

Effect of Blockchain-Technology Strategy on achievement in ... Okekeokosisi, J. O. C. & Dambai, M. S. (2026)

Effect of Blockchain-Technology Strategy on Achievement in Computer Studies Concept among Secondary School Students in Awka-South Local Government Area, Anambra State, Nigeria

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Abstract

The study explored the effect of blockchain-technology strategy (BCTS) on achievement in computer studies concept among secondary school students in Awka-South local government area, Anambra state, Nigeria. The need for the study arises from the persistent average achievement of learners in the theory and essay WAEC examinations. The research was guided by one research question and one hypothesis. It was a quasi-experimental study that employed a total of one hundred and sixty (160) senior secondary two computer studies students. Two intact classes in the sampled schools were randomly drawn. The instrument used for data collection was Computer Achievement Test (CAT). Mean, standard deviation and analysis of co-variance were used for data analysis. The findings from the results showed that students taught with BCTS achieved better than the conventional lecture method (CLM). Based on the findings, the study recommended among others that computer studies teachers should use automate assessments since it encourages learning and promotes achievement.

Keywords: Blockchain-technology strategy (BCTS), Achievement

Introduction

Education usually served as the most important agent of change as it contributes immensely to the overall development of any nation. Okekeokosisi, Aison, Boh and Obiadiazie (2024) described education as a process individuals undergo for the acquisition of knowledge, skills, abilities and attitudes that are necessary for effective living in the society. It is the key factor for economic growth, sustainability and attainment of social and political advancement of any nation (Aniakwu, Nwankwo & Nzewi, 2021). Education plays an essential role in shaping an individual's mindset, attitudes, skills, knowledge, values and experiences in order to understand the environment in which the individual lives. It is therefore necessary to give education a solid foundation through effective and efficient teaching and learning, making available instructional materials for teaching and learning, ensuring conducive environment for teaching –learning and providing appropriate method or strategy for effective teaching and learning. Block-chain technology strategy (BCTS) is a frame that decentralized ledger as a transformative tool that shifts learning from centralized instruction controlled models to open, learner – centric and for life-long learning. This strategy focused on self-efficacy, peer – to- peer collaboration and immutable records of life-long learning. It is one of the foundational learning theories that reshape how students, institutions and employers interact with academic progress. Thus, this study adopted constructivist instructional theory. Constructivist instructional theory states that learners do not passively absorb knowledge / information rather they actively construct knowledge by integrating new experiences with their existing mental frame works. Nwafor in Okekeokosisi and Okigbo (2021) explain constructivist instructional theory as learner-centred instruction rather than teacher-centred. Learners are producer of knowledge or seen as those that generate knowledge by integrating new information and experiences into their prior knowledge. The learner is perceived as the ownership of the instructional problem while the teacher is seen as the coach or the facilitator. The review of literature is exposed to the strategy as an activity-centred method of instruction. The strategy provides opportunity for active involvement of learners in the teaching process. Computer studies instruction and learning requires active participation of learners in the process. This study sets out to employ block-chain technology strategy that anchors on constructivist instructional theory for secondary school students' achievement in computer studies.

Statement of the Problem

The researchers were prompted to embark on this study because of WAEC Chief Examiner's reports on computer studies paper 2 from 2023 to 2025. The reports highlighted that rote learning had dominated teaching and learning in our present

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day. This led to persistent average achievement of learners in the theory and essay examination. Other learners' weaknesses include practical application and technical spelling, poor understanding of programming concepts, advanced data representation, struggle with algorithm design, flowcharts and correctly translating logic into pseudocode. In view of the aforementioned chiefly suspected cause of persistent average academic achievement of students in computer studies, there is an urgent need for an innovative and more dynamic instructional strategy which could reverse the issue of goal attainment in computer studies. It has been argued that BCTS fosters their commitment and active participation in teaching and learning process. This study intends to investigate its effect on achievement of students in Computer Studies. Hence, the problem of the present study is 'how does block-chain technology strategy affect students' achievement in Computer Studies'.

Purpose of the Study

The purpose of the study was to investigate the effectiveness of block-chain technology strategy on secondary school students' achievement in computer studies. Specifically, the study seeks to determine;

1. Difference in the mean achievement scores of students taught computer studies using block-chain technology strategy (BCTS) and those taught with conventional lecture method (CLM)

Research Questions

The study sought to provide answer to the following question;

1. What is the difference between the mean achievement scores of students taught computer studies using BCTS and those taught using CLM?

Hypothesis

The following null hypotheses were tested at 0.05 level of significance.

1. There is no significant difference in the mean achievement scores of students taught computer studies using BCTS and those taught with CLM

