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Enhancing Technical College Students Interest in Electricity Using E- learning Teaching Activities (ELTA) in Benue State, Nigeria

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Abstract
The study determined the impact of e-leaning teaching activities on the interest of technical college students in electricity. The population of the study consisted of 724 Part II Students in Education Zone B of the 2013/2014 academic session. This number is made up of 543 males and 181 females. Two research questions and two hypotheses were asked and formulated respectively. An Electricity Interest Inventory (EII) was used to collect data with two lessons plans of which one was for the experimental group and the other for the control group. Two research questions were answered using mean and standard deviation. The hypotheses were tested at 0.05 level of significance using analysis of covariance. The results from the study revealed that students exposed to the ELTA showed greater interest in Electricity contents than those taught with lecture method. It also revealed that there was no significant difference in the mean interest scores of male and female technical school students. The study recommended this approach to be adopted in schools and the training of teachers in the teaching of Electricity and related topics in Physics.

Keywords: Technical Education, Interest, Electricity, e-Learning Teaching Activities, Benue State Nigeria

Introduction
Interest is very important in that it has to do with human attitude; Interest determines people's actions and reactions to issues and how committed they are to such issues. According to Harbor-Peters (2001), interest is a subjective feeling of intentness or curiosity over something. It is the preference for particular types of activities; that is the tendencies to look out for and participate in certain activities (Agwagh in Harbor-Peters, 2002). In most cases any subject of better performance shows the intensity of self-interest. Poor achievement in Physics, especially in electricity as reported by the Chief Examiner report (NABTEB, 2010/2011), may be indicative of the lack of interest by students. The body also reported that majority of the candidates failed to recognize the relationship between resistance and the balance lengths on the meter bridge wire and candidates wrongly stated the definitions of certain concepts: an example is the definition of a junction as a point where two or more currents meet instead of the wrong definition of a junction as a point where three or more wires meet. These weaknesses are evidence that students have difficulties in understanding concepts in Electricity.
Imoko(2004) and Fatoki (2007) have identified some learning difficulties of students resulting from their preconceptions and misunderstanding of concepts in science. Consensus has not been reached on appropriate pedagogical approach to adequately address these difficulties (Akinyemi & Afolabi, 2009).
The more important task is to insightfully design learning approach and activities that start with students' viewpoint rather than the teacher's anticipation to foster conceptual change (Olubunmi, 2006). Ada (2010) advises that teachers should evolve the approach that involves learner's active participation that will generate interest in the students rather than the traditional method.

The study was anchored on two theories; they are Connectivism and Constructivism theories. The Connectivity Theory, otherwise known as Connectivism was propounded by George Siemens, a Canadian theorist in December, 2005. It addresses e-learning directly when it discusses learning as a process of connecting specialized nodes or information sources; learning as residing in non-human appliances such as computer terminals; nurturing and maintaining connections as a need to facilitate continual learning.

The theory is related to this work in that:

1. electronic -resources harbor useful information that reside outside of the learner, and the learner would get the information by linking to it;
2. electronic-resources information have to be connected to specialized set of equipment such as computers, androids, iPods, notepads and other electronic gadgets before the information can be accessed;
3. Information to the learner from e-resources is more current and comprehensive than the former sources of information.

Constructivism, as founded on Kantian beliefs, claims that reality is constructed by the learner based upon mental activity (Jonassen, 1991). Humans are perceivers and interpreters, who construct their own reality through engaging in those mental activities; thinking is grounded in perceptions of physical and social experiences, which can only be comprehended by the mind. The learner is building an internal representation of knowledge and a personal interpretation of experience. This representation is constantly open to change, its structure and linkages forming the foundation to which other knowledge structures are appended. Learning is an active process in which meaning is developed on the basis of experience. It must be situated in a rich context, reflective of real world context, for this constructive process to occur and transfer to environments beyond the school (Bednar, 1992).

Studies on interest as evidenced by researchers have revealed that performance in any school subject is influenced by several variables. One of such variables is that a student's personal interest toward a subject has motivational consequences; therefore it enunciates the cyclic relationship between interest and achievement. Realizing the fact that performance in any subject depends on interest, Harbour-Peter (2002), opines any effort to tackle the problem of low achievement will proof abortive if students' interest is not taken into consideration. One way of doing this is to study the interest of students.

