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Blended Learning in Teaching Science in Secondary Schools in Abua/Odual Local Government Area, Rivers State

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ABSTRACT

The study examined blended learning approach of science teaching in secondary schools in Abua/Odual Local Government Area of Rivers State. The study adopted a descriptive survey design. The population of the study was made up of the 2530 science teachers and students in the 11 secondary schools in Abua/Odual Local Government Area of Rivers State. Specifically, the population is 2,500 science students and 30 science teachers. The 150 science students which is 6% of the population were randomly selected from the 5 secondary schools while the 30 science teachers were sampled using census sampling technique from the 11 secondary schools. The study utilized Blended Learning Approach Questionnaire for data collection. The instrument was validated by two experts in science education. The reliability of the instrument was carried out using Kuder Richardson formula 21 with a reliability coefficient of 0.83 established for the instrument. Result revealed that many science teachers have not adopted blended learning approach because they are not knowledgeable and up-to-date with the use of computer appliances. The study also showed that computer facilities for effective teaching and learning of science was not enough for science teachers' use. It was therefore recommended, based on the findings that science teachers should attend seminars/workshop training on the use of information and communication technology for the teaching and learning of science. This will facilitate learning activities and enhance understanding. Also, that computer facilities be made available by government and non-governmental organizations to secondary schools especially in public secondary schools in Abua/Odual Local Government Area of Rivers State.

Keywords: Blended learning, Teaching science, Face-to-face learning, E-learning, ICT.

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INTRODUCTION

The use of technology in educational settings has become inevitable in this information age. According to Khader (2016), the past decade has witnessed a huge revolution in the educational applications of the computer, whose use in education is in its beginning taking various forms starting from using computers in education to the use of the internet in education and finally emerged the concept of blended learning. Oxford Dictionary defines blended learning as a style of education in which students learn through electronic and online media as well as traditional face-to-face teaching. Blended learning also known as hybrid learning simply means an approach to education that combines online teaching and learning opportunities with physical traditional face-based

classroom methods. It is an approach where the online portion effectively replaces some of the face-to-face contact time rather than supplementing it (Graham, Woodfield & Harrison, 2013). Terra (2019) reports that blended teaching and learning has lots of benefits as it has been reported to be more effective than purely face-to-face online classes, and that it enables students to move at their own pace, log on, access classes, lectures and other materials at their own time**.**

Blended teaching and learning approach gives students with special educational needs the benefits of both online learning and in-person instruction in that students can work independently at their own pace online and still have access to face-to-face teaching and learning with a teacher in the classroom set up. Blended teaching and learning of science approach in our educational system allow teachers to spend less time giving whole-class lessons, more time meeting and interacting with students with special educational needs with either individually or in small groups to help them with specific concepts, skills, questions or learning problems. There is need for blended teaching and learning of science approach in our educational system since it enables students with special educational needs to use digital and online technologies and they naturally acquire more technological literacy and greater confidence using new technologies which is very essential in the 21ST century and in future. Many researchers like Macoun (2016), Al-Hassan (2013) and Al-Rimawi (2014), carried out studies on the effect of using blended learning approach on students achievement and information retention for the fifth graders in Biology. Al-Rimawi, (2014) investigated the effect of blended learning on direct and delayed achievement of the sixth graders in the English language course. The study showed the presence of statistically significant differences between the mean of direct and delayed achievement for the members of the experimental group which studied using blended learning approach. Al-Hassan, (2013) identified technology of blended learning space and the effect of using it on the academic achievement in biology among the second graders in the private secondary schools. The researcher concluded that there are statistically significant difference in favour of the students who studied using blended e-learning (the experimental group) and that there are statistically significant positive trends among the members of the sample who responded to the items of the questionnaire of the trend measurement towards blended learning. Shahin, (2008) also measured the effectiveness of blended learning on the achievement on science operations among the fifth graders in Al-Naser Experimental School in Tanta and their trends towards it. The most important result of the study revealed the effectiveness of blended learning, since it combines the e-learning and the traditional learning approach. Yigit, Koyun, Yuksel and Cankaya (2013) used blended learning model to optimize learning in teaching Algorithm and programming course in computer in engineering education in Suleyman Demirel

University computer engineering Department. In their comparative study, blended learning is achieved through learning management system (LMS) of university. Evaluation was based on students' homework, mid-term and final exam grades. Results of the study showed in blended learning education to be more effective. Students' achievement were better than expected in comparison to traditional education. However, algorithmic thinking abilities of students who enrolled in the Algorithm and programming course in blended and traditional education where close.