Methodology

The study employed quasi-experimental research design. The design was used because two intact classes of SS2 computer studies students were used due to the fact that complete randomization of participants is not possible. The study was carried out in Awka South Local Government Area of Anambra State. The area was selected because it is situated at the centre of Awka capital territory of Anambra State. Average performance of students in external examination in the area could be attributed to teachers' use of conventional lecture method in teaching as reported by Zonal and State Ministries of education of Anambra State. The population of the study is all the senior secondary two computer studies students in all the secondary schools in Awka South Local Government Area of Anambra State with the estimated number of 2600 students in 2025 / 2026 academic session. This population is constant for the period of the study because SS2 computer studies students could have been exposed to the subject for almost two years. The topics taught during the study were selected from senior secondary school computer studies curriculum. The total sample size of the study is 160 SS2 computer studies students. An intact class of SS2 computer studies students was randomly drawn from each of the sample schools. Purposive sampling is used due to the fact that three schools among the schools are eliminated because they are not co-educational schools. Besides, only two schools which sat for computer studies external examination are included. On the other hand, two other co-educational schools are selected by simple random sampling. The researchers randomly assigned one school that has sat for the examination and the other that has not sat for the computer studies external examination as control group. The instrument that was used for data collection is Computer Achievement Test (CAT). CAT is a 20-item multiple objective test questions extracted from WAEC past questions on computer studies. It covers four units which were taught during the study. The extracted questions cover the knowledge, comprehension and application levels of Bloom's (1971) taxonomy of educational objectives. The researchers also utilized table of specification when extracting the questions. CAT was subjected to face validation by experts. Split-half method was used to find the internal consistency of the achievement test instrument using the twenty multiple choice question items. The items are split into two equal parts. The odd numbered items are grouped together while the even numbered items are also grouped together. The odd numbered items and the even numbered items are administered separately to the participants. The split half reliability coefficient of the whole test is obtained by correlating the scores for odd numbered items against the scores for even numbered items using Spearman Brown prophecy formula. The instrument had a reliability index of 0.90 which implies that the items are reliable. Before conducting the experiment, pre-test was administered to both groups and their results were recorded. The experimental

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group was taught eight lesson topics with block-chain technology strategy (BCTS) while the control group was taught the same eight lesson topics using conventional lecture method which anchored on the traditional modes. Each lesson lasted for 35minutes and two lesson topics were taught weekly. Thus, the experiment lasted for four weeks. At the end of the fourth week, the achievement test (post-test) was administered to both groups. The administered test was re-shuffled before it was administered. Scores of the administered tests were recorded. However, during the cause of the experiment, extraneous variables were held constant. Data collected from the study were analyzed quantitatively. The research questions were answered using mean and standard deviation. The null hypothesis was tested using Analysis of Covariance (ANCOVA).

Presentation of Results

Research Question 1: What is the difference between the mean achievement scores of students taught computer studies using BCTS and those taught using CLM?

Table 1: Mean and Standard Deviation Scores of Computer Studies Students Achievement Test

Group	No	$\bar{X}$ Pre-test	SD Pre-test	$\bar{X}$ Post-test	SD Post-test	$\bar{X}$ Gain
BCTS	80	29.50	5.64	72.58	15.30	43.08
CLM	80	30.00	6.04	50.10	16.11	20.10
$\bar{X}$ difference		0.5		22.48		21.98
Total	160					

Data presented in Table 1 showed that BCTS (experimental) group had a mean of 29.50 and standard deviation of 5.64 in the pre-test achievement test while the conventional (control) group had a mean of 30.00 and standard deviation of 6.04. Besides, the BCTS group had a mean of 72.58 and standard deviation of 15.30 in the post test achievement test while the CLM group had a mean of 50.10 with standard deviation of 16.11. The experimental group had a mean gain of 21.98 more than the control group. This implies that the computer studies students taught with BCTS performed better than those taught with CLM.

H0₁: There is no significant difference in the mean achievement scores of students taught computer studies using BCTS and those taught with CLM

Table 5: Analysis of Co-variance of Students' Achievement Scores in Computer Studies

Source of Variance	df	SSX	SSY	SSXY	SSYX	MSSYX	F-cal
Between groups	1	253.22	259.90	5.048 ^{x10}	414180517.8	414180517.8	
Within groups	158	296754.8	-10580908.42	-10943538.4	-414149891	-2621201.84	158.01
Total	159	297008	163771				

From Table 2, the F-calculated which is 158.01 is greater than F-critical at 3.91 of 150 degree of freedom. The null hypothesis that there is no significant differences between the mean achievement scores of computer studies students who were taught with the BCTS and those who were taught with the CLM is rejected. This implies that there is a significant difference between the mean achievement scores of computer studies students in both groups in favour of experimental (BCTS) group.

Discussion of Finding

The analysis of the scores of achievement shown in Table 1 indicated that the Block-chain technology strategy (BCTS) (experimental) group had a higher mean achievement than (control) group in the achievement test. By implication, BCTS has a positive effect on students' achievement in computer studies. BCTS fosters decentralized and transparent learning which supports practice leading to strong intent, high achievement and competence. In other words, when students are actively involved in teaching-learning process, more energy is liberated towards such and it finally leads to high academic achievement. However, study conducted by Toader, Toader, Boca, Toader and Achian (2023) found that the adoption of blockchain-based educational platforms offer a promising avenue for catalyzing a positive transformation within the



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European educational ecosystem. Suman and Gazal (2023) found that adopting blockchain technology in the academic environment will help in the management of the various issues associated with the process of learning and teaching across the globe on a virtual platform.

Conclusion

Block-chain technology strategy (BCTS) is a teaching strategy that upholds the principle of secure, decentralized and transparent learning where learners independently manage their portable academic histories. When this strategy is applied in computer studies, it increases zeal to learn and academic achievement. Therefore, since BCTS is an innovative and more effective strategy in teaching, it can be concluded by asserting that computer studies teachers should adopt strategy or strategies that could be said to be decentralized and activity oriented in teaching the subject.

Recommendations

It can therefore be recommended based on the study that;

1. Decentralized strategy seen in blockchain technological strategy should be paramount in computer studies teaching-learning process
2. Computer studies instruction should be actively oriented
3. Teachers should automate assessments since it encourages learning and promotes achievement

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