EFFECT OF BLENDED LEARNING APPROACH ON SECONDARY SCHOOL STUDENTS' INTEREST IN BIOLOGY IN AWKA EDUCATION ZONE

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Abstract

The study investigated the effect of blended learning approach on senior secondary students' interest in Biology. Non-randomized quasi-experimental research design was adopted for the study. The population of the study was 4,391 senior secondary school two (SS2) students offering Biology in Awka Education Zone in the year 2022. A sample of 87 students obtained using a multi-stage sampling procedure were involved in the study. Two research questions and two hypotheses guided the study. Biology Interest Scale (BIS) was used for data collection. The instrument was subjected to face validity by 3 experts. A reliability coefficient of 0.84 was obtained using Cronbach Alpha formula. The data obtained were analyzed using Mean and standard deviation, while ANCOVA was used to test the null hypotheses at 0.05 alpha level. The findings of the study revealed that students taught with blended learning significantly improved in their interest in learning biology more than those in the control group. It was also discovered that there was no significantly difference in the achievement of male and female student. Thus, making BLA gender friendly. The study recommended amongst other that Biology teachers should be encouraged through seminars and workshops, and supported financially to adopt blended learning approach in biology classrooms in other to ensure effectiveness in teaching.

Keywords: Effect, Blended Learning, Approach, Secondary School, Students, Biology Interest

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Introduction

One significant objective of contemporary education, now more than ever, is to equip individuals and teachers with current skills that address intricate societal challenges. At the core of the endeavour to cultivate critical thinking abilities and a problem-solving orientation in individuals lies the pivotal role of the teacher as an educator. The teacher as a motivator, emerges as a crucial and irreplaceable catalyst in advancing the all-encompassing goal of education. The current educational landscape has been impacted by the rapid evolution of computer and internet technologies (Kheng, 2021). Modern classrooms now incorporate technology-compliant instructions to meet global standards in education. Some others, on the other hand, integrate or blend technology with conventional instruction such as the lecture method. Incorporation of emerging technologies, whether pure or blended into the educational process is no longer a matter of choice but rather a necessity (Onyema, 2019). Thus, teachers must employ modern pedagogical techniques and resources to enhance student interest and engagement within the science classroom such as biology.

According to the Federal Republic of Nigeria (FRN, 2020), the objective of biology education in senior secondary school is to lay the groundwork for individual growth, nurturing career skills, and unveiling and invigorating potentials and talents. This conforms with Muokwe and Okeke (2021), that biology serves as a platform for equipping students with the capacity to apply scientific concepts and principles in addressing real-world challenges. This goal can be attained as students learn biology under effective classroom instruction. To foster effective classroom learning, students must be actively involved so that knowledge acquisition is driven by curiosity rather than coercion (Oguezue and Osuafor, 2022). This could mean that students' interest in the classroom is a direct derivative of effective teaching and learning especially in biology. A lack of interest in a subject like biology could affect students' achievement.

A close evaluation of students' performance statistics in the Senior School Certificate Examination (SSCE) has shown that students' performance in biology is fluctuating. The analysis of students' achievement in the Senior School Certificate Examination (SSCE) in

biology from performance in biology from 2018-2022 shows that the average percentage of passes at the credit level was 47.9% below the pass. Similarly, Muokwe and Okeke (2021) pointed out that between 2011 and 2015, the average pass rate at the Credit level was 47.9%, with 52.1% scoring below Pass. Students' academic performance could be influenced by their interests. Interest makes a difference in students' academic performance. It means that the more the students develop an interest in a subject, the more it affects their performance. Drawing from the analysis of student academic achievement mentioned above, it is apparent that additional efforts need to be made to enhance the effectiveness of biology education, in the long run aiming for high and consistent student interest in the subject. To improve students' interest, a retouch is needed in the mode of instruction in the classroom. Teachers have persisted with the conventional mode of instruction, which according to Muokwe and Okeke (2021) is the bane of students' academic achievement.