Interest is a subjective feeling of intentness or curiosity over something. It is a preference for a particular type of activity and a tendency to seek out and participate in certain activities (Imoko, 2004). There is the need to introduce the teaching strategy that will interestingly motivate the learner and the need to teach electricity in an interesting manner.

An alternative to text book guided classroom teaching is to change the focus of the classroom from teacher-centeredness to student-centeredness using e-learning strategy (Okojie, 2009).

In a case study of blended teaching and e-learning in a New Zealand secondary school, using an ecological framework, Zaka (2013) shows that students, through e-learning, have more opportunities to interact online with one another. Students develop interest, through student to student collaboration online, using discussion of assignment or question which increases their engagement and motivation.

Empirical evidence reveals that students' cognitive levels are low and that students have difficulties mastering the concepts and principles outlined in the science curricula especially in physics (Njoku, 2002; Eze, 2003 and Nwagbo, 2006). Achor (2001) admitted that e-learning strategy is a veritable tool that impacts on secondary school physics students' interest and achievement.

Statement of Problem

The Registrar and Chief Executive of NABTEB report consistently the poor achievement of students in Electricity. The evidence of this poor achievement is an indication that the educational objective of the country for technological development may not be achieved, hence an inhibition of the Nigeria vision 2020 objectives of attaining a modern and vibrant educational system. Thus, this study sought to explore the e-learning teaching activities, whether it would arouse technical school student's interest.

Purpose of the Study

The purpose of this study was to ascertain the efficacy of E-learning teaching activities. It is to determine if it would improve the achievement of technical school students on the concept of electricity, when it is used to teach them.

Research Questions

The study was guided by the following research questions:

1. What are the mean interest ratings of technical school students taught electricity using ELTA and those taught with Lecture Method?
2. What are the mean interest ratings of male and female technical school students taught electricity using ELTA?

Research Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance

1. There is no significant difference between the mean interest ratings of technical school students taught electricity using e-Learning teaching activities and those taught using lecture method.
2. There is no significant difference in the mean interest ratings of male and female technical school students taught electricity using ELTA.

Methodology

This study focused on the E-learning Teaching Activities (ELTA) of Part II students of the Technical Schools in Education Zone B of Benue State. The physics content was Electricity as contained in NABTEB (2007) curriculum of Part II students. Specifically, emphasis was on Current, Potential Difference, Resistance (in series & parallel), Electric Cells, arrangement of cells in a circuit, Electric Energy and Power. The ELTA was used as an instructional strategy of electricity, which was the topic for the experimental group while the traditional lecture method was used by the control group.

This study adopted a quasi-experimental design of non-randomized group using pretest-posttest of non-equivalent groups.

The study was carried out in Benue State, Nigeria. The state is made up of three educational zones, A, B, and C

with twenty three Local Governments Areas which are distributed as 7 in Zone A, 7 in B and 9 in C. The specific area of this study is Zone B where achievement and interest of students in physics in the technical schools is generally poor (Benue State Examination Board, 2013) and where we have the highest population of Technical Colleges in the state. The population of the study comprises 724 Part II Students in Education Zone B of the 2013/2014 academic session. This number is made up of 543 males and 181 females.

The instrument used for data collection was Electricity Interest Inventory (EII). The researcher adopted an interest inventory instrument invented by Kollar, Baumert and Schnbel (2001). It was modified to suit the purpose of measuring interest of students in Electricity. The items of interest rating scale provided responses on a continuum of very high = 4, high = 3, low = 2 and Very low = 1 to suit this study. The options were scored using this four point's scale. The reliability coefficient of EII as computed using Cronbach Alpha was 0.864.

Means and standard deviations were used to answer the research questions. Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance

Results and Discussion

The results of this study are presented according to the research questions and related hypotheses.

Research Question One: What are the mean interest ratings of technical school students taught electricity using ELTA and those taught with Lecture Method? (See results in Table 1)

Table 1: Mean Interest Rating of Technical Schools Students in E-Learning Teaching Activities and Lecture Method.

Source	Pre-test			Post-test	
	N	$\bar{X}$	SD	$\bar{X}$	SD
Experimental Group	81	1.74	0.22	3.61	0.37
Control Group	142	1.65	0.17	2.67	0.41
Mean difference		**0.09**		**0.94**	
Total	**223**				

Table 1 reveals that the pretest mean interest ratings of both experimental and control groups were 1.74 and 1.65 while the standard deviations were 0.22 and 0.17 respectively. The mean difference of both groups in the pretest was 0.09, indicating that the students of the study were approximately at the same level of ability at the commencement of the study.

