

Effects of Blended Learning Instructional Approach on Secondary School Students' Academic Achievement

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Abstract

The landscape of education has undergone significant transformations in recent years, largely driven by advancements in technology. Online and blended learning environments have emerged as innovative solutions, reshaping traditional educational paradigms. The study investigated the effect of blended learning instructional approach on secondary school students' achievement with three research hypotheses. The study employed pre-test, post-test, control group quasi experimental design.

The study population was 5,880 senior secondary school year two (SS2) computer studies students in Owan-West education zone, Edo State. The study involved a sample of 112 SS 2 students. The data collection instrument was Computer Studies Achievement Test (CSAT) validated by experts. Reliability of the instrument was determined by applying Kuder-Richardson Formula 20 that provided internal consistency value of 0.79. The obtained data were analyzed using ANCOVA. The study findings indicated among others that the mean academic scores of the students who had been taught computer studies with blended learning instructional approach and those taught with conventional instructional approach differed significantly in favour of blended learning. It was suggested that state ministry of education should organize workshops to computer studies teachers on how they can use blended learning instructional approach to teach.

Keywords: Achievement, Computer, Blended-Instruction, Achievement.

Introduction

The shift from traditional classroom learning to digital platforms has accelerated in the past decade. Factors such as technological advancements, the COVID-19 pandemic, and the growing demand for flexible learning options have spurred the development of online and blended learning environments. Online learning refers to the delivery of education via the internet, while blended learning combines online learning with face-to-face classroom interactions.

Nigeria is also in the quest to diversify and grow economically and one of the main aspects of the diversification strategy is to develop a workforce that is technologically literate. The country has been keen on enhancing its human resource and technological infrastructure with special concentration on enhancing computer literacy and vocational skills. The significance of this initiative is supported by the fact that computers have become ubiquitous in nearly all areas of modern life, including business and science, as well as socialization. In this realization, the Edo State Ministry of Education has adopted a major policy of providing secondary schools with computers and other technology to facilitate learning. This initiative was also supported by an in-service

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teacher training program in 2015 that was designed to improve the technological literacy and pedagogical competence of teachers. The final objective was to ensure that teachers mastered the use of computer applications and then impart the same to their learners, especially in the classes that taught computer studies (Edo State Ministry of Education, 2015).

Computer studies is a subject at the secondary school level meant to equip students with the basic skills required to effectively use computers. The longevity of computer science and its pedagogy as an area of study is a credit to the sheer significance of computers in modern society. The skills that modern job seekers need to acquire are becoming more and more computer savvy (Toshalis and Nakkula, 2012), which is why the citizens have to acquire these skills in order to be able to keep up with the pace of scientific and technological advances. The introduction of computer studies as a part of the high school curriculum is thus not an option, but a necessity to equip students with the future.

Studies have identified the following as the causes of the poor performance of students; ineffective teaching, ineffective learning conditions, and absence of functioning computer laboratories (Olunloye, 2010). Moreover, there is an overall mistrust or distrust of the subject in some students. This is especially acute in heterogeneous classes, where students of different abilities are taught in the same classroom, and it is hard to guarantee that all students will obtain good grades. This scenario necessitates that computer studies teachers should step up the pace of research on more innovative and effective teaching and learning methods.

The classical pedagogical method can also be described as being teacher-centered and didactic. In this model, the teacher is the main source of knowledge and the students are passive participants whose main task is to take notes and perform tasks given to them. Although this traditional approach has its merits, including its efficiency in presenting information to a large audience of students and its capability to address a wide variety of topics, it has been subject to widespread criticism in many academic fields. The main criticism is that it does not help the students to own their learning. This is in sharp contrast to current methods, which focus on student agency and active engagement. The traditional approach, by definition, will lead to a reliance on the teacher and might not prepare students with critical thinking and problem-solving abilities that are required in a complicated and technology-driven world. The listless outputs in computer studies are a good sign that a change in these archaic habits is badly overdue.

Blended learning is one of the most promising research and innovation domains in instructional practice. This learning model combines both digital and internet based learning resources with the traditional face-to-face classroom learning (Graham and Dvisuban, 2008). Other names used in academic literature include hybrid learning, technology-mediated instruction, web-enhanced training and mixed-mode instruction. One of the main characteristics of blended learning is that, although it still necessitates the physical presence of both the instructor and the learner, it also includes an element of student control in terms of when, where, and how their learning takes place. Students still go to a physical institution, where they are taught by a teacher, but the delivery of the curriculum is supplemented with interactive and computer-mediated activities.

