Effect of Virtual Learning Technology on Economics Students' Learning Interest and Academic Achievement in Public Senior Secondary School Students of FCT, Abuja

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Abstract

The study examined the effect of virtual learning technology on economics students' learning interest and academic achievement of public senior secondary school students of Federal Capital Territory (FCT), Abuja. The study adopted quasi-experimental research design. The population of the study comprised of 24,771 SS2 students from all public senior secondary schools in six Area Councils of FCT Abuja. 102 students were selected using purposive sampling in which students from intact classes from two different schools were used. The instruments used for data collection was a structured questionnaire named Economics Interest Scale, (EIS) as well as Economics Achievement Test (EAT). The instruments were scrutinized by experts in Economics and Evaluation for the purpose of ascertaining their appropriateness (face validity) and comprehensiveness (content validity. scores emanating from the exercise were used to obtain validity indices of 0.78 and 0.81. The instruments were further subjected to pilot study and obtain reliability indices of 0.75 and 0.77 for the questionnaire and achievement tests respectively. The research questions were answered using mean and standard deviation while the hypotheses were tested using t-test. The findings from the study showed that there is a significant effect of virtual learning technology on economics students' learning interest in public senior secondary schools of FCT, Abuja, and there is a significant effect of virtual learning technology on the economics students' academic achievement of public senior secondary schools in FCT, Abuja. The study recommended that economics teachers should be trained on the use of virtual learning environment technology for the purpose enhancing students' academic achievement. The study concluded that virtual learning technology enhances students' learning interest and academic achievement of FCT, Abuja.

Introduction

The search for more and better education has been one of the concerns of almost every country in the world. In this attempt to do the best, great importance has been given to strategies based on information and communication technologies (ICT), in which, over the last years, the digital has taken precedence over the analogue. Therefore, in order to promote and improve teaching and learning within higher education, higher education institutions have adopted learning management platforms hereinafter referred to as Virtual Learning (Etukakpan , Maduka & Christopher, 2021). This ICT facility has been used both by institutions directed towards distance learning and by institutions essentially directed towards onsite learning. The strong implementation of virtual learning in higher education institutions justifies the concern with such environments so as to assess their influence on students' performance (Huili, 2020). Consolidating the use of these environments implies their contextualization within the formal teaching and learning processes as well as questioning their potentialities according to their known and consolidated features, namely the ones associated with traditional onsite classroom learning (Mallareddy,2015).

Virtual learning refers to a digital space where learners and educators conduct online courses. Educators may deliver course materials through video presentations, audio recordings, virtual classes or other digital means. Virtual   learning gives students access to education no matter where they are (Coursera, 2024). Virtual learning are part of the broader concept of   e-Learning as students and teachers use various multimedia resources and communication tools to access and deliver educational materials. Virtual learning environments are designed to support teaching and learning through optimized digital classrooms that may include learning management systems (LMS) and other educational technology to encourage learning (Olatunde Aiyedun , Ogunode. & Eyiolorunse, 2021). The focus of virtual learning technology is on creating a comprehensive and interactive online space conducive to teaching and learning. It emphasizes the educational experience, simulating a classroom environment in a digital setting. An   LMS is more focused on the administrative and management aspects of delivering education and training. It emphasizes tracking, reporting, and managing the logistics of the learning process. Virtual learning is therefore crucial in enhancing students' learning interest. Apart from enhancing students learning interest, virtual learning technology is equally essential in promoting student academic achievement.

Academic achievement refers to how students manage their learning and how they cope with or accomplish various tasks assigned by their teachers. Academic achievement is the ability to study and remember facts and to be able to communicate facts and knowledge orally or on paper. Adeniyi and Aderinkola (2022) reports that in educational institutions, success is measured by academic achievement or the extent to which a student meets the standards set by the institution. Virtual   learning has given some students the chance to enhance their grades, especially those who might find it difficult to learn in a typical classroom setting. Whether through in-person or online learning, it is crucial for students and professors to collaborate to guarantee that students obtain a high-quality education. Virtual learning provides benefits including

flexibility, resource availability, and opportunity for collaborative learning. Furthermore, virtual learning technology has helped to improve learning outcomes (Gedera, 2014). It is therefore crucial to employ the use of virtual learning to maximize benefits and raise educational standards.

