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Effect of Zoom Teaching and Physical Lecture Method on Undergraduate Students' Academic Achievement and Interest in Health Education in Enugu State University of Science and Technology (ESUT), Enugu.

[1]Chisom Alvina Onumba and [2]Mary Ngozi Nnamani

Department of Human Kinetics and Health Education, Enugu State University of Science and Technology (ESUT), Enugu.

The study sought to determine the effect of Zoom teaching and physical lecture method on undergraduate students' academic achievement and interest in Health Education in Enugu State University of Science and Technology (ESUT), Enugu. Pretest, posttest quasi experimental design format was used. The population consisted of 33 (10 males and 23 females) 100 level undergraduate students in the Department of Human Kinetics and Health Education, ESUT, Enugu. A total of 33 male and female 100 level undergraduate students in the Department of HKHE served as research participants hence census sampling techniques was applied. Two instruments namely Health Education Achievement Test (HEAT) and Health Education Interest Inventory Scale (HEIIS) (adapted) were used for data collection. The 100 level students who had not been previously exposed to the teaching areas used for the study (determinants of health) were taught 4 topics one topic per week for 4 weeks using physical lecture and zoom. A one day briefing was organized to familiarize the participants and the resource persons with the teaching processes. Pretest for both the experimental and the control groups followed the briefing. The experimental groups were exposed to the two methods for 4 weeks after which posttest was conducted immediately using joggled question items for HEAT for both the experimental and control groups. The research questions were answered using mean and SD while the hypotheses were tested with analysis of covariance at .05 level of significance. It was concluded that using lecture via online medium such as zoom facilitates greater academic achievement and interest than physical lecture method in Health Education. The recommendations among others included that the ESUT management should as a matter of urgency introduce and equip every Department in the university with functional ICT centre as well as qualified personnel, equipment, facilities and supplies for the purposes of taking lectures via zoom. There is need to explore other online medium in addition to zoom in order to sustain the already existing high academic achievement and interest in HED via online.

Keywords: Zoom, Physical Lecture, Achievement, Interest, Health Education

INTRODUCTION

Teaching constitutes strategies for developing an individual's intellect especially in a school system for possible behavioural change. According to Smith (2018), teaching is one of the processes of education designed to impact understanding and skill. Primarily, the function of teaching is to make learning effective. This implies that the learning process can get completed as a result of teaching. This however depend on the medium applied by the teacher. One of the teaching medium is through a medicated channel like Zoom. Zoom teaching using lecture method could be utilized in teaching and learning where physical contact is difficult as experienced during the COVID-19 pandemic.

Zoom medium of instruction was popular during school closure amid COVID-19 pandemic. Ngampornechai and Adams (2016), define Zoom learning as learning supported with electronic technology such as online classes and portal to access the

course outside the classroom. Other notable mediums that can be applied via online include Zoom, Start-me, Classtime, Neo, Classwize, Ted-Ed, Coursera, Google Classroom, Bakpax, Pronto, Skillshave, ClassDojo, Edmodo, Blackboard Learn, Parley, Docebo, Feedback Fruits, Udemy and Wexideo, WizIQ,Flipgrid, Codeacademy, Geynzy, Adobe, Captivate, Seesaw, Edx, Goceuardian, Articulate 360, Future Learn, Inspire and many more (Martinez, 2020). Of all these platforms, Zoom was the most applied during the school closure.

Zoom teaching via lecture method could be interesting which may result in better learning outcomes. Teaching through Zoom is one of the several online channels through which information and facts are transmitted to the learners in order to improve upon their intellect for possible growth and development in life (Smith, 2018). Zoom is an interactive audio and video programme based on cloud technology. Consequently, learning institutions could rely on it where face-to- face teaching and learning are not possible.

Every learning institution including higher institutions of learning strives to carry out this primary functional responsibility in order to ensure full implementation of the school curriculum at all times. This however, was impossible across the globe including in Enugu State following the corona virus (COVID-19) pandemic and subsequent school closure. School closure following lockdown compelled teachers, parents and students to quickly adapt to a new educational context, distance learning as against the traditional approaches to teaching and learning in Health Education in higher institution.

