Social and Educational Impact from the Introduction of National Exams in Greek High Schools: First Findings

John Panaretos

Department of Statistics
Athens University of Economics and Business
76 Patision Street, 104 34 – Athens, Greece
E-mail: jpan@aueb.gr

Word count for the manuscript: 4.828 words

1. Introduction

In the past several years it was argued in Greece that the educational system in High Schools (Lyceums) was not effective and that a change was necessary. The major problem of the system was that in order to get entrance to the University school leavers had to sit in national exams, immediately after they finished High School, in four subjects related to the particular field they wanted to study. It was observed that because of this students in the last two years of High School did not pay much attention to the school curriculum. Instead, they concentrated on the four subjects on which they were going to be examined after the end of High School to get an entry to the University. To achieve their goal they were going to cramming schools to better prepare themselves for the entrance exams.

In an attempt to change the situation the Government introduced a new law in 1997. According to the new law all courses (12-14) taught in the 10^{th} and the 11^{th} grade in High School would be examined at a national exam at the end of the school year. The grade for each course would be based both on the in-school performance of the student during the school year and the performance in the written national exam. In fact, the grade in a course would be calculated as the average of the final written exam in the national exams and the grade for the in-school performance (which would be the average of the grades of the two school semesters). With the introduction of the new law high school leavers would not take separate exams for entrance to the University. Entrance to the University would be decided based upon the grades of the students in the 10^{th} and the 11^{th} grade in all courses taken. This was a major change in the structure of High School, which bitterly opposed with large demonstrations and school occupation by students, High School teachers and some parent associations.

(Details of the Greek Educational System and its evaluation can be found in the publications listed in the reference list).

The system was put into effect for the first time in the school year 1998-1999 and for those students who were in the 11^{th} grade.

Naturally, it is of interest to find out how the new system influenced the performance of the students and the social implications of this change. In order to assess this a survey was contacted by the National Education Council of Greece in co-operation with the Department of Statistics of the Athens University of Economics and Business (Unit of Documentation of Education of the Institute of Statistical Documentation, Research and Analysis), during the Autumn of 1999. For the implementation of the survey, the method of census (of the characteristics we were interested in) among all senior high schools of the country was attempted. From the 1435 senior high schools of the country, to which the questionnaire was sent in September 1999, 557 schools responded (which constitutes approximately 39% of the population of schools). The representativiness of the schools that participated in the survey, with respect to the type of school (private or public), its size and its geographical location, is confirmed from the correspondence between the percentages of schools of different type, size, or of different geographical regions of the schools in the set of schools that participated in the survey and in the whole population. The schools that participated in the survey had 36971 students in the 10^{th} and 34259 students in the 11^{th} grade, in the school year 1998-99.

The response of the headmasters of the schools by filling in and returning the questionnaire is indicative of the interest and concern of those involved in the educational process.

2. Data Analysis – Comments

In the sequel the results of the survey are presented. The analysis is mainly confined to descriptive statistics (percentages) and graphs. However, in order to compare different groups of schools or time-periods statistical tests are performed (t-tests or ANOVA tests, depending on what is appropriate). The results of these tests are also provided. In addition to these parametric tests the corresponding non-parametric tests are performed in order to validate the results (since our data do not always comply with the assumptions of the parametric tests). In all cases the results of the non-parametric tests coincided with the results of the corresponding parametric tests (for this reason no further reference to the non-parametric tests is made).

2.1 Comparison of Students' Performance for the School Years 1998-99 and 1997-98

A first evaluation of the impact of the new educational system can be based on the comparison of the "students' failure" rate for the school years 1997-98 (when the previous system was in place) and 1998-99 (when the new system was put into practice). According to the Greek educational system a student fails a class if his overall average is less than 10. (The grading scale is from 0 to 20). Another important feature of the new system is that if a student fails he has to repeat the class. In the previous system students who failed had a chance to take a re-sit examination in September just before the start of the new school year. For the school year 1997-98, the term "students' failure" refers to the percentage of students that failed to pass the class, while for the academic year 1998-99 the same term corresponds to those

students that did not pass the examinations of June 1999[1]. The mean proportion of students who failed to pass the class the year 1997-98 and the June exams the year 1998-99 are given below for the students of 10^{th} and 11^{th} grade of the schools that participated in our survey. The results of the statistical tests used are also provided.