The article describes a particular blended learning framework that has a three-step approach. The classroom teacher presents a specific concept in the first step and right away asks students to go online and search more information, watch educational videos, or read online tutorials. This preliminary stage is useful in strengthening the main idea using various media. Secondly, students are guided by the teacher to particular

databases and websites to find more materials on their course. This is a step towards active exploration rather than passive consumption by students. The third step involves the teacher engaging the students physically and online, probing them to get a better idea of what they are learning. This is an interactive stage that enables individualized feedback and elucidation. Once this cycle of questions and clarification has been completed, the teacher then describes the next lesson topic in the same way, forming a cyclical process of blended instruction.

The advocates of blended learning claim that it is better than regular online classes, and its advantages are proven in a range of disciplines, such as English language (Halverson, Graham, Spring, and Drysdale, 2012) and mathematics (Ojaleye and Awofala, 2018). With online education coupled with personal communication, students can learn at their own pace and teachers can give special attention to students who need special attention. This is a flexible model which enables teachers to customize their curriculum so that every learner can achieve his or her potential. Asynchronous internet communication technology integrated into the educational programs has been demonstrated to enhance independent and collaborative learning experiences at the same time (Caraivan, 2011; Delialioglu and Yildirim, 2008; Gambari, Shittu, Ogunlade, and Osunlade, 2018). The effect of this integration on student performance and student engagement is positive as it can encourage students to do their own research without being clearly guided by the teacher. Finally, blended learning arouses interest and curiosity in the learning process and, therefore, results in better student performance due to active learning, irrespective of gender.

The connection between gender and academic performance is a complicated and well-studied issue. Gender as a social construct that defines masculinity and femininity is believed to affect learning and achievement. Although not all studies have indicated a significant relationship between gender and achievement (Abiam and Odok, 2006), some have indicated small but significant differences. An example is given by the analysis of the 2008 WAEC results, which showed that 7.32 percent of male students and 6.42 percent of female students received credit passes (Uwaidiae, 2008). This result indicates a slight but present difference in performance.

Subsequent research has yielded opposing findings especially when technology-enhanced learning is concerned. According to Anusiuba (2018), there was a considerable disparity in the academic performance of male and female students who were taught computer studies using animated media. Conversely, Nweke (2018) did not find any meaningful difference in the mean score of achievement between male and female students who received the same animated media. Such a discrepancy shows that the problem is rather complex and requires more sophisticated studies.

The results are also not very clear regarding blended learning per se. In a research by Ojaleye and Awofala (2018), the authors established that the mean score of learning mathematics through blended learning and problem-solving methods showed a significant difference in the mean achievement of male and female learners. On the other hand, Adepeko (2018) did not report a significant difference in the mean achievement scores of male and female students taught geometry using blended learning. These conflicting findings highlight the importance of carrying out more comprehensive research on the nature of pedagogical practices that can guarantee equitable and fair outcomes among all students regardless of their gender. The idea is to create a model of education that does not only enhance the general performance, but also reduces any achievement gap that may exist.

Purpose of Study

The study investigated the effect of blended learning instructional approach (BLIA) on secondary school students' academic achievement. The study seeks to examine:

1. The difference in achievement between students taught with BLIA and those taught with a conventional method.
2. The difference in achievement between male and female students taught with BLIA.
3. The interaction effect of teaching methods and gender on students' achievement.

Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance

1. The mean achievement scores of the students taught computer studies by the use of BLIA and those taught by the use of conventional method are not significantly different.
2. The mean achievement scores of male and female students taught computer studies with the help of BLIA do not differ significantly.

Methodology

Research design

The study employed pre-test, post-test, control group quasi experimental design.

Participants and Sampling

The study employed a sample of 112 SS 2 students selected through purposive sampling and randomly assigned to the treatment and control groups.

Instrument

The data collection instrument was Computer Studies Achievement Test (CSAT) validated by experts. Reliability of the instrument was determined by applying Kuder-Richardson Formula 20 that provided internal consistency value of 0.79. The stratified random sampling method provided the research project with an equal opportunity to select all the secondary school students.