Health Education as a process adopts educational principles to facilitate the modification of health behavior (Idowu, 2019). Therefore, to achieve relevant health education both at the individual and community levels, different methods and materials are utilized. In higher institutions of learning, lecture method of teaching is widely used by lecturers. The commonest type of higher education teaching is centered on whole classroom teaching referred to as lecture method.

The lecture method is a teacher–centred and student peripheral teaching approach, in which the teacher delivers a pre-planned lesson to the students with or without instructional materials. It is a chalk and talk method of teaching. Students listen more during lecture method of teaching and are not actively involved in the learning process (Nwagbo, 2017). The report further states that this method of teaching does not promote the interest of the learner in the classroom. This is because students do not interact well enough with the teacher, fellow students or with learning materials for effective learning to take place. These conventional approaches to teaching and learning of Health Education were not possible during lockdown. Consequently, teachers had to develop online academic materials that could be used at home to ensure educational continuity while ensuring the necessary physical distancing. However, It has not been established whether or not students' achievement and interest are better enhanced through physical lecture method of teaching health education better than lecture via Zoom which also was the major concern of this study.

In response to the temporary closure of schools, the higher education system turned to Zoom-based instruction as an alternative to traditional in-person classroom teaching. This shift was prompted by the recognition of a connection between student motivation and e-learning, as highlighted by Harande (2015). Consequently, the current study employed the Zoom platform to facilitate

teaching for undergraduate Health Education students at ESUT in Enugu.The primary objective of this study was to investigate whether utilizing Zoom for teaching over a series of weeks could lead to enhanced academic accomplishments in the specific course area. This approach involved a departure from the conventional physical lecture format and aimed to explore the potential benefits of integrating Zoom as a medium for instructional delivery.

Achievement in Health Education has to do with the successful accomplishment of goal(s). According to Adeyemi (2018), achievement is the scholastic standing of a student at a given moment. Achievement testing enable the teacher and the students evaluate and estimate the degree of success attained in learning a given concept or phenomenon. It is also useful in testing the retention of information in determining the efficiency of instruction (Pajare, britner & Valante, 2008). Measuring students' achievement could be useful in determining if the learning goals have been achieved on not.

Measuring achievement of any learning outcome could be one way in which teachers find out if students are meeting their learning goals. It has been stated that achievement tests measure acquired knowledge or skills (Elliott, 2017). According to Airth (2022), achievement tests could come in form of diagnostic and formative as summative; diagnostic achievements are pretests given prior to a learning segment to determine what students already know and try to bring focus to lesson planning by providing guidelines for meeting the students' needs based on where they are. Formative or summative assessments on the other hand are formal ways that a teacher monitor students throughout a learning experience to make sure students are making the necessary gains (Airth, 2022). In this study, the evaluation process involved administering a pretest to the participants, followed by the implementation of the treatment, and concluded with a posttest to ascertain the outcomes. This sequence of activities aimed to discern the effects and implications of the treatment, find out if there are differences in the mean scores obtained at pretest and posttest following HED teachings using Zoom medium which also could determine students' interest in the unit area.

Interest is crucial in any learning process including learning health Education. Interest is an activity one enjoys and devotes his or her time in doing or studying (Okeke, 2011). For instance, devoting quality time to study health education topics could be a measure of interest in the subject. This also means that if the ordering of Zoom teaching is liked by students, they may begin to develop interest in the Health education units. The zoom medium of instruction is in line with the basic assumptions of Piaget Cognitive Theory which states that the basis of learning is the child's own activity as the child interacts with the physical and social environment. According to Piaget theory, knowledge does not and cannot have the same purpose of representation of an independent reality but instead recognized that human beings are born as active exploratory information processing organisms and actively construct their own ways of thinking about things based on their current level of maturation, actual experiences with objects, people and ideas (Piaget, 1975). In other words, if the undergraduate students of ESUT are more involved in construction of knowledge of the contents through active involvement in the class work, they may get more interested in the subject. Interest measurement is crucial in any learning process.