Table 1a

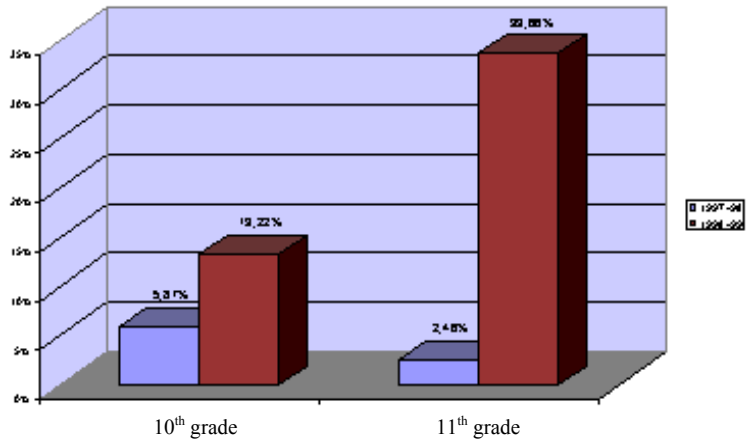
Mean Percentage of Students' Failure	*10^{th} Grade*	*11^{th} Grade*
1998-99	13.22%	33.66%
1997-98	5.87%	2.46%

Table 1b

Results of Paired t-tests ('1998-99' - '1997-98')	*10^{th} Grade*	*11^{th} Grade*
Mean difference of percentages	0.067	0.315
Std. Deviation	0.1229	0.2209
Std. Error Mean	0.0062	0.0104
t-statistic	10.788	30.109
Df	394	447
Sig. (2-tailed)	≅0	≅0

[1] [Those students were given a second chance to pass the class by a re-examination of September 1999. That means that the students that, finally, did not pass the class in 1998-99 were much less than the figure reported here. One could, consequently, argue that we are comparing heterogeneous figures. However, this modification (extra exams in September) was only valid for the first year of the implementation of the new system. Moreover, in the first year of the implementation of the new system, because of a major earthquake in the Athens area students form that area were allowed, as an exception, to a re-sit exam in September a fact that substantially reduced the number of 11^{th} grade students failed that class. So, our comparison sheds light into the actual effects of the new system. In fact, our analysis refers to what would have happened had the new system been applied as it is described in the law].

Graph 1



Graph 1: Comparison of the percentage of students (of 10th and 11th grade) who failed in 1997-98 and the percentage of the students that failed in the exams of June 1999.

As far as the students of 10th grade are concerned, we observe that the "failure percentage" is, almost, doubled (from 5.9% in 1997-98 it increased to 13.2% in 1998-99). In the case of students of 11th grade the difference is even more significant (from 2.5% in 1997-98 it increased to 33.7% in 1998-99).[2] If the new system was put into practice from this year in its original form (i.e. if the students were not given the opportunity of be re-examined in September) then the percentage of students that failed to pass the class in the school year 1998-99 would be more than ten times the percentage of students who failed to pass the class in the school year 1997-98. The statistical tests verify the conclusion that the difference in the "failure proportions" between the two consecutive academic years is statistically significant (approximately

[2] The extremely large difference in the failure proportions of students of 11th grade can also be attributed to other reasons, as a headmaster mentions: "In the academic year 1997-98 we were lenient towards the students of 11th grade since the next year was a year of changes, and if a student failed to pass the class he would have to face a totally different situation …".

zero p-values). These failure rates are extremely high and therefore it is obvious that changes in the system are necessary.

2.2 Study of the Mean Grade of Students of the 11th Grade

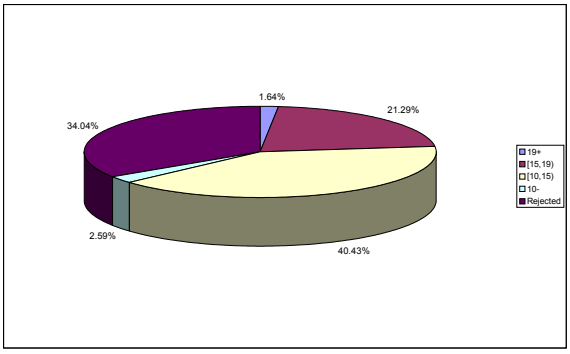
Another measure that can be used to evaluate the effectiveness of the new educational system is the general performance of students, as expressed by the overall mean grade of students. In our survey we categorized the grades in 3 categories: (a) Mean grades 19 or more, (b) Mean grades between 15 and 19, (c) Mean grades between 10 and 15. We asked each school for the proportions of its students that fall into each of these categories. Moreover, in order to take into account an interium provision for the students of 11th grade, by which some students with average grade less than 10 passed the class an additional "grade category" was included in our analysis. This fifth category included the students that failed in June 1999 and were allowed to be re-examined in September.[3] All percentages are based on the number of students that participated in the exams of June 1999. The mean percentage of students of 11th grade in the grade categories mentioned above are given in the table and graph that follow.

