on general theoretical courses, but this study took a different perspective by delving into practical related courses.

## 5. Conclusions

Student performance in practical courses at Covenant University was evaluated using Zoom and Moodle online learning systems. This study contributes to actualising SDG 4 (Quality Education). Quality education is a pathway to social mobility and the reduction of inequality. The teaching process was influenced by an unanticipated shift from traditional in-class teaching to online teaching techniques due to the COVID-19 pandemic. Covenant University students and Lecturers utilised Zoom and Moodle to support remote study due to international school closures to control the spread of the COVID-19 virus. Given that Zoom and Moodle are adaptable online learning systems, students pursuing practical courses performed better academically due to their use. Students studying practical courses prefer to continue using online learning tools because of their efficacy (Zoom and Moodle) and the positive communication between lecturers and students via these platforms. Student satisfaction was excellent when Covenant University employed its e-learning systems throughout the pandemic.

Furthermore, this study emphasis on distance learning as a future direction in teaching practical-related courses such as Industrial mathematics, Industrial physics, Applied biology, Architecture, Biochemistry, Building technology, Computer science, Estate management, Industrial chemistry, Industrial mathematics, Industrial mathematics, Industrial physics, Microbiology, Management information systems, and Industrial chemistry. The findings in this study have demonstrated the positive approach and willingness to utilise Zoom and Moodle platforms. Thus, other institutions of higher learning in Nigeria should invest in online education platforms to maintain academic continuity, especially during times of emergency such as was experienced across the globe in 2020. Furthermore, a mixture of synchronous and asynchronous classes should be used to the fullest extent possible.

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**Institutional Review Board Statement:** The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by Covenant Health Research Ethics Committee of Covenant University.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** Data are not publicly available, though the data may be made available on request from the corresponding author.

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## Appendix A

### QUESTIONNAIRE

#### SECTION A: DEMOGRAPHICS:

1. Age: (a) 14–17 (b) 18–21 (c) 22 and above
2. Gender (a) Male (b) Female
3. College (a) COE (b) CST
4. Level (a) 100 (b) 200 (c) 300 (d) 400 (e) 500
5. Programme of Study . . . . .

**Table A1.** Instruction: Kindly tick the option which represents your choice. Key: SA—Strongly Agree, A—Agree, U—Undecided, D—Disagree, SD—Strongly Disagree.

	STATEMENTS: ATTITUDE	SA	A	U	D	SD
6.	I have heard of Zoom before the online classes started during the COVID-19 pandemic.					
7.	I have used Zoom for other activities before the online classes stated during the COVID-19 pandemic.					
8.	I was acceptive to make use of Zoom and Moodle for online Learning.					
9.	I was reluctant to make use of Zoom for online Learning.					
10.	Before online Learning, I effectively used the Zoom and Moodle platforms.					
11.	During online learning, I effectively used the Moodle platform					
12.	During online learning, I effectively used the Zoom platform					
<b>EFFECT</b>						
13.	Zoom platform was very effective for my course during COVID-19.					
14.	Moodle platform was very effective for my course during COVID-19.					
15.	The communication between me and my lecturer via Zoom and Moodle was very good during the online Learning.					
16.	I learnt as much as I would have learnt in a face-to-face class via Zoom and Moodle online platforms.					
17.	Online Learning should continue to be incorporated after the COVID-19 pandemic.					
<b>ACADEMIC PERFORMANCE</b>						
18.	I had challenges using Zoom and Moodle for online classes.					

**Table A1.** *Cont.*

	STATEMENTS: ATTITUDE	SA	A	U	D	SD
19.	I would have understood better if a different online learning tool was used during COVID-19 online classes.					
20.	The use of Zoom and Moodle affected my academic performance negatively during the COVID-19 online Learning.					
21.	The use of Zoom and Moodle affected my academic performance positively during the COVID-19 online.					
22.	Zoom and Moodle did not affect my academic performance positively or negatively during the COVID-19 online Learning.					

