

# Promotion of Blended Learning Usage in Science Teaching In Nigeria: Some Inhibiting Factors

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**Abstract**—E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching, in which case the term Blended Learning is commonly used. In Nigeria, technology-based tools are already beginning to change the conventional relationships among students themselves and between students and teachers by facilitating cooperative learning. The study revealed that students taught with blended learning performed significantly better than those taught with e-learning. However, the findings in this paper also indicate that, there are some obstacles to the successful integration of Blended Learning. These include inadequate technical personnel, insecurity and poverty, poor network connectivity, inadequate avoidable computer equipment, epileptic power supply, lack of maintenance culture, and lack of competence, confidence and accessibility to technology-based tools. Hence, this paper examines the strategies of integrating technology into classroom instruction across the school curriculum to optimize learning outcome.

**Keywords**—Blended Learning, Science Teaching, Inhibiting Factors.

## I. INTRODUCTION

**B**LENDED learning is a type of education that combines face-to-face classroom strategies with computer-mediated activities to form an integrated instructional approach. The terms, web-enhanced instruction, mixed-mode instruction, hybrid, and technology-mediated instruction are often used interchangeably for blended learning. According to [7] blended learning is a formal education programme in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, path, place and/or pace. The strategy creates a more integrated approach for both instructors and students.

The goal of a blended learning is to join the best aspects of both face-to-face and online instruction. Classroom time can be used to engage students in advanced interactive experiences. Meanwhile, the online portion of the course can provide students with multimedia-rich content at any time of the day; anywhere the student has internet access such as

computer laboratories, libraries and students' homes. This allows for an increase in scheduling flexibility for students. There are no rules in place to prescribe what the ideal blend might be. E-learning is the delivery of a learning, training or education programme by electronic means. E-learning involves the use of a computer or electronic device (for example, a mobile phone) in some way to provide training, educational or learning material (8). The concept of Open and Distance Learning (ODL) was proposed in Nigeria in the 1998 edition of National Policy on Education [4].

According to [2], ODL refers to educational patterns, approaches and strategies that permit people to learn with no barriers in respect of time and space, age and previous educational qualifications – no entry qualification, no age limit, no regard to sex, race, tribe and state of origin. Reference [6] noted that ODL has developed from a modest and inconsequential beginning through correspondence courses to a full-fledged modern day technology-facilitated, flexible and learner-driven, self-directed learning. It involves learners who are often in locations remote from the institution and/or the instructional or tutorial facilitator. ODL provides an affordable, cost effective and flexible educational opportunity for all. This is why it must be the bridge of our educational system in the 21st century.

The Open University system is a 21st century development in Nigeria. According to [5], the open university system in Nigeria is necessitated by many factors among them include; the ever-continuing growth in Africa's population, the attendant escalating demand for education at all levels, the difficulty of resourcing education through the traditional means of face-to-face classroom mode and the compelling need to provide education for all irrespective of environmental, social or cultural circumstances. It implies that Africa must find the appropriate and cost effective means to respond adequately to the huge unmet demand for education [10]. Hence, National Open University of Nigeria (NOUN) makes use of blended learning.

## II. STATEMENT OF THE PROBLEM

Despite the advantages of blended learning that is been made use of by NOUN in order to meet wider students population, there are some students that are unable to attend face-to-face interactions at their respective NOUN study

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centres due to work, family, community responsibilities and women in pudah or with child rearing responsibilities. They only make use of the e-learning which they access in their offices, libraries and homes through the internet facilities by making use of their computer accessories. The GSM revolution can also come to the aid of those who have no access to the computer as the internet can be accessed wherever one is, if the learners own a mobile phone with internet facilities. This implies that, there are two types of NOUN students namely students that are taught with blended learning and those that are taught without blended learning, that is, those that make use of e-learning without face-to-face interaction at their study centres. Hence, would there be any difference in the performance of NOUN students taught with blended learning and those taught without blended learning?

#### *Research Hypothesis*

There is no significant difference in the academic performance of NOUN students taught with blended learning and those taught with e-learning.