Table 2

Grade Categories	*Mean Percentage of Students*
19 +	1.64%
[15,19)	21.29%
[10,15)	40.43%
10 -	2.59%
Failed	34.04%

[3] Note that the percentage of failed students is not the same with the failure percentage previously mentioned. This is due to the fact that now some schools were assigned 'missing values' due to inconsistent answers.

Graph 2



Graph 2: Percentages of examined students of 11th grade in each grade category

It is evident that the performance of students cannot be characterized, in general, to be good. Only 1.6% of students of 11th grade attained grades higher than 19. On the contrary, the majority of students (40.4%) got low grades (between 10 and 15). Approximately 21.3% got fairly good grades (between 15 and 19). Students with grade lower than 10 comprise a large part of students (36.6%). Among them, 2.6% passed the class (because of the interim provision of the law), while 34% were re-examined in September[4].

The above results are rather alarming, especially if we contemplate that, according to the new system, the overall average of the 11th grade is going to be taken into account (optionally) for the entrance to Universities and Technological Institutions.

2.3 Study of the Mean Grade of Students of 11th Grade by the Characteristics of the Schools

In the previous section we examined the performance of students of the 11th grade as this is expressed by their overall average grade. The analysis was performed

[4] In The September re-sit exam about 70% of these students (20% of the total population) passed the class. This raised questions regarding the implication of the "only once" examination policy.

for all the schools in the survey. We now proceed to a more detailed examination, by categorizing schools according to a number of criteria. The characteristics of schools that we take into account are their type (private-public), their size (number of students), and their geographical location.

2.3.1 Comparison of Mean Grades of Students of the 11th Grade by School Type

In this section we try to investigate any possible effect of the type of school in the performance of students in the new educational system. In the table (and Graph 3) that follow we provide the mean percentages of students in each grade category according to the type of school.

Table 3a

Grade categories	*Type of School*	
	Public	Private
19+	1.46%	6.05%
[15,19)	20.21%	41.77%
[10,15)	40.54%	38.86%
10-	2.59%	2.06%
Failed	35.20%	11.25%

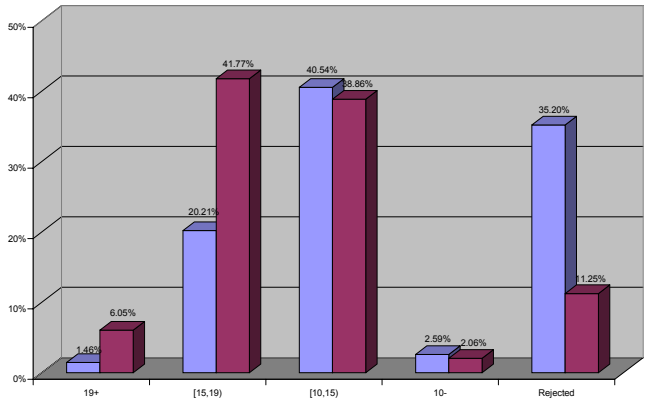
Base : 436 public schools, 21 private schools

Table 3b

Results of t-tests (Public-Private)	*Grade Categories*				
	19+	*[15,19)*	*[10,15)*	*10-*	*Failed*
Mean difference of percentages	-4.6%	-21.6%	1.7%	0.5%	24.0%
t-statistic	-7.184	-6.822	0.530	0.554	5.130
p-value (2-tailed)	0.010(*)	≅0	0.596	0.580	≅0(*)

(*) The t-test for unequal variances was used

Graph 3



Graph 3: Percentages of examined students of 11th grade in each grade category by type of school

By looking at the table of the results of the statistical tests (table 3b), we deduce that the difference in performance of students between public and private schools is statistically significant for the grade-categories '19+', '[15,19)' and for the 'failed' class. It is not significant for the other 'middle' grade-categories. This means that school performance differ when it comes to very good or very bad student performances but not for the moderate ones. Indeed, the percentage of students with grades equal to or greater than 19 is, only, 1.5% in public schools, while it reaches 6% in the private ones. Moreover, in public schools the percentage of fairly good students (with grades between 15 and 19) amounts to 20.2% of the students, while the corresponding percentage in private schools is 41.8% (constituting the majority of students). In public schools the majority of students has grades between 10 and 15 (40.5%), while there is a large percentage of students that did not pass the exams in June (35.2%). (The corresponding percentage in private schools is only 11.3%).

