



EFFECTS OF ENHANCED BLENDED LEARNING ON STUDENTS' LEARNING OUTCOMES IN COMPUTER STUDIES IN SENIOR SECONDARY SCHOOLS IN EKITI STATE, NIGERIA.

BY

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Abstract

This study investigates effects of Enhanced Blended Learning on students' learning outcomes in Computer Studies in Senior Secondary Schools in Ekiti State, Nigeria. The study adopted a two-group pre-test, post-test, control quasi-experimental research design. The sample for this study consisted of 104 (SSII) students offering Computer Studies in four schools. multi-stage sampling procedure. Computer Studies Performance Test (CSPT) and Students' Attitudinal Questionnaire in Computer Studies (SAQCS) were used to collect data for the study. The reliability of CSPT was ascertained using test-retest reliability method. Data collected were analyzed using descriptive analysis of means and standard deviation. Hypotheses were tested using a t-test at 0.05 level of significance. Findings from the study revealed a significant difference in the performance of students in the two groups after the treatment with Enhanced Blended Learning being the more effective strategy of the two. Attitude of students exposed to Enhanced Blended Learning was significantly different from that of their counterparts who were exposed to conventional method. It was recommended that the use of Enhanced Blended Learning should be encouraged in Computer Studies classroom in secondary schools as this will enhance better academic performance of the students.

Keywords: Effect, Enhanced, Learning Outcome, Computer Studies.

Introduction

Investing in education represents a commitment to the development of individuals. It is a general knowledge that a country which invests significantly in human capital, especially through education, will achieve sustainable economic success. By dedicating significant resources to education, a country can equip its population with the knowledge and skills essential for enhanced future productivity. Therefore, education empowers every citizen with the necessary information and skills to comprehend and intelligently engage in the societal activities in which they are involved. As stated by the National Council of Educational Research and Training (2014), education is the process of facilitating learning, surrounding the

acquisition of information, skills, values, morals, beliefs, and habits.

Nigeria's education system comprises three tiers: primary, secondary, and tertiary. secondary education is the intermediary phase following primary schooling and preceding tertiary studies, caters for learners aged approximately 10 to 16 years. Institutions at this level function as critical conduits for cultivating not merely an educated populace, but also a competent labor force (Adeyemi, 2020). The secondary education system is structured to accommodate variations in aptitudes, opportunities, and prospective societal functions. Secondary education instills in students' aspirations for self-betterment,

self-sufficiency, and the pursuit of excellence through disciplines that elevate scientific and technical capabilities at both individual and national levels (Ojediran, Oludipe, & Ehinola, 2020). During the educational process, various fields of knowledge are cultivated, generally dwindling into the groups of arts, social sciences, or sciences. Science education specifically involves the study of subjects such as Computer Science, Mathematics, Chemistry, Physics, Biology. It also involves using teaching methods to effectively convey scientific knowledge to individuals or communities (Omosewo, 2018).

Science is a discipline that involves human efforts meant at providing right clarifications for the events and circumstances that arise within the usual world. The meaning of science in current society cannot be inflated as it serves as a prominent instrument for comprehending the details and improvement of technology. The application of scientific values spreads across a diverse range of disciplines and intelligent pursuits, considered by shared features. Science is typically distinguished by its ability to make exact statements that can be confirmed or established (Sivakumar & Kirubanandhini, 2014). Science education has a crucial role in fostering the scientific and technological advancement of a nation. The National Policy on Education explicitly acknowledges the imperative of preparing students to thrive in the contemporary era of science and technology. This objective is identified as one of the keys aims of scientific education.

(Khader, 2016). Nigeria, as a nation, has been striving to enhance its economic development to compete globally with other countries. Consequently, there has been ongoing efforts to develop human capabilities and technological infrastructure, particularly in the realm of computer literacy and operational skills. Given that computer literacy plays a crucial role in various facets of human endeavors, it has become an indispensable skill. Computer studies, is one of the core science subjects within the secondary tier of education specifically targeted the development of technological prowess essential for the nation's progress. Computer studies are critical for the tangible advancement of nations worldwide (UNESCO 2020).

Nigeria, as a developing economy requiring scientific transformation particularly depends on this discipline for national progress. Computer studies equip learners to comprehend computers' purposes, applications, and constraints while facilitating study of modern information processing systems. In today's digital era, computational technology permeates virtually all spheres of human activity (Sefriani, R., 2022).