Different studies exist in the literature on the effect of virtual learning on academic performance. Ahmed (2021) examined the effect of virtual reality-based instruction on students' interest and conceptual performance in senior secondary school physics. The study employed a quasi-experimental research design adopting pre-test and post-test control group. The population for this study comprised of four hundred and twenty three (423) with the sample of one hundred and four SSII physics Students. The study was conducted in two public co-educational secondary schools in Dutsin-Ma Zonal Education Quality Assurance. The schools were selected using simple random sampling. In each of the two schools, intact science class was used. Two instruments: Physics conceptual Performance Test (PCT) and Physics Interest Scale (PIS) with the reliability and internal consistency of 0.781 and 0.784 respectively were used for the study. The PCT and PIS were used to collect data for Students' interest and Conceptual Performance respectively. Six research questions were answered using mean and standard deviation and the six hypotheses were tested at ($P<0.05$) using t-test independent sample. The result revealed that the virtual reality-based instruction is superior to the teacher-centered method in fostering conceptual Performance and interest among the students. The study also revealed that the use of virtual reality-based instruction does not show any significant difference in both conceptual Performance and interest of male and female students. Thus, the use of virtual reality-based instruction will not only help arrest the problem of males being regarded as high achievers, in science-related courses but will also encourage the female students to enrol in such courses. Based on these, it was amongst others recommended that: teachers of senior secondary schools should expose Physics students to virtual reality-based instruction, so as to promote their conceptual Performance of physics concepts, Science teachers should incorporate the use of virtual reality-based instruction to complement their traditional chalk-talk method of instructional delivery to make students develop interest in the subjects, it should be incorporated in the curriculum of teacher training institutions to promote conceptual Performance of both male and female students, educational stakeholders should encourage physics teachers to use virtual reality-based instruction in teaching the subject to improve the interest of both male and female students in the subject.

Adeyemi and Aderinkola (2023) examined the effect of virtual learning on students' academic performance in mathematics in post Covid-19 era. This study encompasses a quasi-experimental design with nonequivalent control group using pre-tests and post-tests. The sample is made up of 100 students chosen at random from five secondary schools in Oyo State. The experimental group studied academic subjects using virtual learning while the control group studied in an exceeding classroom with a tutor who explained mathematics (i.e. conventional method). Personal data of respondents were examined using frequency count & percentage while MTI collected were analyzed using mean, variance and independent ANCOVA to answer the two research hypotheses at 0.05 (5%) significant level. The findings show that among others

that virtual learning has positive impacts on the students, online education provides a chance for self-study. Thus, the researchers recommended that the virtual learning should be available and utilized for optimum learning.

Moreover, students studying economics often perform poorly academically as a result of the inadequate use of this technology in teaching and learning. This is evident in their appalling performance in the subject. Despite the government's efforts to guarantee effective teaching and learning through periodic recruitment of teachers and provision of adequate learning resources, low achievement among secondary school students has been prevalent. The goal of this study therefore is to determine the effect of virtual learning technology on students' learning interest and academic achievement of public senior secondary schools in FCT, Abuja.

Research Questions

The following research questions guided the study:

1. What is the effect of virtual learning technology on economics students' academic achievement of public senior secondary schools in FCT, Abuja?
2. What is the effect of virtual learning technology on economics students' academic achievement of public senior secondary schools in FCT, Abuja?

Statement of Hypotheses

The following null hypotheses guided this study and will be tested at 0.05 level of significance:

1. There is no significant effect of virtual learning technology on economics students learning interest of public senior secondary schools of FCT, Abuja
2. There is no significant effect of virtual learning technology on economics students' academic achievement of public senior secondary schools of FCT, Abuja.