Several researchers (Muokwe and Okeke, 2021; Oguezue and Osuafor, 2022) have fingered conventional methods as the bane of students' academic achievement, painting the conventional especially the lecture method entirely in a bad light. This is because it is a teacher-centred approach. However, their essence is irreplaceable. One of the commonest benefits of the lecture method is that it is best suited for teaching large students at once, making it also ideal to cover large content areas (Eryilmaz, 2015). The argument is that the lecture method of teaching has been in use for several years but has not yielded the desired result. In this regard, little or no consideration has been given to how two or more approaches can be combined (blended) to make an effective lesson plan. This has left a huge gap in the teaching and learning of biology. Thus, the focus of the present study on innovative teaching strategies like the blended learning approach.

In blended learning (BLA), technology is combined with conventional learning methods like the lecture hall to provide an innovative instructional experience. Lalima and Dangwal (2017) describe blended learning as a way to frame the teaching-learning process as face-to-face teaching supported by technology. Blended classrooms can be achieved by incorporating a variety of techniques, including direct and indirect instruction, collaborative

teaching, computer-assisted learning tailored to individual needs, online assessment, face-to-face instruction, webinars, video and audio teaching online, virtual laboratories, virtual classrooms, and so forth. Ezeanyika and Okigbo (2021) suggest that BLA requires the students to be physically present with their teacher, as well as some control over time, place, path, and pace. The blended learning approach, also known as hybrid teaching is a method of teaching that integrates technology and digital media with traditional instructor-led classroom activities, giving students more flexibility to customize their learning experiences (Hirumi, 2017; Nnoli and Onwudinjo, 2023. This study therefore seeks to investigate the influence of blended learning approach on students' interest in learning biology. It is expected that the approach would improve students' interest in learning biology, and in turn, affect their academic performance irrespective of gender.

Gender is a crucial variable in teaching and learning. It constitutes a socio-culturally constructed notion that assigns specific attributes and functions to the categories of male and female within a given society (Ibenegbu, Nzewi and Aniaku, 2020). Gender and the associated stereotyping within the Nigerian context can impact various facets of human activity. Okeke (2017) noted that gender circumstances have intricately intertwined with cultural aspects to engender stereotypes concerning sex roles that permeate social, economic, political, and educational domains, particularly within the realms of science and technology. This phenomenon is commonly referred to as gender bias. In the Nigerian setting, gender bias remains prevalent, persisting notably within science classrooms overall, and specifically within the discipline of biology (Muokwe and Okeke, 2021).

Furthermore, numerous researchers have presented conflicting findings regarding students' interest in biology and related subjects concerning gender. For example, Ezeanyika and Okigbo (2021) identified a substantial gender disparity in students' inclination towards Computer studies, favoring males. In contrast, Agbasi and Okeke (2020) highlighted a significant variance in both achievement and interest levels amongst students in chemistry, favoring females. By allowing students to engage in dual modes of learning through the integration of traditional classroom methods with Information and Communication

Technology (ICT), Blended Learning Approach (BLA) has the potential to enhance students' interest in biology and yield positive learning outcomes. Consequently, the present study aimed to assess the impact of BLA on students' interest in biology.

Statement of the Problem

Students' academic achievement in biology has continued to dwindle, which has been attributed to students' poor interest in science generally and biology in particular. The subject and content of biology are naturally large in scope, and as a fundamental subject to individual and national development, there is a need to motivate and sustain the students' interest in the subject. Research has established that when students improve on their interests, they will also improve on their academic performance. Specifically, the students need to be actively involved in the learning process by adopting technology-integrated means like blended learning approach, to ensure they sustain their interest which affects their academic achievement (Kheng, 2021). Despite the efforts and contributions made to palliate the situation, the drop in interest has persisted. Based on the reviewed literature, literature is scarce in the context of the area of this study and is subject to the use of a blended learning approach. Research has suggested that the use of blended can motivate and sustain students' interest in biology.

