



AN EMPIRICAL STUDY ON E-LEARNING VERSUS TRADITIONAL LEARNING AMONG ELECTRONICS ENGINEERING STUDENTS IN UNIVERSITY OF LAGOS.

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ABSTRACT

A number of lecturers used traditional lecturing methods when teaching students of electronic engineering in the class. There is need for paradigm shift and the use of e-learning is the best option for lecturers in higher institutions especially when lecturing engineering students. Lecturers need to know and have a better understanding of what e-learning is all about before it can be adopted as their new method of lecturing electronic engineering students. It is in view of this, the researchers will clearly explain the major difference traditional and e-learning lecturing methods. The study also empirically

INTRODUCTION

The use of e-learning method of lecturing has started gaining attention by the lecturers in the fields of engineering in the recent years. In engineering education, previous studies generally found a positive relationship between traditional learning and e-learning (Rodríguez et al., 2013; Soler, 2010; Soler et al., Ubell, 2000) Previous developments on e-learning have involved computer based assessment platforms for teaching and learning, Artificial Intelligence application and autocorrect functions in e-learning platform. However, it appears that these studies on e-learning have yet to examine the impacts of using video shows to ascertain the result of circuit incapable of attempting such result or analyses. The learning in this case becomes teacher-cantered which makes students to repose on the ability of lecturers and this makes students' Interaction as far as their studies are concerned poor. This study propose a new e-learning called FUNDA OP-AMP specifically for learning subject Fundamentals of Operational Amplifier in electronics engineering. This e-learning module is developed by the researchers as to make, teachers, students as well to imitate 21st century learning. The module describes in details the process and steps of derivations in circuit design analyze through value. This guide (module), will be played back by the lecturers as many times as the students want. Perhaps, in a situation whereby students are unsure of an important section on derivation during the class, the module will be explained for more clarification. This study involved two different groups of students which are; the e-learning group which are students exposed to the FUNDA OP-AMP guide and the traditional learning group, that is students who are exposed to



investigated the difference between the two methods of lecturing emphasizing on a module in Electronics Engineering known as Fundamentals of Operational Amplifier. This research involved 200 level electronics engineering students from the Faculty of Engineering and Technology, University of Lagos. After the module was used to lecture them, the lecturers arranged them for survey and quiz. The data collected were analyzed using reliability and Analysis Of Variance (ANOVA) tests. The result indicated that the students of lecturers that used e-learning approach had significantly different academic performance compared to lecturers who used traditional learning methods. The study recommended that e-learning method of lecturing should be adopted by lecturers as a method of lecturing electronic engineering students, lecturers lecturing electronics engineering course should use e-learning method to improve the course design on Fundamentals of Operational Amplifier, lecturers should use e-learning lecturing method to develop effective learning outcomes when lecturing Electronics Engineering and other engineering related fields.

Keywords: Electronics, E-Learning, Lecturing, Fundamentals of Operational, Amplifier, Traditional Learning, Electronics Engineering

traditional lecturing methods. The e-learning group was to be engaged in a more students learning approach. The FUNDA OP-AMP guide or module was released to the e-learning group before the real class lecture for intensive practice beforehand. In the lecture class, this group was given enough chance to speak regarding any doubts noticed on the subject. It is important to make aware of the purpose of e-learning apart from improving the students' performance, e-learning is also designed and aim to be personalized for every lecturer (Thorne, 2003). It is undoubted that e-learning can be a strong proponent in the progression of modern teaching and learning methods. Bersin (2004) suggested that students' examinations academic performance improved by about 12% with the use of e-learning coupled up with the traditional learning approach (Deschacht and Goeman, 2015). The researchers are of the view that e-learning can be used together with the traditional face-to-face learning as well and this mode of learning will be known as blended learning. Many studies concur that blended learning is a hybrid mode of learning which harnesses both face-to-face learning and online learning (Boyle et al., 2003; Garrison and Vaughan, 2008; Lim and Morris, 2009; Mortera-Gutierrez, 2006). Ubell (2000), opined that one of the first methods in e-learning involves database knowledge which is an important subject in computer engineering in 2016, the technical engineering team in computer management and system in the university of Girima discovered that the use of e-learning not only enhanced students' motivation but also enhance their academic performance (Soler et al., 2006). Some developments include a Computer Based Association (CBA) e-learning platform distinguished by the automation of every learning future of the students (Soler, 2010). With the CBA, it was found that interaction exist between lecturers and engineering students. In the process, the delivery of the course exercise, its correction and the feedback collected is performed by the system automatically. Rodríguez et al. (2013) proposed that the Artificial Intelligence techniques were integrated into the e-learning platform of the engineering laboratory practices (System and Automation Laboratories) to form a teacher cognitive system combination.



Research Objectives

1. To find out if there significant between the FUNDA OP-AMP and traditional lecturing methods in the fundamentals of operational amplifiers.

Research Questions

1. Is there difference between the FUNDA OP-AMP and traditional lecturing methods in the fundamentals of operational amplifiers?

Research Hypotheses

1. There is no significant difference between the FUNDA OP-AMP and traditional lecturing methods in the fundamentals of operational amplifiers.

Methodology

This study is divided into two stages, namely the survey stage and the experimental stage. The participants who were electronic engineering students were divided into three types of majoring. These are:

1. BEng (Hons) Electronics majoring in telecommunication
2. BEng (Hons) Electronic engineering majoring Robotics and Automation
3. BEng (Hons) Electronic majoring in Bio-Instrumentation.

