

# *Online Teaching And Learning Of Computational Courses Amidst The COVID-19 Pandemic Among Undergraduate Students In Rivers State, Nigeria*

Dr. George, Nchelem Rosemary  
Department of Mathematics/Statistics  
Ignatius Ajuru University of Education  
Port Harcourt, Rivers State Nigeria.



## **Abstract**

The study investigated the challenges confronting the online teaching and learning of computational courses amidst the COVID-19 pandemic. The population comprised of 66 lecturers and 3,428 B.Sc. and B.Sc. Ed. students in the Faculty of Natural and Applied Sciences in Ignatius Ajuru University of Education Port Harcourt, Rivers State Nigeria. The census sampling technique was used to select 66 lecturers and the stratified sampling was used to select 478 students. The study had three research questions and three null hypotheses. The data-gathering tool was a 15-item online learning questionnaire. Experts in mathematics education and statistics were responsible for the instrument's face and content validity. Using the test-retest procedure, a reliability of 0.81 was gotten. The study questions were answered using the mean and standard deviation, and the independent sample t-test was employed to address the null hypotheses at 0.05 level of significance. Results showed a substantial disparity between lecturers' and students' mean assessments of their familiarity with using online learning platforms in computational courses during the COVID-19 epidemic. The mean judgments of lecturers and students on the contextual elements that influence online teaching and learning of computational courses in the context of the COVID-19 epidemic were also found to differ significantly. The mean assessments of lecturers' and students' preferred methods of teaching and learning computational courses in the context of the COVID-19 epidemic were found to differ significantly. These results led to the recommendation that technological assistance be given to lecturers and students to encourage and improve online teaching and learning of computational courses.

**Keywords – Computational Courses, COVID-19 Pandemic, Teaching, Learning, online learning.**

## **I. INTRODUCTION**

Information and Communication Technology (ICT) has become one of the basic building blocks of every activity in the modern society. The emergence of technology has permeated every sphere of human endeavor. This present era is characterized with the use of modern technology to solve problems in the society. This is the generation of digital technologies and the generation of hi-tech. The ways teaching and learning are carried out presently in schools have experienced huge changes due to the technological trend that the society has embraced in this 21st century (Waddell,2015). The digital age has made available various technological gadgets to work with in various fields of endeavor. The teachers who carry out teaching in the educational sector are not left because there are extensive range of sophisticated technological gadgets available for computer aided instruction in schools (Nwachukwu & Ibekwe, 2021). It is therefore, expected that the teachers should integrate technology in their instructional practices. Some of the ways teachers and students can integrate technology are in the use of computers, smartphones, internet, smart boards, online learning, overhead projectors and application of mathematics software.

Ismail et al. (2020) opined that the factors which limit the successful implementation of online learning include lack of facilities to carry it out and lack of training of the facilitators. Computational courses are those academic disciplines that involve

calculations, use of mathematical or scientific symbols, notations and formulae. The use of online mode for teaching computational courses demands more knowledge and competence on the part of the facilitators. This is because computational courses require the use of software, notations, symbols, numbers, formulas, theorems, proofs, axioms and shapes. It therefore becomes imperative that the facilities must be on ground in addition to the competence to deliver. The developed countries have keyed into the use of digital technology to carry out instructions in the educational sector while the developing countries like Nigeria is still struggling to key in.

The internet is a global system of interconnected networks that communicates between networks and computers using the internet protocol suites. Online refers to being connected with a user computer system, phones and other electronic devices to the internet. An individual is online when he/she make use of the internet, or the computer itself is said to be online when an internet connection has been created. Online has come to determine the activities carried out on the internet and data obtainable on the internet. Since many distance learning programmes are now totally online or known as remote learning, where students have access to online teaching and learning materials. Online teaching and learning has its roots in what was once known as distant learning. Online learning is the use of technology to impart knowledge through different types of multimedia. It may also be described as any type of learning that takes place entirely or in part online. According to Chaney (2010), any type of learning that is conducted partially or wholly online can be referred to as online learning. A wide variety of students find online learning intriguing, and it is growing increasingly prevalent in settings including elementary schools, secondary schools, and post-secondary education.