Here also the results are not encouraging. With the previous system students of public schools (which are 94.47% of the schools in the country) did generally better than the ones in private schools in the entrance exams for the Universities.

2.3.2 Comparison of Mean Grades of Students of the 11th Grade by School Size

Another factor examined was the school size (as this is expressed by the number of students in each school during the school year 1998-99). The comparison of schools by this criterion is important, since schools with few students are, usually, located in small towns or villages, while schools with a large number of students are located in the cities. In order to make the comparison of schools, we categorized them into four categories. These are: schools with number of students (a) up to 100, (b) between 101 and 200, (c) between 201 and 300, and (d) more than 300. In table 4a we present the distribution of students in grade categories for each size of school, while in table 4b the results of the corresponding ANOVA tests are given. The results are also illustrated graphically in the appendix (graph 4).

Table 4a

Grade Categories	*Size of School (# of students)* 1. Up to 100	2. Between 101 and 200	3.Between 201 and 300	4. More than 300
19+	0.88%	1.48%	2.17%	2.77%
[15,19)	13.71%	23.26%	24.09%	29.88%
[10,15)	37.57%	40.40%	43.53%	42.75%
10-	1.71%	3.63%	2.70%	2.74%
Failed	46.13%	31.23%	27.52%	21.87%

Base : 163 schools with size 'up to 100', 118 'between 101 and 200', 88 'between 201 and 300', and 93 'more than 300'

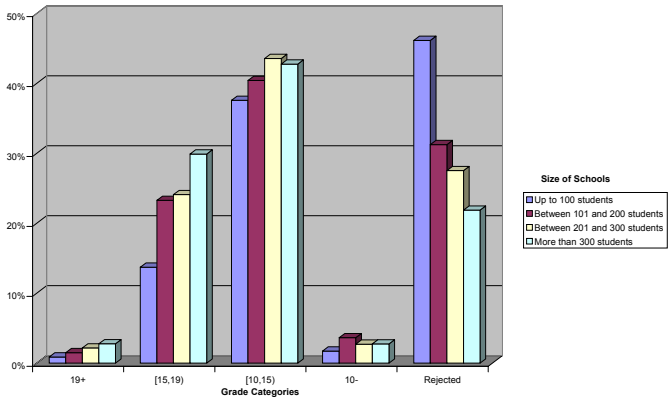
Table 4b

Results of ANOVA tests	*Grade Categories*				
	19+	*[15,19)*	*[10,15)*	*10-*	*Failed*
p-value (2-tailed)	≅0	≅0(*)	0.004(*)	0.003(*)	≅0(*)
Homogeneous Subsets of Schools(**)	(1,2) (2,3) (3,4)	(1) (2,3) (4)	(1,2) (2,3,4)	(1,2,3) (2,3,4)	(1) (2,3) (4)

(*) The assumption of homogeneity of variance does not hold

(**) According to Duncan's method

Graph 4



Graph 4: Proportions of students examined

by grade category and size of school in the 11th grade.

As we can see from part (ii) of table 4b, in all grade categories there are significant differences among schools of different size. In the last part (part iii) of table 4b, the homogenous subsets of schools (i.e. the schools that do not differ significantly) is provided. The more extensive differentiation is observed for the percentage of failed students, and students with grades more than 15.

Based on table 4a, as well as on Graph 4, a very interesting observation can be made. As we can easily see, the percentage of students with grade lower than 10 is negatively correlated to the size of schools. More specifically, while 47.8% of students of small schools had mean grade less than 10 (46.1% had to be re-examined in September), the corresponding percentage for 'large' schools is, only, 24.6%.

Similar comments can be made for the proportion of students with grade between 10 and 15. The proportion of students with mean grade between 10 and 15 is 37.6% in schools with no more than 100 students, while in schools with more than 300 students, this proportion increases to 42.7%. The reverse relationship holds for the 'good' grade categories. The proportion of students with grade greater than 19, as well as those with grade between 15 and 19, is directly related to the size of school. Indeed, the proportion of students with high mean grade 19+ is 0.9% and 13.7% with mean grade in the class (15-19) in schools with no more than 100 students, while in schools with more than 300 students, these proportions increase to 2.8% and 21.8%, respectively. The inequalities just mentioned are of major importance, since they imply unequal opportunities for the students of small towns and villages (where the schools tend to have small number of students) when compared to students from large cities (where the schools have many students). Again here we have a reversed situation compared to the previous system where students from small schools did rather well.