Also, the posttest mean interest rating for experimental groups was 3.61 and standard deviation was 0.37 while control group had the mean interest rating of 2.67 and standard deviation of 0.41. The mean difference was 0.94, which showed that there was an improvement in the interest of the Technical School Students in Electricity.

Hypothesis One: There is no significant difference between the mean interest ratings of technical school students taught electricity using ELTA and those taught with lecture method. (See result of this hypothesis as presented in Table 2).

Table 2: ANCOVA, Result of Technical Schools Students' Interest Ratings in E- Learning Teaching Activities and Lecture Method.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	72.369	2	36.184	941.579	.000
Intercept	0.004	1	0.004	.113	.737
PreTest Int Total	26.292	1	26.292	684.165	.000
Group	28.473	1	28.473	740.925	.000
Error	8.454	220	0..038		
Total	2100.563	223			
Corrected Total	80.823	222			

a. R Squared =.895 (Adjusted R Squared =.894)

In Table 2, reading across row heading group, F(1, 220) with df =1 and P-value of which is less than the set P-value of 0.05, Since p <.05,, the hypothesis which stated that there is no significant difference between the mean interest ratings of technical school students taught electricity with ELTA and those taught with lecture method is rejected. Hence the outcome is statistically significant.

Research Question Two: What are the mean interest ratings of male and female Technical School students taught electricity using ELTA? (See answer to this research question as presented in Table 3).

Table 3: Mean Interest Ratings of Male and Female Technical Schools Students in E-Learning Teaching Activities.

Source		Pre-test		Post-test	
	N	$\bar{X}$	SD	$\bar{X}$	SD
Male Students	46	43.33	5.37	89.93	9.64
Female Students	35	43.97	5.92	90.74	9.02
Mean difference		**0.64**		**0.81**	
Total	**81**				

Table 3 showed that the pretest mean interest ratings of both male and female students were 43.33 and 43.97 respectively while their corresponding standard deviations were 5.37 and 5.92. The mean difference of both groups was 0.64 showing that students for the study were at almost the same level of ability before the commencement of the study.

Also, the posttest mean interest rating of the male students was 89.93 and its standard deviation was 9.64 while female students had a mean interest rating of 90.74 and standard deviation of 9.02. The mean difference was 0.81 showing an improvement in the interest of both male and female students in Electricity.

Hypothesis Two: There is no significant difference in the mean interest ratings of male and female students taught electricity using ELTA. (See test result of this hypothesis is presented in Table 4).

Table 4: ANCOVA, Result of Technical Schools Students' interest rating of male and female students in E-Learning Teaching Activities

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	4295.045[a]	2	2147.522	62.797	.000
Intercept	1407.235	1	1407.235	41.150	.000
PreTestInt Total	4282.065	1	4282.065	125.215	.000
Gender	.029	1	.029	.001	.977
Error	2667.425	78	34.198		
Total	667209.000	81			
Corrected Total	6962.469	80			

a. R Squared =.617 (Adjusted R Squared =.607)

In Table 4, reading across row heading Gender, F (1, 78) with df =1 and P-value of.977 which is greater than the set P-value of 0.05. Since p >.05, the hypothesis which stated that there is no significant difference in the mean interest ratings of male and female students taught electricity using ELTA is not rejected. Hence, the male and female Technical Schools Students' equally improved in their interest in Electricity concepts taught during the period of this study...

Discussion of Findings

The findings revealed that students taught using ELTA had higher interest significantly than those taught using Lecture Method (LM). Lack of interest in the LM is in agreement with Imoko (2004) and Ada (2010) who concluded that the LM makes students to develop dislike and show lack of interest because of the teacher-centered nature of the method.

E-learning teaching activities help to bridge the gap between the male and female technical school students mean interest ratings in electricity. The findings revealed that there was no significant difference in mean interest ratings of male and female students taught electricity with ELTA. This finding is in agreement with Wombo (2014).

