Utilization of virtual classroom amid covid-19 and it's effects on academic performance of senior secondary II physics students in Abak local government area, Akwa Ibom State, Nigeria

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Abstract
This paper examines the use of virtual classroom in the era of the new normal and how it affects senior secondary II (SS2) physics students performance in Abak LGA of Akwa Ibom state. The study adopted a true experimental research design. The design was necessary because it enhances random selection of participants in both experimental and control groups. A sample of 60 students drawn from a population of about 600 was used which comprises of 30 male and 30 female, simple random technique is used for the selection. The purpose of this study is to determine the difference in academic performance of physics students exposed to virtual classroom and those in conventional classroom, find out the effects of virtual classroom on gender. Two research questions and two hypotheses are formulated for the study. Mean is used in answering the two research questions while independent two tailed t-test is used to answer the hypotheses at 0.05 significant level. There was a significant difference in academic performance between students taught in a virtual classroom and those taught in conventional classroom. Also, there is no gender difference in academic performance of those in a virtual classroom. It was recommended that teachers, school administrators, students, parents, government agencies and curriculum developers should take advantage of the available technology to improving teaching-learning process in the face of this pandemic, because virtual classroom brings instructional materials to classroom which ordinarily will not be possible to have them, it removes distance barrier in acquisition of education, it makes learning ubiquitous, facilitates distance learning, above all, it is mostly required to checkmate the spread of corona virus by promoting social distancing.

Keywords: *Academic Performance, Covid-19, Physics, Virtual Classroom.*

Background of the Study

Education has been regarded as the instrument par-excellence and the foundation of human and any country's development (Etim, 2016). Education is about teaching - learning and the aim is to ensure effective

classroom communication which involves proper identification, assembly and application of technological principles to facilitate change in behaviour and performance, which prompted the adoption and adaption of technology in educational system.

The outbreak of the novel corona virus (Covid-19) on 31st December 2019 in a city in China has affected our educational programmes. In response to growing health concern about (Covid-19), The West African Examinations Council (WAEC) in Nigeria, which comprises of Nigeria, Ghana, Gambia, Liberia and Sierra Leone, has decided to put on hold the conduct of the West African Senior School Certificate Examination (WASSCE) for School Candidates, 2020, earlier scheduled to commence on April 6, 2020.(Business day, 20th March ,2020).

According to Wikipedia, COVID-19 pandemic has affected educational systems worldwide, leading to the near-total closures of schools, universities and colleges. Most governments around the world have temporarily closed educational institutions in an attempt to contain the spread of COVID-19 . As of 7 June 2020, approximately 1.725 billion learners are currently affected due to school closures in response to the pandemic. According to UNICEF monitoring, 134 countries are currently implementing nationwide closures and 38 are implementing local closures, impacting about 98.5 percent of the world's student population.

On 23 March 2020, Cambridge International Examinations (CIE) released a statement announcing the cancellation of Cambridge IGCSE, Cambridge O Level, Cambridge International AS & A Level, Cambridge AICE Diploma, and Cambridge Pre-U examinations for the May/June 2020 series across all countries. International Baccalaureate exams have also been cancelled. addition, Advanced Placement Exams, SAT administrations, and ACT administrations have been moved online and cancelled.

Since society is undergoing transformation evoke by the rapid development and diffusion of information and communication technology (ICT) in all works of life. This development has also made a considerable impact in the teaching and learning process. As a result, many innovative teaching strategies can be used to make teaching-learning process more fascinating (Etim,2016). The challenges in educational sector in Nigeria have always been accessibility of quality learning environment with well equipped laboratories and modern facilities that can enhance teaching-learning process. These can be achieved with the introduction of virtual classroom.

Virtual classroom has no single definition because the system is characterized as the learning devoid of time and space. Learning is continuously adopting new formats involving advanced technologies such

as multimedia, internet, blogs, website, mobile phone and wikis as these are accessed in the internet. Virtual learning is not a factor that is confined in the walls of a traditional classroom. According to Lokie (2011), virtual learning expands the possibility of using internet facilities, platforms, satellite links, and related system to access, analyse, create, exchange, and use data, information, and knowledge in ways which until recently, were almost unimaginable. In effect, it involves learning acquired by students through the interaction of digitally delivered content.