A brand-new strain of the Corona Virus, known as Covid-19, has never been identified in humans before. On December 31, 2019, Wuhan, China, reported it to the World Health Organization (WHO) for the first time. COVID-19 is an airborne disease usually transmitted between animals and humans. The outbreak of COVID-19 pandemic suddenly changed the teaching and learning environment, resulting in schools and universities closing down all over the world forcing people to stay home and work from home. Online learning is seen as the only alternative open for traditional education to be replaced (India Today Web Desk, 2020). As a cause of the wide spread of this pandemic there are changes in the teaching and learning process, which has an effect in the relationship between teachers and students. As a result in the spread of the deadly virus, educational processes were limited to conducting their activities mainly online with students (Claudiu et al., 2020).

It has become an important factor for schools and universities to maintain activities online during the corona virus pandemic. According to Ismail et al. (2020), the primary obstacles to effective online learning are a lack of infrastructure, facilities, student preparation, and learning technologies. In order for online learning of computational courses to be successful, suitable facilities must be supplied. There are many advantages of online teaching and learning, and it provides many communications and actions occurring at a time and at the same time, at the same frequency without waiting for each other such as emails, texts, calls, videos conferences etc. It can also increase student contact and allow a large number of students to share content at the same time.

According to Subramanya (2019) computational courses draw combined techniques from mathematics, statistical method, data science, simulation, numerical method, computer science and visualization. Computational science is a fast expanding subject that use cutting-edge computing power to comprehend and resolve challenging natural phenomena. The internet, mobile phones, and computer technologies have advanced to the point that they have almost permeated every field of human effort and are the primary facilitators and propellants of processes and operations in a variety of industries (Subramanya, 2019).

Williams et al. (2012) posited that evaluation procedures are constrained in terms of their diversity and allocation in the online context. Research has revealed that because of the effects caused by the corona virus pandemic (COVID-19), online teaching and learning of computational courses have faced some major challenges and setbacks such as, lack of internet facilities, poor or weak internet connection, cost of data to access the internet, inability to manage time, lack of experience to use online learning platforms and applications. Technical problems, complexity, and activity sequencing were among the biggest barriers to integrating multimedia applications in the classroom, according to prior research (Boyles, 2011; Fahy, 2004).

There are various types of platforms and applications that can be used for teaching and learning of computational courses such as, Stanford Engineering Everywhere, MIT Open Courseware, GitHub, W3Schools, Codecademy, Coursera, Edx, Zoom, FoxFi, Audioboo and WhatsApp. Jaques and Salman (2017) opined that adapting to online environment can be challenging to

both facilitator and students. According to Subramanya (2019), the main goals of computational courses are to introduce students to a wide range of principles and concepts underlying a variety of real-world problems across a wide range of disciplines, to teach methods and techniques of problem analysis, making appropriate assumptions, model formation, establishing relationships between variables and sub models, determining equations and functions, model solving, implementing the model, verifying and interpreting the results, and.

Due to life threat from the COVID-19 pandemic, a lockdown was imposed in all parts of the world and this posing life threat led to the adoption of using online platforms in teaching and learning in Nigeria. At that time online learning was regarded as the best option to keep the educational sector active. Schools were instructed to engage in online learning. One of the educational policies is that all schools should be equipped with 21<sup>st</sup> century technological gadgets in order to engage teachers and students in the use of technology to teach and learn educational contents. Teachers at all levels of education were supposed to be trained and re-trained on how to carry out instruction using technological gadgets. The outbreak of COVID-19 unravelled so many challenges connected to online teaching and learning especially in computational subjects/courses when teachers and students were instructed by the Ministries of Education to embark on online learning. The university lecturers and students were not left out in this struggle. The questions that arises is this: could this challenges encountered by lecturers and students be attributed to non-implementation of the policies that guide the equipping of schools with technological gadgets? This study was therefore embarked upon to investigate online teaching and learning of computational courses amidst the COVID-19 pandemic among undergraduate students