Conclusion

Based on the finding of the study, the ELTA enhanced students' interest due to its learner-centered nature and its creation of curiosity in them. This finding made the researcher to conclude that the method was relevant to students' interest. So, it could be concluded that e-learning teaching activities are appropriate to be adopted by physics teachers as an instructional strategy.

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

1. Physics teachers in technical schools should be encouraged to use ELTA in teaching electricity and other concepts in physics.
2. Teacher education institutions should be encouraged to include ELTA in their physics method curriculum for training and retraining of physics teachers.

Text books writers should be encouraged to incorporate ELTA approach in their writings. This will make physics teachers to be educated about the approach.

References

1. Achor, E.E. (2001). Students' cognitive style, cognitive development and cognitive demands of secondary physics. *Unpublished Ph. D Thesis,* University of Nigeria, Nsukka.
2. Ada, N.A (2010). *Curriculum and Instruction an introduction to general methods and principle of teaching,* Makurdi. Aboki publisher; pg 80-100.
3. Akinyemi,O.A and Afolabi, F. (2009) Constructivitist Practices through Guided Discovery approach. The effect on student's cognitive achievement in Nigeria Secondry Schools Physics. *Bulgerian Journal of Sciences and Education Policy,* Volume 3, Number 2.
4. Bednar, A.K., Cunningham, D., Duffy, T.M. & Perry, J.D. (1992). Theory into practice: how do we link? In T.M. Duffy & D.H. Jonassen, (Eds). Constructivism and the technology of instruction: a conversation. Hillsdale: Lawrence Eribaum Associates.
5. Benue State Examination Board (2013). *Examination records for Technical Colleges in Benue State. Nigeria.*
6. Eze, C. U. (2003). An investigation into the scientific literacy level of non-science students of Nigerian universities: A case study of University of Nigeria, Nsukka. *Journal of Science Teachers Association of Nigeria.* 38 (1&2) 51-57.
7. Fatoki, J.O. (2007). Misconception and Achievement, in physics among secondary school students' *African journal of indigenous development,* Makurdi, Benue State. Pg 165-174.
8. Harbor-Peters, V.F. (2001). Unmasking some aversive aspects of school mathematics and strategies, for averting them. Inaugural lecture 5thjuly.
9. Harbor-Peters, V.F (2002).Teaching strategies in Animalu, A.O.E and Harbor-Peters (Ed) the workshop for re-training Mathematics Teachers at the University of Nigeria secondary school, Nsukka. Enugu Slapp press.
10. Imoko, B.I. (2004). Effect of concept mapping on students' achievement and interest in trigonometry.Sub-department of science education University of Nigeria, Nsukka.
11. Jonassen, D.H. (1991). Objectivism versus constructivism: do we need a new philosophical paradigm? Educational Technology Research and Development, 39 (3), 5-14.

12. Koller, O. Baumert, J & Schnabel, K. (2001).Does Interest matters?.The relationship between academic, interest and achievement in mathematics. Journal of research in mathematics education, 32,448-470.
13. National business and technical examination board (2007*) NABTEB Syllabuses for Miscellaneous Trades Examinations.*[DVD].
14. National business and technical examination board (2010/2011).NABTEB Chief examiner report, through the Registrar.
15. Njoku, Z. C. (2002). Nigerian university non- science students' level of scientific literacy as indicator of national readiness of sustainable development: The case of the University of Nigeria, Nsukka. Proceedings of the 43rd Annual Conference of Science Teachers Association of Nigeria.69-72
16. Nwagbo, C. R. (2006). Effects of two teaching methods on the achievement in and attitude to Biology of students of different levels of scientific literacy.
17. Okojie, M.U (2009). Utilization of E-learning in tertiary institutions in Nigeria; Challenges and way forward. Department of social studies. FCT college of education Zuba, Garki Abuja.
18. Olubunmi, E.O. (2006). Science and technology Education, in Nigeria. The Euphoria, The frustration and the Hopes 21st Inaugural lecture, Lagos State University, Lagos, Faculty of Education.
19. Wombo, A.B.(2014) Effects of E-learning strategies on students' achievement in agricultural Education in university in North Central Nigeria: Implication for teachers preparation University of agriculture Makurdi. Unpublished PhD work.
20. Zaka, P (2013). A case study of blended teaching and learning in a New Zealand Secondary School, using an ecological framework. *Journal of Open, Flexible and Distance Learning.* 17(1)*:* 24-40.