A virtual classroom according to (Rachang,2018) is an online learning environment that allows for live interaction between the tutors and the learners as they are participating in learning activities. Some of the merits accruable from the virtual classroom are as follows; It provides the learners the flexibility of getting the learning experiences at the time, place and rate of assimilation.

Virtual classroom can help in good class organization. The operational documents, assignments, class notes and other related information in the internet can be readily categorized for easy accessibility for the teachers and students. The information posted on the internet could be easily revised and updated for more effective teaching and learning. Virtual classroom provides the learners with the opportunity of gaining learning experiences 24 hours of every 7 days a week without tampering with the learner's leisure time.

The system has the capability of employing the services of most experienced personnel in different areas of need which is not possible in traditional classroom setting. Another educational value is the intellectual and social partnership created by the technology of virtual classroom. Students in their use of technological equipment cultivate the habit of leadership role in relation to other students. The implication is that the technology used increases group cohesion and mutual support more especially in remote classrooms. Besides the virtual classroom enables the students to develop a range of communicative skills that enable them perform creditably in class. Virtual classroom saves money, time and transport for students. The students who are motivated could work on their own at their home environment without wasting time and money to travel to school.

According to (Udoh, 2016). She investigated the use of virtual classroom instruction on students' academic performance in Educational Technology in the University of Calabar. Three hypotheses were formulated to guide this study and quasi-experimental research design was employed for the study. A sample of 72 Educational Technology Students was selected for the study using the purposive sampling

technique. Thirty six (36) respondents were used for experimental group and remaining thirty six (36) were used as control group. A performance test and questionnaire were used for data collection and independent t-test was used to analyze the data. The result of the analysis indicated that utilization of virtual classroom instruction influenced students' academic performance in Educational Technology. It was, therefore, recommended that the use of virtual classroom instruction should be encouraged to boost instructional delivery and optimize students' academic performance in Educational Technology and other courses in the curriculum.

Anekwe & Uzoamaka, (2017) adopted a descriptive approach to examine the impacts of virtual classrooms on students' learning. Virtual classrooms are technologically-driven classrooms that support self-directed and self-regulated learning. The study was carried out in two federal and two state universities in the South-East zone of Nigeria. Four research questions and four hypotheses guided the study. The sample comprised of 280 federal university students and 226 state university students given a total sample of 506 respondents. Stratified random sampling due to ownership (federal and state) was used. Other sample techniques used were; those students who have been involved in online programmes recently and those currently in the programme. Students' consent was also sought before the selection. The instrument was validated. Internal consistency was computed using Cronbach alpha for the four sections, thus; Section A = 0.80; Section B = 0.83; Section C = 0.79; and Section D = 0.85. The instrument was administered and data collected. The data collected were analysed using means for research questions and independent sample t-test to test the hypotheses at 0.05 level of significance. The results showed among others that virtual classrooms have positive impacts on the students of federal and state universities, they reported positively on their continued support and preparedness for virtual classrooms. Based on the findings, the recommendation were that many more students should be made to be more aware of the impacts of the virtual classrooms. They should also be motivated to be participating more in virtual classrooms.

Academic performance in the other hand is the extent to which a student, teacher or institution has attained their short or long-term educational goals . Completion of educational benchmarks such as secondary school diplomas and bachelor's degrees represent academic achievement.

Academic performance is commonly measured through examinations or continuous assessments but there is no general agreement on how it is best evaluated or which aspects are most important; procedural

knowledge such as skills or declarative knowledge such as facts . Furthermore, there are inconclusive results over which individual factors successfully predict academic performance, elements such as test anxiety, environment, motivation, and emotions require consideration when developing models of school achievement

Some of the factors that influenced academic achievement are; Individual differences influencing academic performance, this have been linked to differences in intelligence and personality (Stumm, 2011). Students with higher mental ability as demonstrated by IQ tests and those who are higher in conscientiousness (linked to effort and achievement motivation) tend to achieve highly in academic settings. A recent meta-analysis suggested that mental curiosity (as measured by typical intellectual engagement) has an important influence on academic achievement in addition to intelligence and conscientiousness(Stumm, 2011).

