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

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Abstract
This study investigated the effect of blended learning approach on secondary school students' interest in Awka Education Zone. Two research questions guided the study and three hypotheses were tested. The research adopted quasi-experimental non randomized pre-test post-test control group design. The population consisted of 1842 (810 males and 1032 females) Senior Secondary II Biology students from four intact classes of two public co- educational secondary schools inAwka Education Zone of Anambra State. The sample for the study consisted 103 SS II Biology students (42 males and 61 females) obtained through multi stage sampling procedure Students' interest in Biology Questionnaire (SIBQ) was the instrument for data collection. This instrument was validated and tested for reliability with reliability coefficient being 0.83, using Cronbach Alpha method. The research questions were answered using mean and standard deviation while the hypotheses were tested at 0.05 level of significance using Analysis of Covariance (ANCOVA). The findings of the study showed significance effect of Blended Learning Approach on Students' interest in Biology. This implies that blended learning approach is capable of enhancing interest in Biology. However, result showed gender influence on Students interest in Biology when blended learning approach was used as a method of instruction but there was no significant interaction between instructional approach and gender on interest. It was recommended among others that blended learning approach should be incorporated in teaching of sciences especially Biology in senior secondary schools.
Keywords: Blended learning, interest, biology, gender

Introduction

Knowledge of science and technology is pivotal to sustainable development in any national economy. Developed nations such as United State of America boast of so many scientific ions, hence, it is among the nations rated as world super powers. They forged ahead because they recognized the importance of science. Science and technology is a vehicle which a nation can use to accelerate economic growth, increased productivity, competitiveness, and job creation, development for self-reliance and overall development. Every branch of science such as biology has important contribution to make in a nation's technological advancement.

Biology seems to be the most vital and popular science among secondary school students. Biology is quite vital for natural development because it is the root subject for many careers in science and technology such as medicine, engineering, forestry, agriculture, biotechnology, nursing among others. The deduction here is that any student with the plan of pursuing the afore-mentioned courses of study must prioritize Biology. There are so many contents in senior secondary II (SS 2) Biology. However, the current study would be concentrating on reproduction, which is one of the contents in the scheme of work. Reproduction is the ability of living organisms to give birth to their young ones of the same kind. Similarly, Harrsion (2023) defined reproduction as the capacity of living organisms to bear live offspring. Harrsion added that provided all organs are present, normally constructed, the essential features of human reproduction are liberation of an ovum or egg at a specific time in the reproductive cycle, internal fertilization of the ovum by the spermatozoa or sperm cell. Given the relevance of Biology and its contents, virtually all students enroll for it in the Senior Secondary School Certificate Examination (SSCE).It is expected that since Biology is a popular subject at senior secondary school level, students would have a high mastery of its concepts at graduation. The poor performance of

students in biology could be traceable to instructional approach that is utilized by teachers in driving home their lessons. The poor performance of students in Biology may be explained in the context of the fact that most secondary school teachers are still predominantly adopting teacher-centered related teaching approaches like the lecture approach (Byusa,Kampire, and Mwesigye, 2020; Nsengimana, Habimana, andMutarutinya, 2017), the 8inadequacy of instructional materials as well as dearth of science laboratory equipment in many schools (Ndihokubwayo, 2017; Rubagiza,Umutoni, and Kaleeba, 2016). Thus, once students are taught science concepts with the use of inappropriate teaching and learning strategy, the logical consequence will be poor understanding of the lesson concepts. This culminates in students' memorizationof facts for the purpose of school-based examination while not retaining what they have learned, which may be an explanation for the poor Biology achievement in National Examinations (Orbanić, DimecandCencič, 2016). In other words, the traditional 'chalk and talk' or lecture method has a way of promoting passive learning among the students. The lecture method seems not to be an innovative way of learning especially among students to whom technology has become the extension of their fingers. Lecture method of teaching biology is more teacher-centered than student-centered and is characterized by face-to-face teaching by a teacher with no significant teacher-students interaction nor technology for online learning. Interestingly, the use of technology for teacher-students interaction can be facilitated through blended learning approach (Singh, 2021).

