

## **STIMULATING STUDENTS' INTEREST IN BIOLOGY USING BLENDED TEACHING APPROACH**

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### **Abstract**

*Interest is an educational concept that determines some aspects of students' affective domain which is very important in the teaching and learning process. It has been hypothesised that the use of child-centred approach will stimulate students' interest in any learning situation. Blended teaching approach is one of such child-centred approaches. This study was therefore undertaken to explore the use of blended Teaching Approach in stimulating the interest of students to learn Biology. Two research questions and two null hypotheses guided the study. The design of the study is Quasi-Experimental design, specifically, pretest-posttest non-equivalent control group design. The sample for this study consists of 82 Biology students in four intact classes in secondary schools in Nsukka Local Government Area of Enugu State, Nigeria. Biology Interest Inventory (BII) was used as instrument for data collection. Two experts from Biology unit and one from measurement and Evaluation unit, Department of Science Education University of Nigeria Nsukka validated the instrument. The Interest inventory has an internal consistency reliability of 0.96 established using Cronbach alpha. Mean and standard deviations were used to analyze the data to provide answers for the research questions. The hypotheses were tested at 0.05 level of significance using Analysis of Covariance (ANCOVA). Result of the study showed that the students learning biology using the Blended Teaching Approach had a significant increase in their interest scores. The increase in interest score is not gender dependent as both boys and girls had enhanced interest score. The educational implications of the findings were highlighted and the recommendations proffered which includes that Biology teachers should be trained on how best to involve students into group and individual laboratory activity during biology practical instructions to facilitate students' involvement and interest in biology. This could be achieved through seminars and workshops for teachers in secondary schools. .*

## **Introduction**

Biology is the study of living organisms, their structures, functions, evolution, distribution and interrelationships. Biology occupies a unique position in the secondary school education curriculum because of its importance as a science of life. In Nigeria, the secondary school Biology curriculum is designed to enable students' investigation into natural phenomena, deepen students' understanding and interest in biological sciences and enhance students' ability to apply scientific knowledge to everyday life (Federal Ministry of Education, 2009). Biology is an important science subject and stands as the bedrock to the learning of other science courses like Medicine, Pharmacy, Nursing, Biochemistry, Genetics and Agriculture that are of great economic importance to the nation. Considering the huge importance of Biology as a science subject, there is need stimulate students' interest in it through the use of innovative instructional approaches that are student-centered so that learners will be actively involved in the learning process.

Student-centred approach includes all teaching methods that underscore the teacher as a decision maker and problem solver in the classroom but rather see teachers as facilitators, mentors, coach or consultants in the teaching and learning process. In the educational sector, the term "student-centred" or child-centred are interchangeably used to refer to teaching methods that allow students to share some degree of responsibility and decision making in the classroom. According to O' Bannon (2002) student-centred approach is grounded in constructivism which sees learners as the architects of their own learning. Opara (2011) grouped any teaching and learning process by which the teacher initiates a question or problem and provides assistance by structuring the procedure for solving such question as students-centred. Blended teaching method is one of these methods.

Blended Teaching Approach (BTA) is an instructional approach that involves intermixing of many instructional forms to achieve an educational goal. According to Singh (2011), blended teaching is the transfer of right skills to the right person at the right time by matching the right learning technologies with the right learning style for the purpose of achieving the learning objectives. The concept of blended teaching has been around since the 1960s. The learning is student-directed in terms of time, pace, path, and place. It provides a learning experience that is appealing and that delivers successful learning outcomes. Using computer as an educational method or necessary tool started since 1977 due to the development of the computers and digital multimedia (Vaughan, 2007). Blended teaching approach involves applying more than one method, strategy, technique or media in education. Education is

no longer just about putting pen to paper and memorizing facts. Today, educators are improving learning through technology, as evidenced by the rapid adoption of technology assisted teaching methods and blended teaching approach. Blended teaching 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,2011).