**Appendix B****Table A2.** Coding Guide.

Items on Questionnaire	Attribute	Code	Columns
Age	14–17	1	1
	18–21	2	
	22 and above	3	
Gender	Male	1	2
	Female	2	
College	COE	1	3
	CST	2	
Level	100	1	4
	200	2	
	300	3	
	400	4	
	500	5	
Programme of Study	Spring	Spring	5
I have heard of Zoom before the online classes started during the COVID-19 pandemic.	Strongly agree	1	6
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
I have used Zoom for other activities before the online classes stated during the COVID-19 pandemic.	Strongly agree	1	7
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
I was acceptive to make use of Zoom and Moodle for online Learning.	Strongly agree	1	8
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
I was reluctant to make use of Zoom for online Learning.	Strongly agree	1	9
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	

Table A2. Cont.

Items on Questionnaire	Attribute	Code	Columns
Before online Learning, I effectively used the Zoom and Moodle platforms.	Strongly agree	1	10
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
During online learning, I effectively used the Moodle platform.	Strongly agree	1	11
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
During online learning, I effectively used the Zoom platform.	Strongly agree	1	12
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
Zoom platform was very effective for my course during COVID-19.	Strongly agree	1	13
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
Moodle platform was very effective for my course during COVID-19.	Strongly agree	1	14
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
The communication between me and my lecturer via Zoom and Moodle was very good during the online Learning.	Strongly agree	1	15
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
I learnt as much as I would have learnt in a face-to-face class via Zoom and Moodle online platforms.	Strongly agree	1	16
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
Online Learning should continue to be incorporated after the COVID-19 pandemic.	Strongly agree	1	17
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
I had challenges using Zoom and Moodle for online classes.	Strongly agree	1	18
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
I would have understood better if a different online learning tool was used during COVID-19 online classes.	Strongly agree	1	19
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
The use of Zoom and Moodle affected my academic performance negatively during the COVID-19 online Learning.	Strongly agree	1	20
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	

**Table A2.** *Cont.*

Items on Questionnaire	Attribute	Code	Columns
The use of Zoom and Moodle affected my academic performance positively during the COVID-19 online.	Strongly agree	1	21
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	
Zoom and Moodle did not affect my academic performance positively or negatively during the COVID-19 online Learning.	Strongly agree	1	22
	Agree	2	
	Undecided	3	
	Disagree	4	
	Agree	5	

## Appendix C

**Table A3.** Validity and Reliability Coefficient.

	No. of Items	Reliability		Validity
		Cronbach's Alpha >0.70	Composite Reliability >0.8	Average Variance Extracted >0.5
Attitude toward Zoom and Moodle Platform during COVID-19	7	0.775	0.887	0.671
Effectiveness of Zoom and Moodle Platform on Respondents Learning Process	5	0.847	0.876	0.595
Effects of Zoom and Moodle Platform on Respondents Academic Performance	5	0.865	0.898	0.687

