RESEARCH ARTICLE

APPLICATION OF EXCEL SOFTWARE FOR THE TEACHING OF MATHEMATICS IN STUDENTS OF THE FIRST GRADE OF SECONDARY SCHOOL IN TRUJILLO, PERU

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Abstract

The present research work has the main objective of determining to what extent the Application of Information and Communication Technologies (ICT), improves the academic performance in the mathematics area of the first-grade students of the secondary level, taking as based on a computer program that is available to most students at this level, such as excel. A very important psychological factor for the concretization of this fact is the motivation, generated by the interaction of the student with the TIC, constituting itself in a motor for the improvement of the academic performance of the student. To this end, a questionnaire was developed as an evaluation instrument for a sample of 60 students from a population of 260 male students. The research technique of experimental group design and control with previous and subsequent measurement was used, by non-probabilistic sampling, the section of the 1st "I" was determined as the experimental group (31 students) and the section of the 1st "J"as the control group (29 students), the results being processed and statistically checked. The final conclusion was reached that the application of ICT, in this case the excel computer program, improves by 16.6%, the academic performance in Mathematics of the first grade students of the secondary level of the IEPE GUE José Faustino Sánchez Carrión-Trujillo. ***ASEAN Journal of Psychiatry, Vol. 22(10) December, 2021; 1-6.***

Keywords: Microsoft Excel, Academic performance, Motivational factor

Introduction

Education in the world today has changed a lot with the application of Information and Communication Technologies (ICT). [1]

Pedagogical practices are constantly changing, because new technologies appear every year, so teachers must be constantly updated. Our main problematic reality that has motivated us to carry out this research work is the low academic performance of high school students in the Mathematics Area in our country, despite the fact that the Ministry of Education of Peru, to counteract these results, is trying as much as possible to implement a series of policies, from the increase in remuneration to teachers, to the development of pedagogical tools such as the Learning Routes, where the skills and competences that have to be ensured in students and the indicators of learning achievements by levels of education (initial, primary and secondary) are raised.

Given the problematic reality exposed, the objective of this research is to demonstrate how the use of Information and Communication Technology (ICT) improves the teaching and learning process of mathematics, therefore, this study will serve the educational system in general. Herein lies the convenience of this study, that is, the main beneficiaries are students of all educational levels, teachers, directors of the education sector, parents, in general the entire educational community. That is why the Social Relevance and Importance of this Research Work. Particularly in this research work is promoting the use of one of the most common and well-known computer packages such as excel, which is available to most students, teachers and the general public, but which is a powerful tool of computer technology.

Another problem is that a good percentage of the teaching staff of the state that is appointed has not been motivated to a change of methodology in their teaching, perhaps because of the time of services they have, because there is no direct incentive, whether pecuniary or otherwise, because there is simply a resistance to change. In addition, another percentage of state teachers, if they are affordable to the application of new technologies in their teaching work, and strive for their improvement. Of this last percentage of state teachers mentioned, a large number of them if they apply ICT in their daily routine; while the other group of teachers, although they are trained, do not incorporate it into their daily teaching role [2,3].

It is therefore also the purpose of this research work, to demonstrate to this sector of teachers in the state that they are reluctant to incorporate ICT into their daily work, which precisely by applying new computer technologies in their learning sessions will achieve better academic performance in their students [4-6]. That is why the problem I pose is: To what extent does the application of the Excel computer program improve the learning in the area of mathematics of students at the secondary level? Being the hypothesis that effectively the use of ICT in general improves the learning of mathematics in students at the secondary level, as I am demonstrating with the results obtained.

Materials and Methods

The experimental and control group design with prior and subsequent measurement was used, considering as population all the students of the first grade of secondary school of the José Faustino Sánchez Carrión Educational Institution of Trujillo, Peru in 2017, and through non-probabilistic sampling two sections were chosen, one section as an experimental group (31 students) and the other the control group (29 students). The research instrument was a questionnaire for the student.