Computer studies delve into the intricacies of how computers process information. It goes beyond fundamental computer usage and encompasses more than just programming. This field most times involves exploring techniques for representing objects and processes, necessitating skills like problem definition, problem analysis, solution design, and the development, testing, and maintenance of programs. (Shiela, et al., 2022). From the forgoing, computer studies involve exploring the principles and practices that underpin the understanding and modeling of computation, as well as their application in the development of computer systems. It provides a comprehensive exploration of how computers and computer systems function, how they are designed, and how they are programmed.

Computer Studies furthermore, provides a robust foundation for those inclined toward further study and training in specialized areas such as computer programming, database analysis, computer science, computer education, computer engineering, software engineering, information technology, and game development (Adebayo, 2014). The fundamental essence of Computer Science lies in problem-solving, an indispensable skill applicable across various facets of life.

Despite the established significance of computer studies for national advancement and personal development, secondary school students' attitudes toward the subject remain markedly unfavorable (Uzoamaka & Ngozi, 2022). A significant proportion of secondary school students enrolled in computer studies lack adequate access to resources for effective skill application, potentially hindering their capacity to utilize computational tools in resolving context-specific challenges (Uzoamaka & Ngozi, 2022). This results in unfavorable students' learning outcome is

visible in their performance and attitude towards the subject.

Opoku Mustapha (2016). Attitude functions as a powerful determinant of individual life approach. Characterized by positivity and proactivity, it correlates strongly with enhanced productivity, improved interpersonal relationships, and better overall health. Consequently, attitude constitutes a critical and deliberately influenceable factor in both personal achievement and organizational dynamics Assylzhanova (2022). Enhanced blended learning can be envisaged to be one of these innovative teaching approach. Enhanced blended learning is an advanced blended learning strategy. This teaching learning approach generally means using more than one approach, guideline on technique in teaching and learning for offering teaching content and materials. Enhanced blended learning model seems to engage students, partially, in online delivery of content and instruction, with some degree of control over the timing, pace, and/or location of their learning. It involves the integration of both online and face-to-face instruction by integrating online educational materials and opportunities for online interaction with conventional. Anthony and Keating, (2023).

This study aims to integrate technology to support student-centered teaching learning approach and provide real-time feedback and assessment. This also encourage active learning a collaborative support, diverse learning styles and needs, to enhance access to resources and learning materials. By enhancing blended learning, educators can create a dynamic and supportive learning environment that caters to the diverse needs of students, leading to improved academic outcomes and increased student success (Ifenthaler, 2017).

In enhanced blended learning approach, students will, under the guidance of the teacher, access databases and websites containing additional information relevant to the topic being taught. The teacher will direct students to view animations, simulations, and illustrative tutorials available online that further elucidate the concepts covered in class (Adebowale et al., 2024).

When compared online classes, enhanced blended learning is more effective particularly in subject areas, such as English language

and mathematics, (Halverson et al., 2021; Ojaleye & Awofala, 2018). By combining digital instruction with face-to-face interaction simulation, enhanced blended learning allows students to independently explore new concepts, thereby allow teachers to provide individualized support to students who may require additional attention. This personalized approach enables teachers to tailor their instruction to meet the unique needs of each student, ultimately maximizing their learning potential.

Enhanced blended learning make use of collaborative digital tools and methodologies to improve engagement, effectiveness and personalization in educational settings yielding increased interactivity and improved collaboration (on- line collaboration). Online Collaboration tools are digital platforms that enable individuals to work together in real-time, regardless of their geographical location.

Online collaboration tools constitute cloud-based ecosystems enabling geographically dispersed learners and educators to co-create knowledge through synchronous and asynchronous interactions (Palloff & Pratt, 2013). These platforms facilitate multimodal communication, collective knowledge construction, and scaffolded teamwork which are essential dimensions of modern pedagogy (Garrison, 2016). Google Classroom constitutes a pedagogically architected virtual learning environment (VLE) accessible via cloud-based learning management system (LMS), purposefully designed to serve heterogeneous educational requirements. According to Weller (2020), its core functionality enables democratized access to learning communities through internet connectivity structured collaboration via embedded cognitive tools pedagogical mediation of instructor-student interactions seamless resource orchestration within unified (Vygotsky, 1978)

Statement of the Problem

A good student learning outcome in terms of the overall performance after learning computer studies for three years in senior secondary level ought to be seen in their performance at WASSCE with credit grades and in their positive attitude towards the subject. However, based on the fact that WASSCE report of students in computer

studies is fluctuating, with a decline in the credit grade level of students over a period of five years. Also, the attitude of students towards the subject has been observed to include fear and anxiety, low confidence and wrong perception of subject being hard among others. From the observation, it seems the identified challenges related to these outcomes is attributed to teachers' challenges in identifying a better teaching learning approach for Computer Studies. The deficiency in the conventional teaching and learning approach often used for Computer Studies classes, hinder active student involvement and peer interaction. This approach may have resulted in these unfavorable outcomes.