Measurement of interest in any learning outcome may be crucial as it determines the learner's continued studying of the subject

or course area. Interest measurement could be achieved with tools as interviews, questionnaires and inventories. According to Zavi (2019), the tools for measuring interest comes under formal and informal methods; formal methods are specialized and standardized measuring instruments such as interest inventories and interest test batteries while the informal methods include the person's own statement, a record of his activities and observation by parents and the teachers. In this study, the formal method was applied as the interest inventory scale adapted was modified to ascertain students' interest by gender following weeks of HED teaching using Zoom medium

Gender is a key variable in analyzing achievement status and interest of an individual or group regarding a phenomenon. According to Eddy, Brownwell and Wenderoth (2014), gender is a male or female which represents the properties that distinguish organism on the basis of their reproductive roles as female or male. There are instances of males doing better than their female counterparts with respect to achievements in science related subjects and vice versa. For instance, some writers are of the view that males generally perform better than females in sciences (Iweka, 2006; Obiekwe, 2008). Others however, share a contrary opinion that both males and females achieve equally adding that the perceived differences in the achievement may be as a result of one's socio-cultural orientation and opportunity (Okeke, 2011 & Nzewi, 2010). The instructional method used in the classroom or through Zoom may have influence on students' academic achievements and interest in Health Education and science related disciplines. This justifies inconclusiveness regarding the influence of gender on students' achievement and interest in science subjects. Therefore, gender variable inclusion in this study becomes crucial. It could be possible for gender differentials to influence HED undergraduate students' achievement and interest in the course but which has not been verified empirically.

The undergraduate students in the Department of Human Kinetics and Health Education refer to male and female students in the Department offering Health Education as a single unit from 100 level to 400 level and who must have completed at least a semester in core Health Education courses as at the time of carrying out this study. Such students must possess record of lecture attendance in those courses and must have written examinations on them prior to this study. This may provide such students with the necessary background knowledge about the new topic to be taught. Therefore, it is necessary to reflect on the efficiency of the online classes that were suddenly designed and taught at universities during the second semester of 2020 by understanding the efficiency, strengths and weaknesses of teaching through Zoom as well as considering their complementary aspects.

Teaching through Zoom using lecture method sometimes could provide classroom interaction pattern whereby the teacher ensures that the outlined patterns are effectively applied in each lesson delivery. By this strategy, the teacher ensures that only the advantages of each classroom interaction is fully tapped, skillfully skipping their disadvantages. Teaching through Zoom requires good internet services with steady power supply to ensure uninterrupted teaching-learning processes. It also requires the learner to possess facilities like laptop or smart phones and technical skills to utilize them. Enugu State University of Science and Technology (ESUT) has a well equipped Information and Communication Technology (ICT) facilities and equipment as well as relevant manpower needs to facilitate Zoom teaching at any given time hence the justification for

the study in the institution. The undergraduate students in ESUT, Enugu were used as participants in this study.

The undergraduate students in ESUT are 100 level students in the Department of Human Kinetics and Health Education who must have spent at least one school term in the institution as at the time of carrying out this investigation. Such students in the experimental and control groups may not have been sufficiently exposed to the teaching areas exposed to them that may likely be brought to bear during the teaching. This ensured uniform background knowledge of the topic contents at pretest for both groups. In that regard, can zoom application of classroom interaction patterns serve as an improved and more effective instructional strategy that can lead to students' improved cognitive achievements and interest in Health Education lectures or not?

Statement of the Problem

Teaching using physical lecture method may be difficult in the event of another round of school closure and the coverage of curriculum contents in HED may be adversely affected just like it did during the COVID-19 pandemic. Aditionally, with the 4th wave of COVID-19 (Omicron virus) pandemic with its devastating consequences including mortality, there may likely be another round of school closure in future. Perhaps, with alternative method to conventional approach of teaching HED, content coverage may be achieved and, students' achievement and interest may significantly improve in the subject domain.

In ESUT, it could be possible that the ICT Department may not have organized any refresher course in order to acquaint the lecturers and specifically lecturers in Health Education with the technical skills to conduct online teaching in the event of another round of school closure. It is therefore, certain that without using an effective remedial strategy, HED teaching and learning may experience reduced interest among students in the Department. In view of the prevailing situation, Zoom teaching through lecture method may be useful in teaching HED in order to improve academic achievement and interest in the unit areas thus raising questions as will lecture teaching through Zoom result in better achievement and interest than physical method of teaching HED?

