Effect of Google Meet E-learning Technology on Building Students Knowledge

Obinna-Akakuru, Annabel U.[1*], Ordua, Victor N.[2], Akakuru, Ojiugo C.[3] and Nelson-Okata, Ezinne[4]

[1]*Department of Psychology/G and C, Alvan Ikoku Federal College of Education, Owerri, Imo State Nigeria.*
[2]*Department of Psychology, Federal College of Education, Omoku, Rivers State Nigeria.*
[3]*Department of Social Studies, Alvan Ikoku Federal College of Education, Owerri, Imo State. Nigeria.*
[4]*Department of Life Science Education, Imo State University, Owerri Nigeria.*

Authors' contributions

Original Research Article

ABSTRACT

This study investigated the effect of Google meet e-learning technology on building students' knowledge in Economics in the face of COVID-19 pandemic in Imo State. Two purposes, two research questions and two hypotheses guided the study. The study adopted a quasi-experiment pre-test, post-test, control group design, involving two groups with analysis of covariance as post-hoc control. The population of the study consisted the entire year two students in Alvan Ikoku Federal College of Education, Owerri in Imo State, which are 2,063. The sample consisted of 80 Economics students, drawn from the population. Purposive sampling technique was used to select the 40 students in each class and assigned the classes to experimental and control groups. Google Meet E-learning technology Instructional Package (GMET-IP) and the Economics Achievement Test (EAT) were used as the instrument for data collection, while mean rating, standard deviation and analysis of covariance (ANCOVA) were used to answer the research

---

Corresponding author: Email: obinna.akakuru@alvanikoku.edu.ng;

questions and test the hypotheses. The content and face validities of the instruments were established by two (2) experts in Educational Measurement and Evaluation, two (2) lecturers teaching Economics, who after due corrections, fine-tuned them and certified them fit for administration. Pearson product moment correlation coefficients method was used to determine the reliability of the results obtained with the instrument; and to establish its construct validity that is inter correlations among items which yielded a reliability coefficient value of 0.78. Findings from the study indicated that Video Modules E-learning approach method had effect on the academic achievement of students in Basic Sciences. The treatments have more positive impact on the female students than male students, showing an interaction occurred between the gender. Conclusions were drawn and recommendations made from the findings of the study which includes that there is need for the incorporation of this e-learning approach into the teaching and learning of Economics in tertiary institutions in Imo State.

1. INTRODUCTION

One of the responsibilities of schools is to build knowledge and student learning outcomes and skills [1]. Students study at home through applications that have been agreed upon by educators and students. The learning room component that was originally a classroom in the school environment has shifted to the Google Meet application room.

Google meet is an interactive and alternative media, used for online learning. Google Meet Assist Educators use the lecture method in indirect learning activities. Interactive learning is expected to help students in building knowledge and learning outcomes [2]. Basic skills in the use of media aids during Study from Home (SFH) are the main requirements for educators and students in communication as well as the delivery of material to build student knowledge and learning outcomes. In the application of learning methods, basic skills are the main requirements to facilitate building knowledge and learning outcomes [3]. One of the supports in online learning is student books. In addition to educators delivering material, it is also expected that students will have the habit of reading in each context to support the process of building knowledge and learning outcomes. The habit of reading and bringing books closer to students is a natural way to encourage building knowledge and learning outcomes and facilitate the learning process [4]. Assistance by parents in reading books when the distance learning process helps students be more creative and innovative to follow the learning process optimally [5]. The challenges faced by educators are oriented towards changing planning instruments in learning that are significant for managing various things including building knowledge and learning outcomes [6].

E-learning platforms facilitate continued education during unplanned school closures or pandemics, which go a long way to reduce graduation delays [7]. The use of E-learning platforms provides opportunities for students to develop new skills and to structure their own learning trajectory [8]. Transition to E-learning platforms facilitates virtual classes and remote learning which is gradually becoming the new normal amid COVID-19 lockdown. These Virtual classes are similar to offline classes in a lot of ways: an instructor provides an engaging educational experience through video, image, text, audio, and PDF files, and students follow along to take notes, perform exercises, and engage in discussions and complete exams to test their knowledge. Considering the potential benefits associated with e-learning, the present study examines its impact on student's learning interests and academic achievements.

