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EFFECTS OF SIMULATION METHOD ON SECONDARY SCHOOL STUDENTS' ACHIEVEMENT IN ECONOMICS IN PLATEAU STATE, NIGERIA

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Abstract
The study focused on the effects of the simulation method on secondary school students' achievement in economics in Plateau State, Nigeria. The study had two specific objectives. The study employed a Quasi-Experimental research design specifically a non-equivalent design. A simple random sampling technique was used to select two intact classes from the study area. The two intact classes selected are G.S.S Gagdi as an Experimental group with 26 economics students and G.S.S Lamba with 37 economics students. The instrument for data collection was Economics Achievement Test (EAT. The instrument was validated by three experts. The split-half method was used to ascertain the reliability of the research instrument. The data collected from the study were analyzed using mean, standard deviation, and independent samples t-test. The study revealed that the economic achievement of students who were exposed to the simulation method was significantly improved compared to their counterparts who were exposed to the conventional method. By implications, the findings indicate that the simulation method had an effect on the achievement of secondary school students in economics. Based on these findings, the study recommended that economics teachers should be directed by the Plateau state ministry of education to use the simulation method in teaching economics to secondary school students in order to improve the students' achievement in the subject. Also, the Plateau state government should fund seminars and workshops on the use of simulation methods in teaching economics to secondary school students.
Keywords: Simulation method, Achievement, Economics and Secondary school

Introduction

Economics is one of the vocational subjects offered at senior secondary school to prepare students to master the essential principles of understanding the economic problem, and specific economic issues, help the student to understand and apply economics in a precise and practical manner and promote lasting students interest in the issue of economics (Khadka et al, 2017). The author further stated that the aims of teaching economics at the secondary level are: making students understand some basic economic concepts and developing economic reasoning so thus learners can apply it to their daily lives as citizens, workers, and consumers; enable learners to realize their role in country building and sensitize them to the economic issues that the nation is facing today, to equip learners with the basic tools of economics and statistics to analyze economic issues. Hence, economics which falls under the business subjects is very essential for business organizations. The important ideas of teaching and learning economics in the classroom are to help the basic stage of students master the principles vital for understanding the financial problems and precise economic issues (Hultberg & Calonge, 2017). In view of the importance of economics to our national development, the Plateau State government is making tremendous efforts towards boosting the teaching and learning of economics by employing economics teachers, supply of economics textbooks, renovation of schools, appropriate training, and re-training of economics teachers and scholarship to best graduating students in economics (Plateau State Ministry of Education, 2021). Despite all the government efforts towards improving the teaching and learning of economics, the performance of secondary school students in the subject is highly discouraging as documented in their national examinations specifically, West African Examinations Council (WAEC) and National Examination Council (NECO) (Plateau State Ministry of Education, 2020).

According to chief examiners' reports (2021), many factors may be responsible for the weaknesses of candidates in economics subject ranging from government policies, quality of teachers, teaching and learning environments, school size, school type inadequate economics curriculum/syllabus coverage, lack

of adequate preparation for the examination and above all is the use of an inappropriate method of teaching. This is in line with the argument of Adu and Galloway (2017) who observed that poor choice of teaching methods is a factor that contributes significantly to student poor achievement in economics. Furthermore, John (2013) maintained that instructional strategies adopted by the teachers could influence the cognitive, affective, and psychomotor outcomes of the learner.

Several studies such as Vasiliki, Panagiota, and Maria (2016); Kattayat, and Asha (2016); Adu and Galloway (2017); Linneman (2018) argued that the massive failure recorded among secondary school students in economics is mostly a result of persistence use of conventional teaching method. Previous studies (see, for example, Hossain & Ahmad, 2013; Linneman, 2018) observed that conventional teaching method is less effective in improving the academic achievement of secondary school students. This is due to the fact that in a conventional method, the learners are less engaged in the learning process. Vasiliki et al. (2016) maintained that there is a need for economics teachers to select and apply new teaching methods that will allow students to fully participate in the learning process.