Data collection

ANCOVA was used to analyse data collected.

Result and Discussion

Hypothesis 1: The mean achievement scores of the students taught computer studies by the use of BLIA and those taught by the use of conventional method are not significantly different.

Table 1	ANCOVA Test of Significant Difference between Mean Achievement Scores of Students Taught Using BLIA And Conventional Method					
Source of Variation	SS	DF	MS	F	P-VALUE	DECISION
Corrected Model	22037.656a	2	11018.828	434.172	.000	
Intercept	81152.021	1	81152.021	3197.609	.000	
Pretest	19.466	1	19.466	.767	.383	
Method	21722.198	1	21722.198	855.913	.000	
Error	2766.308	109	25.379			
Total	497744.000	112				
Corrected Total	24803.964	111				

Table 1 indicates that the computed F-value is 855.913, with a numerator of 1 degree of freedom and a denominator of 111 degrees of freedom, yielding a p-value of 0.000, which is not less than or equal to 0.05. The null hypothesis was consequently rejected. A notable disparity exists in the average performance of students instructed by BLIA compared to those educated via traditional methods. This supports the BLIA group.

Hypothesis 2: The mean achievement scores of male and female students taught computer studies with the help of BLIA do not differ significantly.

Table 2 indicates that the computed F value is 9.447, with 1 degree of freedom in the numerator and 58 degrees of freedom in the denominator, and the p-value is 0.003, which is below 0.05. The null hypothesis is hence rejected. Consequently, a notable disparity exists in the average performance of male and female students instructed in BLIA, favouring males.

Table 2	ANCOVA Test of Significant Difference Between the Mean Achievement Scores of Male and Female Students Taught Computer Studies Using BLIA					
Source of Variation	SS	DF	MS	F	P-VALUE	DECISION
Corrected Model	321.614a	2	160.807	5.572	.006	
Intercept	57420.840	1	57420.840	1989.774	.000	Significant
Pretest	20.180	1	20.180	.699	.407	
Method	272.631	1	272.631	9.447	.003	
Error	1616.047	56	28.858			
Total	363394.000	59				
Corrected Total	1937.661	58				

Discussion of Findings

The study's results demonstrate a substantial difference in the average achievement scores of students instructed through a mixed learning approach compared to those taught via a traditional learning method, with the blended learning strategy being favoured. The study's results align with Iga (2018), who asserts that the average score of the experimental group instructed via blended learning surpasses that of the control group. The research findings correspond with those of Kayii and Dambo (2018), who contend that the experimental group employing the blended learning approach outperformed the control group utilising the lecture method. Zhang and Zhu (2018) validate the study's findings, revealing that students engaged in blended learning outperformed their counterparts who participated in traditional face-to-face English as a second language instruction.

The research findings indicated a considerable disparity in the average performance of male and female students instructed via a blended learning strategy. The teaching style and gender exhibited no significant associations with student achievement. The disparity in performance between male and female students in blended learning can be ascribed to differences in engagement with online learning resources and their preferences for various media formats, which may affect their understanding in distinct ways. The study's findings do not corroborate those of Gambariet et al. (2018), who determined that there is no significant difference in the performance of male and female undergraduates in blended learning environments. The study results contradict those of Omenka and Kurume (2013), who observed no significant disparity in the mathematical performance of male and female students when utilising an ethnomathematics approach. The study results contradict Adepeko's (2018) findings, which assert that gender does not influence the academic performance of pupils subjected to comparable exercise settings. The study's findings align with those of Ojaleye and Awofala (2018), which demonstrated that the primary effect of gender on students' algebra achievement is statistically significant, whereas the interaction effect between treatment and gender on algebra achievement is not statistically significant.

Conclusion

The researchers concluded that the blended learning instructional model is effective in improving performance of students in computer courses. Integrated learning enhances student performance.

Recommendations

It is proposed to recommend the following in line with the study findings:

- State ministry of education: should conduct workshops and seminars to secondary school teachers on how to use BLIA to teach computer studies principles.
- School administrators should offer computer, internet and power generation facilities so that teachers can use blended learning strategies to enhance student learning.

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