The participants are also differentiated by gender and status. For survey and experimental stage, the subjects are divided into two different groups the FUNDA OP-AMP group and traditional learning group. The module delivered to both groups is called fundamentals of operational amplifiers The FUNDA OP-AMP group is taught using e-learning method while the traditional learning group is taught using traditional lecturing method. Each of the groups consists of 40 students. For the survey stage, surveys on the lecturing method are distributed to the two groups at the end of the modules. For the experimental stage, students of both groups are instructed to sit for test on the fundamentals of operation amplifiers at the end of the module. The data collected was analysed using ANOVA.

Presentation of results

The tables below showed the presentation of results inform of number of participants, number of male and female that participated in the study. The result also presented Conbach alpha test output, as well as one way ANOVA result for both within and between groups. Group statistics for survey of the data collected was presented in the table. The results in the table also presented the outputs of the effect of gender, status and majoring on the FUNDA OP-AMP and traditional lecturing methods

Table 1 Summary of electronics engineering students that participated in the study

	Frequency	%	Cumulative %
Telecommunications	26	52	52
Robotics and Automation	20	40	92
Bioinstrumentations	4	8	100
Total	50	100	



Table 1 above showed that telecommunications students who participated in the study were 26 with 52%, robotics and Automation students were 20 in number with 40% and bioinstrumentations which were 4 students having 8%. This means that the highest number of participants were from telecommunications because they had the highest number of 26 students (52%).

Table 2 summary of males and females who participated in the study

	Frequency	%	Cumulative %
Male	33	66	66
Female	17	44	44
Total	50	100	100

Also, table 2 above indicated the summary of male and female students who participated in the study. Male students were the highest participants with 33 (66%) students while female had 17 (44%) participants.

Table 3 Cronbach Reliability Test Results

Variables	Cronbach Alpha	Number of Items
Traditional	0.767	20
E-learning	0.751	20

The table 3 above showed the Cronbach's alpha results for traditional lecturing and FUNDA OP-AMP lecturing methods. The results indicated that the alpha values for both variables were above 0.700 which was an indication that the internal consistency and reliability of the data were adequately okay.

Table 4. One way ANOVA for survey Data

	df	Mean Square	Sig.
Between Group	39.987	1	0.000
Within Group	28.876	48	
Total	68.863	49	

Table 4 above showed the results of one way ANOVA for the survey data . the results indicated that the p-value of the relationship was less than 0.05 and it was an indication there was significant difference between FUNDA OP-AMP and lecture methods in the fundamentals of operational amplifiers. This means that the null hypothesis was rejected.

Table 5 Group Statistics for Survey Data

Lectured Method	N	Mean	Std	std Error
Traditional	25	4.765	1.987	0.765
E-Learning	25	3.902	1.065	0.543

Table 5 above showed that the mean of students' score of FUNDA OP-AMP learning group is higher than the mean of students' score of traditional learning group. This showed that the students'



understanding and perception of the FUNDA OP-AMP lecturing method is significant different than that of traditional lecturing method and it was important in the fundamental operational amplifiers.

Table 6. Effect of gender on traditional and FUNDA OP-AMP lecturing method

	Sum of Squares	df	Mean Square	F	p-value
Tradition Between group	3.805	1	0.887	0.876	0.145
Within group	12.878	12	0.564		
Total	16.683	13			
E-learning Between group	1.892	1	0.564	1.821	0.234
Within group	8.231	12	0.231		
Total	10.123	13			

Table 6 above showed the effect of gender on traditional and FUNDA OP-AMP lecturing methods. It was found that the p-value was greater 0.05. This indicated that the two lecturing methods were not significantly affected by gender. Meaning there is no significant gender difference between traditional and FUNDA OP-AMP lecturing methods.

Table 7. Effect of status on traditional and FUNDA OP-AMP lecturing method

	Sum of Squares	df	Mean Square	F	p-value
Tradition Between group	7.033	1	1.212	0.213	0.211
Within group	9.650	12	0.324		
Total	16.683	13			
E-learning Between group	3.229	1	0.120	1.217	0.786
Within group	6.894	12	0.109		
Total	10.123	13			

Table 7 above showed the effect of status on traditional and FUNDA OP-AMP lecturing methods. The result indicated that the p-value is greater than 0.05 which indicated that there is no significant status different between the traditional and FUNDA OP-AMP lecturing methods.

Table 8. Effect of majoring on traditional and FUNDA OP-AMP lecturing method

	Sum of Squares	df	Mean Square	F	p-value
Tradition Between group	2.897	1	0.722	0.785	0.298
Within group	13.786	12	0.238		
Total	16.683	13			
E-learning Between group	1.167	1	0.321	1.543	0.587
Within group	8.956	12	0.129		
Total	10.123	13			

Table 8 above showed that results of majoring on traditional and FUNDA OP-AMP lecturing methods. Since the p-value is greater than 0.05 level of significant, it was an indication that there is no significant difference in majoring between traditional and FUNDA OP-AMP lecturing methods.



Conclusion

The study has clearly shown that there is significant difference between traditional and FUNDA OP-AMP lecturing methods in the fundamentals of operational amplifiers among electronics engineering students. The study showed that the number of students who participated in the study were more that female students. The study also showed that students' understanding of FUNDA OP-AMP lecturing method was effective in the lecturing of fundamentals of operational amplifiers. It was also showed in the study that there is no significant status different between the traditional and FUNDA OP-AMP lecturing methods. The results of the study also indicated that gender had no effect on traditional and FUNDA OP-AMP lecturing methods.

Recommendations

1. e-learning method of lecturing should be adopted by lecturers as a method of lecturing electronic engineering students
2. Lecturers lecturing electronics engineering course should use e-learning method to improve the course design on Fundamentals of Operational Amplifier
3. Lecturers should use e-learning lecturing method to develop effective learning outcomes when lecturing Electronics Engineering and other engineering related fields.

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