## **II. STATEMENT OF THE PROBLEM**

Online teaching and learning in educational scenario is fundamentally concerned with the impartation of educational course contents such as knowledge, skills, processes and attitudes via virtual platforms. The teaching and learning of mathematics course contents in developed countries have tilted to both physical and online modes. The use of online modes for teaching courses that are computational demands a lot of formulae, sketches and calculations. There are many problems militating against online teaching and learning of computational courses. It is technical, involves critical thinking and uses advanced computing capabilities to understand and solve complex and natural problems. Hence, it is difficult for teachers to adopt a good teaching strategy to involve students and engage them in effective problem-solving skills. Due to the COVID-19 pandemic, a lockdown was enforced by the government in all parts of the nation and it resulted to shutting down all conventional teaching and learning activities which led to distance learning using the internet, separating teachers and students. Therefore, it is impossible to get full attention of facilitators and students learning from the comfort of their homes in different environments all over the nation in online instructional process. But facilitators and students may lack enough time to carry out course work because of some factors such as unfriendly network connection and lack of experience in using training platforms and applications. On this note this study sought to investigate the challenges that confronted the online teaching and learning of computational courses amidst the COVID-19 pandemic.

## **III. AIM AND OBJECTIVES OF THE STUDY**

The purpose of this study was to investigate the challenges that confronted the online teaching and learning of computational courses amidst the COVID-19 pandemic in Rivers State Universities. The specific objectives of this study were to:

1. Determine how conversant lecturers and students were with online learning platforms and applications used to carry out instructions in computational courses amidst the COVID-19 pandemic.
2. Determine how lecturers and students maintained their attention in a noisy environment and family distractions during instructional process amidst the COVID-19 pandemic.
3. Determine lecturers and students preferred mode of learning computational courses amidst the COVID-19 pandemic.

## **IV. RESEARCH QUESTIONS**

The following research questions were raised and answered in the study.

1. How conversant are lecturers and students with online learning platforms and applications used to carry out instructions in computational courses amidst the COVID-19 pandemic?

2. What environmental factors affected online teaching and learning of computational courses amidst the COVID-19 pandemic?
3. What mode of teaching and learning of computational courses is more effective amidst the COVID-19 pandemic?

#### V. HYPOTHESES

The following null hypotheses were tested at 0.05 significant level.

H<sub>01</sub>: There is no significant difference on how conversant lecturers and students are with online learning platforms and applications used to carry out instructions in computational courses amidst the COVID-19 pandemic.

H<sub>02</sub>: There is no significant difference on how environmental factors affect online teaching and learning of computational courses amidst the COVID-19 pandemic.

H<sub>03</sub>: There is no significant difference between lecturers and students' preferred mode of teaching and learning of computational courses amidst the COVID-19 pandemic.

#### VI. RESEARCH DESIGN

The analytic survey research design was used to gather information from lecturers and students on the challenges that confronted the online teaching and learning of computational courses amidst the Covid-19 pandemic.

#### VII. POPULATION OF THE STUDY

The target population of this study comprised of all 66 lecturers and 3,428 BSc and B.Sc. Ed. students in the Faculty of Natural and Applied Sciences in Ignatius Ajuru University of Education Port Harcourt, Rivers State Nigeria.

#### VIII. SAMPLE AND SAMPLING TECHNIQUE

A census sampling technique was used to select all the 66 lecturers in Mathematics, Chemistry, Physics and Computer Science Departments in Ignatius Ajuru University of Education Port Harcourt. The stratified random sampling was used to select a sample of 478 students.

