STATISTICAL ANALYSIS OF SOME FACTORS AFFECTING STUDENT ACADEMIC LEARNING PERFORMANCE

Letiția OPREAN[1]

Abstract: *The paper aims to monitor and establish the presence of correlations concerning learning capacity according to gender, origin, social environment, health condition and family, on a sample of 28 students who attended two courses: the standard and innovative ways.*Correlations were determined by statistical methods. T*hese demonstrated that either environment where students come or their gender or family status does not affect their learning ability*.
Keywords: Learning, performance, statistical analysis.
JEL Classification: I 250

1. Introduction

The current curriculum reform focuses on student teaching for life. Cultivating receptiveness and holistic abilities to allow students to easily and effciently connect to new information together with direct access to sources are of primary interest as well as stimulation of creativity and boosting team work spirit (Mara et all, 2009; Popa et all, 2010).

We can speak thus about a competition-centered education system, stimulation of moral-volitive qualities, imagination and creativity. The transition from static knowledge acquisition, theory and opinions toward a practical creative system that encourages inventiveness, implicitly determines an adjustment to new methods of evaluation and a further approach of quantifying the answer that reproduces the subject matter topics applied on creativity and pragmatism (Mara et all, 2009; Duşe, 2005; Mara, 2010).

[1] „Lucian Blaga" University of Sibiu, Victoriei Avenue, No 9, Sibiu, 550024, Romania, e-mail: oprean.letitia@yahoo.com

Thus, the system of invariable evaluation will be replaced by an auxiliary, flexible, descriptive- subordinate evaluation method. Education becomes genuinely formative whose shaping impact gets appreciated through skills, capacities and attitudes developed in students (Duşe, 2004; Oleksik et all, 2010).

2. Student academic learning performance

We further discuss whether there are differences between female and male student learning skills related to their average means. There are 4 grading scales to be considered as follows: (5,6], (6,7], (7,9], (9,10].

Table no. 1

Grading scales of notes

	5-6 grades	6-7 grades	7-9 grades	9-10 grades	Total number of students
Girls	6(6)	9(7)	5(6)	0(1)	20
Boys	2(2)	1(3)	3(2)	2(1)	8
Total	8	10	8	2	28

We use the chi square test with gender as a nominal value. The tables indicate the real situation given by the average of the two tests and the theoretical situation given in brackets.

Table no. 2

Compute the chi square with the help of the previous data

O-E	(O-E)^2	E	((O-E)^2)/E	sqrt(E)	R
0	0	6	0	2,44949	0
0	0	2	0	1,414214	0
2	4	7	0,571429	2,645751	0,755929
-2	4	3	1,333333	1,732051	-1,1547
-1	1	6	0,166667	2,44949	-0,40825
1	1	2	0,5	1,414214	0,707107
-1	1	1	1	1	-1
1	1	1	1	1	1

We compute the chi square value that equals 4,58. The number of degrees of freedom in our case is 3. The table of critical values of chi square distribution for 3 degrees of freedom and a significance threshold of $p<0.05$ shows a value of 7.82. The value we obtained is significantly lower, which leads to the idea that there is no difference between girls and boys, thus the null-hypothesis gets rejected. We can compute Pearson's contingency coefficient and Cramer's correlation coefficient with the help of the chi square. We obtain Pearson's coefficient of 0.13245 and Cramer's coefficient of 0.13363.

We notice that the two coefficients are not too near to 1 therefore there is no strong correlation between the two groups; the standardized residual does not show either the presence of any strong correlation between variables. If we use the bilateral t test for the previous table we get a value of 1. The critical value for a 05 significance threshold would be 2.353. We are further on interested whether there is any influence on the average as a result of origin. We design the following table according to the previous model we used for gender.

Table no. 3

Student's origin

	5-6 grades	6-7 grades	7-9 grades	9-10 grades	Total number of students
Urban	3(4)	4(4)	2(3)	2(1)	11
Rural	6(5)	6(6)	5(4)	0(1)	17
Total	9	10	7	2	28

The table 3 shows the presence of two grades of 10 from the students living in urban areas. This is why we question whether the environmental factor influences student learning skills. We use an intermediary table to compute the chi square:

Table no. 4

The chi square table

O-E	(O-E)^2	E	((O-E)^2)/E
-1	1	4	0,25
1	1	5	0,2
0	0	4	0

O-E	(O-E)^2	E	((O-E)^2)/E
0	0	6	0
-1	1	3	0,33333333
1	1	4	0,25
1	1	1	1
-1	1	1	1

The chi square value is: 3.033. There are 3 degrees of freedom and a value of 7.82 for the $p<0.05$ significance threshold. The chi square value is significantly lower indicating no difference between rural and urban areas, with a rejected null-hypothesis.

We further on consider the influence of family and health condition factors on grades, computed with the help of witness, pilot and final grades of the two courses. The average values are displayed in the following table:

Table no.5

The influence of family and health condition factors on grades

Total average 1	Total average 2
6,666666667	8
6	8
8	8
6,666666667	8
7,666666667	8
7	7,666666667
7	8,666666667
7,666666667	10
6,666666667	8,666666667
6,666666667	7,666666667
6	8
9,666666667	10

Total average 1	Total average 2
6	7
5	6,666666667
7,666666667	8
6,666666667	7,666666667
6,666666667	8,666666667
5,333333333	7,666666667
5	7,666666667
8	8
6	8
6,333333333	7,666666667
6	7,666666667
8	8,666666667
7	8
9,666666667	10
5	5,666666667
7,666666667	9,666666667

Table no. 6

The family factor to the first course average

	5-6 grades	6-7grade	7-8grades	8-10grades	Total number of students
Family factor 0	6(5)	7(7)	5(4)	0(1)	18
Family factor 1	2(3)	4(4)	2(3)	2(1)	10
	8	11	7	2	28

