Effects of Internet-Based Tools on Performance of Technical College Students in Electrical and Electronics for Sustainable Development

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Conceptual Framework and Background

Internet-based technologies have been supporting and conditioning firm management with regard to offered capabilities and technical limitations; in this way the Internet can influence strategic and operational management, leading to new business models for the whole value chain. Because of the difficulty to preside and manage many different technologies and competencies, the evolving scenario is shifting companies' objectives, which is to produce graduates who can meet the demand of modern industrial standards.

The best way to make learning more concrete is to make use of real objects. Therefore, using real object or models to teach students will have proffered relevant impact in one way or the other than use of any other chalk- talk methods (Akinwale, 2016). It is important to note that students require information through many instructional materials so as to bring better understanding of what they are being taught. Hence the motive of using teacher-constructed electrical models to augment standard instructional materials needed for teaching electrical and electronics in Technical Colleges in Nigeria.

Performance can be explained as a term, which is directly proportional to change in a learning context, input, or classroom process. Sati (2014) described performance as a complex student" behavior that underlies several abilities. Examples include memory, previous knowledge or aptitude, as well as psychological factors like motivation, interest, temperaments or emotions. Deary et al (2011) stated that performance can either be low or high. Frohlich (2015) explained that the causes of low performance are diverse and cannot be associated with a single factor. Johnson et al (2013) reported that performance in any form of activity is based upon study interpretation and application and that study has a purpose so it depends on the individual to decide why he or she wants to study. Newman et al (2011) and Penil et al (2017) revealed that students perform poorly in science secondary schools and a

number of factors were found to be responsible for the poor attainment of the objectives of science instruction. Some isolated factors as deduced by some researchers like Newman et al (2011) and Frehlich, (2015) include inappropriate and uninspiring teaching approaches adopted by science teachers, inadequate teaching and learning facilities and so on. In this research the researcher intends to find out if the use of Internet-Based Tools can help students to acquire skills that can be extended to out of classroom situation, to be able to recall the concepts being taught in the classroom, as well as improve academic performance in science learning.

Research Questions

1. What is the difference in the level of performance between students taught Electrical and Electronics concept using Internet-Based Tools and those taught using lecture method?

2. What is the difference in the science and technology process skills acquired in students that were taught Electrical and Electronics concept using Internet-Based Tools and those taught using lecture method?

Research

The research design adopted for this study is quasi-experimental design. There are 6 technical colleges in Niger State with a population of 1,264. The sample for this study is made up of four schools. Simple random technique was used to select the sample from the population. Two instruments were used for data collection. These instruments are: Electrical and Electronics Performance Test (EEPT) and Process Skills Acquisition Test (PSAT). The instrument was validated by experts in the Departments of ITE, FUT, Minna. The essence of the validation was to check the face and content validity of the instrument.

The instrument was used to collect data after the administration of treatment as pre-test. After a period of two weeks, post-posttest was administered. The scores of the experimental and control groups were recorded separately and subjected to data analysis. The research questions were answered using descriptive statistic of mean and standard deviation. Inferential statistical of t-test was used to test the research hypotheses. Data generated were analyzed at $p \leq 0.05$ level of significance.

RESULTS

Research Question One: What is the difference in the level of Performance between Students taught Electrical and Electronics concept using Internet-Based Tools and those taught using Lecture Method?

Table 1: **Mean Score of Performance for Experimental and Control Groups**

	N	Mean pretest	Mean posttest	SD	MD
Group	100	12.19	27.75	3.63	
					8.69
Control	100	11.86	19.06	2.35	

Table 1 revealed that there was a difference in the performance between students taught Electrical and electronics concept using Internet-Based Tools and those taught using lecture method. The pretest mean scores of experimental and control groups are 12.19 and 11.86 respectively. The posttest mean scores of performance between the Experimental and Control groups are 27.75 and 19.06 respectively with mean difference of 8.69 in favor of the experimental group.

Research Question Two: What is the difference between the Science and Technology Process Skills Acquired in Students that were taught using Internet-Based Tools and those taught using lecture method?

Table 2: **Mean Score of Science Process Skill Acquisition between Experimental and Control Groups**

Group	N	Mean pretest	Mean posttest	SD	MD
Experimental	100	6.33	9.69	4.85	
					2.48
Control	100	6.01	7.27	2.64	

Table 2 revealed that there was a difference in the acquisition of Science Process Skills between students taught Electrical and Electronics concept using Internet-Based Tools and those taught using lecture method. The pretest mean scores of Experimental and Control groups were 6.33 and 6.01 respectively. The posttest mean scores of Experimental and Control groups were 9.69 and 7.27 respectively with mean difference of 2.48 in favor of the experimental group. This showed that the mean scores of Science Process Skill Acquisition of the Experimental group were significantly higher than that of the Control group.

Results

The findings of this study showed that significant difference existed in the level of Performance between students taught Electrical and electronics concept using Internet-Based Tools and those taught using Lecture method. This finding is in agreement with Nwafor, (2014) who investigated on the relative effects of Synchronized Multimedia on the Academic Performance and Motivation of Senior Secondary School Biology Students in Port Harcourt, Nigeria. The result showed that students that were taught Biology using Synchronized Multimedia performed significantly better than those taught using lecture method only. Also the finding this study contradicted with the finding of Putman, (2010) who conducted a similar research in Northern Ohio, U.S.A. The study investigated the effect of teaching Arts, and Mathematics using Power Point Presentation (PPP). The finding revealed that there was no significant difference in students" performance among those taught using PPP and those taught using lecture method.

Recommendations

Electrical and electronics teachers in technical colleges should be encouraged to use the Internet-Based Tools in teaching electrical and electronics as it improves performance and enhances the acquisition of practical skills.

The State Ministry of Education should provide adequate Information Technology equipment such as computers and software, which are the basic equipment needed for the implementation of Internet-Based Tools as a method of teaching.

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