Linneman (2018) suggested that the simulation method is one of the teaching methods that require the full participation of learners in the learning process. This is because the method engages students' interest and attention, increases visual or other stimulation, causes students to think about course material in new ways, and/or helps them grasp abstract concepts through their understanding of familiar ones. On the other hand, Sulaiman, Mustapha, and Bulama, (2016), see the simulation method as a convenient instructional method as opposed to those conventional methods where the learner is placed in a world defined by the teacher. That is to say, simulation represents a reality within which students interact. Kissallah (2017) is of the opinion that, teaching through the simulation method has been found worthy of increasing students' active participation, improving attitude towards the subject, increasing confidence and development of human skills and the learning become more entertaining and made relevant to the student life experience. In view of the above arguments, this paper intends to examine the effects of the simulation method on secondary school students' achievement in economics in Plateau State, Nigeria.

The definition of academic achievement varies among scholars. Academic achievement is the outcome of education and the extent to which a student, teacher or institution has achieved their educational goals (Emmanuel, Adom, Josephine & Solomon, 2014). To Emmanuel, achievement may be defined as the act of achieving or successful performance. Achievement is the level of performance attained by a learner in a task (Budak, 2015). According to Uche (2014) achievement is a task that somebody has carried out successfully, especially using his effort and skills. Uche asserted that achievement is excellence in all academic disciplines, in class as well as in co-curricular activities. Academic achievement means how a student performs in school. Some schools define this as a certain G.P.A or ranking in class. Academic achievement is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested or which aspects are most important procedural knowledge such as skills or declarative knowledge such as facts (Budak, 2015). Academic achievement is something you do or realize at school, university, or college in class, in a laboratory, library, or in fieldwork and it does not include sport or music. Academic achievement generally refers to how well a student is accomplishing his or her tasks and studies. The most well-known indicator of academic achievement is the grades the students re' for their classes and overall tenure.

Economics, as a vocational subject, has been defined differently by different authors, and among those is Charles (2020) who defined Economics as a social science that is concerned with the production, distribution, and consumption of goods and services. It studies how individuals, businesses, governments, and nations make choices about how to allocate resources. In a related manner, Hausman (2018) accepted the fact that Economics is concerned with aspects of the production, exchange, distribution, and consumption of commodities and services. Hausman added that, although, the definition is arguable because economics is relevant to a great deal the claim and the terms it contains are vague. Economics could be described as a social science directed at the satisfaction of needs and wants through the allocation of scarce resources which have alternative uses (Amaka, 2016). Economics is about the study of scarcity and choice and finding ways of reconciling unlimited wants with limited resources, economics explains the problems of living in communities in terms of the underlying resource costs and consumer benefits, and Economics is about the coordination of activities that result from specialization (All Answers Ltd, 2018).

Since a long time ago, simulation has been used by human and even by animals to train their young ones for adaptation with their environment. For example, at first, chess was assumed as the original form of the war game, later on, it developed into a more serious and sophisticated military game to train new soldiers. The simulation technique has been applied successfully in the last decade in education. According to Nwodo (2016), different teaching methods may be used in teaching economics and these methods include the discussion method, lecture method, discovery method, Inquiry method, project method, and simulation method to mention a few. However, the concern of this study is the simulation methods. Nwodo continued that, Simulation is an innovative teaching method that is learner-centered activity-oriented teaching method. Similarly, Simulations are instructional scenarios where the learner is placed in a world defined by the teacher (Sulaiman, 2016). Sulaiman lamented that, simulation represents a reality within which students interact and that, the teacher controls the parameters of this "world" and uses it to achieve the desired instructional results. A simulation is a form of experiential learning which is a strategy that fits well with the principles of student-centered and constructivist learning and teaching (Anonymous, 2021).
In a related manner, Simulation refers to the imitation of real-world activities and processes in a safe environment (Maheshwari 2016). Maheshwari continued that, simulation aimed to provide an experience as close to the 'real thing' as possible. A simulated activity has the advantage of allowing learners to reset the scenario and try alternative strategies and approaches. In concord with Maheshwari, Uchegbu, (2006) in (Nwodo, (2016) emphasized that the word simulation comes from the Latin word 'similes' meaning 'like' that is to act like, to resemble, to pretend to be, thus Simulations are activities or materials that presents real-life situation, past events or organisation in such a way that students will learn and understand more about them.