Blended learning approach is an online learning approach that facilitates the delivery of instruction through the use of computers, projectors, laptops. Diovu, Chinyere and Eze (2021) defined blended learning as the use of the internet to afford each student a personalized learning experience with increased student control over time, place, and place of their learning. Similarly, Enwemasor and Charles-Odili (2022) defined blended learning as an educational method that promotes the use of multiple means for the transmission of knowledge and experience to learners with a view to achieving the best outputs of learning. Blended Learning promotes the use of computers as a veritable tool alongside traditional learning and digital learning. The implication here is that teaching is done using laptops, palmtops, mobile phones, televisions, video conferencing and other digital tools while integrating them with face-to-face learning (Aswad, Hamid and Syafryadin (2020). Thus, the term 'blended learning approach' is not entirely new in the educational landscape as various scholars (Adams, Tan and Sumintono, 2021; Dziuban et al., 2018; Evans et al., 2020) have considered blended learning approach as the 'new norm' in educational technology and course delivery. Horn and Staker (2014), identified four major models of blended learning viz: rotation model, flex model, self- Blend model and enriched virtual model.

In modern times, there appears to be a transition from traditional lecture approach to blended learning across all levels of education. This current awakening may not be unrelated to the COVID-19 pandemic that took the world by storm in 2020. Accordingly, blended learning approach provides an opportunity for the integration of the innovative and technological milestones of online learning as complemented by the elements of traditional learning approach such as classroom engagement and involvement (Islam,Sarker and Islam 2022). Lending credence to this, Zulhamdi et al. (2022) averred that the use of blended learning approach alongside the traditional learning method have the capability to improve students' information retention. Ibenegbu et al. (2020) noted that teachers grant the students the opportunity of using their gadgets in a blended learning approach. Considerably, blended learning approach tailors learning as well as development to individual needs of students (Shohel et al., 2022). There are essential elements to the use of blended learning approach. Darrow (2013) noted that leadership, professional development, teaching, operations and content technology are the most 2critical components for the use of blended learning who needs to be encouraged, empowered and supported to facilitate an effective and lasting learning.

Interest refers to someone's feeling for something for which they expend time and energy. Danjuma (2015) defined interest as what someone's development of passion for something and their consequent

commitment of time in doing it. The indication here is that a student develops interest in a stimulus which they consider stimulating to them. Michelsen (2013) sees interest as a relational construct between a person and an object. Michelsen added that students' interests vary in how deeply or permanently they are situated within students. Okoro(2012) defines interest as an individual behavioural tendency to be attracted towards a certain class or classes of activities.However, use of activity – based instructional strategy could arouse and sustain students' interest in learning. Interest can be situational when it is triggered temporarily by features of the immediate situation (Amadi, 2016). Furthermore, Amadi stated that unusual sights, sounds, or words are capable of stimulating situational interest. A students' interest can be triggered when a teacher makes a surprising remark; displays a visually stimulating image on the overhead projector, or makes a brief bit of sonorous sound. The interest of a student in a subject could impact on their academic achievement in that subject and interest among students could differ along gender lines.

Gender is a potent factor in interest which has been a concern of various researchers over the years. However, there have been consistencies in their findings. For instance, Ngozi, Anyanwu, Bitrus, Dalhatu and Folashade (2018), and Ogbianigene (2014), found that males and females recorded equally overall achievement in biology. However,Bichi, Fatima and Rahinatu (2019), Bozdoğan, Günaydın and Okur (2014), Okorie and Ezeh (2016) found that females outperformed males in biology, Nnenna and Adukwu (2018) and Kashu (2014) found that male outperformed female. Oluyemo, Musbahu, Jukwil, Anikweze and Shaluko (2020) revealed that male students had higher interest in mathematics than their female counterparts. Thus, Danjuma (2015) found that gender had no significant influence on students' interest. However, Kans and Claesson (2022); Palmer, Burke and Aubusson (2017); Slavit, Holmlund Nelson and Lesseig (2016) found that females were more interested in biology than their male counterparts. The foregoing trend could be traceable to the fact that while female students associated practical subjects with a sense of creativity and relaxation (from more theoretical and demanding subjects), male students associated practical subjects principally with usability. Thus, it will be research-worthy to find out the effect of gender on students' interest. More so, the effect of blended learning approach on secondary school students 'interest in Biology appears to be under researched to the researchers' knowledge. The reasons adduced for the poor performance of students by the biology chief examiners include students' non adherence to instructions, poor knowledge if most biology concepts, lack of skills on the usage of technical terms whererequire and poor knowledge of laboratory apparatus, among others. It is in view of the foregoing that the researcher deemed it expedient to investigate biology in Awka Education Zone.