2.3.3 Comparison of Mean Grades of Students in the 11th Grade by Region

The schools that participated in our survey have been grouped into 13 categories according to the 13 geographical regions that Greece is administratively divided. In the present section we study the influence of geographical region to the performance of students (more precisely, to the mean grades of students of the 11th grade). The large number of categories in this classification makes the corresponding table of proportions hard to read (and comprehend). For this reason, we constrain ourselves to the graphical illustration of the results (graph 5a to 5e). The results of the corresponding ANOVA tests are given in table 5. According to these tests, the factor

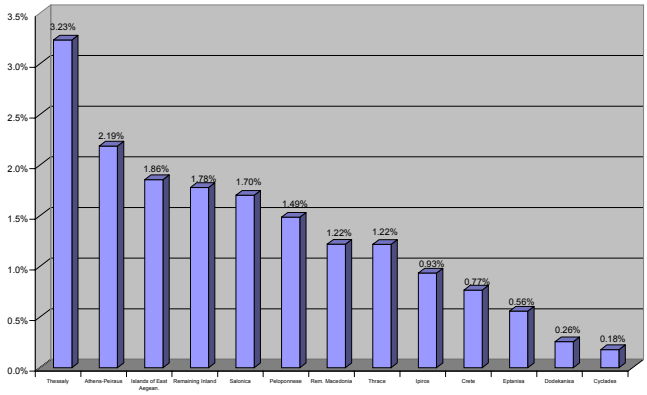
of geographical region has a significant effect in the proportion of good and very good students (with grade more than 15) as well as to the proportion of failed students.

Table 5a

Results of ANOVA tests	*Grade Categories*				
	19+	*[15,19)*	*[10,15)*	*10-*	*Failed*
p-value (2-tailed)	$0.005^{(*)}$	$\cong 0$	0.054	$0.814^{(*)}$	$\cong 0^{(*)}$

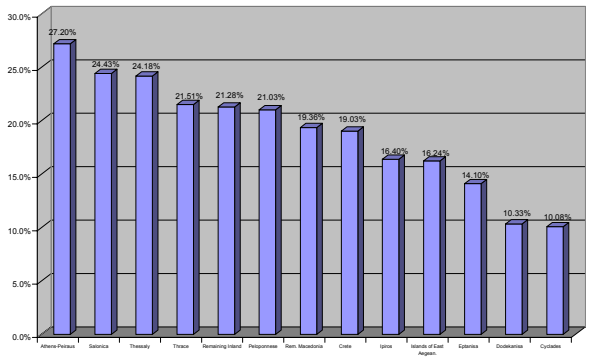
It is obvious, from the corresponding table and figure, that the students of schools in Thessaly and the greater Athens area achieved the best performances. In the schools of Thessaly, the percentage of students with grade greater than 19 (3.2%) is, almost, twice the corresponding percentage in other regions. This percentage is also high for the schools of Athens. Moreover, the smallest percentage of failed students (25.1%) comes from the schools of Athens. On the other hand, students living in islands, in general, seem to have the worst performance. More precisely, the largest percentage of failed students appears in Dodekanisa (50.7%), while large is also the corresponding percentage in Cyclades (44.9%) and in Eptanisa (43.4%). In these three areas, one can also find the smallest percentages of the "excellent" students (0.18% in Cyclades, 0.26% in Dodekanisa and 0.56% in Eptanisa).

Graph 5a



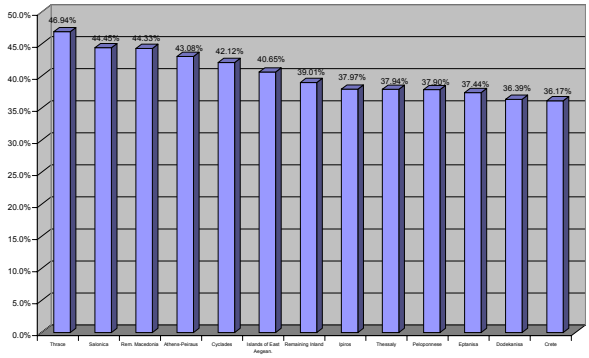
Graph 5a: Percentages of examined students in the 11th grade with mean grade 19+, by the geographical region of schools