Several studies have been conducted on the effect of the simulation method on secondary school students' achievement and attitude. For instance, Chumba, Omwenga and Atemi (2020) conducted a study to find out the effect of computer simulations on academic achievement of form two learners in physics. The study revealed that there was a statistically significant difference in academic achievement of control and experimental group in favour of experimental group. In a study conducted by Ojo, (2020) to determine the effect of computer simulation instructional strategy on primary school pupils' achievement in Basi in Ondo state, Nigeria. Constructivist theory was used as the framework, while the study adopted pre-test-post-test control group quasi-experimental design. The study revealed that, pupils exposed to computer simulation strategy had a higher basic science achievement mean score than their counterparts in the convention strategy and that, the computer simulation instructional strategy enhanced primary pupils' achievement in basic science. Maluku and Kurawa (2020) conducted a study on the effect of simulation instructional strategies on students' attitudes and achievements in Biology. The study was conducted in FCT-Abuja. A quasi-experimental design was adopted in the study. The results revealed a significant effect of simulation instructional strategies on achievement of the students in seed germination.

Research Questions

The following question is formulated:

1. What is the difference in the economic achievement scores of students in the simulation method and those in conventional method before the treatment?
2. What is the difference in the economic achievement scores of students in the simulation method and those in conventional method after the treatment?

Null Hypothesis

The following null hypotheses are formulated to guide the study.

$H0_1$ There is no significant difference between the economic achievement scores of students in simulation method and those in conventional method before the treatment.

$H0_2$ There is no significant difference between the economic achievement scores of students in simulation method and those in conventional method after the treatment.

Methodology

The population of this study comprised 15, 874 SSII students that offer economics in Plateau State Nigeria. The justification for choosing the SSII students is because that they are not under the pressure of preparing for external examinations (Akanbi & Kolawole, 2014). The present study used a quasi-experiment design, a non-equivalent control group design to examine the effect of the simulation method on secondary school students' achievement in economics in Plateau state, Nigeria. The instrument for data collection is

Economics Achievement Test. It comprised of 20 multiple choice questions. The test questions were adopted from the West African Examination Council (WAEC) past examination based on the topics covered during the study. Prior to the actual study, the instrument was pilot tested on the students that are not part of the population but have similar characteristics to the subjects in the study. The instrument was also subjected to the validity and reliability test. The Economics Achievement Test was prepared by the researchers and assessed by two experts. This is to ensure that the content and face validity of the test instrument are established by expert judgment (Baykul, 2000). The Split half was used to determine the reliability of the research instrument. The value of the reliability coefficient in this study is 0.79, suggesting that the research instrument is reliable. The data collected from the study was analyzed using mean, standard deviation and independent samples t-test. The independent samples t-test is a statistical tool for comparing the mean score of two different groups (Tabachnick & Fidell, 2007). The hypotheses of this study are for difference between two groups (i.e., experimental and control group). Hence, independent samples t-test was appropriate in testing the hypotheses of this study. The null hypothesis with a p-value of less than 0.05 was rejected while the null hypothesis with a p-value of 0.05 and above were failed to reject.

Results

What is the difference in the economics achievement scores of students in simulation method and those in conventional method before the treatment?

Table 1: Descriptive statistics of pre-test mean achievement of simulation and conventional methods

Groups	N	Mean	Std. Deviation
Simulation method	37	31.15	*18.831*
Conventional method	26	30.89	*16.202*
Total	**63**		

The descriptive statistics output of pre-test achievement scores of the two groups (i.e., simulation and conventional groups) is presented in Table 1.The calculated pre-test means achievement score and standard deviation of simulation method group are(M = 31.15, SD = 18.831), while the calculated pre-test means achievement score and standard deviation of conventional method group are(M = 30.89, SD = 16.202). This indicated that, the difference between the two groups is trivial. That is to say, the two groups are in the same achievement baseline before treatment.

H0₁ There is no significant difference between the economic achievement scores of students in simulation method and those in conventional method before the treatment.

Table 2: Independent samples t-test of pre-test achievement scores of simulation method and conventional method.

			Levene's Test for Equality of Variances					
Variable	Groups	N	F	Sig.	t-value	Mean	SD	Sig. (2-tailed)
Pre-test	Simulation Method	26	.688	.410	.260	31.15	18.831	.796
	Conventional Method	37				30.89	16.202	
Total		**63**						

An independent sample t-test was carried out to test the difference in the pre-test scores of economics students in the simulation method and those in the conventional method. The result in Table 2 indicated that statistically there was non-existence of significant difference in the pre-test scores of economics students assigned to the simulation method with M = 31.15 while SD = 18.831 and those assigned to the conventional method with M = 30.89 while SD = 16.202and the t = .260, *p*= .796. The study therefore, failed to reject the null hypothesis one. This finding clearly showed that, the SSII economics students of simulation method and those of conventional method come from the same population baseline. This is because, at the start of the experiment, the SSII Economics students of simulation and conventional methods did not differ significantly in terms of their economics achievement.