Purpose of the Study

The purpose of this study was to investigate the effect of blended instructional approach on secondary school students'interest in Biology. Specifically, the study sought to find out the:

1. difference in the mean interest scores of SS II students taught reproduction in Biology using blended instructional approach and those taught same concept using lecture method.
2. difference in the mean interest scores of male and female SS II students taught reproduction in Biology using blended instructional approach and those taught same concept using lecture method
3. Interaction effect of instructional approaches and gender on students' interest scores in Biology.

Research Questions

The following research questions were posed to guide this study:

1. What is the difference in the mean interest scores of SS II students taught reproduction in Biology using blended instructional approach and those taught same concept using lecture method.

2. What is the difference in the mean interest scores of male and female SS II students taught reproduction in Biology using blended instructional approach?

Hypotheses

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

1. There is no significant difference in the mean interest scores of SS II students taught reproduction in Biology using blended instructional approach and those taught same concept using lecture method.
2. There is no significant difference in the meaninterest scores of male and female SS II students taught reproduction in Biology using blended instructional approach.
3. There is no interaction effect of instructional approaches and gender on students' interest scores in Biology

Methods

Quasi-experimental design was used for the study. In specific terms, pre-test post-test non-randomized control group design was used. Nworgu (2015) pointed out that this research design is adopted to establish cause and effect relationships between two or more variables. The justification for the choice of the design was based on the fact that the researcher sought to establish the effect of blended learning approach on secondary school students' achievement and interest in Biology. Furthermore, there was no disruption of class activities in the course of the experimental treatment as intact classes were used. The sample size for the study comprised 103 SS2 biology students (52 boys and 51 girls) in AwkaEducation Zone of Anambra State. Multi-stage sampling procedurewas used in composing the sample for the study. First, simple random sampling technique was used to obtain two local government areas out of the five local government areas that make up the zone. This was achieved via balloting where every local government area was given an equal chance of being selected for the study. Thus, the names of the local governments were written on pieces of papers and put in a container and shuffled. Thereafter, the researcher drew the local government areas without replacement (balloting without replacement). Second, purposive sampling technique was used to selecttwo co-educational schools, one school each from the sampled local government areas.The justification for the use of purposive sampling technique was to obtain schools with at least two streams of SS2 classes and qualified teachers with teaching qualification in biology. Two intact classes of SS2 biology students were randomly obtained from each of the sampled schools. The two intact classes from each school were further assigned to experimental group (Blended instructional approach) and control group (lecture method) using toss of a coin to obtain 51 (22 boys and 29 girls) students in the experimental group and 52(20 boys and 32 girls) students in the control group. This gave rise to a total of four intact classes of SS2 biology students from the two co-educational schools.Six weeks were used for the experiment. Each week had double period of 40 minutes per periodfor both experimental groups and control groups. The instrument for data collection was Students' Interest in Biology Questionnaire (SIBQ).The preliminary part of the instruments contains provisions for obtaining the bio-data information on gender of the students.SIBQwas adapted from Students' Interest in Basic Science Scale which was developed by Danjuma (2015). SIBQ contains 25 items and constructed in a way that the respondents will respond in the mode of four-point rating scale of: Strongly Agree (SA=4), Agree (A=3), Disagree (D=2), and Strongly Disagree (SD=1). The modification in SIBQ is the replacement of 'Basic Science' with 'Biology'. The instrument was then re-validated and tested for reliability using Cronbach alpha statistics. The instrument was first administered as pre-test, scored and kept without any feedback to the students. After the treatment, the same instrument with the same contents was reshuffled and given as post-test. Both tests were scored by only one of the researchers to avoid bias. The results were used for analysis. The research questions were answered using mean and standard deviation while the hypotheses were tested at 0.05 level of significance using analysis of Covariance (ANCOVA).

Results

Research Question one: What is the difference in the mean interest scores of SS II students taught reproduction in Biology using blended instructional approach and those taught same concept using lecture method?

Table 1: Mean Interest and Standard Deviation Scores of SS II Students Taught Reproduction with Blended Instructional Approach (BIA) and those taught with Lecture Method (LM).