Graph 5b



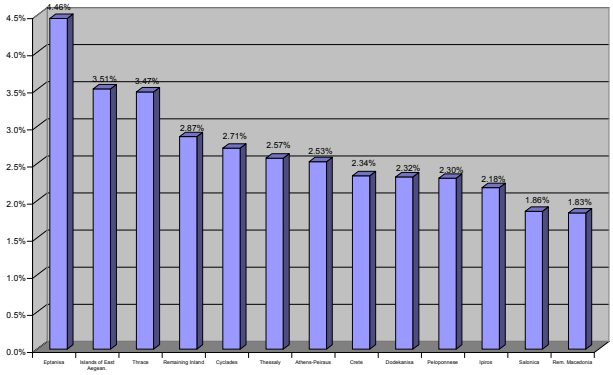
Graph 5b: Percentages of examined students in the 11th grade with mean grade 15-19, by the geographical region of schools

Graph 5c



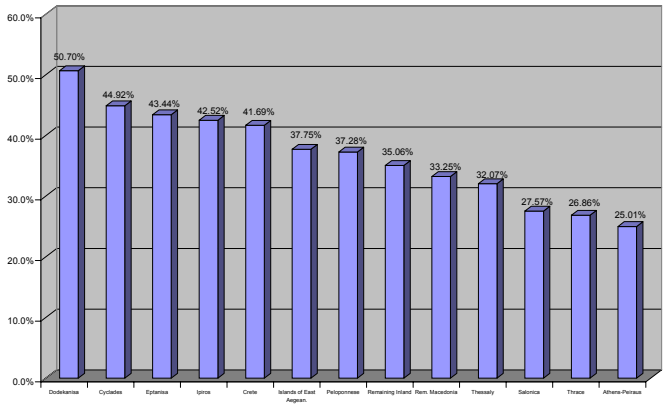
Graph 5c: Percentages of examined students in the 11th grade with mean grade 10-15, by the geographical region of schools

Graph 5d



Graph 5d: Percentages of examined students in the 11th grade with mean grade 10-, by the geographical region of schools

Graph 5e



Graph 5e: Percentages of examined students in the 11th grade that were failed, by the geographical region of schools

2.4 Study of the Percentage of Failed Students in the 10th Grade by Characteristics of the Schools

In the study, we also collected data regarding students in the 10th grade. These students do not have to take national exams. However, we felt that it would be interesting to see how they performed in the prospect of participating in the new system form the next school year.

2.4.1 Comparison of Percentage of Failed Students in the 10th Grade by School Type

In the table that follows (and in the corresponding Graph 6) we present the mean percentage of failed students, in the 10th grade, in the exams of June 1999, discerning between public and private schools. As was the case for the grades of students in the 11th grade, the predominance of private schools is evident. The percentage of failed students in private schools is as low as 1.2%, while in public schools the corresponding percentage rises to 14% of students (the difference is statistically significant based on the results of table 6b).

Table 6a

Type of School	*Percentage of Failed Students*
Public	13.98%
Private	1.15%

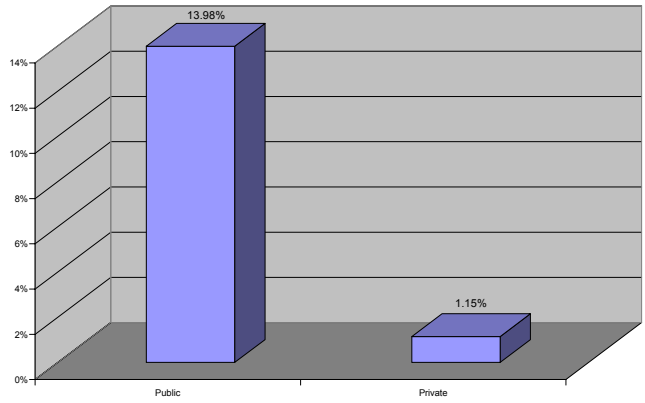
Base: 507 public schools, 31 private schools

Table 6b

Results of t-test (Public-Private)	
Mean difference of percentages	12.8%
t-statistic	6.047
p-value (2-tailed)	$\cong 0^{(*)}$

(*) The t-test for unequal variances was used

Graph 6



Graph 6: Percentages of "failed" students of the 10th grade, by school type

2.4.2 Comparison of Percentage of Failed Students in the 10th Grade by School Size

In the sequel, we study the effect of school size to the percentage of failed students in the 10th grade. These percentages are given below (numerically as well as graphically). As previously mentioned, the percentage of failure is negatively correlated to the size of schools. Specifically, the percentage of failed students of large schools (schools with more than 300 students) is 11.2% and of moderately-size schools (between 201 and 300 students) is 13%. In smaller size (between 101 and 200 students) this percentage is 12.1%, while in schools with fewer students, the

percentage rises to 15.3%. The result of ANOVA test verifies the intuitive feeling that there is statistically significant difference among schools of different size. Specifically, according to Duncan's subsets, significant differences are detected between schools with less than 200 students and schools with more than 300 students.