Theoretical Review

This study connected to the constructivism theory propounded which was propounded by Jean Piaget in 1964. The theory emphasizes that learners can actively construct their own knowledge through experience and interaction with the environment. The theory further suggests   that learners do not receive information passively but rather build on their understanding by connecting their knowledge to with existing schemas and engaging in meaningful activities. The theory is relevant to the study because virtual learning environments can apply the use constructivist learning theory by ensuring that a learning environment becomes conducive by providing opportunities for exploration, experimentation and collaboration for effective learning among learners.

Research Method

Quasi-experimental research design was used in this study. The population of the study comprises 24,771 SS2 students from all public senior secondary schools in six Area Council. 102 students were selected using purposive sampling by selecting students from intact classes in two selected secondary schools. The instrument used for data collection was a structured 10-item questionnaire named Economics Interest Scale (EIS). In addition, a 40-item Economics Achievement Test was developed for the study for the purpose assessing students' academic achievement in Economics. The two instruments were subjected to the scrutiny of experts in Economics and Evaluation this provided scores that were used to obtain logical validity indices of 0.78 and 0.81 respectively. The instruments were further subjected to pilot study. The instruments were pilot tested on 30 students; the respondents were part of the population but not part of the sample for this study. Even though the instruments were standardized, they were still subjected to reliability in order to ascertain their degree of consistency. The data obtained from the pilot test was used to compute the internal consistency of the instrument using Cronbach's Alpha reliability method. Results obtained from the exercise were used to obtain reliability indices of 0.75 and 0.77 for the questionnaire and achievement tests in economics respectively. Mean and standard deviation was used to answer the research questions developed for the study while t-test statistics was used to test the hypotheses at 0.05 level of significance.

Results and Discussion

Research Questions 1: What is the effect of virtual learning technology on economics students' learning interest in public senior secondary school of the FCT, Abuja?

Table 1. Mean and Standard Showing Effect of virtual learning technology on Economics Students Learning Interest in Public Senior Secondary School of the FCT, Abuja.

S/N	Groups	N	Pretest		Posttest		Mean Achievement Gain
			Mean	Std Dev	Mean Std Dev		
1	Experimental	48	35.29	7.71	53.25	9.73	17.96
2	Control	54	20. 71	3.24	27.87	3.17	7.16

Table 1 shows the effect of virtual learning technology on economics students' learning interest in public senior secondary school of the FCT, Abuja. Results indicate that the pretest mean and standard deviation interest scores for the experimental group was given as 35.29 and 7.71 respectively while the posttest mean and standard deviation scores were 53.25 and 9.73. As for the control group, the pretest mean and

standard deviation interest scores were 20.71 and 3.24 respectively while the posttest mean and standard deviation mean scores were given 27.87 and 3.17 respectively. It is observed from the table that the mean gain for the experimental group was found to be higher at 17.96 than the mean achievement gain of the control group. At 7.16. Hence virtual learning technology has a high effect on economics students' learning interest in public senior secondary school of FCT, Abuja.

Research Questions 2: What is the effect of virtual learning technology on economics students' academic achievement in science in public senior secondary school of FCT, Abuja?

Table 2. Mean and standard showing effect of virtual learning technology on Economics Students' Academic Achievement in Public Senior Secondary School of the FCT, Abuja

S/N	Groups	N	Pretest		Posttest		Mean
			Mean	Std Dev	Mean	Std	Achievement
					Dev		Gain
1	Experimental	48	17.00	2.79	67.75	8.40	50.75
2	Control	54	12. 29	4.59	40.00	2.45	27.71

Table 2 shows the effect of virtual learning technology on economics students' academic achievement in public senior secondary school of FCT, Abuja. Results indicate that the pretest mean and standard deviation academic achievement scores for the experimental group was given as 17.00 and 2.79 respectively while the posttest mean and standard deviation scores were 67.75 and 8.40. As for the control group, the pretest mean and standard deviation academic achievement scores were 12.29 and 4.59 respectively while the posttest mean and standard deviation mean scores were given 40.00 and 2.45 respectively. It is observed from the table that the mean gain for the experimental group was found to be higher at 50.75 than the mean achievement gain of the control group at 27.71 Hence virtual learning technology has a high effect on economics students' academic achievement in science in public senior secondary school of FCT, Abuja.