The concept of blended learning simply has to do with educational practices of combining digital learning tools with more traditional classroom face to face teaching. In a true blended learning environment, both the students and the teacher should be physically located in the same space. Blended learning concerns not only different ways or strategies of learning but different theories of learning which are applied using both traditional, new and innovative media. It affects different levels like combining different learning theories such as behaviourism, cognitivism, constructivism etc. Combining methodical levels such as: self- directed with instructor-led learning, individual with cooperative learning, receptive and explorative learning etc. Other levels are that of the media, combining face to face with on-line elements, using different media like books, video, computer-based test (CBT) etc.

Statement of the Problem

The rate at which students fail science subjects both in internal and external examinations has been associated with poor methods of teaching and learning of the subjects (Opara, 2011). According to World Schools Report (2023), teaching methods carried out in teaching science subjects do not provide students with a personalized learning experience that can enhance performance, because they are forced to follow the same pattern and learning styles regardless of their interest.

Traditional methods of teaching science does not provide students to learn at their pace and does not enthuse learners for a more productive engagement with the content of science. The introduction of new technologies for teaching and learning have been shown to improve learners' engagement and performance in science and other subjects. Blended teaching and learning approach is a student centered approach that combines traditional face-to-face classrooms with e- learning activities. Blended learning empowers students by building their capacity to communicate, improving their thinking ability to enhance performance and upgrading of their technology application skills (Attard & Holmes, 2020; Kashefi, 2012).

The problem of this study therefore is: Is blended teaching and learning approach applied by science teachers and students in secondary schools in Obual/Odual local

Government Area of Rivers State? Are there necessary appliances to carry out blended teaching and learning approach? This study therefore aim to answer the above questions.

Purpose of the Study

The study examined the use of blended teaching and learning approach in science teaching and learning in secondary schools in Abua/Odual Local Government Area of Rivers State. Specifically, the objectives of the study include:

1. To find out if science teachers in secondary schools in Abua/Odual Local Government Area of Rivers State use blended teaching and learning approach.
2. To find out if electronic/computer appliances are available for use of blended teaching and learning approach for teaching of science in secondary schools in Abua/Odual Local Government Area of Rivers State.

Research Questions

The following research questions guided the study:

1. To what extent do science teachers and students in secondary schools in Abua/Odual Local Government Area of Rivers State use blended teaching and learning approach?
2. To what extent are electronic/computer appliances and other instructional materials available in the application of blended teaching and learning approach in secondary schools in Abua/Odual Local Government Area of Rivers State.

METHODOLOGY

The study employed a descriptive survey design. The population of the study was made up of all science teachers and science students in Abua/Odual Local Government Area of Rivers State. `Specifically, the population is 2,500 science students and 30 Science teachers given a total number of 2,530. 150 science students and 30 Science teachers given a total number of 180 make up the sample size. The 150 science students which is 6% of the population were randomly selected from the 5 secondary schools while the 30 science teachers were sampled using census sampling technique from the eleven secondary schools in Abua/Odual Local Government Area of Rivers State.

The instrument utilized was a questionnaire titled: Blended Learning Approach Questionnaire (BLAQ) adapted from Ndirika (2020). The instrument was a four-point Likert scale with response modes as: Very High Extent (VHE), High Extent (HE), Low Extent (LE) and Very Low Extent (VLE). The instrument was validated by two experts in science education. The reliability test of the instrument was carried out using Kuder Richardson formula 21 with a reliability coefficient of 0.83 established for the instrument.

The researcher administered the instrument in the five (5) secondary schools to both science students and teachers respectively within one week with the assistance of

the school administrators in each school visited to ensure success of the exercise. The data collected were analyzed using mean and standard deviation. Mean value of 3.00 and above was interpreted as VHE, 2.50 – 2.99 was HE, 1.50 – 2.49 was LE, while mean value less than 1.50 was VLE.

RESULTS

Research Question 1

To what extent do science teachers and students in secondary schools in Abua/ Odual Local Government Area of Rivers State use blended teaching and learning approach?

Table 1

Mean Responses to Show the Extent to Which Science Teachers and Students use Blended Teaching and Learning Approach.