Purpose of the Study

The specific purposes of the study were to;

1. determine the mean difference in the achievement level between those taught via Zoom (experimental group) and their counterparts exposed to physical lecture (the control group).
2. determine the mean difference in the interest level between those taught via Zoom (experimental group) and their counterparts exposed to physical lecture (the control group).
3. determine the mean difference in the achievement level between those taught via Zoom and their counterparts exposed to physical lecture by gender.
4. determine the mean difference in the interest level between those taught via Zoom and their counterparts exposed to physical lecture by gender.

Research Questions

The following research questions guided the study.

1. What is the mean difference in the achievement level between those taught via Zoom (experimental group) and their counterparts exposed to physical lecture (the control group).
2. What is the mean difference in the interest level between those taught via Zoom (experimental group) and their counterparts exposed to physical lecture (the control group).

3. What are the achievement mean differences between the male and female students exposed to lecture via zoom instruction and their counterparts exposed physical lecture during the pretest and posttest?
4. What are the interest mean differences between the male and female students exposed to lecture via zoom instruction and their counterparts exposed physical lecture during the pretest and posttest?

Research Hypotheses

The study was guided by the following hypotheses and were tested at .05 level of significance at appropriate degree of freedom.

1. Significant effect does not exist in the achievement mean differences of students exposed to lecture via zoom instruction and their counterparts exposed physical lecture during the pretest and posttest based on gender
2. There is no significant effect in the interest mean and standard deviation differences of students exposed to lecture via zoom instruction and their counterparts exposed physical lecture during the pretest and posttest based on gender

Method: The design for the study is two groups pretest, posttest, quasi experimental design. Specifically, the study applied the non equivalent control group design. This means that both the experimental and control groups possess similar characteristics but differed in the treatment procedures. The area of the study was Enugu State University of Science and Technology (ESUT), Enugu. The population for the study consisted of 33 (10 males and 23 females) 100 level undergraduate students in the Department of Human Kinetics and Health Education (HKHE), Faculty of Education, ESUT, Enugu, during the 2020/2021 academic session (Departmental Admission Register, 2022). A total of 33 male and female (10 males and 23 females) 100 level undergraduate students served as research participants hence census sampling technique was used.

Two instruments namely; Health Education Achievement Test (HEAT) and Health Education Interest Inventory Scale (HEIIS) was adapted in the study. The HEAT was developed from Ajiboye (2013), consisted of 34 multiple choice items with four response options A, B, C and D**.** Each of the items in the HEAT items were developed from the topics (4 topics) taught as contained in the Health and Physical Education text book used for the Zoom lessons (Ajiboye, 2013). The four topics taught to the students were (1) determinant of health (heredity and environment) (2) determinant, of health (mental health) (3) determinant of health (personal health) and (4) determinant of health (environmental/community health). These topics were chosen because they are inclusive of Health Education curriculum from 100 level to 400 level. This ensured comprehensiveness in assessing the achievement level in the unit area.

The second instrument was Health Education Interest Inventory Scale (HEIIS) which was adapted from Kim (2020), English Reading Comprehension Interest Inventory Scale (ERCIIS) was used to assess students' interest in Health Education. It contains 23 items used to generate the opinions of the respondents on interest in HED. The instrument was modified by changing the item statements from question format to direct statement to suit HED concept regarding interest. The items were placed on four point likert type rating scale thus: Strongly agree (SA), Agree (A), Disagree (A) and strongly Disagree (SD).

Experimental Procedure

The duration of the study was 4 weeks for the control group from the day that the Health option students finished their Departmental courses. Class meetings lasted for 1 hour and were held once a week. A one day training programme was organized for Health Education lecturers used for the study. These Health Education lectures that must have taught through lecture via Zoom were given prior information about their primary functional responsibilities with regard physical lecture and lecture via zoom as well as the characteristics of each method. Questionnaire was administered as pretest and posttest to collect learner's opinions on real time video lectures using Zoom and to assess their satisfaction. Two achievement tests were conducted as pretest. The experimental group was taught using Zoom while the control group were taught physical lecture. The same tests were given at the same time for both the control and experimental groups. The format and number of questions for both tests was the same. The duration of the test was 40 minutes.