The blended learning approach, also known as the hybrid strategy integrates technology and digital media with traditional instructor-led classroom activities, giving students more opportunities to be actively involved in their learning experiences. Thus, the a need to investigate the effect of the blended learning approach (BLA) on the interest of secondary school students in biology in Awka Education Zone.

Purpose of the Study

The purpose of the study was to determine the effect of the blended learning approach (BLA) on the interest of senior secondary school students in biology in Awka Education Zone. Specifically, the study sought to determine:

1. mean interest rating scores of students taught biology using BLA and that of those taught using the conventional lecture method (CLM).
2. mean interest rating scores of male and female students taught biology using BLA and that of those taught using the conventional lecture method (CLM).

Research Questions

This study sought answers to the following research questions:

1. What are the mean interest rating scores of students taught biology using BLA and that of those taught using CLM?
2. What are the mean interest scores of male and female students taught biology using BLA and CLM?

Hypotheses

The following null hypotheses (H_o) were tested at a 0.05 level of significance:

1. There will be no significant difference in the mean interest rating scores of students taught biology using BLA and those taught using the conventional lecture method (CLM).
2. There will be no significant difference between the mean interest rating scores of male and female students taught biology using BLA and CLM.

Methods

This study adopted a pre-test-post-test non-equivalent control group quasi-experimental design. According to Nworgu (2016), the design is where a random assignment of research subjects into experimental and control groups is not possible. Therefore, in this study, the already existing classroom arrangements in the schools that were sampled as experimental and control groups were not disrupted by the researcher but rather used the way they were. The area of the study was the Awka Education Zone. The zone is one of the six education zones in Anambra State. The population and sample of the study are comprised of 4,391 and 87 (36 males & 51 females) public secondary school students respectively. The participants were selected from two out of 47 public secondary schools in

the area using a multistage sampling procedure. The instrument for data collection was the Biology Interest Scale (BIS). The instrument was structured into two parts. Part A was to elicit information on students' demographic data while part B contained the main question. The BIS is a 27-item questionnaire scaled 4 for strongly agree; 3 for agree; 2 for disagree and 1 for strongly disagree.

The face validation of the instrument was done by three experts and was subjected to reliability. The reliability coefficient of the instrument was found to be 0.84 which confirmed the reliability of the instrument. Mean and standard deviation were used to answer the research questions while analysis of Covariance (ANCOVA) was used in testing the hypotheses at an alpha level of0.05.

Results

Research Question 1: What are the mean interest scores of students taught Biology using BLA and those taught using CLM?

Table 1: Mean Interest Scores of Students taught Biology using BLA and CLM

Group	N	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Gained Mean
BLA	42	43.88	10.89	68.29	6.75	24.41
CLM	45	43.67	6.27	60.49	9.21	16.82

Table 1 reveals that the students taught biology using blended learning approach had pretest mean interest score of 43.88 with SD of 10.89, posttest mean interest score of 68.29 with SD of 6.75 and gain in mean of 24.41, while those in the control group taught with conventional method had pretest mean interest score of 43.67 with SD 6.28, posttest mean interest score of 60.49 with SD 9.21and gain in mean of 16.82. Although students in the BLA gained more based on their mean interest scores of 7.59, the scores were more spread in the control group with an SD of 9.21.

Research Question 2: What are the mean interest scores of male and female students taught Biology using BLA and CLM?

Table 2: Mean Interest Scores of Male and Female Students taught Biology using BLA

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and CLM

Method	Gender	N	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Gained Mean
BLA	Male	16	44.63	5.54	72.19	1.97	27.56
	Female	26	43.42	13.25	65.88	7.52	22.46
CLM	Male	23	41.83	6.93	58.91	11.61	17.08
	Female	22	45.59	4.93	62.14	5.58	16.55

Table 2 shows that with a higher gain in mean 27.56, the BLA increased the interest of male students in biology. Blended learning increased the spread of scores (7.52) among female students more than among male students (1.97). the difference in the mean interest is 6.31 in favour of the males.