Hypothesis 1: There is no significant effect virtual learning technology on economics students' learning interest in public senior secondary school of FCT, Abuja.

Table 3. Analysis of Variance showing the effect virtual learning technology on Economics students' students' Learning Interest in public senior secondary school of FCT, Abuja.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.

	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	288.741[a]	2	144.371	4.675	.036
Intercept	1738.243	1	1738.243	28.142	.000
Pre-test	418.379	1	418.379	4.155	.036
Learning Interest	288.741	1	288.741	4.675	.036
Error	2841.259	46	61.766		
Total	67078.000	49			
Corrected Total	3130.000	48			

Table 3 above shows analysis of variance on the effect of virtual learning technology on economics students' learning interest in public senior secondary school of FCT, Abuja. The results showed that at F-calculated value of 4.675, the p-value of 0.036 was found to be less than 0.05. Hence, the result reveals that there is a significant effect of virtual learning technology on economics **students**' learning interest in public senior secondary schools of FCT, Abuja.

. Hypothesis 2: There is no significant effect of virtual learning technology on academic achievement in public senior secondary schools of FCT, Abuja.

Table 4. Analysis of variance Statistics showing the effect of virtual learning integration technology on Academic Achievement in Public Senior Secondary Schools of FCT, Abuja.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	472.580[a]	2	236.290	48.123	.000
Intercept	198.138	1	198.138	20.176	.000
Pre-test	2415.12	1	2415.12	0.082	.445
Achievement	472.580	1	472.580	48.123	.000
Error	451.733	46	9.820		
Total	37721.000	49			
Corrected Total	924.312	48			

Table 4 above shows the analysis of variance statistic on the effect of virtual learning technology on students' students' academic achievement in public senior secondary school of FCT, Abuja. The results showed that at F-calculated value of 48.123, the p-value of 0.000 was found to be less than 0.05. Hence, the result reveals that there is a significant effect of virtual learning technology on the students' academic achievement in public senior secondary schools of FCT, Abuja.

Discussion

Findings from the study on hypothesis one reveal there is a significant effect of virtual learning technology on the learning interest of public senior secondary school students in public senior secondary school of the FCT, Abuja. This finding is in agreement with the findings from the study of Ahmed (2021) which indicated there was a significant effect of virtual reality-based instruction on students' interest and conceptual Performance in Senior Secondary School Physics. This entails that employing virtual learning integration technology enhances students' learning interest.

Findings from the study on hypothesis two reveal there is a significant effect of virtual learning technology on the academic achievement in public senior secondary schools of FCT, Abuja. This finding is in agreement with the findings from the study of Adeyemi and Aderinkola (2023) which there was significant effect of virtual learning on students' academic performance in mathematics. This entails that employing virtual learning technology in the course of instructional delivery helps in improving students' academic achievement.

Conclusion

Based on the findings of this study, it can be inferred that there is a significant effect of virtual learning technology on the learning interest of public senior secondary schools of FCT, Abuja. Finding also reveal that there is a significant effect of virtual learning technology on the academic achievement of public senior secondary schools of FCT, Abuja. Based on these results, it was therefore recommended among others that schools should be equipped by the Federal ministry of Education with virtual learning tools for the purpose of creating an enabling environment that will enhance students' learning interest. Furthermore, periodic trainings and seminars should be organized by the Federal Ministry of Education for teachers in order to facilitate the effective use of virtual learning technological devices that may enhance students' academic achievement.

