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ZOOM MEETING A STIMULATING TOOL TO BIOLOGY EDUCATION STUDENTS ACADEMIC PERFORMANCE.

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ABSTRACT

This study centered on zoom meeting as a stimulating tool to Biology Education students' academic performance in Rivers State University. The pre-test post-test nonequivalent control group involving quasi experimental design was used. Specifically, two research questions and two null hypotheses guided the study. The study was conducted using Biology Education Students of Science Education Department, Rivers State University. The population was made up of eight hundred and thirty two (832) out of which a sample of one hundred and twenty two was drawn from 200 Level students through a purposive sampling technique. Intact class was used, and the students were randomly assigned by balloting to experimental and control groups respectively. The experimental group was taught Biology Methodology using zoom meeting, while the control was taught using conventional (lecture) method. Biology Achievement Test on Biology Method (BATBM) was used for data collection. Mean and standard deviation were used to answer the two research questions while Z-test statistics with the aid of SPSS was used to test the hypotheses at 0.05 level of significance. The result revealed among others that there was statistical significant improvement in students' academic performance in Biology Method after exposure to zoom meeting. The study held that there was statistical significant difference in the mean performance score of male and female Biology Education Students taught Biology Method using zoom meeting. Base on the findings and conclusions the study recommended the use of zoom meeting should be encouraged, since it affected the students' academic performance positively, training should be organized for science educator lecturers to equip them with knowledge and skill in using zoom meeting.

Keywords: Zoom meeting, Stimulation, Biology Education, Students, Academic Performance

INTRODUCTION

Biology is a science. Science works according to the scientific method. The scientific method accepts only reason, logic, and experimental evidence to tell between what is scientifically correct and what is not (Kelly, 2017). Scientists do not simply believe-they test, and keep testing until satisfied. Just because some big scientist says something is right, that thing does not become a fact of science. Unless a discovery is repeatedly established in different laboratories at different times by different people, or the same theoretical result is derived by clear use of established rules, we do not accept it as a scientific discovery (Tenney, 2018). The real strength of science lies in the fact that it continually keeps challenging itself. Biology, which has been shown to be the cornerstone of scientific and technological advancement globally in both developed and developing nations, has a few characteristics that are widely acknowledged and thought to expand learners' knowledge and comprehension of the subject. These characteristics are deemed necessary because it is thought that if they are appropriately and critically followed and applied in any given situation and at any given time, they will be able to make this subject simple for students to understand and, as a result, dispel misconceptions about physics held by people, including parents, students, teachers of other subjects, and the community at large.

Classroom learning of biology tertiary institution undergo various challenges due to time limitation in covering the necessary curriculum however, instructional technological medium such as Zoom meeting, Google meet, WebEx etc. has helped facilitate the teaching and learning of Biology in tertiary institution. The application of technology must be used appropriately and competently.

Right on target means being able to answer challenges in the education system, namely the quality of learning and access to quality education (Kemdikbud, 2021). Nigeria and major parts of the Globe faced a trying season which tend to do with the Covid-19. Due to the Covid-19 epidemic, in-person instruction has been replaced with online instruction. In the field of education, online learning has become the norm. The learning process in currently available online as well as in a classroom setting. The belief that easily accessible computer-based technology is used as a learning resource for learning activities both inside and outside of the classroom in the digital age is corroborated by (Smaldino, Lowther, & Mims, 2015).

Online education involves interaction. Students can use online learning resources to communicate with teachers and other students. In the future, face-to-face learning will not yield the same learning outcomes as the utilization of online learning resources, since the media used for online learning is appealing, easily available, and adaptable. Learning can be made more effective and efficient by using online learning resources. Online learning resources can help students overcome time and space constraints, spark their interest in studying, and given them chances to engage with their classroom. This is in line with the belief (Sanjaya, 2014) that allowing students to study freely in accordance with their passions and interests makes it easier for them to meet learning objectives. Online learning presents additional difficulties that call for a reliable internet connection, a supportive home environment, and the unwavering support of parents. Students need to keep up their studies during the Covid-19 pandemic. The utilization of online learning apps is the answer to the need for good teacher-student interaction. Zoom meeting is the learning application that is frequently utilized during remote learning, according to the finding of field observations. Zoom is already widely used in Nigeria classrooms for online instruction.

