Learning Experiences and Performance Evaluation of Engineering Students' In Mathematics Using Hybrid Blended Learning System (HBLS) Via Social Media Networks

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---ABSTRACT---
This paper gives the report of the experimental set-up to evaluate the effectiveness of Hybrid blended learning system (HBLS) in teaching mathematics among engineering students in Nigeria. A total of 1197 students was sampled. We first conducted and investigative research with questionnaire to assess the student's readiness to use of social medias networks. We discovered that 93% (1113) of the sampled population has internet enable mobile phone and they make use of facebook or WhatsApp account at least 5hrs in a week. We use both face-to-face method in the physical classroom while virtual classroom was created in facebook and WhatsApp where course content is delivered before physical class, also for after physical classroom interactions among the students and lecturers. Another questionnaire was given to the sample population to assess their learning experiences after which the exams was given to evaluate the students' performance. Exam result was compared with previous result where teaching was done through face to face method. It was discovered that about 89% (1065) of sample population had 50 and above in the collated result which is sharply defer when compared with the previous semester where only face-to-face method was adopted.

Keywords: **Blended learning system, Hybrid Blended Learning System, Engineering Students, facebook, face-to-face, physical classroom, WhatsApp, virtual classroom**

I. INTRODUCTION

The use of modern technology has become sin-qua-non in this era of computer proliferation. Several approaches have been adopted in the past and present as regards to the use of computer technology towards teaching and learning in TVETS institutions. No doubt that student engagement centrals to better learning outcomes. To engage students beyond normal physical classroom is a proactive approach towards accomplishing better learning outcomes. Stakeholders in education are now engaging in blended learning for student's engagement after normal classroom setting.

Many researchers perceived blended learning as: learning that takes place when a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace [1]. Blended learning is an approach that combines the best elements of online and face-to-face learning. It is likely to emerge as the predominant model of the future [2]. Blended learning, combines face-to-face learning with a mixture of online activities is a cost-effective way to relieve overcrowded classroom, and a convenient alternative to the traditional classroom experience [3].

Many students want to engage in technology, particularly if it's socially based, whether it's with teachers, students, other schools, or experts around the world, some students who were never interested in writing are excited about blogging [4]. Blended learning gives room for a fundamental redesign of the educational model, it creates a more consistent and personalized pedagogy that allows each student to work at her own pace and helps each students feel and be successful at school. Blended-learning programs can let students learn at their own pace, use preferred learning modalities, and receive frequent and timely feedback on their performance for a far higher quality learning experience.

In this research model, we perceived the integration of one or more social media network with face-to-face method of learning will result to hybrid learning approach refers to as blended learning. Social networking sites are fast becoming very popular means of both interpersonal and public communication in Nigeria. Social networking sites are modern interactive communication channels through which people connect to one another, share ideas, experiences, pictures,messages and information of interest [5]. This research model will enable students receive instruction from their teachers and participate in traditional

classroom activities simultaneously. Conversely, the learning is supplemented by online and offline activities which are self-directed and self-paced using facebook and WhatsApp social media network.

II. LITERATURE REVIEW

A. Institutional Approach to Blended Learning

Institution of learning across the globe are currently engaging in adoption of blended learning approach to teaching and learning and many academic scholars has conducted research on blended learning across the globe. Typical examples of this is research conducted by [6]at Nottingham Trent University (NTU) in the United Kingdom to evaluate students' experiences of using blended learning. The discussion in the researchwas focused on lessons learned from academics in developing blended learning, and has reported students' perceptions of the blended learning environment [7], conducted a study that looks at the experiences of postgraduate students moving from the traditional face-to-face delivery mode to a blended mode. The results of the research show that it is very important for postgraduate students to interact with their peers and engage in classroom discussion; Higher education institutions must understand the needs and preferences of their students in the design of blended learning programmes; there is need for clarity in the structure of online materials, and the age of the student groups involved must be put into consideration.