Blended teaching has certain advantages such as flexibility and comfort in the learning environment, increase in the level of learning, increase in permanence in learning, increase in interest in learning, good-quality interaction and low cost. The importance of blended teaching has increased in recent years due to its advantages. Young (2002) stated that the blended teaching approach has been the best and unique trend so far in higher education and that in the near future, the number of blended courses executed in higher education will increase. The ability of computers to present information visually is especially important for biology course. Well-developed pictures, three-dimensional models, animations and interactive environments allow easy understanding of the learning objectives (Holley and Oliver, 2014). Activities carried out during the usual course hour are not sufficiently effective because of time constraints. With the blended teaching approach, students are able to carry out multimedia applications which cannot be sufficiently taught during lessons using traditional method of teaching alone. In addition, ability to see the course content before coming to the class enables students' research the subjects and thus come to the class prepared for the lesson.

With the use of the blended teaching approach in biology, students' interest in biology is expected to increase. Using projects in classes equipped with technology tools supports students to be intellectually responsive while providing them with real life experiences and skills. Garrison and Kanuka (2004) identified different forms of blended teaching approach as rotation model, flex model, lacerate model, Enriched Virtual model and Face-to-face driver model. Even though there are challenge in terms of the feasibility and applicability of implementing hybrid teaching in secondary schools, a body of research supports the idea of combining face-to-face instruction with technology delivery mode. Such a combination provides better learning outcomes (Garrison & Kanuka, 2004). Garrison and Kanuka (2004) also stated that blended teaching can facilitate independent and collaborative learning experiences. Blended teaching builds both a community of inquiry and a platform for free and interactive dialogue. Technology has

been identified as playing a critical role in curriculum implementation as it has been found that its proper use can enhance teaching and learning. There has been very little efforts in the integration of ICT into the Nigerian secondary school classroom. Based on the above, there is need to energize action to bring technology into the classroom in the form of blended teaching and learning to enhance interest in learning. This study therefore seeks to find out how Blended Teaching Approach can be used to enhance students' interest in learning biology.

Interest is an educational concept that determines some aspects of students' affective domain which is very important in the teaching and learning process. Interest is a feeling, desire and act of developing affection towards something. In education, interest is characterized by increased attention and concentration in classroom and academic activities. It is a motivational variable and emotionally oriented trait which determines the vigour of the learner in tackling educational activities. Okoro (2011) stated that interest reflects a central feature in the knowledge value system of a learner, meaning that learners' interests are influenced by the value they have for an activity or knowledge. Interest guides and encourages students to think critically and to keep trying until success is achieved. Interest and achievement correlate in teaching and learning process and have intra influence on each other, high interest improves students' achievement while high achievement promotes interest, and in other hand low interest retards learning and results to poor achievement. Estelami(2012) noted that interest correlates with intelligence and some factors like teaching methods in determining students' academic achievement and when kicked by students results to poor academic achievement and most often students dropping out from school. Obiekwe (2008) and Torty and Offorma, (2013) indicated that students' interest can be influenced by innovative teaching methods. Researchers like Overbaugh & Nickel(2011);Dziuban, &Moskal, (2011), and Murray, Pérez, Geist, & Hedrick (2012) are of the opinion that in blended teaching approach, students' interest and self-efficacies are important variables that are likely to affect the application process. A study conducted by Dziuban and Moskal (2011) showed that the blending technology with normal classroom instructional approach significantly and positively influences the students attitudes toward web-based, computer- based and internet based instruction. Enebechi (2016) noted that the use of appropriate instructional approach in teaching and learning of Biology promote students' interest in the subject. Based on poor interest of students in Biology, this study seeks to find out which of the teaching methods lead to better interest among students. The

influence of the Blended learning approach on the interests of students will also be investigated along gender lines.

Gender is a socio-culturally constructed concept that ascribes certain characteristics and roles to sex such as male and female within the society. The concept of gender can be likened to class and race. In Nigeria, the issue of gender and gender stereotyping affect every aspect of human endeavour. Okeke (2007) observed that the circumstances of gender have strongly interacted with culture to produce sex role stereotypes which cuts across social, economic, political and educational development especially in the areas of science and technology. Okwoli(2014), explained sex role-stereotype as the socio-cultural classification of human activities by sex in line with what the society consider as appropriate for one sex or the other.