The primary advantage of the zoom program is that it may be utilized at any time and by anyone without the need for in-person meetings. It is also free of charge. We can have direct video communication with anyone by using zoom. Zoom is an application that uses video to support in-person instruction (Ganesha, Nandiyanto, & Razon, 2021). Moreover, videos can be viewed, downloaded, recorded, and replayed. One benefit of zoom is its use of technology, which allows for flexibility in the learning process and can span time and space (Bawanti & Arifani, 2021). The quality, instant success, and simplicity of usage of Zoom are among its other benefits, the display features are useful, easily accessible, well-organized, and simple to operate, more capacity for meeting rooms. Superior audio and video production. It shows a presentation file that can be distributed to every meeting attendee. By using the meeting schedule parameters, teachers may quickly create learning schedules. The subject matter, the kind of the learning to be done, the amount of time spent learning can all be chosen by the instructor, as well as the accessibility of links for engaging in events in accordance with a scheduled time table. In the zoom meeting application, the breakout room is separated from the main meeting room. Teachers can divide students into small groups so that teachers and students are separated to maximize learning activities. With the breakout room, students have a private space to carry out discussion activities. Through this breakout room feature, students can have a virtual discussion learning experience to increase their confidence. According to Serhan (2020) there is less student involvement when learning via zoom than when learning in a classroom. However, students adore how convenient and flexible zooming is. This is in line with research findings (Suardi, 2020) that more laid back than in-person instruction and have been shown to raise academic performance in students.

Statement of the Problem

Educational stakeholders, parents, and administrators are generally concerned about the academic performance of their children. In the same way that parents demand transition and growth from their children at the end of each section, semester, academic year, or session, teachers never want their students to fail. In several Rivers State tertiary institutions, it was noted that the performance of students did not live up to the standards set by the staff in terms of time, effort, resources, and energy.

Several researches have it that some students have no effective access to the online teaching due to lack of either the means or the instruments due to economic and digital divide (UNESCO, 2020). This would hamper or distort performance in examination. In a study, the challenges of learning were including loss of interest, non-availability of internet to students that live in provincial and rural areas, speed and cost of internet hinder proper delivery of study materials by both students and teachers, non-availability of learning devices such as laptops, tablets, and smartphones devices to access the internet and view the online materials, the shortness of the available time to solve the online tests, which causes panic, lack of or inability to teach the practical lessons or subjects in online basis, at times, spending long time in online learning makes the students loss their motivation to participate, also they feel tired with sleeping issues, less interactive due to no contact between students, teachers which makes it very boring and easily loss concentration, lack of effective communication as some students have the sense of loneliness (Mohammed, 2020).

In a nation such as ours, there are many obstacles and shortcomings concerning zoom classes. These include, but are not limited to, the digital divide, financial difficulties, network issues, and power outages. Teaching and learning approaches consistently show a positive correlation between the application of modern technology and positive learning outcome. (Chukundah & Odibo, 2024). Thus, this study intends to examine the influence of zoom meeting as a tool in stimulating Biology education students academic performance of Rivers State University.

Purpose of the Study

The main purpose of this study is to examine the influence of zoom meeting on academic performance 200level students. Specifically, the study intends to:

i) Ascertain the extent to which 200level Biology education students are taught Biology methods through zoom meeting application.
ii) Determine the difference in the mean performance score of male and female Biology education student taught Biology methods using zoom meeting.

Research Questions

The following research questions will guide the study:

i) What is the extent to which 200level Biology education students are taught Biology methods through zoom meeting application and those through conventional lecture method and their academic performance?
ii) What is the difference in the mean performance score of male and female Biology education students taught Biology methods using zoom meeting?

Research Hypotheses

HO_1: There is no significant difference between the mean score of Biology education students taught Biology method through zoom meeting application and those taught through conventional lecture method and their academic performance.

HO_2: There's no significant difference between the mean score of male and female Biology education student taught Biology method using zoom meeting in Rivers State University.

Scope of the Study

The study intends to examine the influence of zoom meeting as a 21^{st} century tool in stimulating Biology education students' academic performance. The study is centered on Biology education students of the Rivers State University.