Aspects of building knowledge were adapted by researchers from John Piaget, namely building understanding; Build a scheme and adjust to the scheme; Organizing experience; Equilibration and Stages of development [9]. The Build understanding is the process of building knowledge and understanding of something that is processed through the five senses to produce a scheme [10,11, 12,13]. The Build a scheme and adjust to the scheme is the process of assimilating the scheme with information and experience and accommodation in adjusting to the scheme to consider information and experience [14]. The Organizing experience is part of a higher thought process [15]. The Equilibration and Stages of development is a process of cognitive conflict about the schemes that are being built with the information and experiences they have to create a process for change [16].

The need to achieve learning outcomes in learning activities both physical, mental, knowledge, and emotional in the responsibility of the tasks given. The researcher adopts from bloom in the assessment of student abilities that are tailored to the learning objectives and focuses on aspects of student cognitive learning outcomes. The learning outcomes refer to the course objectives that contain aspects is analyzing, evaluate, and create [17].

Gender refers to the sex of an individual either male or female. One of the millennium development goals (MDGs) is gender equality. As Fatokun and Odagboyi [18] noted, in most societies, the roles of women is knocked to the floor, preventing women from participating in, and benefitting from development efforts. They added that some subjects such as science and mathematics are branded masculine, while others like home economics, secretarial studies are branded feminine. Haliru [19] in his comparison of the knowledge of male and female in Geography, concluded that male students were very vast in the knowledge of environmental education than female students. Gin [20] observed that in a world where patriarchal values predominate; there are observable general sets of beliefs that women are inferior to men and therefore, this ideas and beliefs give men more power and more opportunities over women in the society [21,22,23].

2. PURPOSE OF THE RESEARCH

The purpose of this work is to determine the effect of Google Meet E-learning Technology (GMET) on building student's knowledge in tertiary institutions in Imo State, Nigeria. The objectives are to:

1. Ascertain the effect of GMET on building student's knowledge in tertiary institutions in Imo State, Nigeria;
2. Assess the academic achievement of male and female students on the use of GMET and conventional teaching methods.

2.1 Research Questions

The following research questions were asked:

1. What is the effect of GMET on building student's knowledge in tertiary institutions in Imo State, Nigeria?

2. What is the academic achievement of male and female students on the use of GMET and conventional teaching methods?

2.2 Hypotheses

The following hypotheses were formulated and tested on a 0.05 level of significance:

$H0_1$ There is no significant difference between the academic achievement of students taught using GMET and those taught using conventional teaching method in tertiary institutions in Imo State, Nigeria.

$H0_2$ There is no significant difference in the academic achievement of male and female students on the use of GMET and conventional teaching method.

3. METHODOLOGY

The design of this study is quasi-experimental, pre-test, post-test, control group design. The study adopted a 2X2 factorial design. The subjects were assigned to treatment and control groups without randomization. Year two Economics classes were used for the study and the treatment was administered for one hour after school in order not to disrupt the academic program of the school. The study was carried out in Imo State. The State is in the South-eastern Geopolitical zone of Nigeria. The population of the study is 2,063, comprising the entire year two students in Alvan Ikoku Federal College of Education, Owerri. The sample for this study consists of 80 year two students from Economics Department. GMET was used to treat the students in class A, while conventional teaching method was used to treat class B. Purposive sampling technique was used to assign the two classes to experimental and control groups. Two instruments were used for data collection namely; Google Meet E-learning Technology Instructional Package (GMET-IP) and the Economics Achievement Test (EAT). The instrument consists of a researcher-made question items drawn from the topics taught in the experimental and control group classes. It consists of 30 well structured questions which were given to two experts in Economics and Measurement and Evaluation departments at Imo State University, who checked the content and face validity. Thereafter, they fine-tuned the instrument to be in simple and devoid of ambiguity. The researcher administered these instruments to 24 year two students in Economics from another school (Imo Polytechnics Umuagwo) which were not be part

of the study. The same test was re-administered to the same students after two weeks. The pre-test and post-test scores were compared using the Pearson Product Moment Correlation Coefficients method to determine the reliability of the results obtained which yielded a reliability coefficient value of 0.78.