Teaching Approach	Pre-test			Post-test		Mean Gain Score
	N	Mean	SD	Mean	SD	
B2IA	51	32.17	3.42	77.90	3.64	45.20
LM	52	35.04	3.71	60.70	4.10	25.66
Mean Difference		2.87		17.20		19.54

Table 1 shows the pre and post-tests mean interest scores of students taught reproduction with blended instructional approach (BIA) to be 32.17 and 77.90 with mean gain score of 45.20.

Their counterpart taught using lecture method (LM) has 35.04; 60.70 and 25.66 as mean pre-test, post-test and mean gain scores respectively. Both the mean post-test score and mean gain score of students taught using blended instructional approach are higher than that of students taught using lecture method with a mean gain difference of 19.54.From the above table, it can be deduced that the Blended instructional approach method is more effective in ignited the interests of students in biology as opposed to the lecture method.

Research Question Two: What is the difference in the mean interest scores of male and female SS II students taught reproduction in Biology using blended instructional approach?

Table 2: Mean Interest and Standard Deviation Scores of Male and Female SS II Students Taught Reproduction with Blended Instructional Approach (BIA).

Gender	Pre-test			Post-test		Mean Gain Score
	N	Mean	SD	Mean	SD	
Male	22	31.05	3.11	74.00	3.52	42.95
Female	29	33.28	3.72	81.80	3.76	48.52
Mean Difference		2.23		7.80		5.57

Table 2 shows the pre-test and post-test mean interest scores of 31.05 and 74.00 for male, 33.28 and 81.80 for female students taught reproduction using blended instructional approach. The male students have a mean gain score of 42.95 while their female counterparts have a mean gain score of 48.52 with a mean difference of 5.57 in favour of the female students. This shows that interest in biology is ignited more, using the blended instructional approach, especially in the female students.

Hypotheses Testing

Hypothesis one: There is no significant difference in the mean interest scores of SS II students taught reproduction in Biology using blended instructional approach and those taught same concept using lecture method.

Table 3: Summary of ANCOVA Test of Significant Difference between the Mean Interest Scores of SS II Students taught Reproduction with BIA and LM.

Source	*SS*	*Df*	*MS*	*F*	*P*
Corrected Model	728.14[a]	2	364.07	61.12	.000
Intercept	4510.28	1	4510.28	705.26	.000
Pre-Test[a]	.412	1	.412	.04	.619
Group	706.94	1	706.94	153.26	.000

Error	1204.00	100	12.04
Total	419857.00	103	

Table 3 shows that there is a statistically significant difference in the mean interest scores of students taught reproduction with blended instructional approach and those taught with lecture method, F(1, 100) = 153.26, *P*<0.05. The null hypothesis of no significant difference between the two groups was therefore rejected. This means that the mean interest score of students taught reproduction using blended instructional approach was significantly higher than that of those taught with lecture method.

Hypothesis Two: There is no significant difference in the mean interest scores of male and female SS II students taught reproduction in Biology using blended instructional approach.

Table 4: Summary of ANCOVA of Male and Female SS II Students' Interest Taught Reproduction in Biology Using Blended Instructional Approach.

So2urce	*SS*	*Df*	*MS*	*F*	*P*
Corrected Model	4.22[a]	2	2.11	.60	.225
Intercept	1243.12	1	1243.12	132.45	.000
Pre-Test[a]	2.11	1	2.11	0.84	.159
Gender	1.42	1	1.42	.38	.214
Error	180.94	48	3.77		
Total	144426.00	51			

Table 4 shows that there is no statistically significant difference in mean interest scores of male and female students taught reproduction using blended instructional approach, F(1, 48) = .38, *P*>0.05. The null hypothesis of no significant difference between the two groups was therefore not rejected. This means that the mean interest score of female students taught reproduction using blended instructional approach was not significantly greater than that of their male counterparts.

Hypothesis Three: There is no interaction effect of instructional approaches and gender on students' interest scores in Biology.

Table 5:Summary of ANCOVA Test of Interaction Effect of Instructional Approaches and Gender on Students'Interest in Biology.