Zoom Meeting

Zoom meeting is a form of online communication and collaboration facilitated by zoom, a video conferencing platform. It allows individuals or groups to connect in real-time via audio and video, enabling face-to-face interactions, screen sharing, and more.

Biology education students the 21 century require to key into this new innovation or practice of utilizing zoom meeting application and its existing service to enhance their realistic efforts to get at relevant information or knowledge in physical education. (Ukeje, 2017).

Last few decades are known for the technological happenings so to say, diffusion is a process through which new ideas, technologist, products or processes are spread through communication among members of a social system via communication channels over time, it is an important form promotes social progress in the evaluation and adoption of important new ideas to address social issues (Kemdibud, 2021). Diffusion helps to reduce uncertainty about how to address difficult issues and provides direction for achieving social goals. The pace of development of new technologies has led to the development to innovatively utilize ICT (e.g) zoom meeting technologies) to facilitate knowledge and skill acquisition, especially in this 21st century. These technologies in themselves are innovations and have led to many new inventions and discoveries that were never thought before (Ogun-Ranti, 2018).

The Concept and Importance of Biology Methodology

Biology, as a discipline, is the science that deals with living things. Biology is a science that deals with the study of the environment, ecology and genetic, and the interaction between the fundamental constraints of the observable trait. Biology is a natural science that involves the study of matter and ecosystem. Biology methodology is an index or the methods used in various branches of biology to achieve a stated objective. The dominant methodology in biology is the scientific method. It include steps like observation and formulation of a hypothesis. Further steps are to test the hypothesis using an experiment, to compare the measurement to the expected result, and to publish the findings.

Conceptual Framework

Concept of Zoom Meeting Technology

The modern world is one in which technology is pervasive. The teaching methodology's pedagogy has changed dramatically as a result of technology's pervasiveness. In the context of education, online distance learning has become a buzzword. Technology has to be included into education in order to meet the needs of today's students. The contemporary classroom differs greatly form the classic classroom (Kefe, 2016). The use of technology in education is expanding all the time. Online courses are becoming more and more common, buy they can be used with traditional classroom instruction rather than only servicing as a replacement for them. This frequently provides more interesting and inspiring experiences for students. Numerous developments have been aided by the electric education resource zoom. Thankfully, the availability of computers and Internet connection in homes and high schools alike has made technology-assisted learning feasible.

Zoom is a cloud-based video conferencing platform that provides users with the ability to conduct virtual meetings, conferences, webinars, and collaborative sessions. It gained significant popularity, especially during the COVID-19 pandemic, due to the increased need for remote work and virtual communication (Tony, 2018).

Our world and the way we learn to live are changing as a result of online distance learning resources. Zoom technology is one of the newest, unique software-based conference room options available. Zoom is a cloud-based platform that facilitates video conferencing, content sharing, and meetings as well as webinars. To get more done, it is beneficial for teachers, for instance, to gather their students in a frictionless setting. With a simple, dependable cloud platform for video and audio conferencing, teamwork, chat, and webinars across mobile devices,

computers, phones, and room systems, zoom is the industry leader in contemporary business video communications.

Influence of Zoom Meeting in Academic Performance of Biology Education Students
According to Nimmark (2020), the influence of zoom meeting of Academic performance in multifaceted and has become particularly pronounced in recent years, especially with the increased adoption of remote and online learning Mimmark highlighted below detailed explanations of the various ways in which zoom meetings have influenced education.

Facilitation of Remote Learning
Zoom enables students and teachers to connect from different geographical locations. This is especially valuable for distance education, allowing individuals to participate in classes without the need for physical presence.

Flexibility and Convenience
Zoom facilitates synchronous (real-time) and asynchronous (recorded) learning. Recorded zoom sessions can be accessed later, providing flexibility for students who may have scheduling constraints.

Virtual Classroom Experience
Zoom meetings offer features like video feeds, chat, and reactions, providing a virtual environment that stimulates aspects of face-to-face classrooms. Enhances student engagement and allows for real-time interaction with instructors and peers.

Collaborative Learning
Zoom allows educators to create breakout rooms for small group discussions, collaborative projects, and interactive activities. This promotes teamwork and peer-to-peer learning.

