Journal of Business and Economics, ISSN 2155-7950, USA
October 2017, Volume 8, No. 10, pp. 876-880
DOI: 10.15341/jbe(2155-7950)/10.08.2017/008

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Impact of Free Software Crocodile Learning of Electricity

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Abstract: Currently there is no denying the importance of the use of information technologies and communication in education levels on all software that has been created with the specific purpose to be considered as a teaching tool and as a complement to facilitate processes teaching and learning. At the National University of Chimborazo there is research related to the use of software for teaching mathematics learning, but learning physics is scarce. Therefore, this research aimed to identify the impact of the use of free software for learning crocodile Electricity, the hypothesis was: "With the use of free software successfully improves learning crocodile electricity". According to the characteristics of study is a viable and feasible, same research that relies on a correlational research, with a quasi-experimental design; a diagnosis developed students to know the degree of knowledge related to electricity. The study population were 70 students of the School of Sciences; the type of sampling is not probabilistic intentional considered students of the 8th semester. As a strategy for a structured data collection before and after application of the software, obtaining satisfactory results questionnaire it was applied. The findings obtained in this investigation served to make clear the importance of today use software for the improvement of education.

Key words: free software; crocodile; electricity

JEL code: I29

1. Introduction

In today's society, science and technology play a fundamental role, both in production systems and services and in everyday life. It would be difficult to understand the modern world without understanding the role that meet science and technology, so adolescents and the population in general, require a basic scientific and technological culture that allows them to better understand their environment.

For some years, the education system in Ecuador, is subjected to continuous and profound changes at all levels. So a learning tool is the information and communications technology (Peñaherrera Monica Leon, 2013).

As indicated Barbera and Fuentes (2012) in their study of student perceptions on the inclusion of ICT in secondary schools, 89% of respondents state that students learn better with ICT. In the same study it indicates that what the student demand is not only the use of ICT but a change in how to teach the classes.

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The insertion of ICT in education depends largely on the teaching and preparation possessing for incorporation into the teaching/learning, referring to knowing how to use the teaching resources offered by these new media and in turn train students for the receipt and proper assimilation of messages transmitted said means, if we want the education system conform to the continuous cultural changes (Cabero, 2002)

Personally it could show that Tics is not a perfect solution, but the means to reach that can effectively achieve meaningful learning by the students and the acquisition of skills.

The teaching of experimental science and technology is addressed in most of the schools from a theoretical point of view; the great extension of the curriculum, pressure testing selectivity, lack of well-equipped laboratories, groupings of students not suited to work safely and other factors, determine which work in the classroom with a single tool, the classic slate (Pedro Fernandez, 2010).

The problem is evident in the career of Sciences is that students look at the subject of physics as an abstract subject and are not motivated to learn it. Their attitude in the classroom is memorization, leaving aside the reasoning and triggering the so-called anxiety the number, creating a false impression of having understood the proposed during the study of the physical content, which creates problems in the continuous learning development for the next academic content. As future teachers need both methodological and cognitive tools that allow you to communicate successfully in the world of physics and solve problems that warrant its use but with understanding.

A little more specific on the subject of electronic there are problems in students especially in understanding the content, these problems are caused by preconceived ideas that students have in the interpretation of certain concepts of physics related curricular electricity as: resistance, electric power, electric current, electric circuit, among others, most students learn to solve problems without understanding or assimilate the concept.

It is Nolasco (2012) who proposes the use of multimedia resources for learning electricity after a study of two groups of students in which it was approved that these resources help in their learning.

It is with this awareness that this article invites teachers of Physics seize the opportunity they give us the integration of new technologies in Ecuador's education, including the use of software freely available Crocodile that has been created with the specific purpose of It is considered as a teaching tool and as a complement to facilitate the teaching-learning contributing to change the paradigms that guide our professional activity and innovation in our educational practice that is so necessary to our country.

The main goal invites this modest contribution is to understand the impact of the use of free software crocodile learning Electricity in students 8th semester of studies of Exact Sciences Faculty of Educational Sciences, Humanities and Technologies National University of Chimborazo.