What is the difference in the economic achievement scores of students in simulation method and those in conventional method after the treatment?

Table 3: Descriptive statistics of post-test mean achievement of SSII economics students taught with the simulation method and those taught with the conventional method

Groups	N	Mean	Std. Deviation
Simulation method	37	71.54	15.606
Conventional method	26	40.92	*16.240*
Total	**63**		

Descriptive statistic was carried out to ascertain difference in the economic achievement scores of students in simulation method and those in conventional method group after exposing them to the treatment. The result in Table 3, indicated that, difference existed in the post-test achievement scores of students in simulation method (M = 71.54, SD = 15.606) and conventional method (M = 40.92, SD = .16.240). The result indicated that the achievement of economics students taught using the simulation method is better than that of those of economic students exposed to a conventional method.

H0₂ There is no significant difference between the economic achievement scores of students in simulation method and those in conventional method after the treatment.

Table 4: Independent samples t-test of post-test achievement scores of simulation method and conventional method

			Levene's Test for Equality of Variances					
Variable	Groups	N	F	Sig.	t-value	Mean	SD	Sig. (2-tailed)
Attitude	Simulation Method	26	.053	.819	7.489	71.54	15.606	.000
	Conventional Method	37				40.92	16.240	
Total		**63**						

An independent sample t-test was conducted to test whether there is significant difference between the economics achievement scores of students in simulation method and those in conventional method after the treatment. The statistical evidence documented in Table 4 indicated there was a significant difference in the post-test achievement scores of students in simulation method (mean = 71. 54, S.D = 15.606) and conventional method (mean = 40.92, SD = 16.240), t = 7.486, p = .000. The null hypothesis two was therefore rejected. The result suggested there was a significant difference between the economics achievement scores of students in simulation method and those in conventional method after the treatment. The result also implies the significant effect of simulation method on secondary school students' achievement in economics.

Discussion

The findings of research question 1 and its corresponding hypothesis showed that statistically there was non-existence of significant difference in the pre-test mean achievement scores of economics students assigned to simulation method and those assigned to conventional method. The finding is consistent with Inuwa, Abdallah, and Hassan (2017) who reported that there was non-existence of significant difference in the pre-test scores of students who were assigned to the experimental and those who were assigned to the conventional teaching approach before exposure to the treatment. The finding also agreed with the study of Chumba et al (2020) who reported that there is non-existence of significant difference in the mean scores of experimental and control group students prior to the treatment. A similar finding was also reported in the study of Ezeudu et al (2013) that, before exposing students to the simulation method in Chemistry, the academic achievement of both experimental and control group students did not differ significantly. This finding is also in line with studies (Santos, 2019; Chumba et al, 2020).

The findings of research question 2 and its corresponding hypothesis showed that there was the existence of a significant difference in the post-test achievement scores of economics students exposed to the simulation method and those exposed to the conventional method in favor of simulation method students. The finding is in consistent with Ngatia, Changeiywo, and Wambugu (2019) who asserted that, students taught using simulation teaching approach demonstrated significant improvement in Physics Achievement Test (PAT) when compared to those taught through Conventional Teaching Methods. The finding also agreed with study of Santos (2019) who reported that, there is existence of significant difference in the

post-test achievement scores of experimental group (Simulation Method) and control group (conventional method) students after the treatment.

Conclusion

The present study has established empirical evidence on the effects of simulation method on secondary school students' achievement in economics in Plateau State and the study was affirmed by evidence that, the simulation method had a significant effect in improving the achievement of secondary school students in economics. Therefore, the massive failure recorded among secondary school students in the national examination economics in Plateau state can be drastically reduced when of simulation method is applied in teaching economics to secondary school students in Plateau State.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Economics teachers should be directed by the Plateau state ministry of education to use the simulation method in teaching economics to secondary school students in order to improve their achievement in the subject.
2. Plateau state and the federal government should fund seminars and workshops on the use of simulation methods in teaching economics to secondary school students.

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