The arbitrary assigning of roles and expectations to different sex (male and female) within the society has given rise to such misconception of perceiving science as masculine and of male domain only. Oludipe (2012) observed that in Nigeria, certain vocations and professions have traditionally been regarded as men's (medicine, engineering and architecture etc.) and others as women's (nursing, catering, secretarial studies etc.). The society's socio-cultural construct of females as weaker sex together with females self-perception of themselves as weaker sex, inferior and subordinate to the males have imposed some socio-cultural limitations on female aspirations and achievement in sciences (Ojobo, 2008). Consequently fewer females opt for science subjects thereby creating some differences in the number of males and females in science discipline in favour of the males. Chang (2003) reported that although there is a decrease in the gap in gender difference in student performance in sciences, but female representation in sciences is still low in comparison with their male counterparts. Gender issues and its effects on students' interest in science subject (Biology) has been persisted over the years with contradicting results and stands out as a controversial issue in science education due to varying reports from different researcher. This study was geared towards investigating the effect Blended teaching which is an innovative and learner centred approach will have in stimulating students in Biology.

The effect of Blended Teaching Approach and discussion method on students' interest in

The following research questions and hypotheses were formulated to guide this study:

1. What are the mean interest scores of students taught biology using Blended Teaching Approach?
2. What is the influence of gender on students' interest in Biology?

The null hypotheses were tested at 0.05 level of significant.

- a. There is no significant difference in the mean interest scores of students taught biology using blended teaching approach and those taught using discussion method.
- b. Gender is not a significant factor in the mean interest scores of students in biology.

**Method**

The design of the study is Quasi-Experimental design, specifically, pretest-posttest non- equivalent control group design. The sample for this study consist 82 Biology students from four intact classes in Nsukka Local Government Area. The sample was drawn from the population of the study using purposive sampling technique. The choice of purposive sampling technique is because the researcher wants to use school that have similar characteristics such as well-equipped Biology Laboratory two stream of SS1 classes and well qualified Biology teacher. The researcher used Biology Interest Inventory (BII) as instrument for data collection. This instrument was developed by the researcher to ascertain the students’ level of interest in learning of biology. Two (2) experts from Biology unit and one (1) from measurement and Evaluation unit, Department of Science Education University of Nigeria Nsukka validated the instrument, after which it used to establish the reliability by administrating them to 30 Biology students. The scores obtained from the BII was analysed using Cronbach alpha formula and it yielded internal consistency reliability index of 0.96. Mean and standard deviations were used to analyze the data to provide answers for the research questions. The hypotheses were tested at 0.05 level of significance using Analysis of Covariance (ANCOVA).

**Results**

**Table 1: Mean ( $\bar{x}$ ) and Standard Deviation (SD) of students’ interest to Biology**

Method	N	Pre-test		Post-test		Gain score
		$\bar{x}$	SD	$\bar{x}$	SD	
Experimental group (Blended Teaching Approach)	38	8.23	2.63	25.0	86.76	16.85
Conventional group (Discussion method)	44	7.56	2.36	18.78	7.74	11.22

The data on interest in table 1 revealed that students taught Biology using Blended teaching approach had mean pre-test score of 8.23 and post-test score of 25.08 while the students taught using the conventional Discussion method had pre-test score of 7.56 and post test score of 18.78. Students taught Biology using Blended teaching approach had gain score of 16.85 and their counterparts taught using conventional method had gain score of 11.22. Therefore, students taught Biology using Blended teaching approach had higher interest score than their counterparts taught using the conventional discussion method.

**Table 2: Mean ( $\bar{x}$ ) and Standard Deviation (SD) of male and female students' interest to Biology**

Gender	N	Pre-test		Post-test		Gain Score
		$\bar{x}$	SD	$\bar{x}$	SD	
MALE	40	7.81	2.52	24.13	7.53	16.32
FEMALE	42	7.94	2.51	19.71	7.71	11.77

Data in Table 2 revealed mean interest score of 7.81 in pre-test and 24.13 in posttest for male Biology student, while the female Biology students had mean interest score of 7.94 in pretest and 19.71 in posttest. Male students had gain score of 16.32 while their female counterparts had gain score of 11.77. Therefore, male student had higher interest than their female counterparts in Biology.