#### *Research Method*

Ex-post facto design was adopted for the study. The population for the study comprised of all the 161 year one NOUN students that registered for physics courses at Akure study centre, Nigeria. These are: PHY 111: Elementary Mechanics, PHY 113: Heat and Properties of Matter, PHY 124: Geometric and Wave Optics and PHY 132: Electricity, Magnetism and Modern Physics.

Based on the fact that the population is few, all the students

constituted the sample size of the study. The class attendance list was used to categorise students into blended learning and e-learning groups. Students that attended the face-to-face interaction were categorised as blended learning group while those students that did not attend were categorised as e-learning group. The instruments consisted of the NOUN standardised examination questions in PHY 111, PHY 113, PHY 124 and PHY 132 already validated and the reliability had been obtained by NOUN during 2012.2013 academic sessions. The data collected were analysed using t-test and the hypothesis was tested at .05 level of significance.

### III. RESULT

#### *Hypothesis*

There is no significant difference in the academic performance of NOUN students taught with blended learning and those taught with e-learning.

The analysis is as shown in Table 1.

The analysis in Table 1 shows that, the calculated t-value of 10.89 is greater than the critical t-value of 1.96. Thus, the hypothesis which stated that, there is no significant difference in the academic performance of NOUN students taught with blended learning and those taught with e-learning is rejected. The table also shows that NOUN students taught with blended learning performed significantly better than those taught with e-learning

TABLE I

T-TEST ANALYSIS OF NOUN STUDENTS' PERFORMANCE TAUGHT WITH BLENDED LEARNING AND THOSE WITH E-LEARNING.

Strategy	N	X	SD	Df	t-cal.	t-critical	Decision
Blended learning	82	64.28	6.84	159	10.89	1.96	*
e-learning	79	52.16	7.24				

\* = significant at  $p < .05$  alpha level

### IV. DISCUSSION

The better performance of students in blended learning than e-learning might be due to the fact that, working together cooperatively enhances appropriate behaviour in organizing work, asking questions, encouraging social interaction, demonstrating self management and facilitating better study habit and retention of knowledge. This is in line with the findings of [1] that, working in small group enhance performance, promote learning and skills, and improve self-development through collaborative learning.

Blended learning also includes synchronous activities that involve the exchange of ideas and information with one or more participants during the same period of time. A face-to-face discussion is an example of synchronous communications. Synchronous activities occur with all participants joining in at once in virtual classroom or meeting.

#### *Obstacles to the Successful Integration of Blended Learning in Teaching and learning of Science*

Some of the barriers towards the use of blended learning in the teaching of science include:

##### *(i) Poor Network Connectivity:*

The network connectivity is very poor and not reliable. The disconnection may come at anytime without prior notices. The barriers include waiting for websites to open and failing to connect to the internet. The reason for the disconnection could be cabling problem, virus attack or web server maintenance problem. The situation may lead to frustration and discouragement on the part of the instructors and students.

##### *(ii) Lack of Maintenance Culture and Technical Support:*

Technical problems include malfunctioning computers, students and teachers having to work on old computers and

printers not printing. These barriers impeded the smooth delivery of the lesson or the natural flow of instructional activities. Due to lack of technical support and maintenance culture in study centres and schools, technical maintenance will not be carried out regularly, resulting in a higher risk of technical breakdowns.

*(iii) Epileptic Power Supply:*

The effective use of Information Communication Technology (ICT) in blended learning in particular, demands the provision and availability of electricity supply. In Nigeria, unsteady power supply or none in some rural areas may have stood in the path of progress of the use of computer as an instructional tool in blended learning.

*(iv) Inadequate Funding:*

Teacher education programmes require adequate funding. Funds are required for purchase of materials, tools and equipment, laboratory chemicals and reagents, as well as maintenance and replacement of these facilities. Despite the roles of education in the development of a nation, the yearly budget for education is very low (usually below 10%) compare with other sectors in Nigeria budget [3].

*(v) Insecurity and Poverty:*

An average Nigerian is poor and lives below poverty line and as a result, some of the students cannot buy computer. Although, the cost of a computer nowadays is relatively less expensive, but the supply of computers to study centres is still very low. Insecurity is another problem to ICT utilization in Nigeria. Due to poverty and unemployment, ICT facilitating structures are prone to vandalisation by thieves. Hence, many people who can afford to buy computer are afraid of their own being stolen.