B. Merit and Demerit of Using of Blended Learning Approach

Some amassbenefits of the blended learning model include but not limited to the following: Access to high quality, relevant, and engaging content in a variety of forms; More flexible class time and structure; Ability to adapt to the learning needs of students; Student access to multiple sources of instruction and assessment and diagnostic tools to help direct the pace and format of their learning; Capability for teachers to tailor their instruction and guidance to ensure progress and mastery for all students, with a focus on those who historically have been underserved [8]. Other benefits of blended learning are: Provides personalized training experiences; Offers 24/7 access to training resources; Track employee performance and skill development; Reduction in training costs. This learning method is associated with the following demerits: Ineffective use of learning technology tools can waste resources; Learners must have basic technology knowledge or a

willingness to learn; High technology set up and maintenance costs [9].

C. Teaching and Learning with Social Media Network Site

Teaching and learning with social media is a new approach to blended learning system especially now that social media network site has become romantics toy for many students of higher institutions of learning. People willing to embrace social media in their personal lives than they are to use it for professional or teaching purposes. Majority of faculty now use social media in a professional context (any aspect of their profession outside of teaching). Concerns about privacy, both for lecturers and for their students, and about maintaining the class as a private space for free and open discussion, have been at the top of the list of concerns in the use of social media in teaching. Until that issue has been addressed, the wide-scale adoption of commercial social media tools in the classroom will remain limited. Concerns about the integrity of student submissions also cast a shadow on the adoption of these tools.The larger universe of social media will continue to evolve, and steady increase in classroom use of social media will continue, but unless some fundamental modifications take place to address concerns about the privacy and integrity of social medial tools, this adoption will be very selective and continue to lag behind in teaching and learning[10].

III. METHOD

Data for this research were collected 2015 and 2016 at Yaba College of Technology, Lagos state polytechnics Ikorodu Lagos, Nigeria 52 percent of the sampled population are from YabaTech, while 48% are from Lagos state polytechnics. The sampled students are higher national diploma students of computer, Mechanical, and electrical electronics engineering students from both schools.

Questionnaire was used to collect data, the survey began with the collection of background information, such as year of study, mode of study, and age. Data Collected was divided into two:

A. Pre Research Data Questionnaire

In this part of research data were gathered to access student's readiness to use of social network site. Data obtained is tabulated as in table I – IV.

TABLE I: ASSESSING STUDENT'S READINESS TO USE OF SOCIAL NETWORK I

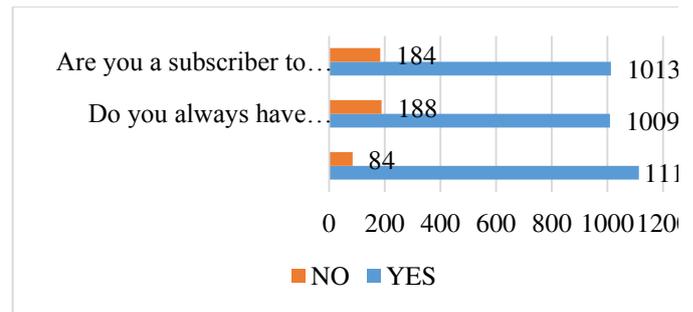| QUESTION/RESPONSE	YES	NO
Do you have internet enable mobile device?	1113	84
Do you always have data to connect to internet with your mobile device?	1009	188
Are you a subscriber to 1 or more social media network?	1013	184

TABLE II: ASSESSING STUDENT'S READINESS TO USE OF SOCIAL NETWORK II

Facebook	**347**
Twitter	84
Badoo	36
Friendster	0
My space	12
2go 4	0
Whatsapp	395
Googl+	48
Linkedin	275