Table 1: Sample Distribution

Departments in Faculty of Natural & Applied Sciences	Students level				Lecturers
	100	200	300	400	
Mathematics/statistics	30	28	30	30	12
Computer science	30	30	30	30	18
Chemistry	30	30	30	30	23
Physics	30	30	30	30	13
<b>TOTAL</b>	120	118	120	120	66

#### IX. INSTRUMENT FOR DATA COLLECTION

The instrument used for data collection was a structured Online Learning Questionnaire (OLQ) constructed by the researcher on the challenges confronting online teaching and learning of computational courses amidst the COVID-19 pandemic. The instrument consisted of two (2) sections. Section A was designed to ascertain the bio data of lecturers and students while, section B was designed with fifteen (15) items to ascertain the challenges confronting the online teaching and learning of computational courses amidst the COVID-19 pandemic. Items 1-5 determined the extent to which lecturers and students understand the functions and process on how to use learning platforms and applications, items 6-10 was designed to determine the environmental factors confronting online instruction of computational courses and items 10-15 was designed to determine lecturers and students preferred mode of learning computational courses amidst the COVID-19 pandemic. The instrument was designed on four points Likert's scale such that respondents can select an option against a particular statement. The response

categories were Strongly Agreed (SA=4), Agreed (A=3), Disagree (D=2) and Strongly Disagree (SD=1). The criterion mean for OLQ was 2.5.

#### X. VALIDATION OF THE INSTRUMENT

The content and face validity of the instrument was done by two experts in mathematics education and statistics. The corrections made were effected in the final preparation of the final draft of the questionnaire before administering to the sample.

#### XI. RELIABILITY OF THE INSTRUMENT

The test re-test method was used to determine the reliability coefficient of 0.82.

#### XII. METHOD OF DATA COLLECTION

The researcher obtained permission from the sample heads of Department in Ignatius Ajuru University of Education Port Harcourt, Rivers State. A date was fixed to administer the instrument to the lecturers and students of the sample Departments. The researcher ensured all the questionnaires were intact and duly responded to. The respondents were given the chance to ask any required questions and were assured that their answers would be kept secret. This was done to increase response rates and decrease subjectivity and fear, which might affect the results. With the aid of three research assistants, the researcher distributed the online learning questionnaire (OLQ) to the sampled respondents inside the school. Furthermore, after administration, copies of the completed questionnaire were recovered on the spot.

#### XIII. METHOD OF DATA ANALYSES

The study questions were answered using the mean and standard deviation, and the independent sample t-test was employed for the analysis of the null hypotheses at a 0.05 significant level.

#### XIV. RESULTS

**Research Question 1:** How conversant are lecturers and students with online learning platforms and applications used to carry out instructions in computational courses amidst the COVID-19 pandemic?

Table 1: Mean and Standard deviation on how conversant lecturers and students were in the application of online learning platforms in computational courses during COVID-19 pandemic

S/N	Items	Lecturers N = 66		Students N = 478	
		Mean	SD	Mean	SD
1	Not enough time to freely express thoughts and ideas	3.93	0.89	3.63	0.56
2	Lack of experience to use online platforms	3.35	0.80	3.80	0.41
3	Poor network connections	2.93	0.80	3.73	0.45
4	Inability to access online learning platforms	3.33	0.69	3.83	0.46
5	High engagement than face to face mode of learning	3.50	0.64	3.80	0.41
	<b>Grand Mean</b>	<b>3.01</b>	<b>0.26</b>	<b>3.62</b>	<b>0.26</b>

**Criterion Mean = 2.5**

Table 1 shows that the mean and standard deviation on how conversant lecturers and students were with online learning platforms and applications used to carry out instructions in computational courses amidst the COVID-19 pandemic were 3.01, SD=0.26 and 3.62, SD=0.26 for lecturers and students respectively. The most conversant for lecturers was that they lacked enough time to freely express the thoughts and ideas (M=3.93, SD=0.89) while that for students was inability to access online learning platforms (M=3.83, SD=0.46). The grand mean was 3.01 and 3.62 for lecturers and students respectively. Since both

means are greater than the criterion mean of 2.50, it then implies that both lecturers and students were conversant with online learning platforms and applications used to carry out instructions in computational courses amidst the COVID-19 pandemic.