**Table 3: Analysis of covariance of students' mean interest score in Biology**

SOURCES OF VARIATION	SUM OF SQUARES	DF	MEAN F SQUARE	SIG	DCS
Corrected model	3521.287 <sup>a</sup>	8	440.161	10.702	.000 Sig
Intercept	3219.841	1	3219.841	78.289	.000 Sig
Pre-test	482.005		1482.005	11.720	.001 Sig
Method (treatment)	1021.753	1	1021.753	24.844	.000 Sig
Gender	91.980	1	91.980	2.236	.137 Not Sig
Location	174.202	1	174.202	4.236	.041 Not Sig
Method x Gender	148.884	1	148.884	3.260	.059 Not Sig
Error	5757.840	80	41.127		

Total	79994.000	82
Corrected total	9279.128	81

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a R Squared = .379 (Adjusted R Squared = .344)

Data in table 3 showed that there is significant effect of Blended teaching approach on students' interest to Biology  $f(1, 149) = .241, p < .05$ . The null hypothesis therefore was not rejected because the significance is above 0.05, indicating that there was significant difference in the mean interest score of students using Blended Teaching Approach.

Table 3 revealed that there is no significant influence of gender on students mean interest scores in Biology  $f(1,82) = p > .640 .425$ . The null hypothesis was not rejected because the significance is above 0.05, indicating that there is no significant difference in the mean interest scores of male and female students in Biology.

### Summary of Major Findings

1. Students taught Biology using Blended teaching approach had higher mean interest score than their counterparts taught using conventional method.
2. Gender is not a significant factor in the mean interest score of students in Biology.

### Discussion

Blended Teaching Approach was superior to the conventional discussion method in enhancing the interest of the learners. The findings of this study showed that students taught Biology using BTA had higher interest than those taught with discussion method. This difference in interest scores of students might have been as a result of the type of instructional approach used. Blended Teaching Approach has to do with the use of innovative method such as computer, cell phone, projector which uses pictures, videos and animation during teaching and learning which discussion method could not provide.

These attributes of BTA could have helped to arouse and stimulate students' interest to learn even difficult concepts in Biology. In BTA, all the students were attentive and focused, watching and listening to the lesson whereas in discussion method, students were too familiar to the method, lack focus and were distracted by their classmates. BTA being an innovative instructional approach creates opportunities for adequate participation of the students during the teaching while discussion method is a traditional method which could not provide room for all the students to participate because of time. The activities allowed the students to have first-hand information about

the concept, which made learning concrete by providing real-life situation through the use of pictures and videos while discussion method made learning abstract. It engages students through brain-storming as they are made to explain the pictures and videos. The activities also made learning easy and permanent because students learn more on what they see and feel than what they hear while in discussion method, students easily forget what they hear.

The findings of this study showed that male students had higher interest score than their female counterparts. The difference in the interest scores for male and female students was statistically significant. This difference could be as a result of the nature of the instructional approach used during the teaching process. All the students were given equal opportunities and actively involved in the instructional process. This instructional approach allowed both the male and female students to find out facts by themselves. The male students are kinesthetic learners which means that they are activity and group work oriented while females prefer working individually. Male students were bold, outspoken and also asked questions in the classroom while their female counterpart are shy, male students are attracted to what they see than what they hear but female students are not. Male students have passion for ICT aid and are always attracted to any ICT activities while female students prefer reading their notes and text books. Male students are time conscious and love any activity that is not time consuming which BTA offers but female students are not. Male students are always focused and do one thing at a time but female students try to manage different activities at the same time such as copying note, eating and writing their assignments

### **Recommendations**

1. Teachers should strive to use BTA as innovative instructional approach in teaching Biology as this will help to concretize learning and enhance interest of the students
2. Teachers should be equipped with computer and other ICT facilities to enable them use them effectively
3. In-service training, seminars, workshops and conferences should be organized by the Ministry of Education, Government and non-government organization NGOs to train teachers on the use of innovative pedagogical strategies like BTA.

### **Conclusion**

This study has shown that the use of Blended Teaching Approach was effective in enhancing students' interest in biology. Teachers should be given

more training through workshops and conferences on the best approach to employ in teaching science subjects especially Biology.

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