Purpose of the study

The main purpose of the study was to investigate effect of enhanced blended learning on student learning outcome in Computer Studies in senior secondary school.

- i. examines the difference in computer studies the academic performance of student before and after expose to treatment.
- ii. determine the difference in the student attitude towards the computer studies before and after exposure to treatment.

Research Questions

The following general questions were raised to guide the study.

- i. What is the difference in the performance of students in computer studies before and after treatment?
- ii. What is the difference in the attitude of students towards computer studies before and after treatment?

Research Hypotheses

The following null-hypotheses were formulated to guide the study

1. There is no significant difference in the performance of mean score of students in computer studies in experimental and the control groups before the treatment.
2. There is no significant difference between the performance mean score of students exposed to computer

studies blended learning and those exposed to conventional method.

3. There is no significant difference in the attitude of male and female students towards computer studies when exposed to enhance blended learning.

Methodology

This research employed a pretest, posttest control group quasi-experimental design. The design enabled variable manipulation, with a pre-test administered to both groups to establish baseline homogeneity in academic performance and attitudes. Specifically, evaluating effect of enhance blended learning on learning outcome of Secondary School Students. Two groups were used for the study. One experimental group exposed to Enhanced Blended Learning and a control group exposed to conventional teaching method. The design is represented thus:

Experimental group: $O_1 \quad X_E \quad O_2,$
 $O_3 \quad X_c \quad O_4$

Control group:

Where:

$O_1 \quad O_3$ = Pre-test observations

$O_2 \quad O_4$ = Post-test observations

X_E = Treatment using enhanced blended learning

X_c = Treatment using conventional method

The population for this study consisted of all the 1,125 Senior Secondary two (SSII) students offering computer studies in all the 203 public secondary schools across the 16 Local Government Areas (LGAs) of Ekiti State, Nigeria. The choice of SSII was considered appropriate because students in SSII class were not preparing for any external examination; thereby, they are more readily available for the research. The sample for this study was 104 students offering Computer Studies. This study employed a multi-stage sampling procedure to select the sample. Stage one is the random selection of one senatorial district out of the three senatorial districts in Ekiti State. This was followed by the selection of two Local Government Areas (LGAs) from the selected senatorial district, using simple random sampling technique. The next stage was the selection of two schools from each of the LGAs using purposive sampling technique. The selection was based criteria: (a) Schools offering Computer Studies at the senior

secondary level, and (b) availability of computer laboratory facilities in school. Stratified sampling was considered in selecting two schools each from rural and another two from urban. Students were selected from the four classes of computer studies students in their intact forms.

Also, the purposive sampling was done in such that from each of the two LGA, one school was selected from the rural community and another one from the urban community. one group for experimental and the other group for control. Computer Studies is not a compulsory subject for senior secondary school students hence; not all the students are offering the subject. Therefore, all the students offering Computer Studies in senior secondary school class two (SSII) in the four selected schools formed the sample for the study.

Two research instruments were used in this study. They are Computer Studies Performance Test (CSPT), and Students' Attitudinal Questionnaire in Computer Studies (SAQCS). CSPT was used to measure the performance of students in Computer Studies. The questions were drawn from the past WASSCE conducted by West African Examination Council (WAEC) for the period of five year (2018-2023). Each correct response was awarded 1 mark giving a maximum score of 30 marks which was converted to percentage. Students' Attitudinal Questionnaire in Computer Studies (SAQCS) was a self-constructed questionnaire used to measure students' attitude towards Computer Studies. SAQCS comprised two sections. Section A sought bio-data of respondents while Section B consisted of 30 items on

the attitude of students towards learning Computer Studies. SAQCS was worded on a 4-point Likert type scale ranging from Strongly Agree (SA) 4 points, Agree (A) 3points, Disagree (2) points and Strongly Disagree (SD) 1 point for positively worded items and the reverse for negatively worded items. Copies of SAQCS were given to experts in the field of Test and Measurement and experienced Computer Studies teachers for face and content validity. Computer Studies Performance Test (CSPT) comprised of questions drawn from past WASSCE conducted by West African Examination Council (WAEC), being standardized questions, had already been validated by the examination body. The reliability of SAQCS was ascertained using test-retest method of reliability which involved 20 senior secondary school two students from a school outside the sampled schools for the study. The reliability of SAQCS was determined using Cronbach Alpha while that of CSPT was determined using Kuda-Richardson 20. Reliability coefficients of 0.83 and 0.86 were obtained for the instruments respectively.