## Appendix D

**Table A4.** Crosstabulation of Gender and Variables in the Study.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
I have heard of Zoom before the online classes started during the COVID-19 pandemic started.						
Male	85	58	9	49	26	227
	23.6%	16.1%	2.5%	13.6%	7.2%	63.1%
Female	56	40	5	20	12	133
	15.6%	11.1%	1.4%	5.6%	3.3%	36.9%
Total	141	98	14	69	38	360
	39.2%	27.2%	3.9%	19.2%	10.6%	100.0%
I have used Zoom for other activities before the online classes stated during the COVID-19 pandemic.						
Male	44	34	7	68	74	227
	12.2%	9.4%	1.9%	18.9%	20.6%	63.1%
Female	34	19	5	40	35	133
	9.4%	5.3%	1.4%	11.1%	9.7%	36.9%
Total	78	53	12	108	109	360
	21.7%	14.7%	3.3%	30.0%	30.3%	100.0%
I was acceptive to make use of Zoom and Moodle for online learning.						
Male	57	103	43	14	10	227
	15.8%	28.6%	11.9%	3.9%	2.8%	63.1%
Female	29	71	13	16	4	133
	8.1%	19.7%	3.6%	4.4%	1.1%	36.9%
Total	86	174	56	30	14	360
	23.9%	48.3%	15.6%	8.3%	3.9%	100.0%
I was reluctant to make use of Zoom for online learning.						
Male	18	34	30	108	37	227
	5.0%	9.4%	8.3%	30.0%	10.3%	63.1%
Female	9	25	19	57	23	133
	2.5%	6.9%	5.3%	15.8%	6.4%	36.9%
Total	27	59	49	165	60	360
	7.5%	16.4%	13.6%	45.8%	16.7%	100.0%

Table A4. Cont.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
Before online learning, I effectively used the Zoom and Moodle platform.						
Male	12 3.3%	37 10.3%	34 9.4%	90 25.0%	54 15.0%	227 63.1%
Female	10 2.8%	30 8.3%	18 5.0%	46 12.8%	29 8.1%	133 36.9%
Total	22 6.1%	67 18.6%	52 14.4%	136 37.8%	83 23.1%	360 100.0%
Zoom platform was very effective for my course during COVID-19.						
Male	24 6.7%	64 17.8%	52 14.4%	61 16.9%	26 7.2%	227 63.1%
Female	11 3.1%	45 12.5%	27 7.5%	30 8.3%	20 5.6%	133 36.9%
Total	35 9.7%	109 30.3%	79 21.9%	91 25.3%	46 12.8%	360 100.0%
Moodle platform was very effective for my course during COVID-19.						
Male	40 11.1%	94 26.1%	42 11.7%	34 9.4%	17 4.7%	227 63.1%
Female	20 5.6%	47 13.1%	26 7.2%	27 7.5%	13 3.6%	133 36.9%
Total	60 16.7%	141 39.2%	68 18.9%	61 16.9%	30 8.3%	360 100.0%
The communication between me and my lecturer via Zoom and Moodle was very good during the online learning.						
Male	11 3.1%	62 17.2%	49 13.6%	72 20.0%	33 9.2%	227 63.1%
Female	8 2.2%	32 8.9%	21 5.8%	48 13.3%	24 6.7%	133 36.9%
Total	19 5.3%	94 26.1%	70 19.4%	120 33.3%	57 15.8%	360 100.0%
I learnt as much as I would have learnt in a face-to-face class via Zoom and Moodle online platforms.						
Male	13 3.6%	42 11.7%	31 8.6%	70 19.4%	71 19.7%	227 63.1%
Female	5 1.4%	22 6.1%	14 3.9%	49 13.6%	43 11.9%	133 36.9%
Total	18 5.0%	64 17.8%	45 12.5%	119 33.1%	114 31.7%	360 100.0%
Online learning should continue to be incorporated after the COVID-19 pandemic.						
Male	48 13.3%	61 16.9%	45 12.5%	36 10.0%	37 10.3%	227 63.1%
Female	18 5.0%	39 10.8%	21 5.8%	29 8.1%	26 7.2%	133 36.9%
Total	66 18.3%	100 27.8%	66 18.3%	65 18.1%	63 17.5%	360 100.0%
I had challenges using Zoom and Moodle for online classes.						
Male	31 8.6%	67 18.6%	21 5.8%	81 22.5%	27 7.5%	227 63.1%
Female	21 5.8%	36 10.0%	11 3.1%	52 14.4%	13 3.6%	133 36.9%
Total	52 14.4%	103 28.6%	32 8.9%	133 36.9%	40 11.1%	360 100.0%
I would have understood better if a different online learning tool was used during COVID-19 online classes.						
Male	17 4.7%	39 10.8%	91 25.3%	55 15.3%	25 6.9%	227 63.1%
Female	15 4.2%	15 4.2%	48 13.3%	42 11.7%	13 3.6%	133 36.9%
Total	32 8.9%	54 15.0%	139 38.6%	97 26.9%	38 10.6%	360 100.0%