Bossaert,(2011) opined that Children's semi-structured home learning environment transitions into a more structured learning environment when children start first grade. Early academic achievement enhances later academic achievement.

This study adopted Bruner's constructivism learning theory which is a philosophy that enhances students' logical and conceptual growth. The underlying concept within the constructivism learning theory is the role which experiences-or connections with the adjoining atmosphere-play in student education.

The constructivism learning theory argues that people produce knowledge and form meaning based upon their experiences. Two of the key concepts within the constructivism learning theory which create the construction of an individual's new knowledge are accommodation and assimilation. Assimilating causes an individual to incorporate new experiences into the old experiences. This causes the individual to develop new outlooks, rethink what were once misunderstandings, and evaluate what is important, ultimately altering their perceptions.

Accommodation, on the other hand, is reframing the world and new experiences into the mental capacity already present. Individuals conceive a particular fashion in which the world operates. When things do not operate within that context, they must accommodate and reframing the expectations with the outcomes.

The role of teachers is very important within the constructivism learning theory. Instead of giving a lecture the teachers in this theory function as facilitators whose role is to aid the student when it comes to their own understanding. This takes away focus from the teacher and

lecture and puts it upon the student and their learning. The resources and lesson plans that must be initiated for this learning theory take a very different approach toward traditional learning as well. Instead of telling, the teacher must begin asking. Instead of answering questions that only align with their curriculum, the facilitator in this case must make it so that the student comes to the conclusions on their own instead of being told. Also, teachers are continually in conversation with the students, creating the learning experience that is open to new directions depending upon the needs of the student as the learning progresses. Teachers following Piaget's theory of constructivism must challenge the student by making them effective critical thinkers and not being merely a "teacher" but also a mentor, a consultant, and a coach.

Instead of having the students relying on someone else's information and accepting it as truth, the constructivism learning theory supports that students should be exposed to data, primary sources, and the ability to interact with other students so that they can learn from the incorporation of their experiences. The classroom experience should be an invitation for a myriad of different backgrounds and the learning experience which allows the different backgrounds to come together and observe and analyze information and ideas.

The challenges in educational sector in Nigeria have always been accessibility of quality learning environment with well-equipped laboratories and modern facilities that can enhance teaching- learning process. These can be achieved with the adoption of virtual classroom, this will minimize the problems like lack of qualified faculties, distance barrier to access the few equipped schools available, hence this study investigates the effects of virtual classroom on student's academic performance in secondary school.

This study aimed to; determine the difference in academic performance of physics students exposed to virtual classroom and those in conventional classroom, find out the effects of virtual classroom on gender.

The findings of this study would be beneficial to stakeholders in educational sector, it would help the curriculum planners/designers, it would benefit government, teachers, students and parents.

Research questions

1. What is the difference in academic performance of physics students exposed to virtual classroom and those in conventional classroom?
2. How does virtual classroom influence the academic performance of male and female physics students?

Hypotheses.

Ho: 1. Academic performance of physics students exposed to virtual classroom and those using conventional classroom do not differ significantly.

Ho: 2. Academic performance of male and female physics students exposed to virtual classroom do not differ significantly.

Methodology

The study adopted a true experimental research design. The design was necessary because it enhances random selection of participants in both experimental and control groups.

This study was conducted at Abak LGA of Akwa Ibom State. The population of SS2 students in the 11 public schools in Abak is about 600.

A sample size of 60 students was used which comprises of 30 male and 30 female, simple random technique was used for the selection.

A physics test instrument (pti) was used for data collection. The (pti) contained 20 multi-choice items.

The instrument was validated with face and content validation methods by giving copies of pti to three SS 2 students who are not part of the process to check it relevance, also a physics teacher and an expert in test and measurement to validated the items.