For the experimental groups, the lecturer A lectured the experimental group through lecture via Zoom using a mock teaching exercise with the prepared lesson module. The researcher was monitoring them to ensure that they did not deviate from the procedure of instruction given to them by the researcher.

A HED health determinant class was set up as experimental group-lecture via Zoom while the control group were taught with physical lecture only. The class schedule, contents and procedure were similar for both groups. The difference lies on whether Zoom technology is used. Lectures were held twice per week with each session lasting for an hour. Wednesday and Friday were the teaching days. However, in the experimental class, a video lecture was uploaded and a real time video lecture using Zoom was implemented every week. The real time Zoom lectures were used to teach the contents of each topic. Students were asking questions and also engaged in discussions in real time through the Zoom video lectures.

The pretest was administered to the undergraduate students before the treatment to measure the students' group equivalent and it provided the researcher with baseline data about the participants while posttest was administered to the participants 24 hours upon completing the treatment. This was to allow the participants carry out revisions on the topics taught during the 4 weeks teaching periods. The question items were joggled to avoid applying residual knowledge from the pretest item order.

Method of Data Analysis: The scores obtained from the pretest and posttest were analyzed using mean (x) and standard deviation for research questions while analysis of covariance (ANCOVA) was used for testing the hypotheses at 0.05% level of significance.

Result

Research Question One: What are the achievement mean differences between the students exposed to lecture via zoom instruction and their counterparts exposed to physical lecture during the pretest and posttest?

Table 1: Achievement Mean and SD Differences of the Respondents Exposed to Lecture via Zoom and their Counterparts Exposed to Physical Lecture During Pretest and Posttest

Key: Lect via zm-Lecture via Zoom. Achvmt-Achievement. Phys Lect-Physical Lecture. HA-High Achievement. LA-Low Achievement.

Variable	Test	n	Mean ($\bar{X}$)	SD	X Gain	Dec Achvmt
Lect via Zm						
	Pretest	24	20.91	5.180		
	Posttest		27.52	4.301	3.25	HA
	Phys Lect					
	Pretest	9	10.52	5.209		
	Posttest		24.27	6.419		LA

Data as presented in Table 1 shows that the mean achievement of participants taught with lecture method via zoom at pretest is 20.91 with SD 5.180 while the posttest score is27.52 with SD 4.301. The control group, that is physical lecture has mean achievement score of 10.52 with SD 5.209 at pretest and 24.27 with SD 6.419 at posttest. The mean difference of the experimental group and the control group is 3.25 (27.52-24.27). This signifies higher achievement score for the experimental group. This means that the group taught using lecture via Zoom have higher achievement scores in HED than their counterparts taught with physical lecture

Research Question: Two: What is the interest mean differences between the students exposed to lecture via zoom instruction and their counterparts exposed to physical lecture during the pretest and posttest?

Table 2: Interest Mean and SD Differences of the Respondents Exposed to Lecture via Zoom and their Counterparts Exposed to Physical Lecture During Pretest and Posttest

Variable	Test	n	Mean ($\bar{X}$)	SD	X Gain	Dec Interest
Lect via Zm						
	Pretest	24	27.52	4.378		
	Posttest		67.09	5.728	9.30	HI
	Phys Lect					
	Pretest	9	19.64	6.097		
	Posttest		57.79	16.081		LI

Key: Lect via zm-Lecture via Zoom. Phys Lect-Physical Lecture. HI-High Interest. LI-Low Interest.

Data as presented in Table 2 shows that the mean interest of the participants taught with lecture method via zoom at pretest is 27.52 with SD 4.378 while the posttest score is

67.09 with SD 5.728. The control group, that is physical lecture has mean interest score of 19.64 with SD 6.097 at pretest and 57.79with SD 16.081 at posttest. The mean difference of the experimental group and the control group is 9.30 (67.09-57.79). This signifies higher interest score for the experimental group. This means that the group taught using lecture via Zoom have higher interest in HED than their counterparts taught with physical lecture.

Research Question: Three: What are the achievement mean differences between the male and female students exposed to lecture via zoom instruction and their counterparts exposed physical lecture during the pretest and posttest?