Table A4. Cont.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Total
The use of Zoom and Moodle affected my academic performance negatively during the COVID-19 online learning.						
Male	9	24	52	91	51	227
	2.5%	6.7%	14.4%	25.3%	14.2%	63.1%
Female	5	11	29	56	32	133
	1.4%	3.1%	8.1%	15.6%	8.9%	36.9%
Total	14	35	81	147	83	360
	3.9%	9.7%	22.5%	40.8%	23.1%	100.0%
The use of Zoom and Moodle affected my academic performance positively during the COVID-19 online.						
Male	32	62	82	34	17	227
	8.9%	17.2%	22.8%	9.4%	4.7%	63.1%
Female	18	37	48	22	8	133
	5.0%	10.3%	13.3%	6.1%	2.2%	36.9%
Total	50	99	130	56	25	360
	13.9%	27.5%	36.1%	15.6%	6.9%	100.0%
The use of Zoom and Moodle did not affect my academic performance positively or negatively during the COVID-19 online learning.						
Male	24	38	89	48	28	227
	6.7%	10.6%	24.7%	13.3%	7.8%	63.1%
Female	20	28	45	29	11	133
	5.6%	7.8%	12.5%	8.1%	3.1%	36.9%
Total	44	66	134	77	39	360
	12.2%	18.3%	37.2%	21.4%	10.8%	100.0%

## References

1. Armstrong-Mensah, E.; Ramsey-White, K.; Yankey, B.; Self-Brown, S. COVID-19 and Distance Learning: Effects on Georgia State University School of Public Health Students. *J. Front. Public Health* **2020**, *8*, 547. [CrossRef]
2. Li, C.; Lalani, F. The COVID-19 Pandemic Has Changed Education Forever. This Is How. *J. World Econ. Forum* **2020**. Available online: <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/> (accessed on 4 June 2021).
3. Wallis, L. Growth in Distance Learning Outpaces Total Enrollment Growth. *J. State Or. Employ. Dep. Qual. Inf. Inf. Choices* **2020**. Available online: <https://www.qualityinfo.org/-/growth-in-distance-learning-outpaces-total-enrollment-growth> (accessed on 4 June 2021).
4. Andreas, S. The Impact of COVID-19 on Education—Insights from Education at a Glance 2020. Available online: <https://www.oecd.org/education/the-impact-of-covid-19-on-education-insights-education-at-a-glance-2020.pdf> (accessed on 4 June 2021).
5. Bergdahl, N.; Nouri, J. COVID-19 and crisis-prompted distance education in Sweden. *Technol. Knowl. Learn.* **2021**, *26*, 443–459. [CrossRef]
6. Reviandani, W. The Effectiveness of Using Blended Learning with Google Classroom and Zoom Media on Students' Understanding. *Innov. Res. J.* **2021**, *2*, 99–118. [CrossRef]
7. Teräs, M.; Suoranta, J.; Teräs, H.; Curcher, M. Post-COVID-19 education and education technology 'solutionism': A seller's market. *Postdigit. Sci. Educ.* **2020**, *2*, 863–878. [CrossRef]
8. United Nations. *Policy Brief: Education during COVID-19 and beyond*; United Nations: New York, NY, USA, 2020; p. 26.
9. UNESCO. COVID-19 Educational Disruption and Response. 2020. Available online: <https://en.unesco.org/covid19/educationresponse> (accessed on 7 July 2021).
10. Schleicher, A.; Reimers, F. *Schooling Disrupted, Schooling Rethought: How the COVID-19 Pandemic Is Changing Education*; OECD: Paris, France, 2020.
11. Rashid, S.; Yadav, S.S. Impact of COVID-19 pandemic on higher education and research. *Indian J. Human Dev.* **2020**, *14*, 340–343. [CrossRef]
12. Otamas, I.H.; Anishchenko, V.O.; Ovsiankina, L.A.; Afanasieva, I.A.; Bieliatynskiy, A. COVID-19 Pandemic: Development of Digital Technologies that Provide Connection, Collaboration and Lifelong Learning. *Stud. Appl. Econ.* **2021**, *30*, 39. [CrossRef]
13. Chaka, C. Higher education institutions and the use of online instruction and online tools and resources during the COVID-19 outbreak—An online review of selected U.S. and SA's universities. *Res. Squ.* **2020**, *1*, 1–46.
14. Republic of Italy. Measures to Strengthen the National Health Service and Economic Support for Families, Workers and Companies Related to the Epidemiological Emergency from COVID-19 (Law Decree 17 March 2020 Number 18), 161/70. Official Gazette of the Italian Republic. 2020. Available online: <https://www.gazzettaufficiale.it/eli/gu/2020/03/17/70/sg/pdf> (accessed on 17 June 2021).
15. Adeoye, I.A.; Adanikin, A.F.; Adanikin, A. COVID-19 and E-learning: Nigeria tertiary education system experience. *Int. J. Res. Innov. Appl. Sci.* **2020**, *5*, 28–31.
16. EiEWG. *Nigeria Education Sector COVID-19 Response Strategy in North East*; EiEWG: Maiduguri, Nigeria, 2020; p. 18.