2. Materials and Methods

The research was conducted in his study of the Faculty of Education Sciences, Humanities and Technology, National University of Chimborazo in the research of Teacher Education and Education Sciences. According to the characteristics of study constitutes a viable and feasible, same research that relies on research correlational, by relating the two variables of study, the independent variable that corresponds to the software freely available crocodile and the dependent variable learning electricity. The quasi-experimental research design is under actors subjects of this research were not selected randomly. The hypothetical-deductive method was used because a problem arose, the hypothesis was established, there were deductions consequences of the hypothesis and finally contrasted. The techniques used were the survey and test their instruments questionnaire and objective test, the

same as were applied in order to determine the degree of knowledge that students had about the use of software, as well as knowledge related with the issue of electricity. The study population were 70 students of the School of Sciences, and for the purposes of this investigation a non-probabilistic intentional sampling being considered 8th semester students was selected. According to the characteristics of the sample for testing the hypothesis nonparametric Wilcoxon statistical test was selected for comparative samples.

How the application of software for the unit crocodile electricity developed detailed below:

- Students a structured questionnaire was applied, which allowed it to determine the level of knowledge they had about the use of freely available software especially related to electricity.
- Without using the software crocodile electricity unit with its thematic explained: Montage of circuits with resistors in series, parallel and mixed, Ohm's law, Whesthone Bridge, then the pretest was applied. Barrales, Rogelio (2015).
- After the theoretical part, the crocodile software was installed on computers Computer center of the Faculty.
- With the help of the electronic board, management software crocodile, through guided practice, independent investigations and checks are explained.

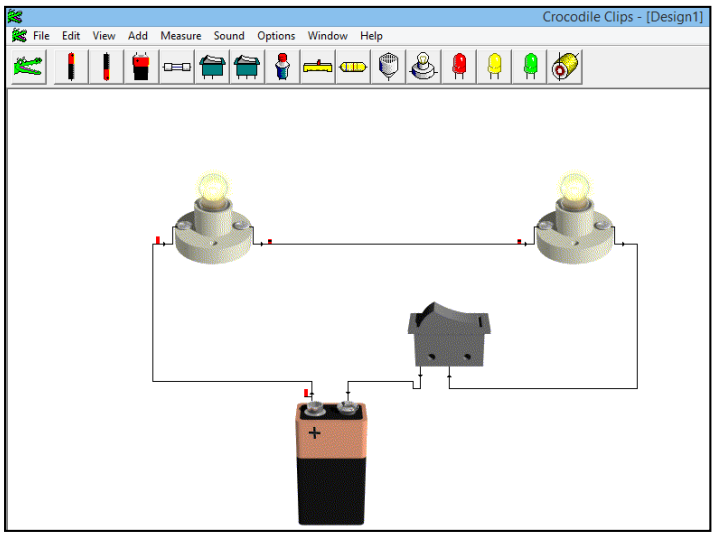

Figure 1 Workspace Software Crocodile

To develop the application uses a variety of characteristics of the new technologies of communication and information techniques, giving priority to those specifically related to the design of interactive hypermedia applications.

- Learning schemes aimed at encouraging students in participation and interest in development issues and knowledge was incorporated.
- The software also allowed crocodile formatively evaluate the student through the development of practical exercises, workshops in the classroom on the basis of proposals formulated. Posttest was applied.
- Finally it is recommended that the student on individual use and at home as a study tool, test and review or reinforcement

3. Results and Discussion

With the data obtained from pre and post-test analysis and interpretation of results proceeded.

As evidenced in Table 1, the average score of post-test is greater than the average pre-test, which conclude that by using the software crocodile on the subject of electricity significantly improved learning.

According to Figure 2 in the pretest there is more number of students who have obtained RATING 5, while in posttest is evidence there more students who have obtained qualifications between 8 and 9, which means that the methodology applied in the post-test it is better than the pretest.