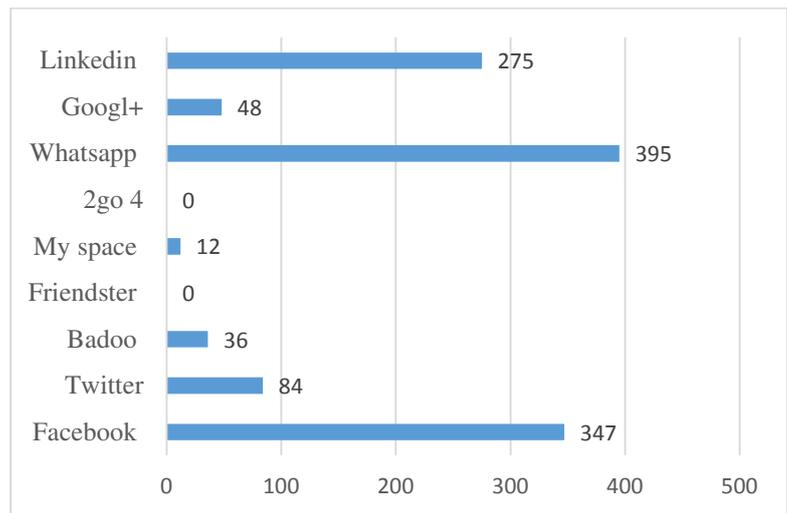
TABLE III: ASSESSING STUDENT'S READINESS TO USE OF SOCIAL NETWORK III

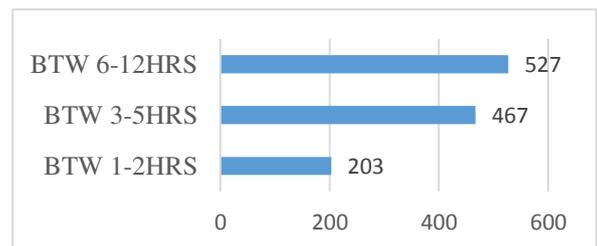| QUESTIONS/RESPONSE	BTW 1-2HRS	BTW 3-5HRS	BTW 6-12HRS
How long do you hook to the choice social media per week?	203	467	527

TABLE IV: ASSESSING STUDENT'S READINESS TO USE OF SOCIAL NETWORK IV

What is major purpose of yours for using social networking sites? Please tick only one.	
Communicating and interacting with friends.	**323**
Online learning.	24
Finding friends online.	227
Leisure and personal socialization.	168
Academic purposes such as group discussion and getting study partners online.	108
Private messaging, uploading photos and online profiles.	347
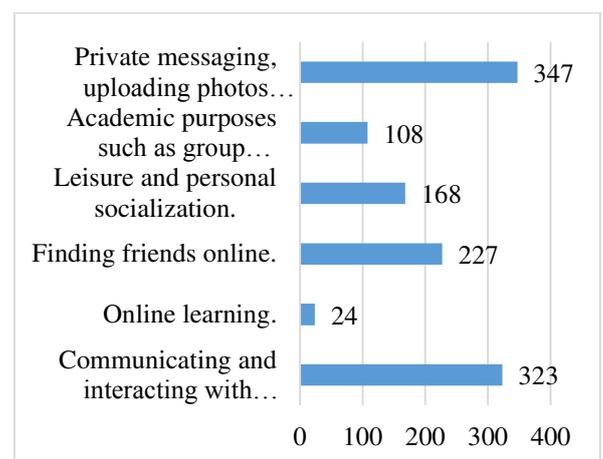
B. Post Research Data

In this part of research data were gathered to access student's experience and satisfaction with *the useof* proposed *hybrid blended learning system*. Data obtained is tabulated as in table V.

TABLE V: ACCESSING STUDENTS EXPERIENCE AND SATISFACTION WITH THE USE PROPOSED HYBRID BLENDED LEARNING SYSTEM

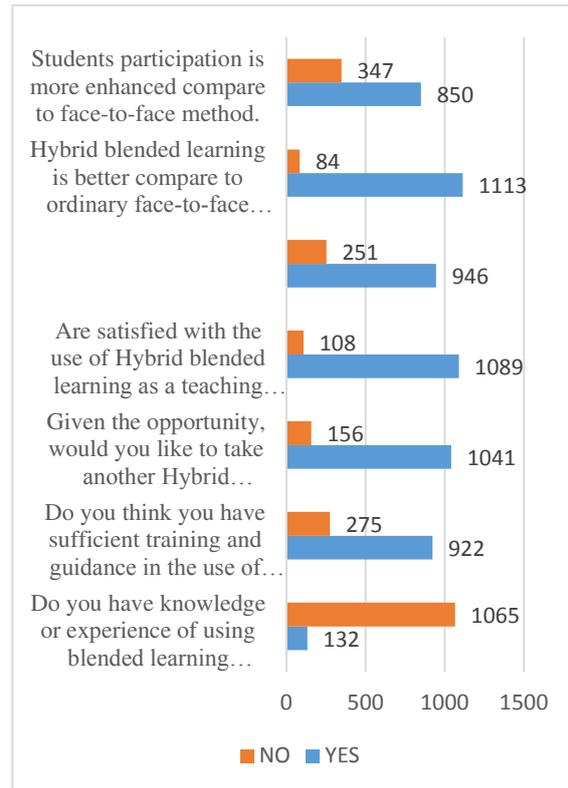| QUESTION/RESPONSE	YES	NO
Do you have knowledge or experience of using blended learning prior to attending this course?	132	1065
Do you think you have sufficient training and guidance in the use of blended learning methods?	922	275
Given the opportunity, would you like to take another Hybrid blended learning module in the future.	1041	156
Are satisfied with the use of Hybrid blended learning as a teaching method.	1089	108
This Hybrid blended learning approach adopted is flexibility compare to face-to-face.	946	251
Hybrid blended learning is better compare to ordinary face-to-face method.	1113	84
Students participation is more enhanced compare to face-to-face method.	850	347