Access to Experts and Guest Speakers
Zoom makes it easier for educational intuitions to invite guest speakers, industry experts, or professionals from different locations to deliver virtual lectures or participate in discussions without the need for travel.

Resource Sharing and Screen Sharing
Instructors can share presentations, documents, and other educational resources directly through screen sharing. This facilitates effective content delivery and visual aids.

Assessment and Evaluation
Zoom can be integrated with other tools to facilitate online assessment and examinations, allowing instructors to monitor students remotely during exams.

Professional Development
Zoom is used for professional development workshops, training sessions, and conferences for educators. This allows teachers to enhance their skills and stay updated on educational trends.

Parent-Teachers Communication
Zoom provides a platform for virtual parent-teacher conferences, enhancing communication between educators and parents. This is especially valuable for parents who may not be able to attend in person.

Cost and Time Saving
Zoom reduces the need for travel, leading to cost savings for both educational institutions and participants. It also saves time that would be spend commuting.

Challenges of Zoom Meeting in Teaching and Learning
Adams (2019) stated that while zoom and other online meeting platforms have brought significant benefits to teaching and learning, they also come with challenges which are highlighted below:

Communication Barriers
Virtual settings may accentuate language barriers for students who are not proficient in the language of instruction.
Lack of informal, face-to-face interactions can impact social bonding among students and between students and teachers.

Inclusive Learning
Ensuring that online content and interactions are accessible to all students, including those with disabilities, can be challenging.
Some students may struggle with the shift to virtual learning, as it may not align with their preferred learning styles.

Empirical Review
Dogan & Robin (2014) carried a study on The Effectiveness of Online Learning Using Zoom Meeting at Elementary Schools. This study aimed to describe the effectiveness of using Zoom Meetings, as one of the online learning platforms, in the learning process at the select school of elementary school. The purposive survey method was used in this study involving the process of data triangulation from tests, questionnaires, and unstructured interviews. Sampling in this study is random sample or probability sampling is a sampling technique that uses technical opportunities in the sampling process. A sample of 160 students select school participated in this study by filling out questionnaires distributed online. Student responses were analyzed descriptively quantitatively to determine the using of Zoom Meeting the implementation of learning. Data was collected using a five-item Likert scale survey. Based on the results of data analysis from filling in student questionnaires, it can be concluded that the online learning system using zoom in elementary schools is effectively used, with the percentage of students understanding learning is 72.50%.
Asdar (2021) carried out a study on The Effect of Online Learning Zoom on student's learning outcomes. This study aims to determine the effect of implementing online learning with the zoom platform on student's learning outcomes. This study aims to determine the effect of implementing online learning with the zoom platform on student's learning outcomes. Researchers used quantitative and qualitative methodologies. Data were collected utilizing test. The population of this study was all eighth-grade students of SMP Telkom Makassa in the even semester of the 2020/2021 academic year, which consisted 7 class was randomly selected as the research sample were 24 students. Data collection was carried out using a learning outcome test after online learning with zoom for four meetings. The data analysis technique used is descriptive and inferential statistical analysis techniques. The descriptive statistical analysis results showed: the average student learning outcomes 87.42 were in the high category, classical completeness was achieved that was 100% (24 students) achieved individual mastery. The results of inferential statistical analysis with $\propto$=5% show that student's average score after online learning using zoom is greater than 73 (KKM). It is shown from pvalue = 0,000 with pvalue< 0,05, so it can be concluded that the average score of student learning outcomes is significantly greater than 73 (KKM). Therefore, the application of the online learning through zoom has an effect on the learning outcomes of class VIII students of SMP Telkom Makassar.

Siefta (2021) did a study on The Influence of Using Zoom Application Towards Student's Writing Ability in Descriptive Text at the Seventh Grade Students of SMP N 6 Bandar Lampung in the Academic Year of 2020/2021. This research was used Quasi Experimental Design that used Cluster Random Sampling. They were 31 students for experimental class (VIII A) and 30 students for control class (VII F) the total are 61 students. In order to collect the data, this research used writing test as the instrument. There were pre-test which was held before they were given treatment in experimental class and post-test was held after given the treatment. To make the data analysis, the researcher analyzed the data by using SPSS. The result of this research, it was obtained that Sig. (2-tailed) of the equal variance was 0.000 and a=0.05. Ha is accepted if Sig. (pvalue) < a=0.05 and Ho is rejected. Based on the computation, it can be concluded that there was any significant influence of using zoom application towards students' writing ability in descriptive text at the seventh grade students of SMP N6 Bandar Lampung in the academic year of 2020/2021.