Hypothesis

Hypothesis 1: There is no significant difference between the mean interest scores of students taught Biology using Blended learning approach (BLA) and those taught using Conventional Lecture method (CLM).

Table 3: ANCOVA Test of Significance of Difference in the Mean Interest Score of Students taught Biology using BLA and CLM

Source	SS	df	Mean Square	F	Sig.	Decision
Corrected Model	1841.564[a]	4	460.391	7.433	.000	
Intercept	12733.113	1	12733.113	205.580	.000	
Pretest	10.635	1	10.635	.172	.680	
Method	1520.869	1	1520.869	24.555	.000	Sig.
Gender	53.097	1	53.097	.857	.357	Not Sig.
Method* Gender	448.739	1	448.739	7.245	.009	Sig.
Error	5078.873	82	61.937			
Total	366094.000	87				
Corrected Total	6920.437	86				

Table3shows that there is a significant main effect of the treatment on students' interest in Biology, $F(1, 82) = 24.555$, $P < 0.05$. Therefore, the null hypothesis is rejected meaning that there is a significant difference between the mean interest scores of students taught

Biology using Blended learning approach (BLA) and those taught using Conventional Lecture method(CLM).

Hypothesis 2: There is no significant difference between the mean interest scores of male and female students taught Biology using BLA and CLM. This hypothesis is tested in Table 6.

Table 3 also shows that there is no significant main influence of gender on students' interest in Biology, F (1, 82) = 0.857, P > 0.05. Therefore, the null hypothesis was not rejected meaning that there is no significant difference between the mean interest scores of male and female students taught Biology using BLA and CLM.

Discussion

The study revealed that students taught biology using blended learning approach improved more on their level of interest in learning biology compared to those in the control group. The disparity in interest observed between the blended learning group and the conventional group could be attributed to the repetitive nature of the learning process inherent in the blended learning approach. The combination of classroom instruction and online learning utilizing diverse media formats, students were repeatedly exposed to the course material. This repetitive exposure is considered a vital factor in maintaining interest, thereby leading to a significantly higher level of interest among the students in the blended learning group compared to their counterparts in the conventional group.

The findings of this study align with those of Ibenegbu et al. (2021) and Adeleye (2020), both of whom also discovered that students instructed using a blended learning approach demonstrated a greater level of interest in learning compared to those taught using traditional lecture methods.

The findings of this study also indicate that there was no significant difference in the interest scores of male and female students who were instructed using a blended learning approach. It was not observed that the combination of teaching methods and gender had any significant impact on the student's interest levels. The comparable effect of blended learning on both male and female students could potentially be attributed to the students'

overall acceptance and preference for online materials and various media as a means of learning, which might have influenced their overall comprehension.

The findings of the study align with the findings of Omenka and Kurume (2016), who also concluded that there were no notable differences in the performance of male and female students in mathematics at the junior secondary school level.

Conclusion

Based on the findings, it is concluded that blended learning approach is more effective for enhancing students' interest in Awka Education Zone compared with conventional method of teaching. The study also revealed that there is no significant different in the male and female students taught biology with BLA. This implies that BLA is not gender biased and friendly as both sexes achieved equally.

Recommendations

The following recommendations are made based on the findings of the study:

1. The Post Primary Schools Service Commission should expose teachers to annual training and retraining programmes on the use of computer-assisted instruction like blended learning to enable them to upgrade their skills in using the techniques in presenting lessons to bring about improvement in academic achievement and interest of students.
2. Orientation exercises should be organized for students by school authorities on how to surf the internet on concepts taught in the traditional classroom before a blended learning approach is adopted by classroom biology teachers to ensure effectiveness.

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