C. Results

Based on the findings of this study, Majority of the sampled population are social network inclined 92.98245614%, 84.2940685%, and 84.62823726% respectively has internet enable mobile device; with ready to go data to connect to social network site, and also a subscriber to 1 or more social media network? See Table I.

Majority of the students sampled are facebook and WhatsApp subscriber with 29% and 39% adherence which equivalent to 68% of the sampled population. Hence prompt the researchers to choose the two network sites as the tools to combine with the face-to-face method to form the proposed hybrid blended learning system (HBLS). See Table II, about 83.04093567% of the sampled population uses the social network sites almost three to 12 hrs in a week. See Table III.

Their choice social network site is being used for activities ranging from: communicating and interacting with friends 27%; online learning 2%; finding friends online 19%; leisure and personal socialization 14%; academic purposes such as group discussion and getting study partners online 9%; and private messaging, uploading photos and online profiles 29%. About 11% only uses their network site for education related activities See Table IV.

About 89% does not have knowledge or experience of using blended learning prior to attending this course, the student's response to questions in Table V shows that they are satisfied with *the use proposed hybrid blended learning system. And which to attend lecture with such method in future if opportunity comes. See Table IV.*

IV. CONCLUSION, RECOMMENDATIONS

This paper has reported a study that investigating and evaluate hybrid learning system (HBLS) in teaching mathematics among students of TVET institutions in Nigeria. It was discovered that the Hybrid Blended learning system enhances students' learning experiences by creating opportunities for them to improve their understanding through interaction with other students and lecturers both online and offline at their own pace. The combination of traditional classroom instruction and the digital environment creates a highly personalized and more productive learning experience with better outcomes in examinations results. Hence we recommended that TVET institutions lecturer adopt blended learning system in their teaching.

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APPENDIX: QUESTIONARE

Pre Research Data Questionnaire

Facebook	
Twitter	
Badoo	
Friendster	
My space	
2go 4	
Whatsapp	
Googl+	
Linkedin	

1. Accessing student's facilities towards Use of Social media.

QUESTION/RESPONSE	YES	NO
i. Do you have internet enable mobile device?		
ii. How often do you have data to connect to internet on your phone?		
iii. Are you a subscriber to 1 or more social media network?		

iv. Which of the following social media you subscribe with and use regularly?

QUESTIONS/RESPONSE	BTW 1-2HRS	BTW 3-5HRS	BTW 6-12HRS
v. How long do you hook to the choice social media per week?			

2. What is major purpose of yours for using social networking sites? Please tick only one.

i.	I Use social networking sites for communicating and interacting with friends.	
ii.	For online learning.	
iii.	sites for finding friends online.	
iv.	sites for leisure and personal socialization.	
v.	I use social networking sites for academic purposes such as group b discussion and getting study partners online.	
vi.	I use social networking sites for private messaging, uploading photos and online profiles.	

End of Research Data Questionnaire: Experience and satisfaction with *the use Blended Learning*

QUESTION/RESPONSE	YES	NO
i. Do you have knowledge or experience of using blended learning prior to attending this course?		
ii. Do you think you have sufficient training and guidance in the use of blended learning methods?		
iii. Given the opportunity, would you like to take another Hybrid blended learning module in the future.		
iv. Are satisfied with the use of Hybrid blended learning as a teaching method.		
v. This Hybrid blended learning approach adopted is flexibility compare to face-to-face.		
vi. Hybrid blended learning is better compare to ordinary face-to-face method.		
vii. Students participation is more enhanced compare to face-to-face method.		