S/N	Statement	Mean	SD	Remarks
1.	Teachers and students use file-sharing services (e.g., Google Docs) to collaborate and share feedback on class work	2.21	0.92	Low Extent
2.	Learners use online channels like zoom and task managers to plan their work and control the flow.	2.55	0.83	High Extent
3.	In addition to classroom discussions, learners use online services for text and voice chat	2.48	1.02	Low Extent
4.	Learners' progress is evaluated sometimes by online quizzes and tests with face-to-face tests and examinations.	2.38	1.05	Low Extent
5.	Learners meet in a classroom to collaborate and contribute to project after sufficient time of independent learning with online resources	2.12	0.98	Low Extent
6.	Learners can listen to a lecture in a classroom and then take an online quiz right there or at home.	2.48	0.99	Low Extent
7.	Teachers teach remote and physically present students at the same time using tools like Zoom	1.25	1.02	Very Low Extent
	Grand Mean	**2.21**		**Low Extent**

Table 1 shows the extent to which teachers and students use blended teaching and learning approach. It has a grand mean of 2.21 and standard deviation 0.97. This indicates low extent of involvement with the use of blended teaching and learning approach.

Research Question 2

To what extent are electronic/computer appliances and other instructional materials available in secondary schools in Abua/Odual Local Government Area of Rivers State for use and application of blended teaching and learning approach?

Table 2

Mean Responses on the Extent to Which Electronic/Computer Appliances and Other Instructional Materials are Available for Blended Learning

S/N	Statement	Mean	SD	Remarks
1.	There is equipped electronic and computer laboratory in my school.	2.09	0.99	Low Extent
2.	I have my own personal android computer/browsing phone.	2.55	0.83	High Extent
3.	There is stable electrical power supply in my school.	1.48	1.07	Very low Extent
4.	Students and teachers have regular access to the school electronic appliances	2.08	0.98	Low Extent
5.	I have access to online teaching of my students always.	2.52	0.85	High Extent
6.	There is provision for adequate access to internet in my school.	2.21	0.92	Low Extent
7.	There is a functional interactive whiteboard in my school	1.20	1.03	Very low Extent
	Grand Mean	**2.02**		**Low Extent**

Table 2 shows the teachers' response on the extent of availability of electronics/computer appliances to facilitate blended science teaching and learning approach. The grand mean of 2.02 indicates low extent of availability of computer/ electronic appliances and other teaching and learning facilities for use of Blended Learning approach.

DISCUSSION OF FINDINGS

The results from the study indicate low extent to which the teachers and students are involved with the use of blended teaching and learning approach. This implies that science teachers in secondary schools in Abua/Odual Local Government Area have not embraced blended teaching and learning approach, this may reduce academic performance in science subjects. The finding is in line with the study of Al-Hassan (2013), who stated that students taught with e-learning blended approach performed significantly better than those taught using only traditional approach.

Results also indicate low availability of electronic/computer appliances and other resources needed for blended learning. This implies that blended science teaching and learning approach cannot be used in secondary schools in Abua/Odual Local Government Area of Rivers State since there are no e-learning facilities to apply the approach. This could lead to lack of understanding of science subjects resulting to poor academic performance. This agrees with the study of Maccoun, (2016), Al-Hassan; (2013) and Al-Rimawi (2014) which stated that blended teaching and learning approach improved students' retentive memory of information since the experimental group taught using blended learning performed better than those taught using only the traditional teaching and learning approach that is not blended with electronics/computer appliances

CONCLUSION

Blended teaching and learning approach is very important for better academic performance and acquisition of knowledge. Findings of the study showed that secondary school science teachers and students in Abua/Odual Local Government Area of Rivers State do not generally use blended teaching and learning for science subjects. The secondary schools there are not well equipped with e-learning facilities for easy application of blended teaching and learning approach which has to do with online and face-to-face teaching and learning.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

1. Teachers should be made to undergo some training through seminars/workshops on how to apply blended teaching and learning approach for better academic performance.
2. Computer education should be taught intensively both theory and practical, not only for students, but also for teachers.
3. Facilities for blended teaching and learning in schools should be made available by government and non-governmental organizations for science teachers to apply blended learning approach in their schools for effective teaching and learning of science subjects.
4. The efficacy of blended teaching and learning approach can be achieved if teachers and students are computer literate and have access to internet enabling devices both at home and school environment.

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