4. RESULTS AND DISCUSSION

4.1 Research Question One

What is the effect of GMET on building student's knowledge in tertiary institutions in Imo State, Nigeria? The result of the data analysis has been summarized in table 1.

The mean and the standard deviation were computed to answer research question two. Although the pre-test mean of the GMET group exceeds that of the control group by 2.47, the post-test mean ($\bar{x}$) score follow similar pattern. The GMET group had a mean gain of 4.09 over the pre-test mean score of 16.36 while the lecture group has 14.52 post-test mean with a mean gain of 0.63 over the pre-test. Having considered this higher mean of 20.45 in post-test, the researcher concluded that the GMET of teaching enhances students' knowledge in Economics.

4.2 Research Question Two

What is the academic achievement of male and female students on the use of GMET? The result of the data analysis has been summarized in Table 4.

Table 2 showed the difference in mean being 1.38 in the GMET, the females had a mean of 20.6 while the males had 19.84 with standard deviations of 2.87 and 4.63 respectively. The difference in mean here was 0.76. The mean of both genders show only slight variation. The researcher therefore, concluded that the gender mean difference in achievement in the treatment variables does not greatly affect student's academic achievement.

4.3 Hypothesis One

There is no significant difference between the academic achievement of students taught using GMET and those taught using conventional teaching method in tertiary institutions in Imo State, Nigeria. The result of the data analysis has been summarized in Table 3.

The summary of ANCOVA in Table 4.3 gave a calculated F of 28.14 while the critical F remains 3.91 given 1 and 118 degrees of freedom at the 0.05 alpha level of significance, the null hypothesis was therefore rejected. Rejection of the null hypothesis given a $\bar{x}$ of 20.45 for the GMET group and a $\bar{x}$ of 14.68 for the control implies that those in GMET group achieved more in Economics after the treatment. The researcher therefore concluded that the GMET impacted positively better than the lecture method among the students offering Economics.

4.4 Hypothesis Two

There is no significant difference in the academic achievement of male and female students on the use of GMET and conventional teaching method. The result of the data analysis has been summarized in Table 4.

Table 1. Summary of Mean and Standard Deviation on Students Achievement using GMET

Variable		Pre-test			Post-test	
	N	$\bar{X}$	SD		$\bar{X}$	SD
GMET	40	16.36	3.28		20.45	3.14
Lecture Method	40	13.89	4.4		14.52	3.57
Total	80					

Table 2. Summary of Mean and Standard Deviation of the Treatment Group by Achievement and Gender

Variable	GMET		
	N	$\bar{X}$	SD
Male	45	19.84	4.63
Female	35	20.6	2.87
Total	80		

Table 3. Summary of ANCOVA showing the Mean Difference between the GMET Group and Lecture Method Group

Source of Variation	df	Sum of Squares	Mean Square	F Cal	F Crit.	Decision
Between groups	1	27574.9	27574.9			P<0.05
Within groups	78	183758.85	980.075	*28.14	3.91	Reject H$_0$
Total	79	211,333.75				

Significant, P<0.05; Calculated f= 28.14, critical f = 3.91 given 1 & 78 degrees of freedom

Table 4. Summary of ANCOVA Showing the interaction effect by gender and treatment in Economics