**Research Question 2:** What environmental factors affected online teaching and learning of computational courses amidst the COVID-19 pandemic?

Table 2: Mean and standard deviation on environmental factors which affected online learning platforms of computational courses during COVID-19 pandemic

S/N	Items	Lecturers N = 66		Students N = 478	
		Mean	SD	Mean	SD
6	Noisy environment	2.38	0.80	1.87	0.71
7	Covid -19 lockdown restriction	2.15	0.93	1.93	0.84
8	Domestic workload	2.40	1.03	2.18	0.83
9	Laziness and procrastination	2.25	1.01	2.29	0.71
10	Comfortable learning environment	2.03	0.85	2.07	0.51
	<b>Grand Mean</b>	<b>2.25</b>	<b>0.39</b>	<b>2.19</b>	<b>0.34</b>

**Criterion Mean = 2.5**

Table 2 shows that the mean and standard deviation on environmental factors which affected online learning platforms in computational courses during COVID-19 pandemic were 2.25, SD=0.39 and 2.19, SD=0.34 for lecturers and students respectively. The most environmental factor which affected lecturers was domestic workload (M=2.40, SD=1.03) while that of students was laziness and procrastination (M=2.29, SD=0.71). The grand mean was 2.25 and 2.19 for lecturers and students respectively. Since both means are less than the criterion mean of 2.50, it then implies that environmental factors did not affect both lecturers and students in the use of online learning platforms in computational courses during COVID-19 pandemic.

**Research Question 3:** What mode of teaching and learning of computational courses is more effective amidst the COVID-19 pandemic?

Table 3: Mean and standard deviation on the effective mode of teaching and learning of computational courses amidst the COVID-19 pandemic

S/N	Items	Lecturers N = 66		Students N = 478	
		Mean	SD	Mean	SD
11	Online lecture creates extensive interaction between lecturers and students	2.29	0.69	2.33	0.82
12	Online lecture is interesting and motivating	2.21	0.83	2.13	0.41
13	Online lecture provides easy processing of information	1.33	0.82	2.30	0.55
14	Online mode is better than face-to-face	2.46	0.66	1.67	0.52
15	Online teaching provides better tools	1.50	0.59	1.17	0.75
	<b>Grand Mean</b>	<b>2.23</b>	<b>0.65</b>	<b>2.07</b>	<b>0.52</b>

**Criterion Mean = 2.5**

Table 3 shows that the mean and standard deviation on the effective mode of teaching and learning of computational courses amidst the COVID-19 pandemic were 2.23, SD=0.65 and 2.07, SD=0.52 for lecturers and students respectively. The most



effective mode for lecturers was face to face (M=2.46, SD=0.66) while that for students was that online lecture creates extensive interaction between lectures and students (M=2.33, SD=0.82). The grand mean was 2.23 and 2.07 for lecturers and students respectively. Since both means are less than the criterion mean of 2.50, it then implies that both lecturers and students did not see the online learning platform to be effective mode of teaching and learning of computational courses amidst the COVID-19 pandemic.

**H<sub>01</sub>:** There is no significant difference on how conversant lecturers and students are with online learning platforms and applications used to carry out instructions in computational courses amidst the COVID-19 pandemic.