References

Adeniyi,A.A and Aderinkola, D (2023) The effect of virtual learning on students' academic Performance in mathematics in post Covid-19 era. AJSTME, Vol. 8, Special Issue No. 1, 456-462, August, 2022. https://www.ajstme.com.ng

Ahmed, S (2021) The effect of virtual reality-based instruction on students' interest and conceptual Performance in Senior Secondary School Physics. A Dissertation Submitted to The Department of Science And Vocational Education, Umaru Musa Yar' Adua University Katsina, In Partial Fulfillment of the Requirements for The Award of Master's Degree.

Ajana, O. E; Abanum. I. C and Afolabi, T. K (2024) the effect of virtual learning on academic

performance, autonomy and response rate of Basic Science students in JSS 2 in Ojo Local Government Area of Lagos State. *LASU International journal of Arts and social Science Education.* downloaded at

https://www.google.com/search?q=impact+of+virual+learning+environment+on+students+academic+achievement+in+secondary+schools+in+nigeria&

Coursera, S (2024) What is virtual learning? Downloaded at https://www.coursera.org on the 21st of December, 2024.

Etukakpan U. A., Maduka C. O. & Christopher A. U. (2021). Virtual Classroom and Academic Performance of SS II Physics Students in Secondary Schools in Abak Local Government Area, AkwaIbom State. African Journal of educational archive Vol. 7(1), 1-8.

Huili, H. (2020). How to make the switch to online teaching more effective? AJSTME, Vol. 8, Special Issue No. 1, 456-462, August, 2022. https://www.ajstme.com.ng ISSN: 2251-0141

Izuegbunam, A. G & Osuafor, A.P (2021) the effect of adaptive learning approach (ALA) on students' achievement in chemistry in Awka Education Zone. International Journal of Education and Evaluation E-ISSN 2489-0073 P-ISSN 2695-1940 Vol 7. No. 5 2021 www.iiardjournals.org

Mallareddy, A. (2015). Advantages and limitations of virtual classroom in telugu language teaching.

Journal of Humanities and Social Science (IOSR-JHSS), 15(6), 54-56. https://doi.org/10.9790/0837-1565456.

Mutungi, B. (2014). The status of school libraries In Kenya: the case of public Secondary schools in Nairobi County. *Unisa press issn 0027-2639 mousaion 32 (2) 2014 pp. 150—172.*

Ogunode, N. J., Abigeal, I, Lydia, A. E. (2020). Impact of COVID-19 on the Higher Institutions Development in Nigeria. Electronic Research Journal of Social Sciences and Humanities, 2(2), 126-135.

Olatunde Aiyedun T. G., Ogunode, N.J. & EyiolorunseAiyedun, C.T. (2021). Assessment of Virtual Learning during Covid-19 Lockdown in Nigerian Public Universities. Academicia Globe: Inderscience Research Vol 2(5), 159- 175. http://agir.academiascience,org

Onyia, and Mary (2013). The Impact of ICT on University Students' Academic Studies. Journal of Educational and Social Research. 3. 10.5901/jesr.2013.v3n8p105.

Owoc, M. & Sawicka, A. & Weichbroth, P. (2021). Artificial Intelligence Technologies in Education:

Benefits, Challenges and Strategies of Implementation. 10.1007/978-3-030-85001-2_4.

Salido, V. (2013). Impact of AI-Powered Learning Tools on Student Understanding and Academic Performance. *BAPS 85: Introduction to Political Analysis and Research Instructor: Marc Darish P. Alcazar*

Ugah, J. O; Obabueki, O-O; Tiamiyu O. (2023). Persuasive Technology: An Overview of SMS-Based Persuasion for Waste Management in Low-Income Areas. 8. 1 - 10.

Williamson, B. (2023). The Social life of AI in Education. International Journal of Artificial Intelligence in Education. 34. 10.1007/s40593-023-00342-5.

Yusuf, M. O. (2015). Information and communication education: Analyzing the Nigeria national policy for information technology. *International Educational Journal* 6(3) 316-321.

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