17. Oyediran, W.O.; Omoare, A.M.; Owoyemi, M.A.; Adejobi, A.O.; Fasasi, R.B. Prospects and limitations of e-learning application in private tertiary institutions amidst COVID-19 lockdown in Nigeria. *Heliyon* **2020**, *6*, e05457. [CrossRef]
18. Jacob, O.N.; Abigeal, I.; Lydia, A.E. Impact of COVID-19 on the higher institutions development in Nigeria. *Electron. Res. J. Soc. Sci. Humanit.* **2020**, *2*, 126–135.
19. Tomasik, M.J.; Helbling, L.A.; Moser, U. Educational gains of in-person vs. distance learning in primary and secondary schools: A natural experiment during the COVID-19 pandemic school closures in Switzerland. *Int. J. Psychol.* **2021**, *56*, 566–576. [CrossRef] [PubMed]
20. UNESCO. *School Closures Caused by Coronavirus (COVID-19)*; UNESCO: Paris, France, 2021.
21. UNICEF and Microsoft Launch a Global Learning Platform to Help Address the COVID-19 Education Crisis. Available online: <https://www.unicef.org/press-releases/unicef-and-microsoft-launch-global-learning-platform-help-address-COVID-19-education> (accessed on 8 July 2021).
22. Bozkurt, A.; Jung, I.; Xiao, J.; Vladimirsch, V.; Schuwer, R.; Egorov, G.; Paskevicius, M. A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian J. Distance Educ.* **2020**, *15*, 1–126.
23. Ehiane, O.S. Discipline and academic performance (A study of selected secondary schools in Lagos, Nigeria). *Int. J. Acad. Res. Progress. Educ. Dev.* **2014**, *3*, 181–194.
24. Petousi, V.; Sifaki, E. Contextualising harm in the framework of research misconduct. Findings from discourse analysis of scientific publications. *Int. J. Sustain. Dev.* **2020**, *23*, 149–174. [CrossRef]
25. Alameri, J.; Masadeh, R.; Hamadallah, E.; Ismail, H.B.; Fakhouri, H.N. Students' Perceptions of E-learning platforms (Moodle, Microsoft Teams and Zoom platforms) in The University of Jordan Education and its Relation to self-study and Academic Achievement During COVID-19 pandemic. *J. ISSN* **2020**, *2692*, 2800.
26. Ibrahim, A.; Attia, A.; Bataineh, A.; Ali, H. Evaluation of the online teaching of architectural design and basic design courses case study: College of Architecture at JUST, Jordan. *Ain Shams Eng. J.* **2021**, *12*, 2345–2353. [CrossRef]
27. Ekanem, T.; Odiboh, O.; Olatunji, R.; Amodu, L.; Yartey, D.; Adesina, E.; Adeyeye, B. A case for e-teaching and e-learning of destination public relations in Nigeria. In Proceedings of the 31st International Business Information Management Association Conference, Milan, Italy, 25–26 April 2018.