To determine the reliability of the instrument, the instrument was administered to 20 students who were not part of the process, and a split-half method was used to establish the reliability of the instrument. The data collected was analysed using Pearson products moment correlation and it yielded a coefficient of 0.7. The r-value was subjected to spearman-Brown test which yielded a coefficient of 0.81, signifying high reliability.

The pti was administered to the respondent in the two groups (experimental and control) through research assistants in their various schools.

Mean and variance was used to answer the two research questions while independent two tailed t-test was used to answer the hypotheses at 0.05 significant level.

Table 1

t-Test: Two-Sample Assuming Unequal Variances				
	control	*experiment*		
Mean	48.1	59.7		
Variance	55.33448	62.9069		
Observations	30	30		
Hypothesized Mean Difference	0			

Df	58			
t Stat	-5.84297			
P(T<=t) one-tail	1.24E-07			
t Critical one-tail	1.671553			
P(T<=t) two-tail	2.47E-07			
t Critical two-tail	2.001717			

Research question 1

What is the difference in academic performance of physics students exposed to virtual classroom and those in conventional classroom?

From table 1, the mean of control group is 48.1 and that of experimental group is 59.7, the difference in mean is 11.7 signifying a better performance by experimental group.

Ho: 1. Academic performance of physics students on virtual classroom and those in traditional classroom differ significantly.

From table 1, the t-crit value is 2.001717 and the t-cal value is -5.84297 which is greater than the critical value, hence the null hypothesis is rejected.

Table2

t-Test: Two-Sample Assuming Unequal Variances				
	male	*female*		
Mean	62.5	55.5		
Variance	32.73529	92.27778		
Observations	18	10		
Hypothesized Mean Difference	0			
Df	13			
t Stat	2.106142			
P(T<=t) one-tail	0.027597			
t Critical one-tail	1.770933			
P(T<=t) two-tail	0.055194			
t Critical two-tail	2.160369			

Research question 2

How does virtual classroom influence the academic performance of male and female physics students?

From table 2, the mean of male students is 62.5 and that of female students is 55.5, the difference in mean is 7, signifying no much difference in performance by both male and female exposed to virtual classroom.

Ho: 2. Academic performance of male physics students and female physics students do not differ significantly.

From table 2, the t-crit value is 2.160369 and the t-cal value is 2.106142 which is less than the critical value, hence the null hypothesis is upheld.

Discussion of the result

There is a significant difference in academic performance between students taught in a virtual classroom and those taught in conventional classroom. Also, there is no gender difference in academic performance of those in a virtual classroom. This is in agreement with (Anekwe & Uzoamaka, 2017) and (Udoh, 2016). Udo investigated the use of virtual classroom instruction on students' academic performance in Educational Technology in the University of Calabar while Anekwe saw positive impact of virtual learning on students of South Eastern University students in Nigeria. The result of the analysis indicated that utilization of virtual classroom instruction influenced students' academic performance in Educational Technology. It therefore mean that schools can utilized the available and affordable technology during this pandemic to teach students rather than continuous keeping them at home which will adversely affect the educational system.

Recommendations

1. Teachers, school administrators, students, parent, government agencies and curriculum developers are advice to take advantage of the available technology to improving teaching-learning process.
2. Virtual classroom brings instructional materials to classroom which ordinarily will not be possible to access, e.g ship in a remote area. It removes distance barrier in acquisition of education, it makes learning ubiquitous. Virtual classroom facilitates distance learning.
3. With the adoption of simple and popular gadgets e.g Facebook platform, WhatsApp etc for teaching-learning process, our students can go back to classrooms at the face of covid-19.

Conclusion

The outbreak of covid-19 has changed the way people behave in the society, there is new normal in every aspect of our lives like the use of face mask, maintaining of social distancing, all these is to curb the spread of covid-19 which has affected our lives negatively. Education sector is not

excepted, in order to save our educational sector, there is need to adopt virtual learning so as to avoid total collapse in the education system. Virtual learning is seen to have been effective, hence need to embrace it.

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