Summary of Reviewed Literature

The literature review for the study, Zoom Meeting a 21st century tool in stimulating Biology Education Students Academic Performance of Rivers State University, is grounded in two main theoretical frameworks: Anchored on Social Cognitive Theory and the Technology Acceptance Model (TAM), the review delves into the theoretical frameworks guiding the study. Social Cognitive Theory, developed by Albert Bandura, emphasizing the dynamic interaction between personal factors, environmental influences, and behaviour. It underscore the role of observation, imitation, and cognitive processes in learning, particularly in the context of zoom meetings. The theory highlights the importance of self-efficacy, emphasizing students' belief in their capability to learn effectively through zoom.

The Technology Acceptance Model (TAM), created by Fred Davis, is employed to understand users' acceptance and adoption of new technologies. TAM considers perceived ease of use (PEOU) and perceived usefulness (PU) as primary factor influencing the intention to use technology. In the context to zoom, PEOU evaluates the ease of using the platform, while PU assesses it's perceived benefits for academic performance. The conceptual framework outlines key aspects of the study, including the concepts of technology, zoom technology, the influence of zoom in education, and academic performance. It defines technology as the deliberate use of knowledge to produce systems and goods that address human needs. Zoom technology is described as a cloud-based video conferencing platform that gained popularity, especially during the COVID-19 pandemic. The review emphasizes the multifaceted influence of zoom meetings on academic performance, such as facilitating remote learning, providing flexibility, and enhancing collaborative learning. The empirical review includes studies assessing the effectiveness of online learning using zoom at elementary schools and its impact on students' learning outcomes. These studies provide insights into the positive aspects of zoom student outcomes. The synthesis of theories, concepts, and empirical findings provides a robust foundation for understanding the dynamics of online learning through zoom and its implications for student achievement.

Design of the Study

This study adopted the quasi experimental research design to carry out the investigation.

Population of the Study

The study population comprises of 832 Biology Education students of Science Education Department, Rivers State University, Port Harcourt

Sample and Sampling Techniques

The sample consists of 122 Biology Education students as sample for the study purposive sampling techniques was used to draw the sample for the study from 200level.

Table 1. Illustrating Sampled Schools

S/N	200 Level Biology Education	Sampled students
1.	Group A	61
2.	Group B	61
	Total	**122**

Instrument of Data Collection
The instrument employed for data collection for this study is Biology Achievement Test on Biology methods (BATBM). The achievement test contain two sections, section A contain Personal data of respondents which include school name, students' gender while section B consist of 15 multiple choice questions with options A-D, each question is 1mark so a maximum of 15marks and a minimum of zero.

Reliability of the Instrument
To establish the internal consistency of the instrument, the Cronchbach alpha Coefficient was used to compute the instrument reliability with an index of 0.76.

Administration of Instrument
The first week: The researcher sampled students for introduction and , for the study. Pre-test was administered to all the students involved, both the control and experimental group. Two lecturers serve as research assistants in the study.
The second week and third week: the Biology lecturer for control group took over the group A using conventional (lecture metho. While students in the B group were taught using zoom technology.

Method of Data Collection
After the administration of pre-test and post-test, the data were collected from the scores obtained by student in both experimental and control group in the Biology method achievement test. Scores of students in the marked scripts were collated.

Method of Data Analysis
The method of data analysis used to answer the research questions is mean and standard deviation, while Z-test statistics with the aid SPSS was used to test the hypotheses at 0.05 level of significant.

Research Question 1: What is the extent to which 200 level Biology education students are taught Biology methods through zoom meeting application?