*(vi) Lack of Competence, Confidence and Accessibility to Technology-Based Tools by the Students and Teachers:*

Very few teachers can operate the computer. The students who have idea of computer cannot effectively surf information with it. Under this prevailing condition, no reasonable application of ICT can take place in the school system. Hence, a lack of ICT skills is a serious obstacle to the integration of technologies into science education. The main problem with the implementation of blended learning in science is the insufficient amount of in-service training programmes for teachers. These include lack of training in digital literacy, lack of pedagogical and didactic training in how to use ICT in the classroom, and lack of training concerning the use of technologies in specific areas of physics in particular, and science in general.

*(vii) Lack of Access to Resources:*

Lack of access to resources, including home access is another obstacle that discourages teachers from integrating new technologies into education and particularly into science education. A student would have no access to ICT materials because most of these are shared with other students. Some of

the barriers related to the accessibility of ICT include insufficient numbers of computers, insufficient peripherals, insufficient copies of software, insufficient simultaneous internet access, oldness or slowness of ICT systems, and scarcity of educational software in the school.

## V. CONCLUSION

The national policy on education has identified that education is the most important instrument of change in any society and that any fundamental change in the intellectual and social outlook of any social has to be preceded by an educational revolution. The advent of National Open University of Nigeria through the use of blended learning marks the beginning of this educational revolution already foreseen in the national policy on education. Hence, blended learning can serve as the bridge by providing answers to the needs of providing education for all irrespective of environmental, social or cultural circumstances. However, there are some obstacles to the successful integration of blended learning in teaching and learning of science. These include lack of competence, confidence and accessibility to technology-based tools by the students and teachers, inadequate funding, insecurity and poverty, poor network connectivity, lack of maintenance culture and technical support, and epileptic power supply.

### Strategies of Promoting Blended Learning Usage in Science Teaching in Nigeria

In view of the implications of the findings from this study, the following recommendations are made:

The Power Holding Company of Nigeria (PHCN) should improve on its generation of electricity and the government should extend electricity to the rural communities where NOUN institutions are cited in particular and to all parts of the country in general. There should be adequate back-up systems such as standby generators, uninterrupted power supply (UPS), stabilizers and diskettes to sustain the ICT system in the face of unstable electricity, disaster and other environmental hazards.

Computer education should be given its rightful place in our education system because of its importance in the development of the nation. It should be implemented at all levels of education. Computer education at all level will help to eradicate computer illiteracy so that, an average Nigerian will have the basic knowledge of computer and use it to solve problems and perform tasks.

ICT experts should be posted to NOUN study centres as a government policy. Digital libraries should be established in NOUN study centres by the government so that students can be connected to the internet. The stock of library should be updated regularly in order to provide current materials and information. Training programmes such as conferences, seminars and workshops should be organized often for staff of NOUN in all the study centres. The training programmes should deal with the new devices, modern technologies, and new pedagogical approaches. ICT resources including

software and hardware, effective professional development, sufficient time, and technical support need to be provided for teachers. Policy makers, cognitive researchers and administrators, and technologists to work together effectively to harness the power in all the elements of ICT so that it can transform the productivity of educational systems, just as it is gradually but surely doing for business community and many other aspects of society.

Government, non-governmental organizations and multi-national companies should be encouraged to be actively involved in the funding of teacher education. They should also provide grants in the area of procurement of ICT equipment and in-service training of teacher educators. Government should give sufficient grants to all levels of education based on the rising population. Also bursaries and scholarships should be given to students in order to procure computer and other ICT materials.

Science teachers should adopt the use of blended learning and emphasize on a variety of procedures for promoting insight, meaningfulness, organization of experience, discovery of interrelatedness among ideas and techniques, and the application of knowledge acquired in one situation to a variety of situations.

Hence, the strategies for integrating technology into classroom instruction across the school curriculum to optimize learning outcome, and argues for a technology-based students development that not only equips teachers with computer and other technological skills but in providing the kind of training that actively explores integrating technology (blended learning) into methods, courses and students learning activities should be emphasized.

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