IMPROVING TEACHING METHODS IN HIGHER EDUCATION BY IMPLEMENTING THE ACTIVE, PARTICIPATIVE STRATEGY

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Abstract: *During the last decades the problem of finding the teaching methods that fit the best the changing mentality of the students and allow them to better assimilate the material that has to be learnt has been a matter of interest for many researchers. In this study we have considered two different methods of learning: a traditional and an innovative one. We taught the class using the two methods mentioned above and tested their knowledge in order to determine the most efficient method. We have made a correlation between the traditional and the innovative way of teaching showing that the results for the new method of teaching were better, especially for the students who generally had lower marks. The results obtained indicate that traditional teaching methods can be improved by increasing the aspect of creativity and group work which ultimately will converge in better results for all types of students.*

Keywords: teaching methods, students, active strategy, participative strategy.
JEL Classification: I 250

1. Introduction

The sea changes occurring in the contemporary society impose new requirements on the schooling of the young generation. Thus, schools are

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forced to adapt constantly to rapid economic and social changes through innovative curriculum projects that decisively influence people's outlook on the role played by the education system (Păcurari, 2003).

For a long time, education focused mainly on the informational, traditionalist aspect, as the educated person was considered to be the one who possessed a great deal of knowledge. The teaching act was confined to transferring knowledge from teacher and manual to student, the volume and diversity of the information possessed being the measure of the students' high qualification. Students were invited to listen to explanations, understand demonstrations and make value judgments as a result of reasoning (Oleksik et all, 2010; Hedges et all, 2010). Learning by retention and practice of new knowledge could only be done individually, and the confrontation of ideas was not a priority. More and more emphasis is placed on current dynamic, stimulating teaching methods (Mara, 2010; Popa et all, 2010; Madson et all, 2013).

The diversification of teaching and learning tools plays a decisive role in the students' evolution from one year to another. The experiment focuses on the monitoring of a sample of 28 students, out of whom 20 are girls and 8 are boys, from the perspective of the scores obtained by the students after teaching two courses that follow two preset methods – the control and pilot methods. The paper aims at determining whether there are significant correlations between the results regarding different teaching methods, classic and innovative, applied in two courses.

2. Improving teaching methods in higher education

The influence of the different learning methods reflected in scores on the various categories of students (Figure no. 1). The graph below shows that witness test scores are lower than pilot test ones.

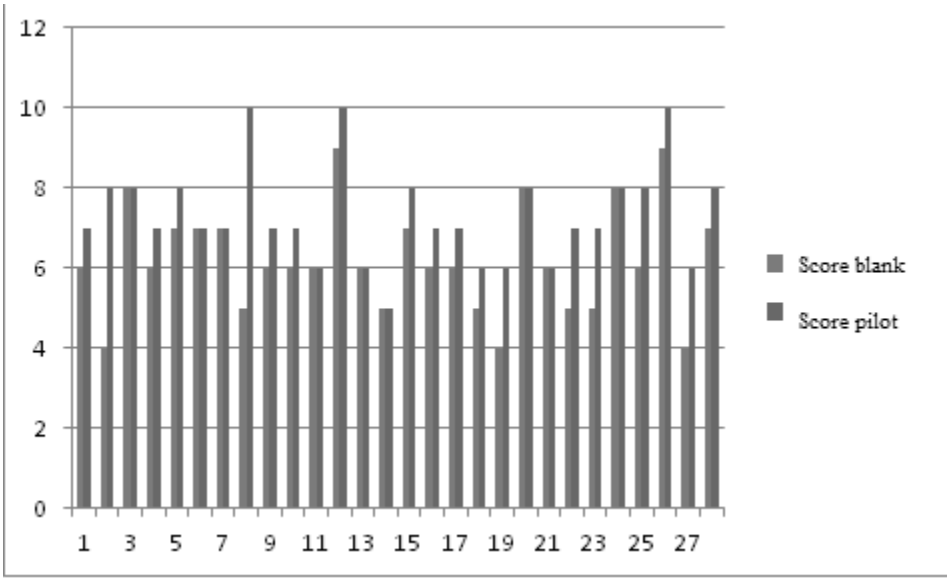

Figure no. 1. The influence of the different learning methods in scores on the various categories of students

This can be explained by calculating efficiency:

Efficiency of module 1			0.15	0.67	0.00	0.15	0.13
0.00	0.00	0.67	0.15	0.15	0.00	0.11	0.00
0.00	0.13	0.15	0.15	0.18	0.40	0.00	0.00
0.33	0.33	0.00	0.29	0.11	0.40	0.13	
Efficiency of module 2			0.25	0.00	0.00	0.25	0.00
0.13	0.12	0.00	0.12	0.13	0.25	0.00	0.29
0.46	0.00	0.13	0.35	0.13	0.13	0.00	0.25
0.13	0.13	0.12	0.00	0.00	0.55	0.11	

Formula for calculating efficiency:

(pilot score 1- witness score 1) / [(witness scores 1 + pilot score 1)*2]. (1)

Efficiency can be noted to always have a non-negative value, which shows that the scores obtained using the pilot test are equal to or better than those obtained in the witness test (Figure no. 2). These results were obtained for both modules considered. Moreover, higher values of efficiency can be noted for module 1, which shows that the new learning methods have a greater influence on this module.