28. Adesina, E.; Oyero, O.; Okorie, N.; Amodu, L.; Adeyeye, B.; Yartey, D. Data on information sources, knowledge and practice on Hepatitis b virus in Southwest Nigeria. *Data Brief* **2020**, *30*, 105507. [CrossRef]
29. Khogali, H. The effect of COVID-19 corona virus on sustainable teaching and learning in architecture engineering. *Modern Appl. Sci.* **2020**, *14*, 44–58. [CrossRef]
30. Mahfouz, S.M.; Salam, W.J. Jordanian University Students' Attitudes toward Online Learning during the COVID-19 Pandemic and Lockdowns: Obstacles and Solutions. *Int. J. Learn. Teach. Educ. Res.* **2021**, *28*, 20. [CrossRef]
31. Adeyeye, B.; Amodu, L.; Odiboh, O.; Oyesomi, K.; Adesina, E.; Yartey, D. Agricultural Radio Programmes in Indigenous Languages and Agricultural Productivity in North-Central Nigeria. *Sustainability* **2021**, *13*, 3929. [CrossRef]
32. Adesina, E.; Oyero, O.; Okorie, N.; Omojola, O.; Amodu, L.; Adeyeye, B. Health management strategies for hepatitis care practices: An interplay of communication structures and social marketing theory. In Proceedings of the 32nd International Business Information Management Association Conference, Sevilla, Spain, 15–16 November 2018; pp. 7305–7309.
33. Njoroge, P.M.; Nyabuto, A.N. Discipline as a factor in academic performance in Kenya. *J. Educ. Soc. Res.* **2014**, *4*, 289. [CrossRef]
34. Bozkurt, A.; Sharma, R.C. Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian J. Distance Educ.* **2020**, *15*, i–vi.
35. Edeh, M.; Nwafor, C.; Ezeanya, C.; Patricia, N. Impact of E-learning Platforms on Students' Interest and Academic Achievement in Data Structure Course. *CCU J. Sci. Fac. Nat. Appl. Sci.* **2020**, *1*, 1–16.
36. Elhadary, T.; Elhaty, I.; Mohamed, A.; Alawna, M. Evaluation of Academic Performance of Science and Social Science students in Turkish Universities during COVID-19 crisis. *J. Crit. Rev.* **2020**, *7*, 1740–1751.
37. Salem, O.; Marietta, K.I. The Evaluation of E-Learning System During the COVID-19 Pandemic from the Students' Perspective. *Int. Bus. Manag.* **2021**, *15*, 241–246.
38. Elhaty, I.A.; Elhadary, T. A pre-assessment of the educational programs intended to be applied by Turkish universities in light of the continuing spread of COVID-19. *Eur. J. Mol. Clin. Med.* **2020**, *7*, 1–20.
39. Makruf, I.; Rifa'i, A.A.; Triana, Y. Moodle-based online learning management in higher education. *Int. J. Instr.* **2022**, *15*, 135–152. [CrossRef]
40. Kashoob, M.; Attamimi, R. Exploring Omani EFL Students' Perceptions of the Newly Adopted Online Learning Platforms at the University of Technology and Applied Sciences-Salalah. *J. Educ. Learn.* **2021**, *10*, 28–36. [CrossRef]