Results

In Table 1 and Figure 1, it can be seen that, in the pre-test level of the experimental group of the students, that is, before applying the mathematics learning sessions with the excel program, there is a prevalence of 35.5% with the qualification of bad, followed very closely with 32.3% with the qualifier of regular. In third place, with 22.6%, they are with the qualification of very good, and finally with 9.7%, with the qualifier of good [7-10]. However, in the post test level, after applying these learning sessions, no student obtains the qualification of bad, 71% of students obtain the qualification of very good, 25.8% obtain the qualifier of good, and 3.2% of students the qualifier of regular, which indicates an undeniable improvement in the level of learning of mathematics, when applying the learning sessions with the Excel Software. On the other hand, in the control group, the students, although it is true there is an improvement in the level of learning of mathematics in the post test stage, this is not as significant as in the

experimental group, because in this case the learning sessions were not applied with the excel computer program, but both in the pre-test stage and in the post test stage, the same traditional teaching methodology of mathematics was applied. When comparing the results obtained in both the experimental group and the control group, it is clearly defined that in the experimental group there was a significant increase in the level of learning of mathematics, while in the control group, although it is true there was an improvement in the level of learning of mathematics, this is much lower than in the experimental group.

Table 1. Distribution of students of the first grade of secondary school by experimental group and control group.

Level of learning mathematics with the use of ICT	Experimental group				Control group			
	Pre test		Post test		Pre test		Post test	
	N°	%	N°	%	N°	%	N°	%
Very good	7	22.6	22	71	4	13.8	6	20.8
Good	3	9.7	8	25.8	10	34.5	13	44.8
Regular	10	32.3	1	3.2	4	13.8	3	10.3
Bad	11	35.4	0	0	11	37.9	7	24.1
Total	31	100.0	31	100.0	29	100.0	29	100.0

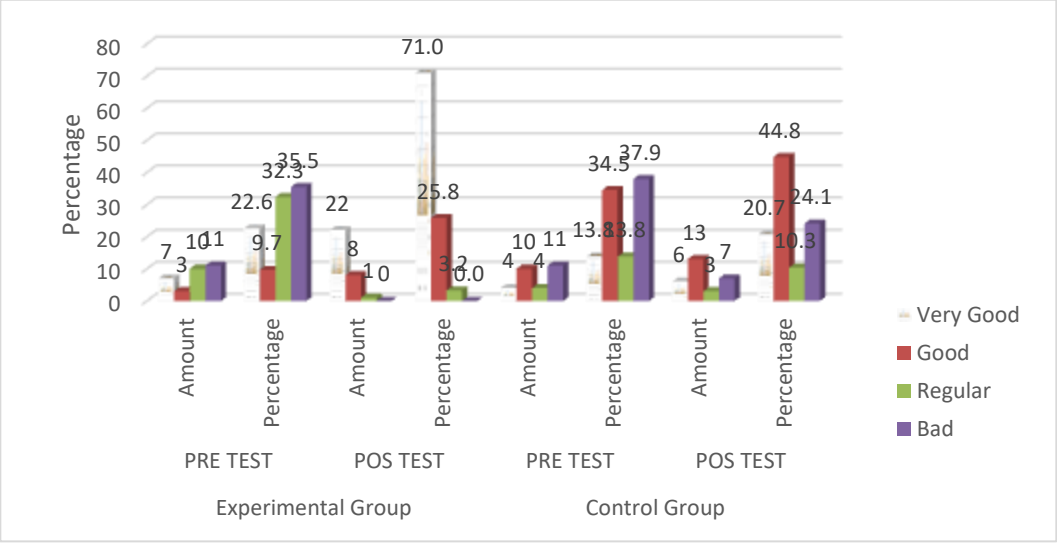

Figure 1. Percentage distribution of students in the experimental group and the control group.

Table 2 and Figure 2 show that, in the experimental group, there is an increase of the average of 4.63 points in the mean of the post-test with respect to the average of the pre-test; which shows a significant improvement in the level of learning mathematics, generated by greater motivation on the part of the students, when receiving mathematics classes with a computer program, in this case excel. Likewise, the data show a greater dispersion in the pre-test than in the post test, which indicates that there is a greater uniformity in the scores obtained in the post test. In the control group, on the other hand, there is an increase of 1.5 points in the post test mean with respect to the pre-test average. In this group the students have been

attended with the traditional methodology of teaching mathematics that is, without the application of ICT. This indicates that with the traditional methodology of teaching mathematics, if you have an improvement in the level of learning mathematics, but much less than with the application of ICT.