Source of Variation	Df	Sum of Squares	Mean Square	F Cal	F Crit.	Decision
Treatment (Factor A main effect)	1	0.6	0.06	*0.057	3.91	P<0.05 Retain H0
Sex of students (Factors B main effect)	1	108.04	108.04	*10.24		P<0.05 Retain H0
Sex of students x treatment	1	41.1	41.1	*3.9		P<0.05 Retain H0
Within groups	76	2068.05	10.55			
Total	79	2135.59				

The table 4 showed that when the male and female students were given treatment, a significant f was obtained. The calculated f gave 0.057 while the critical f remains 3.91 given 1 and 76 degrees of freedom. The null hypothesis was therefore retained. The researcher therefore concluded that there is no difference in achievement by treatment under study. The table also showed a significant f of 10.24 while the critical f gave 3.91 by gender. The females had an overall mean ($\bar{x}$) of 20.75 while the males had an overall mean of 19.68. The 1.07 difference was statistically strong to be significant at the 0.05 alpha level. The researcher therefore concluded that the treatments have more positive impact on the female students than male students. Interaction occurred between the gender. The table also gave a no difference interaction in both independent variables population and their mean performance in Economics achievement.

The calculated f for interaction is 3.90 while the critical f value gave 3.91 given 1 and 76 degrees of freedom. The researcher therefore retained the null hypothesis of no interaction effect in the two variables under study, that is, treatments and sex of students. This means that there was no significant relationship/interaction in Economics achievement, whether or whether the student was a male or a female.

5. CONCLUSION AND RECOMMENDATIONS

The GMET positively impacted on the students' knowledge and academic achievement in Economics to a very high extent. Students' performance increased using this method. From the findings, the following recommendations are made:

1. The treatments have more positive impact on the female students than male students, showing an interaction occurred between the gender. There is need to make the male students more abreast with this modern learning method.
2. There is need for the incorporation of modern instructional methods like Google meet e-learning technology into the teaching and learning of Economics in tertiary institutions in Nigeria. This will ensure that students are abreast with global best practices which enhance achievement.
3. The entire teachers must train and retrain themselves continuously on the use of instructional resources they should at least understand the organization of content. This will enable students to participate actively in the lesson and arouse the interest of the students.
4. Government on its part should provide adequate, effective and functional

instructional resources to higher institutions which make lessons easy to deliver, interesting and successful.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the authors.