Table 3: Achievement Mean and SD Differences of the Male and Female Respondents Exposed to Lecture via Zoom and their Counterparts Exposed to Physical Lecture During Pretest and Posttest

Variable	Test	n	Mean (x)	SD	Mean mean Gain	Dec Achvmt	Lect via Zm
	Male						
	Pretest	5	18.40	3.912			
	Posttest		27.60	5.177	0.10	HA	
	Female						
	Pretest	18	9.17	4.962			
	Posttest		27.50	4.301	18.33	LA	
	Phys Lect						
	Male	4					
	.Pretest		9.00	.816			
	Posttest		17.76	3.504	8.76	LA	
	Female	6					
	Pretest		9.00	2.000			
	Posttest		16.17	3.189	7.17	LA	

Key: Lect via zm-Lecture via Zoom. Achvmt-Achievement. Phys Lect-Physical Lecture. HA-High Achievement. LA-Low Achievem.

Table 3 data shows that the mean achievement score of the male participants taught with lecture method via zoom at pretest is 18.40 with SD 3.912 while the posttest score is 27.60 with SD 5.177. The female mean achievement score at pretest is 9.17 with SD 4.962. For the control group-that is physical lecture, the mean achievement score of the male participant at pretest is 9.00 with SD .816 while the posttest is17.76 with SD 3.504. The female mean achievement score at pretest is 9.00 with SD 2.00 while the posttest score is16.17 with SD 3.189. The mean gain of 18.33 of the females taught physical lecture via Zoom is greater than the mean gain of their male counterparts taught with physical lecture among the experimental and the control groups. This signifies greater achievement in Health Education. This means that the female students taught with lecture via Zoon have greater achievement in Health Education than their male counterpart taught with the same medium.

Research Question: Four: What are the interest mean differences between the male and female students exposed to lecture via

zoom instruction and their counterparts exposed physical lecture during the pretest and posttest?

Table 4: Interest Mean and SD Differences of the Male and Female Respondents Exposed to Lecture via Zoom and their Counterparts Exposed to Physical Lecture During Pretest and Posttest

Variable	Test	n	Mean (x)	SD	Mean¯	mean Gain	Dec
Interest	Lec via Zm						
	Male						
	Pretest	5	20.00	4.000			
	Posttest		66.00	4.359		46.00	
	Female						
	Pretest	18	21.17	5.612			
	Posttest		67.30	6.127		46.13	HI
	Phys Lect						
	Male	4					
	Pretest		21.00	5.913			
	Posttest		37.00	9.416		16.00	LI
	Female	6					
	Pretest		13.83	5.013			
	Posttest		36.00	12.017		22.17	LI

Key: Lect via zm-Lecture via Zoom. Phys Lect-Physical Lecture. HI-High Interest. LA-Low Interest.

Table 4 data shows that the mean interest score of the male participants taught with lecture method via zoom at pretest is 20.00 with SD 4.000 while the posttest score is 66.00 with SD 4.359. The female mean interest score at pretest is 21.17 with SD 5.612 while the posttest score is 67.30 with SD 6.127.. For the control group- that is physical lecture, the mean interest score of the male participant at pretest is 21.00 with SD 5.913 while the posttest is 67.30 with SD 6.127. The female mean interest score at pretest is 13.83 with SD 5.013 while the posttest score is 36.00 with SD 12.017. The mean gain of 46.13 of the females taught physical lecture via Zoom is greater than the (16.00) mean gain of their male counterparts taught with physical lecture among the experimental and the control groups. This signifies greater interest in Health Education. This means that the female students taught with lecture via Zoon have greater interest in Health Education than their male counterparts taught with similar medium.

Hypothesis 1: Significant effect will not exist in the achievement mean and standard deviation differences of students exposed to lecture via zoom instruction and their counterparts exposed physical lecture during the pretest and posttest based on gender

Table 5: Analysis of Covariance (ANCOVA) Test of Difference in the Achievement of the Respondents Exposed to Lecture via Zoom Instruction and their Counterparts Exposed Physical Lecture during Pretest and Posttest Based on Gender.

Variable Source	Type 11 sum of square	df	mean square	F	Sig
HEATAchv	647.540	1	647.540	35.583	.000

From the data presented in Table 5 regarding differences in the achievement of the participants exposed to lecture via zoom instruction and their counterparts exposed to physical lecture during pretest and posttest based on gender has a significance value of .000. This means that the calculated value of the significance is less than the probability value set for the study. Hence the null hypothesis was rejected. Therefore, there is significant difference between male and female participants taught through lecture via zoom and the group taught with physical lecture method.