Table 4: Independent sample t-test on how conversant lecturers and students were in the application of online learning platforms in computational courses during COVID-19 pandemic

S/N	Items	Lecturers N=66		Students N=478		df=542	T	P-value
		Mean	SD	Mean	SD			
1	Not enough time to freely express thoughts and ideas	3.93	0.89	3.63	0.56	3.73	0.00	
2	Lack of experience to use online platforms	3.35	0.80	3.80	0.41	1.51	0.14	
3	Poor network connections	2.93	0.80	3.73	0.45	2.12	0.04	
4	Inability to access online learning platforms	3.33	0.69	3.83	0.46	1.18	0.25	
5	High engagement than face to face mode of learning	3.50	0.64	3.80	0.41	0.64	0.53	
<b>Grand Mean</b>		<b>3.01</b>	<b>0.26</b>	<b>3.62</b>	<b>0.26</b>	<b>5.66</b>	<b>0.03</b>	

The result of the independent sample t-test in table 4 showed that there is a significant difference in the mean ratings of lecturers and students on how conversant lecturers and students are in the

application of online learning platforms in computational courses during COVID-19 pandemic (t=5.66, df=542, p= 0.03<.05). The null hypothesis one was rejected at 0.05 alpha level.

**H<sub>02</sub>:** There is no significant difference on how environmental factors affect online teaching and learning of computational courses amidst the COVID-19 pandemic.

Table 5: Independent sample t-test on how environmental factors affect online teaching and learning of computational courses amidst the COVID-19 pandemic

S/N	Items	Lecturers N=66		Students N=478		df=542	T	P-value
		Mean	SD	Mean	SD			
6	Noisy environment	2.38	0.80	1.87	0.71	1.19	0.25	
7	Covid -19 lockdown restriction	2.15	0.93	1.93	0.84	2.11	0.04	
8	Domestic workload	2.40	1.03	2.18	0.83	1.95	0.06	
9	Laziness and procrastination	2.25	1.01	2.29	0.71	0.25	0.80	
10	Comfortable learning environment	2.03	0.85	2.07	0.51	1.35	0.19	
<b>Grand Mean</b>		<b>2.25</b>	<b>0.39</b>	<b>2.19</b>	<b>0.34</b>	<b>6.57</b>	<b>0.00</b>	

The result of the independent sample t-test in table 5 showed that there is a significant difference in the mean ratings of lecturers and students on the environmental factors which affect online teaching and learning of computational courses amidst the COVID-19 pandemic (t=6.57, df=542, p= 0.00<.05). The null hypothesis two was rejected at 0.05 alpha level.

H<sub>03</sub>: There is no significant difference between lecturers and students preferred mode of teaching and learning of computational courses amidst the COVID-19 pandemic.

Table 6: Independent sample t-test on lecturers' and students' preferred mode of teaching and learning of computational courses amidst the COVID-19 pandemic

S/N	Items	Lecturers N=66		Students N=478		df=542	t	P-value
		Mean	SD	Mean	SD			
11	Online lecture creates extensive interaction between lectures and students	2.29	0.69	2.33	0.82	3.20	0.00	
12	Online lecture is interesting and motivating	2.21	0.83	2.13	0.41	3.93	0.00	
13	Online lecture provides easy processing of information	1.33	0.82	2.30	0.55	2.35	0.02	
14	Online mode is better than face-to-face	2.46	0.66	1.67	0.52	2.77	0.01	
15	Online teaching provides better tools	1.50	0.59	1.17	0.75	2.51	0.01	
	<b>Grand Mean</b>	<b>2.23</b>	<b>0.65</b>	<b>2.07</b>	<b>0.52</b>	<b>4.61</b>	<b>0.08</b>	

The result of the independent sample t-test in table 6 showed that there is no significant difference in the mean ratings of lecturers and students on lecturers' and students' preferred mode of teaching and learning of computational courses amidst the COVID-19 pandemic (t=4.61, df=542, p= 0.08>.05). The null hypothesis three was retained at 0.05 alpha level.