Testing of Hypotheses

Hypothesis 1: there is no significant difference in the pre-test performance of Computer Studies student exposed to enhanced blended learning and those exposed to conventional teaching learning approach.

To test hypothesis 1, pre-test of students in experimental group and those in the control group were computed and compared for statistical significance using t-test at 0.05 level. The result is presented in Table 4.

Table 4: t-test of Pretest Performance of Students in Experimental and Control Groups

Group	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>df</i>	<i>t</i>	<i>P</i>
Experimental	53	10.71	3.685	102	1.449	0.932
Control	51	120.46	5.303			

p>0.05 (Not Significant Result)

The result in Table 4 showed that $t_{102} = 3.449$, $p = 0.932 > 0.05$. Since the *p-value* is greater than 0.05, the hypothesis that says there is no significant difference in the pretest mean scores of those exposed to enhanced blended learning and those not exposed was

not rejected. This indicated that both Experimental and Control groups performed equally prior to the commencement of the treatment. Hence the two groups were homogenous.

Hypothesis 2: There is no significant difference in the post-test performance of student in computer studies exposed to enhanced blended learning and those exposed to the conventional teaching learning approach.

In order to test this hypothesis, post-test mean scores of students in experimental group and those in the control group were computed and compared for statistical significance using t-test at 0.05 level. The result is presented in Table 5.

Table 5: t-test of Post-test Performance of Students in Experimental and Control Groups

Group	N	Mean	Std. Deviation	df	T	P
Experimental	53	18.25	5.660	102	5.643	0.000
Control	51	14.58	6.451			

*** $p < 0.05$ (Significant Result)**

The result in Table 5 showed that $t_{102} = 5.643$, $p = 0.000 < 0.05$. Since the p -value is less than 0.05, the hypothesis that there is no significant difference in the post-test mean scores of those exposed to enhanced blended learning and those not exposed to was rejected. This means that there was a significant difference between the performance of students in Experimental and Control groups. Students in experimental group performed better than those in the control groups.

Hypothesis 3: There is no significant difference in the attitude of student towards Computer Studies in experimental and control groups before the treatment.

In testing hypothesis 3, attitude of students in experimental and control groups before the treatment were computed and compared for statistical significance using t-test at 0.05 level. The result is presented in Table 6.

Table 6: t-test analysis of Students' attitude in Experimental and Control Groups before treatment.

Group	N	Mean	Std. Deviation	Df	T	P
Experimental	51	98.02	13.206	102	1.004	0.318
Control	53	100.80	15.041			

$p > 0.05$ (Not Significant Result)

Table 6 shows that $t_{102} = 1.004$, $p = 0.318 > 0.05$. Since the p -value is greater than 0.05, the hypothesis that there is no significant difference in the pre-attitude mean scores of those exposed to enhanced blended learning and those not exposed to it was accepted.

Hypothesis 4: There is no significant difference in the attitude of student towards

Computer Studies when exposed to enhanced blended learning and those exposed to the conventional teaching learning approach.

To test this hypothesis, post-attitude mean scores of students in experimental group and those in the control group were computed and compared for statistical significance using t-test at 0.05 level. The result is presented in Table 7.

Table 7: t-test of attitude of Students in Experimental and Control Groups after the treatment

Group	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>df</i>	<i>T</i>	<i>P</i>
Experimental	53	103.63	12.619	102	0.392	0.696
Control	51	102.77	9.392			

p > 0.05 (Not Significant Result)

Table 7 showed that $t_{102} = 1.004$, $p = 0.696 > 0.05$. Since the *p-value* is greater than 0.05, the hypothesis that says there is no significant difference in the post-attitude mean scores of those exposed to enhanced blended learning and those not exposed to was not rejected. This implies that there was no significant difference in the attitude of students in the experimental and control groups. They all had same attitude towards Computer Studies.

Discussion

The research explored the effects of enhanced blended learning on student's learning outcomes in computer studies in senior secondary schools in Ekiti State. Findings from the study established the homogeneity of the two groups involved in the study before the commencement of the experiment. Findings shows that both the experimental and control groups were similar before the intervention. The two groups had varying performance mean with the control group being a little higher after the experiment the experimental group students' performance was higher than the control group. This implies that there is difference in the performance of computer studies students specifically, those taught using enhanced blended learning have better performance than those taught using conventional teaching learning approach.