The "negative" relationship between the size of schools and the percentage of failed students is also illustrated by the Pearson's correlation coefficient which equals -0.2 and is statistically significant different from zero (the corresponding p-value equals 0.008).

Table 7a

Size of School	*Percentage of Failed Students*
1. Up to 100 students	15.33%
2. Between 101 and 200 students	12.08%
3. Between 201 and 300 students	12.96%
4. More than 300 students	11.16%

Base : 186 schools with size 'up to 100', 139 'between 101 and 200', 105 'between 201 and 300', and 108 'more than 300'.

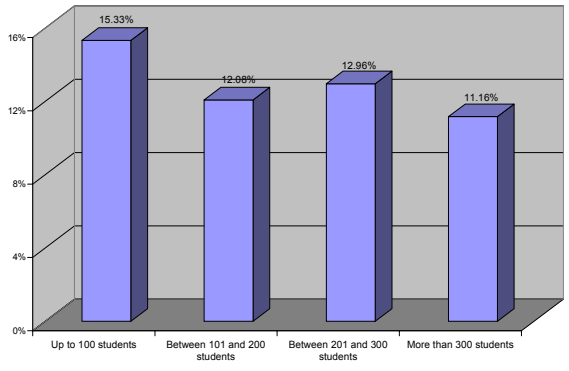
Table 7b

Results of ANOVA test	
p-value (2-tailed)	0.014(*)
Homogeneous Subsets of Schools(**)	(1,2,3) (3,4)

(*) The assumption of homogeneity of variance does not hold

(**) According to Duncan's method

Graph 7



Graph 7: Percentages of failed students in the 10th grade, by school size

2.4.3 Comparison of Percentage of Failed Students in the 10th Grade by Geographical Region

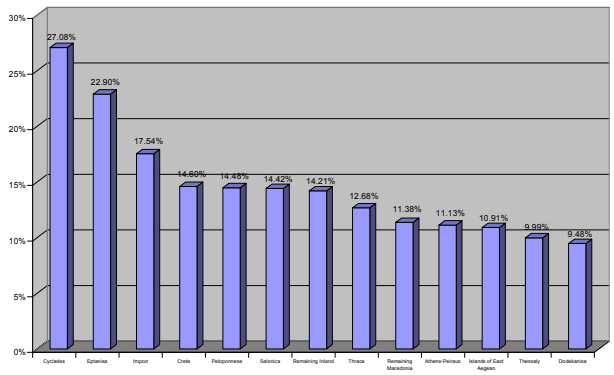
Finally, with the aid of Figure 8 (in the appendix), we examine the effect of the geographical region to the failure rate of students in the 10th grade. From this figure, we observe that some of the results here are analogous to the results for the students in the 11th grade, though not all of them. More precisely, the largest percentage of failed students is observed at the schools of Cyclades (27.1%) and the second largest in Eptanisa (22.9%). The schools with the smallest percentage of failed students are the schools of Dodekanisa (9.5%). The performance of the schools of Thessaly and Athens-Peiraus is also satisfactory (failure rate 10% and 11.1%, respectively). The difference among schools of different regions is also verified by the ANOVA test (table 8).

Table 8

Results of ANOVA tests	
p-value (2-tailed)	$\cong 0^{(*)}$

(*) The assumption of homogeneity of variance does not hold

Graph 8



Graph 8: Percentages of failed students of the 10th grade, by geographical region of schools

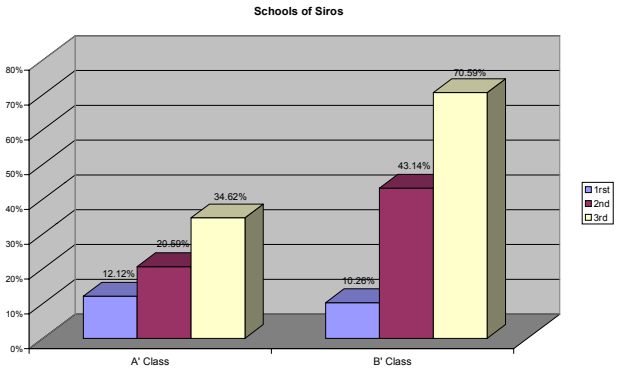
2.4.4 The Case of the Island of Siros

We have examined more closely the island of Siros, a small island in the Dodecanisa, since we have information about all the schools of the island (three in all). It is really striking the fact that (as seen below) three schools in such a small area exhibit so different performances.