Table no. 7

The auxiliary table to compute the chi square:

O-E	(O-E)^2	E	((O-E)^2)/E
1	1	5	0,2
-1	1	3	0,333333333

O-E	(O-E)^2	E	((O-E)^2)/E
0	0	7	0
0	0	4	0
1	1	4	0,25
-1	1	3	0,333333333
-1	1	1	1
1	1	1	1

The use of these data shows the chi square value of: 3,12; this is significantly lower than 7,82. For this reason we cannot reject the null hypothesis, there are thus no differences between the students with a special family situation and the rest of them. The t test would be another method employed to compare the two tests and their influence on their average. We use the t test on pair samples for normal distribution data. We consider the two columns of the table correspondent of the witness and pilot tests. We use the Excel TTEST key to analyze data as follows:

p-value =T.TEST(A2:A29;B2:B29;2;1)= 4,04146E-05<0.05=α (1)

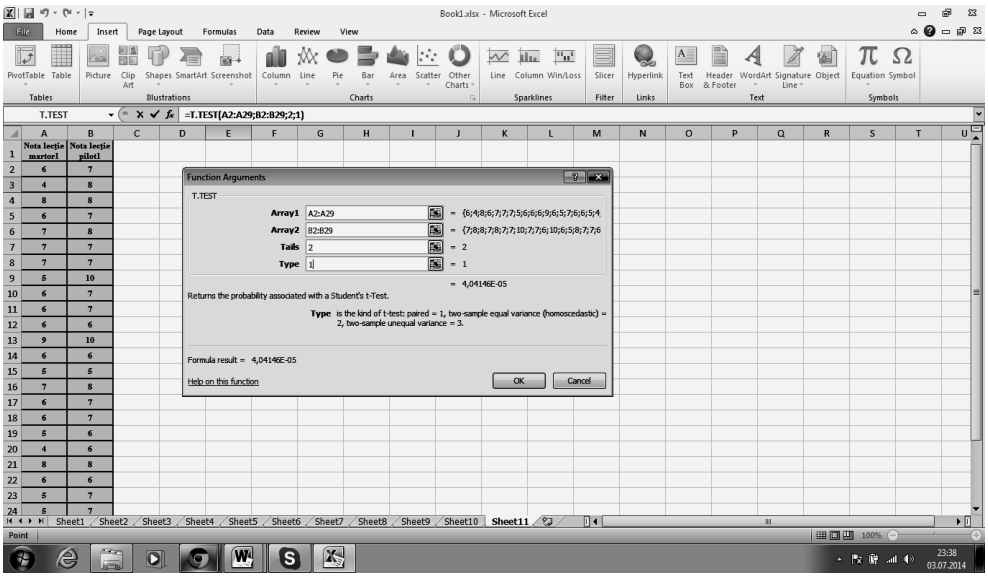

Figure no.1. p-value= T.TEST(A2:A29;B2:B29;2;1)= 4,04146E-05<0.05=α

The null hypothesis is thus rejected, the two types of tests having a different influence on students. We may compare the progressive evaluation to the final grades. We use the t test on pair samples that contain normal distribution data. We use the T TEST key to get:

p-value= T.TEST(A2:A29;B2:B29;2;1)= 2,28099E-09<0.05=α (2)

The result indicates a rejected null hypothesis.

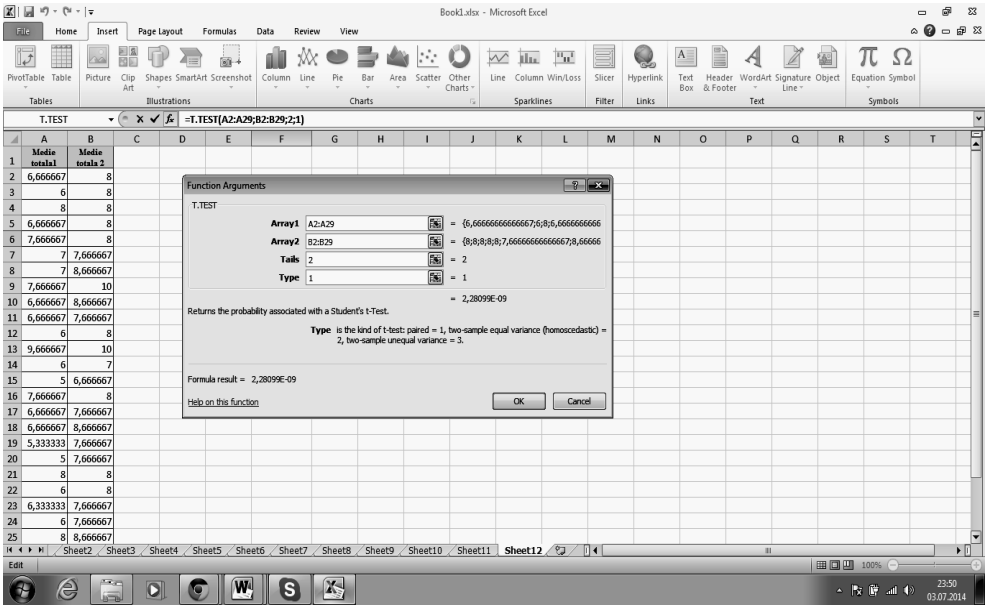

Figure no. 2 p-value =T.TEST(A2:A29;B2:B29;2;1)= 2,28099E-09<0.05=α

Conclusion

The tests we used above prove no presence of any statistical significant difference between the results of students who live in urban areas compared to those who live in rural areas. There are no results to show that gender may influence student learning skills or better grades for male or female samples. Family does not influence learning skills, it only captivates and boosts student attention.