Table 4.1: Mean ($\overline{X}$) and standard deviation (SD) between students taught using Zoom meeting and lecture method

		Pre-test		Post-test		
Groups	**N**	$\overline{X}$	**SD**	$\overline{X}$	**SD**	**Mean gain**
Zoom meeting	61	24.09	8.81	69.26	21.90	45.17
lecture Method	61	24.29	8.90	58.75	20.10	34.46

Table 4.1,shows that Zoom meeting (Experimental group) pre-test score of students' gave a mean ($\overline{X}$) value of 24.09 and a standard deviation of 8.81, while their post-test score gave a

mean ($\overline{X}$) value of 69.26 and standard deviation (SD) of 21.90. The pre-test score of students taught with lecture method (Control group) gave mean ($\overline{X}$) value of 24.29 and standard deviation of 8.90, while their post-test score gave mean ($\overline{X}$) value of 59.75 and standard deviation (SD) of 20.10. The mean gain scores for the two groups were 45.17 for Zoom meeting and 34.46 for the lecture method respectively. This indicates that the 200 level Biology education students taught with Zoom meeting showed a significant increase in performance than those 200 level Biology education students taught with conventional (lecture) method. Also, the difference in the mean gain scores of both groups is 10.71 in favour of Zoom meeting.

Research Question 2: What is the difference in the mean performance scores of male and female Biology education students taught Biology methods using zoom meeting.

Table 4.2: Mean ($\overline{X}$) and standard deviation (SD) between male and female students taught using Zoom meeting

		Pre-test		Post-test		
Groups	**N**	$\overline{X}$	**SD**	$\overline{X}$	**SD**	**Mean gain**
Male	68	24.21	11.98	70.82	7.17	46.61
Female	54	24.10	11.99	67.66	5.81	43.56

Table 4.2, shows that Zoom meeting platform (Experimental group) pre-test score of students gave a mean ($\overline{X}$) value of 24.21 and standard deviation of 11.98 for the male and 24.10 and standard deviation of 11.99 for the female students. For the post-test mean score, male students obtain a mean of 70.82 and standard deviation of 7.17. The female students obtain a mean performance score of 67.66 and standard deviation of 5.81. The mean gain scores for the two groups were 46.61 for male and 35.65 for female students respectively. The mean score of both groups are relatively close, hence it suffices that both group are at almost the same level of achievement. Also, the difference in the mean gain scores of both groups is established at 3.05 in favor of male. This signifies that gender has a little effect on determining students' performance using Zoom meeting method.

Hypothesis 1: There is no significant difference in extent to which Biology education students taught Biology methods through zoom meeting application and their academic performance.

Table 4.3: Summary of Z-test analysis comparing scores of students on zoom meeting and lecture method

Category	**N**	**Mean**	**SD**	**Z-cal**	**df**	**Z-value**	**Decision**
Zoom meeting	61	2.9	1.1	3.819	2098	1.965	Rejected
Lecture method	61	2.7	0.9				

Table 4.3 shows that the value of the z-calculated (1.819) is more than the critical value (1.965) at 5 % level of significant. Therefore, the null hypothesis is rejected. Meaning, there is a significant difference between scores of students on zoom meeting and lecture method

Hypothesis 2: There is no significant difference in the mean performance score of male and female Biology education students taught Biology methods using zoom meeting in Rivers State University.

Table 4.4: Summary of z-test analysis between male and female students on zoom meeting

Gender	N	Mean	SD	z-cal	Df	z-value	Decision
Male	68	70.82	7.17	1.06	2098	1.965	Accepted
Female	54	67.66	5.81				

Table 4.4 revealed that the value of the z-calculated (1.06) is less than the z value (1.965) at 5 % level of significant. Therefore, the null hypothesis is accepted. Meaning, there is no significant difference in the mean performance score of male and female Biology education students taught Biology methods using zoom meeting in Rivers State University.

SUMMARY/CONCLUSIONS

In course of our study on zoom meeting a stimulating tool to biology education students' academic performance, the study revealed that students exposed to zoom meeting show a significant increase in performance than students exposed to lecture method. In addition, the mean score of both male and female are relatively close, hence it suffices that both group are at almost the same level of achievement. Also, the difference in the mean gain scores of both male and female is established at 3.05 in favor of male. This signifies that gender has a little effect on determining students' performance using Zoom meeting method.

RECOMMENDATIONS

The following recommendations are made based on the findings and conclusions drawn from the study:

1. The use of zoom meeting should be encouraged, since it affected the students' academic performance positively.
2. Training should be organized for science educator lecturers to equip them with knowledge and skill in using zoom meeting.

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