Table 2. Descriptive statistics of the samples of the experimental group and control group both in the pre-test level and in the post test level.

Descriptive statistics	Experimental group		Control group	
	Pre test	Post test	Pre test	Post test
Average	12.81	17.44	13.03	14.34
Standard deviation	4.078	1.802	3.896	3.528
Maximum	19	19	19	19
Minimal	7	12	7	8
Sample size	31	31	29	29

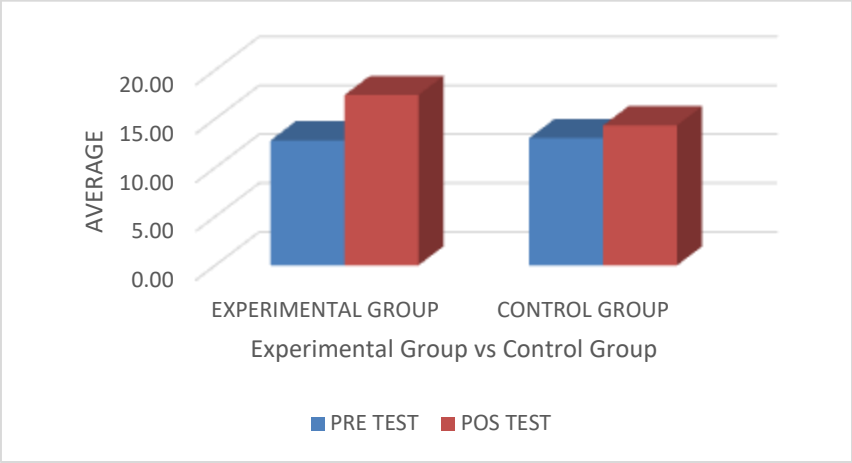

Figure 2. Comparison of the means of the experimental group and the control group

In Table 3, the student's t test results for related samples suggest that, the application of the excel computer program in the teaching of mathematics improves significantly ($p \leq 0.05$) and at a high level the learning of mathematics compared to traditional teaching in students of the first grade of secondary school of an educational institution of Trujillo, Peru in 2017.

Table 3. Student's T test (related samples) to compare the experimental group and control.

Statistics for related samples (Pre test-Post test)	Experimental Group	Control Group
Average	-4.629	-1.310
Standard deviatión	3.033	1.692
Statistic t of student	-8.497	-4.169
Degrees of freedom	30	28
P value	0.000	0.000

Discussion

In relation to the results obtained in the research, it can be affirmed that in the experimental group, two tests were taken; a first the pre-test, before carrying out the learning sessions with application of ICT; the second the post test, which was taken after the teaching of mathematics with ICT. When analyzing and comparing these results, a difference of the means or averages is calculated in 4.63 points, in favor of the average of the post-test, which is enough. It is clearly defined then that this difference of means, is due to the effectiveness of the learning sessions with the excel, in the improvement of the academic performance of the students. These results are aligned with what was pointed out by Grisales who states that there is a research trend around the use and appropriation of ICT resources in the classroom and evidence has been found of the positive impact that this use has on the learning processes of different areas, including mathematics. Likewise, it coincides with what was stated by Hodges et al. who propose that ICT allows students with few symbolic and numerical skills to develop strategies to solve problematic situations, using various tools that provide them with a better understanding [11,12].

Conclusion

With the present study it was possible to determine that the learning sessions of mathematics applying ICT, in this case excel, raises to a greater degree the academic performance of students at the secondary level than the traditional model of teaching Mathematics in the IEPE. GUE José Faustino Sánchez Carrión–Trujillo, because it is a great positive motivational factor for the student and due to the modern environment in which it operates, to the technological facilities that it entails, to the speed and effectiveness of the results and other elements of computer technology". Finally to promote a greater use of information and communication technology in the teaching-learning processes of each of the areas, so that teachers and students can be favored with all the benefits that this educational policy entails, being the motivational factor one of the most important factors that leads to better academic performance and research capacity of the student.

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