#### XV. DISCUSSION OF FINDINGS

From the first research question on how conversant lecturers and students are with online learning platforms and applications used to carry out instructions in computational courses amidst the COVID-19 pandemic, after carrying out the test of Ho<sub>1</sub>, the finding revealed that there is a significant difference in the mean ratings of lecturers and students on how conversant lecturers and students are in the application of online learning platforms in computational courses during COVID-19 pandemic. Table 1 shows that the most conversant for lecturers was that they lacked enough time to freely express their thoughts and ideas while, that for students was their inability to access online learning platforms used to carry out instructions in computational courses amidst the COVID-19 pandemic. This means that both lecturers and students faced one form of challenge or the other when learning computational courses online amidst the pandemic, However, it was observed that there was not enough time for lecturers to openly elaborate or explain their ideas and thoughts to students in a manner they will find it easy to understand concepts in computational course due to the fact that most applications logs one out once the time limit elapse with several other factors that can cause this challenge, and it was confirmed that students find it difficult to access online platforms used to learn computational courses as a result of poor network, insufficient data, no smart phones regarding other factors. This result is in agreement with the research finding of Abellem (2020). Also in agreement with this result is the finding of Udaka (2021).

Research question 2 was on environmental factors that affected online teaching and learning of computational courses amidst the COVID-19 pandemic. Ho<sub>2</sub> indicated that the result of the independent sample t-test showed that there is a significant difference in the mean ratings of the environmental factors which affect online teaching and learning of computational courses amidst the COVID-19 pandemic. Therefore, in table 3 the most environmental factor which affected lecturers was domestic workload while that for students was laziness and procrastination. Hence the grand mean was 2.25 and 2.19 for lecturers and students respectively. Since both means are less than the criterion mean of 2.50. The study found out that the most environmental factor which affected lecturers was domestic workload. This means that lecturers feel tired and exhausted after engaging in some home chores before instruction time while that for students was laziness and procrastination because learning online from ones comfort zone always has its way of making people addicted to their home environment hence making them feel reluctant and put up an " i don't care" attitude in doing certain things. However, the grand mean indicated that environmental factors did not affect both lecturers and students in the use of online learning platforms in computational courses during COVID-19 pandemic.



Research question 3 examined what mode of teaching and learning of computational courses is more effective amidst the COVID-19 pandemic.  $H_03$  was tested and it was found that the result of the independent sample t-test showed that there is no significant difference in the mean ratings of lecturers' and students' preferred mode of teaching and learning of computational courses amidst the COVID-19 pandemic. The most effective mode for lecturers was face to face while that of students was the online lecture, which creates extensive interaction between lecturers and students. Though, it is a fact that most science students and lecturers are freaked out using online platforms to learn computational courses but the study revealed that lecturers prefer using the traditional face to face method to teach computational courses than using online platforms. Students are of the opinion that online lecture creates extensive interaction between lecturers and students. As such the grand mean was 2.23 and 2.07 for lecturers and students respectively. Since both means are less than the criterion mean of 2.50, it then implies that both lecturers and students did not see the online learning platform to be effective mode of teaching and learning of computational courses amidst the covid-19 pandemic.

## **XVI. CONCLUSION**

There is a substantial disparity between the mean evaluations of lecturers and students on their familiarity with using online learning platforms in computational courses during the COVID-19 pandemic. It was also concluded that there is a significant difference in the mean ratings of lecturers and students on the environmental factors which affect online teaching and learning of computational of courses amidst the COVID-19 pandemic. Lastly from hypotheses 3 findings, it was concluded that there is no significant difference in the mean ratings of lecturers' and students' preferred mode of teaching and learning of computational courses amidst the COVID-19 pandemic.

## **RECOMMENDATIONS**

The following recommendations were made by the researcher:

1. Lecturers and students should find time to research and learn how to operate platforms and applications used in online teaching and learning of computational courses before implementing.
2. Technical support should be provided to promote and enhance online teaching and learning of computational courses.
3. Lecturers and students should be trained on how to utilize online learning platforms for computational courses instruction.

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