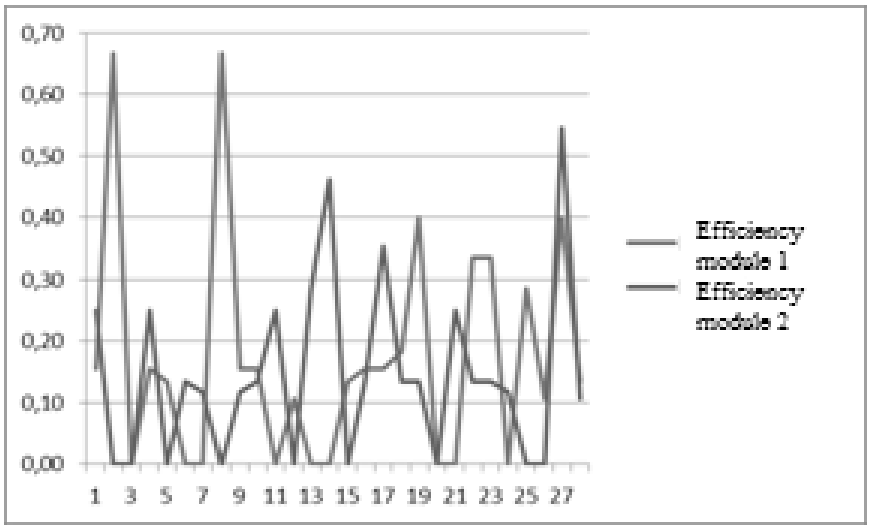

Figure no. 2. Efficiency of module 1 and 2

The pilot test can be noted to have better values than the witness test in both cases.

To compare the correlation between the two learning methods, we will use the chi-squared test and calculate Cramer's correlation coefficient and Pearson's contingency coefficient. Cramer's coefficient is used especially when a larger table is involved, due to the impossibility of reaching value 1.

To calculate the two coefficients, we will first calculate the value of chi square. The table used in the calculation is the following:

Table no. 1

Calculate the value of chi square

	Scores 4-6	Scores 6-7	Scores 7-8	Scores 8-10	Total
Witness	18(13)	5(7)	3(5)	2(2)	28
Pilot	7(12)	10(8)	8(6)	3(3)	28
	25	15	11	5	56

To calculate the value of chi square, we need the following auxiliary data:

Table no. 2

Auxiliary data to calculate the value of chi square

O-E	(O-E)^2	E	((O-E)^2)/E	sqrt(E)	R
6	36	12	3	3.464102	1.732051
-6	36	13	2.76923077	3.605551	-1.6641
-2	4	7	0.57142857	2.645751	-0.75593
2	4	8	0.5	2.828427	0.707107
-2	4	5	0.8	2.236068	-0.89443
2	4	6	0.66666667	2.44949	0.816497
0	0	2	0	1.414214	0
0	0	3	0	1.732051	0

Were also calculated the theoretical frequencies, based on the total weights of the scores, depending on the ranges examined, which have the following values: 44.64%, 26.78%, 19.64%, 8.92%. Theoretical frequency values are listed between brackets. Using data from the table, we obtain the value of chi square: 8.31. The value obtained is compared to the value in the statistical table corresponding to three degrees of freedom for a significance threshold of $p < 0.05$. The value in the table is 7.82. The value obtained is higher, so the null hypothesis can be rejected.

Examining the results, we can say that there are significant differences between the two tests. We analyze the standardized residual values in the table to see if there are values responsible for obtaining a significant value of chi square. The closest values to 2 are the ones corresponding to the ranges with low scores (4, 6) for both tests. Pearson's coefficient is 0.36.

Cramer's coefficient is 0.54.

Comparing the two coefficients will be relative to 1, so the closer the coefficient obtained is to 1, the more likely we are to obtain a positive correlation. The results obtained lead to the assertion that there is a positive correlation between the two types of tests. This test was performed to compare the two tests in the first course. The same can be done for the second course. The calculations for the previous test will be remade, this time based on the following data:

Table no 3

Test score in the first course and for the second course

	Score 4-6	Score 6-7	Score 7-8	Score 8-10	Total
Witness	3(2)	12(7)	9(12)	4(8)	28
Pilot	0(1)	1(6)	15(12)	12(8)	28
	3	13	24	16	56

The value of chi square is equal to 14.7. Having three degrees of freedom, as in the previous case, the value of chi square will be compared to the table value. The value of chi square can easily be noted to be greater than 7.82.

This allows us to conclude that there is a difference between the two tests, and the value responsible for obtaining a significant value of chi square is given by the scores within range (6, 7) for the pilot test.

Table no. 4

The auxiliary table used to calculate chi square

O-E	(O-E)^2	E	((O-E)^2)/E	sqrt (E)	R
1	1	2	0.5	1.414214	0.707107
-1	1	1	1	1	-1
5	25	7	3.571428571	2.645751	1.889822
-5	25	6	4.166666667	2.44949	-2.04124
-3	9	12	0.75	3.464102	-0.86603
3	9	12	0.75	3.464102	0.866025
-4	16	8	2	2.828427	-1.41421
4	16	8	2	2.828427	1.414214

One can easily notice that the number of scores within this range is low and that the number of scores within ranges (7, 8), (8,10) has significantly increased compared to the scores obtained in the witness test.

The correlation coefficient and the contingency coefficient were also calculated, the value of the former being 0.51 and of the latter 0.46.

3. Conclusion

In conclusion, we demonstrated that there is a correlation, as described above, between the two teaching methods. We also pointed out that the pilot test results are higher than the pilot test ones, as demonstrated by calculating efficiency and the t-test. The ranges of scores that have an influence on chi square are (4, 6) for the first course and (6, 7) for the second course.

Thus, for the first course, the number of scores below 6 obtained in the pilot test drops considerably compared to the witness test, and, for the second test, the number of scores within range (6, 7) obtained in the pilot test goes up significantly, according to the data obtained from the study of standardized residue.

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