Source	*SS*	*Df*	*MS*	*F*	*p-value*
Correcte2d Model	7.12[a]	4	1.78	.17	.426
Intercept	322.54	1	322.54	30.68	.000
Pre-Test[a]	.15	1	.15	.01	.434
Group	4.51	1	4.51	.43	.178
Gender	1.29	1	1.29	.12	.311
Group * Gender	.20	1	.20	.02	.423
Error	512.54	98	5.23		
Total	128022.0	103			

Table 5 shows that there is no interaction effect of instructional approaches and gender on students' interest scores in Biology, *F(1,98)*= .02, *P>0.05*. The null hypothesis was therefore notrejected. This

interaction was depicted in Figure1

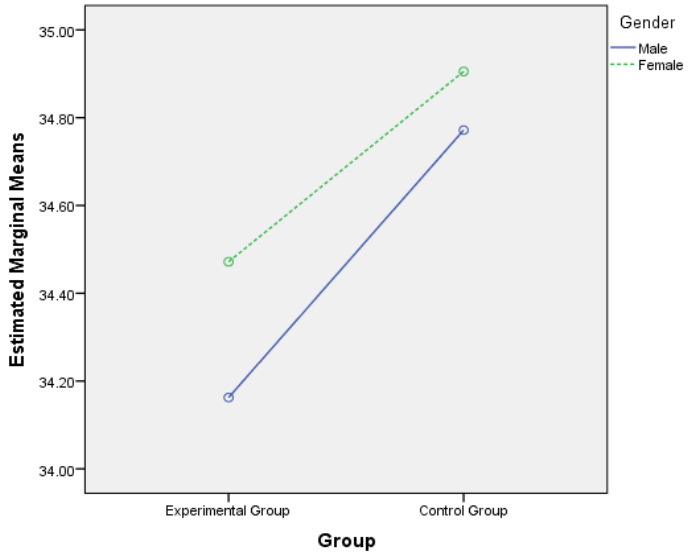

Fig.1:Meaninteraction effect of instructional approaches and gender on students' interest towards Biology.

Discussion

The result of the findings of the study confirmed that mean interest score of students taught using blended instructional approach is higher than that of students taught using lecture method. More so, a statistically significant difference existed in the mean interest scores of students taught reproduction with blended instructional approach and those taught with lecture method in favour of those taught with blended instructional approach. This may not be unrelated to the fact that modern day students show higher interest in novel instructional approaches than the archaic instructional approaches. Additionally, modern day students are bound to be keenly interested in technology since it has beco2me an extension of their fingers. The findings of the current study are in alignment with those of Anari (2021) that the mean achievement and interest of students taught with blended learning strategy was significantly better than those instructed with simulation and expository strategies.

The findings of the study also show that the mean interest score of female students taught using blended instructional approach is higher than that of their male counterparts. This is an indication that female students are more favourably disposed to learning Biology with blended instructional approach than their male counterparts. The findings of the study are in contradiction with those of Oluyemo, Musbahu, Kukwil, Anikweze and Shaluko (2020) male students have higher interest in Mathematics than their female counterparts and excel in Mathematics more than their female counterparts. This contradiction may not be separated from the disparity in the secondary school subject of interest used in the two studies. More so, the trend could be linked to the fact that female students are fewer tests anxious more in Biology than their male counterparts. More so, there was no statistically significant difference in mean interest scores of male and female students taught reproduction using blended instructional approach.This is corroborated by the findings of Anari (2021) that no significance existed in the mean interest scores in respect to gender.

Conclusion

In view of the findings of the study, it was concluded that blended instructional approach positively affects the interest of students in Biology. Again, it was concluded that the effect is stronger on female

students' interest than their male counterparts. It was further concluded that the effect of blended instructional approach on the interest of students across gender lines is not significant.

Recommendations

In line with the findings of the study, some recommendations were made. These include:

1. Biology teachers should adopt the use of blended instructional approach to enhance the interest of students in Biology.
2. Government, in line with global trend, should promote the use of blended instructional approach for the teaching and learning of Biology so as to improve students' interest in the subject.
3. School administrators, in view of the current technological reality, should organize training courses and workshops for the biology teachers on how to implement blended instructional approach. This is with a view to entrenching the students' interestin Biology for improved academic achievement in the subject.
4. Guidance counsellors should organize counseling sessions for male students so as to bridge the interest gap between them and their female counterparts via the use of blended instructional approach in Biology.
5. Curriculum planners should make modifications in the curriculum as a matter of necessity to reflect the use of blended instructional approach for improvement in the interest of students in Biology.

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