Table 1 Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Pre-test	9	5,1111	1,36423	3,00	7,00
Pos-test	9	8,2222	1,09291	6,00	9,00

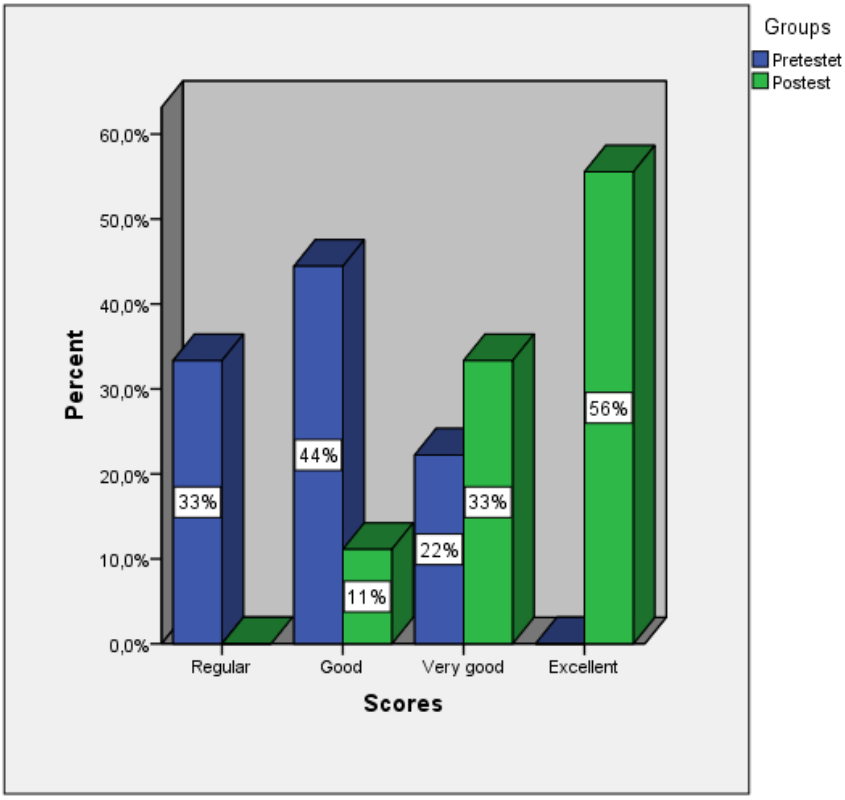

Figure 2 Comparison Pretest vs Postest Groups

Using the SPSS statistical software, and with a level of significance of 5%, proceeded to testing the hypothesis with the nonparametric Wilcoxon test for related samples. The assumptions are:

H0: The use of free software crocodile improves learning not satisfactorily electricity.

H1: The use of free software successfully improves learning crocodile electricity

Table 2 Wilcoxon Signed-rank Test

		N	Mean Rank	Sum of Ranks
Pretest- Postest	Negative Ranks	0[a]	0.00	0.00
	Positive Ranks	9[b]	5.00	45.00
	Ties	0[c]		
	Total	9		

Decision criteria:

If the probability obtained P-value ≤ α, reject Ho (H1 accepted)

If the probability obtained P-value ≥ α, it does not reject H0 (H0 accepted)

As shown in Table 3, the p-value significance obtained bilateral asymptotic is 0.007, as it is less than 0.05 significance level; the null hypothesis is rejected and accepts research; so it is concluded that there is a significant difference between mean scores of students before and after applying the Crocodile software.

Table 3 Test Statistics

	Pretest -Postest
Z	-2.687[a]
Asymp. Sig. (2-tailed)	0.007

a. Based on negative ranks. b. Wilcoxon Signed Ranks Test

4. Conclusions

- It is found that use of the software crocodile, students acquire new skills that complement significantly the learning of electricity.
- It is observed that there is greater interaction and student participation in learning electricity, appropriating concepts and definitions for the development of exercises and proposed problems.
- The crocodile software encourages a rigorous and methodical self-employment, raising the motivational level students, knowing that motivation is one of the main engines of learning, which encourages activity and thought.
- With the rapid advancement of society, technology and science, students need more critical, reflective, research and above all ability to resolve situations, taking into account the applicability of the theory and practice.

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