ETHICAL PROCEDURE

As per international standard or university standard written ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Mercer DK. Who is the building leader? Commentary on educational leadership preparation programs for the future. Educational Considerations. 2016;43(4): 6-10.
2. Roscoe RD. Self-monitoring and knowledge- building in learning by teaching. Instructional Science: An International Journal of the Learning Sciences. 2014;42(3):327-351.
3. Cabero J, Piñero R, Reyes M. Material educativo multimedia para el aumento de estrategias metacognitivas de comprensión lectora. Perfiles educativos. 2018;40(159):144-159.
    Available:http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S018569820180 00100144&ln g=es&tlng=es
4. Jimenez L, Manzanal A, Baridon D. Reading literacy and metacognition in spanish adult education centre. European Journal for Research on The Education and Learning of Adults; 2019.
    Available:https://doi.org/10.5093/psed2018 a2.
5. Medina D, Nagamine M. Estrategias de aprendizaje de aprendizaje autónomo en la comprensión lectora de estudiantes de secundaria. Propósitos y Representaciones. 2019;7(2):134-159.
    Available:http://dx.doi.org/10.20511/pyr201 9.v7n2.276.
6. Tobon S, Prieto J, Fraile J. Secuencias didacticas: aprendizaje y evaluacion de competencias. Mexico: Pearson Education Education; 2010.
7. Onyema EM. Opportunities and Challenges of use of Mobile Phone Technology in teaching and learning in Nigeria-A Review. International Journal of Research in Engineering and Innovation. 2019b;3 (6):352-358.
    Available:http://doi.org/10.36037/IJREI.201 9.3601.
8. Benta D, Bologa G, Dzitac I. E-learning Platforms in Higher Education. Case Study. Procedia Computer Science. 2014;31:1170 – 1176.
9. Santrock JW. Masa Perkembangan Anak. Jakarta: Salemba Humatika; 2011.
10. Joubert M, Wishart J. Participatory practices: Lessons learnt from two initiatives using online digital technologies to build knowledge. Computers & Education. 2012;59(1):110-119.
    Available:https://doi.org/10.1016/j.comped u.2011.09.024.
11. Robson B, Boray S. Data-mining to build a knowledge representation store for clinical decision support. Studies on curation and validation based on machine performance in multiple choice medical licensing examinations. Computers in Biology and Medicine. 2016;73:71-93.
    Available:https://doi.org/10.1016/j.compbio med.2016.02.010.
12. Hipkiss AM, Varga PA. Spotlighting pedagogic metalanguage in Reading to Learn – How teachers build legitimate knowledge during tutorial sessions.Linguistics and Education, 2018;47:93-104.
    Available:https://doi.org/10.1016/j.linged.20 18.08.002.
13. Meyer MW, Norman D. Changing Design Education for the 21st Century. She Ji: The Journal of Design, Economics, and Innovation. 2020;6 (1):13-49.
    Available:https://doi.org/10.1016/j.sheji.201 9.12.002.
14. Rustiadi S. Creating Better Education System, Building Stronger Human Capital: A Creative Industries Perspective. Procedia - Social and Behavioral Sciences. 2015;169:378-386.
    Available:https://doi.org/10.1016/j.sbspro.2 015.01.323
15. Ahmad NB, Alias UF, Mohamad N, Yusof N. Principal Component Analysis and Self-Organizing Map Clustering for Student Browsing Behaviour Analysis. Procedia

Computer Science. 2019;163:550-559.
Available:https://doi.org/10.1016/j.procs.20 19.12.137

16. Muthivhi AE. Piaget's Theory of Human Development and Education, Editor(s): James D. Wright. International Encyclopedia of the Social & Behavioral Sciences (Second Edition). Elsevier. 2015;125-132.
Available:https://doi.org/10.1016/B978-0-08-097086-8.92013-0.

17. Aboagye E, Yawson JA, Appiah KN. COVID-19 and E-Learning: The Challenges of Students in Tertiary Institutions. Soc. Educ. Res. 2020;1–8.

18. Fatokun KVF, Odagboyi IA. Gender Disparity and Parental Influence on Secondary School Achievement in Nasarawa State, Nigeria. Journal of Research in National Development; 2011.
Available:Http://Www.Transcampus.Org

19. Haliru U. Effect of cooperative learning strategy on geography students' academic performance in senior secondary schools in Sokoto State, Nigeria. Published thesis submitted to the department of curriculum and instruction of the department of educational foundations and curriculum,

Faculty of Education, Ahmadu Bello University, Zaria; 2015.

20. Gin EK. Gender and politics in nigeria: lessons and challenges for the Nigerian woman for the actualization of vision 20: 2020. The Belt Journal of Education. 2011;2(2):67-96.

21. Onyema EM. Integration of Emerging Technologies in Teaching and Learning Process in Nigeria: the challenges. Central Asian Journal of Mathematical Theory and Computer Sciences. 2019a;1:35-39.

22. Onyema EM, Deborah CE, Alsayed AO, Noorulhasan Q, Sanober S. Online Discussion Forum as a Tool for Interactive Learning and Communi-cation. International Journal of Recent Technology and Engineering. 2019a;8(4): 4852–4859.
Available:https://doi.org/10.35940/ijrte.d80 62.118419

23. Onyema EM, Udeze OA, Deborah CE. Potentials of Mobile Technologies in Enhancing the Effectiveness of Inquiry-based learning. International Journal of Education (IJE). 2019;2(1):1–25.
Available:https://doi.org/10.5121/IJE.2019. 1421

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle4.com/review-history/71333