Hypothesis 2: There is no significant effect in the interest mean and standard deviation differences of students exposed to lecture via zoom instruction and their counterparts exposed physical lecture during the pretest and posttest based on gender

Table 6: Analysis of Covariance (ANCOVA) Test of Difference in the Interest of the Respondents Exposed to Lecture via Zoom Instruction and their Counterparts Exposed Physical Lecture during Pretest and Posttest Based on Gender

Variable Source	Type 11 sum of square	df	mean square	F	Sig
HEIIS Intrst	4448.387	1	4448.387	81.580	.000

From the data presented in Table 6 regarding differences in the interest of the participants exposed to lecture via zoom instruction and their counterparts exposed to physical lecture during pretest and posttest based on gender has a significance value of .000. This means that the calculated value of the significance is less than the probability value set for the study. Hence the null hypothesis was rejected. Therefore, there is significant difference between male and female participants taught through lecture via zoom and the group taught with physical lecture method regarding interest in HED.

Discussion: The discussion of the findings of the study are presented as follows: The findings of the study revealed that Students taught with lecture via zoom had higher achievement than those taught with physical lecture. There is significant difference between male and female participants taught through lecture via zoom and the group taught with physical lecture method. This finding agree with Vurdien (2019), which found the group that interacted with face-face-face interaction achieving less. Furthermore, the findings of the study fall in line with respect to gender influence on mean academic achievement status with the females achieving higher than their male

counterparts. On the contrary, the study findings did not agree with Ugwu (2014), results that guided enquiry instruction method was superior to physical lecture method in facilitating students' achievement in basic science. The study findings however, agree with Ugwu (2014), on no significant difference in the mean score of male and female students in Baisc science after the treatment.

The disagreement of the study findings with Vurdien (2019), report could be because the participants were secondary school students who do not receive teaching more often with physical lecture method unlike the undergraduate students who regularly receive lectures in their courses with physical lecture. It could also be on account of undergraduate students' familiarity with lecture method of teaching as it is generally recognized in higher institutions of learning.

The findings also showed that Students taught with lecture via zoom had higher interest than those taught with physical lecture. The hypothesis showed that significant differences exist between male and female participants taught through lecture via zoom and the group taught with physical lecture method regarding interest in HED. This finding disagrees with Vurdien (2019), which showed that the group that interacted virtually using Zoom outperformed the group with face-face-face interaction. The finding of the study also did not fall in line with Nnorom and Erhabor (2019**),** that students taught with classroom interaction patterns performed better than those taught with physical lecture or conventional method. Despite these disagreement with previous findings, it agrees with Nnorom and Erhabor (2019), the no significant difference existed between the male and the female participants regarding cognitive achievement scores in biology following application of classroom interaction patterns. The agreement with previous report of Nnorom and Erhabor (2019), could be because zoom application favours classroom interaction pattern utilized in the study. The no gender differentials in both studies is strange especially that male and female always differ in performance with respect to science subjects including Health Education. Perhaps, the quest for scientific innovation in schools may have accounted for the no differences in the mean academic achievement teaching through lecture via zoom.

Conclusion

From the findings of the study, it was concluded that using lecture via online medium such as zoom facilitates greater academic achievement and interest than physical lecture method in sciences.

Recommendations

The following recommendations are made.

1. The ESUT management should as a matter of urgency introduce and equip every Department in the university with functional ICT centre as well as qualified personnel, equipment, facilities and supplies for the purposes of taking lectures via zoom. This could be helpful in a situation where the course lecturer is challenged with physical approach to teaching HED.
2. There is need to explore other online medium in addition to zoom that are probably less convenient in order to sustain the already existing high academic achievement and interest in HED via online.
3. More instructional resources in form of textbooks, chats, models and journals should be supplied to the Departmental libraries with good access during course accreditation in order to update online information in the unit area.
4. There is the need for seminars, workshops and symposiums on online applications by the university

management in order to create the awareness in students. This may equip students with the necessary skills to access online teachings via phones.

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