This result corroborate Bawa's (2016) assertion regarding the positive impact of pedagogically appropriate instructional resources on computer Studies achievement. In similar vein, Okikiola *et al.*, (2024) study had revealed the effect of computer science in junior secondary school students' in Kwara State using non- conventional teaching learning approach for two schools in the story telling strategy. The study revealed that those taught with storytelling as a non-conventional teaching learning approach, had

enhanced conceptual understanding in Computer Studies.

Findings revealed similar result in the pretest attitudinal mean scores for both groups. This finding is in line with Opoku (2016) explore senior high school students' dispositions and attitudes toward computer education, had positive attitude in computer studies in addition to further findings, these results confirm the baseline equivalence of both groups prior to the intervention, indicating comparable initial knowledge levels. Furthermore, findings also revealed that there was a difference in the post attitudinal mean score of both groups. There was an increase in the mean score of both groups after the treatment but those taught with enhanced blended learning had higher mean those taught with conventional method.

This collaborates the study of Assylzhanova (2022) that the enhanced blended teaching application enabled the experimental group to achieve significantly higher computer scores, develop more positive attitudes, and demonstrate greater learning permeance compared to the control group. This is also consistent with the claims of Opoku (2016) who affirmed that student's attitude in Computer studies improve when the teacher uses appropriate instructional method. The findings revealed that there was no significant difference in the pretest performance of students in the experimental and control groups. In other words, it could be assumed that the knowledge criteria of the two groups involved in the study are similar. Consequently, any statistically significant post intervention differences can be confidently attributed to the experimental treatment rather than pre-existing variations or random chance. This affirms the findings of Obadiaru (2020) in River State that student performance remained consistently above average across the five year period.

In addition, there is a significant difference in the post -test performance mean scores of students taught computer studies using enhanced blended learning approach and conventional approach. Enhanced blended learning was found to be the more probable effective strategy hence; students in the experimental group performance mean score was higher their counterparts in the control group. This performance enhancement pattern substantiates the platform-agnostic Adedayo and Ajayi (2022) with conclusion that properly implemented learning management systems improve outcomes. While their study focused specifically on Google Classroom's features, our parallel results with enhanced blended learning suggest the underlying pedagogical principles transcend particular technological implementations.

The experimental procedure for the studies was in six stages: pretreatment stage (one-week) the treatment stage (six-week) and post treatment stage (one-week), the whole exercise lasted eight weeks. The data collected were analysed using descriptive and inferential statistics. The research question raised were answered using descriptive statistics such as mean, standard deviation, while the hypotheses formulated were tested using inferential statistics such as t-test. Decision was taking at 0.05 level of significance.

1. There is difference in the performance of computer studies students specifically those taught using enhanced blended learning have better performance than those taught using in conventional approach.
2. There is difference in the attitudinal mean score of students taught specifically those taught with enhanced blended learning had better mean score than those taught with conventional teaching learning approach.
3. There is no significant difference in the performance mean scores of students in enhanced blended learning and control groups prior to the treatment.
4. There is a significant difference in the performance mean scores of students taught Computer Studies using enhanced blended learning strategy and conventional method.
5. There was no significant difference in the attitudinal mean scores of students in

enhanced blended learning and control groups prior to the treatment.

Conclusion

The results of this study demonstrate that implementing an enriched blended learning approach through Google Classroom serves as a viable and efficient method for boosting students' academic achievement while also cultivating a more favorable perception of Computer Studies among senior secondary school learners. The results also revealed that the interaction between the treatment (enhanced blended learning), gender, and school location did not have a statistically significant impact on students' academic performance or their attitudes toward Computer Studies at the senior secondary level.

Therefore, the effectiveness of Google Classroom as a platform for teaching Computer Studies online is not influenced by gender or geographical location, proving equally successful in improving academic results and student perceptions in both rural and urban schools.

Recommendations

Based on the findings of this study, the researcher made the following recommendations:

1. **Teacher Training Initiatives:** The State Ministry of Education, alongside relevant government agencies, should design specialized professional development programs (such as workshops, training sessions, and seminars) to enhance Computer Studies instructors' competencies in utilizing advanced blended learning platforms, including Google Classroom.
2. **Curriculum Enhancement:** To maximize educational effectiveness, curriculum planners should formally incorporate enriched blended learning strategies, particularly tools such as Google Classroom into the foundational structure of the senior secondary Computer Studies syllabus.
3. **Publishers of Computer Studies** instructional materials should prioritize the development of interactive e-textbooks specifically designed for blended learning environments. These digital resources should incorporate multimedia elements and platform compatibility to maximize



their utility in enhanced pedagogical approaches.

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