Table 9

Schools of Siros	*Percentage of Failed Student* 10th Grade	11th Grade
1rst	12.12%	10.26%
2nd	20.59%	43.14%
3rd	34.62%	70.59%

Graph 9



Graph 9 : Percentage of failed students, in 10th and 11th grade, for the three schools of Siros

The above finding calls for further research in order to find the reasons for the difference in performance in the three schools.

3. Conclusions - Main Findings of the Survey

Here, we summarize, in brief, the main findings of our analysis.

- The percentage of 'failure' for students in the 10th grade has almost doubled in the school year 1998-99, compared to 1997-98. The corresponding percentage for

students in the 11th grade is, approximately, ten times larger in 1998-99 compared to 1997-98.

- The majority of students in the 11th grade that have passed, got low mean grades (between 10 and 15).
- The performance of students in private schools, in the 10th as well as in the 11th grade, is significantly better than the performance of students in public schools.
- Students' performance seem to be positively correlated to the size of schools, in both 10th and 11th grade. Schools with a large number of students display better performances than schools with a few students.
- As far as students in the 11th grade are concerned, the largest percentages of students with grades more than 19 is observed in Thessaly, while in Athens and Peiraus we have the smallest percentages of failed students. The worst performance is observed for the students in the islands (Cyclades, Dodekanisa, and Eptanisa). Similar results hold for the students in the 10th grade. The only difference, that we should mention is that in Dodekanisa the performance of students in the 10th grade is good, while this does not hold for students in the 11th grade.
- The diversification of different groups of schools (of different type, size or region) is, generally speaking, significant with respect to the proportion of students with good grades or very bad grades (i.e. failed students). When it comes to moderate grades the schools do not actually differ (not statistically significant).
- Another interesting observation that could be made is that extensive inequalities are observed not only among schools in different regions but, also, among schools in the same area (see the case of Siros).

The findings of this study are, in many ways, alarming educationally, but mainly socially. It is clear that many aspects of the new educational system should be re-examined in order that some of the negative effects found in our study are removed.

4. Acknowledgements

I would like to thank Z. Tzourti and A. Moursellas, graduate students of the Department of Statistics for the computer analysis of the data of the survey.

5. References

Panaretos, J. (Ed.) (1995). Evaluation of Research and Teaching in Universities. Proceeding of a Greek-British Meeting held in Patras, February 12-13, 1993, Athens. (ISBN: 960-90146-1-5).

Panaretos, J. (Ed.) (1995). Ministry of National Education and Religious Affairs. Greece: Educational Policy Review. Background Report to OECD on Education. (ISBN: 960-06-0505-x).

Panaretos, J. (Ed.) (1996). Ministry of National Education and Religious Affairs. European Pilot Program for the Assessment of Tertiary Education: The Greek Case. Athens. (ISBN: 960-06-0570-3).

Panaretos, J. (Ed.) (1999). National Education Council of Greece. Research Report, vol. 1, Athens. (ISBN: 960-8036-00-3).

Panaretos, J. (Ed.) (1999). National Education Council of Greece. Proceedings of the 1st General Meeting of the Council. Athens. (ISBN: 1108-4537).

6. Appendix

6.1 Characteristics of Schools

The tables that follow show the distribution of some characteristics of the schools that participated in the survey in conjunction with the corresponding distributions of all schools in the country.

(A) Type:

Type of Schools	Frequency of Schools in the Population	Percentage of Schools in the Population	Frequency of Responded Schools	Percentage of Responded Schools
Public	1370	95.47%	514	94.31%
Private	65	4.53%	31	5.69%
Total	1435	100%	545	100%

* In 12 returned questionnaires (2.15% of the respondents), there was no information about the type of schools.

(B) Geographical Region:

Region	Frequency of Schools in the Population	Percentage of Schools in the Population	Frequency of Responded Schools	Percentage of Responded Schools
Athens-Peiraus	421	29.3%	109	20.8%
Salonica	120	8.4%	45	8.6%
Remaining Inland	132	9.2%	50	9.5%
Rem. Macedonia	159	11.1%	70	13.3%
Thrace	36	2.5%	12	2.3%
Thessaly	113	7.9%	55	10.5%
Ipiros	59	4.1%	19	3.6%
Peloponnese	165	11.5%	67	12.8%
Eptanisa	39	2.7%	18	3.4%
Cyclades	34	2.4%	13	2.5%
Islands of East Aegean.	43	3%	23	4.4%
Crete	81	5.6%	29	5.5%
Dodekanisa	33	2.3%	15	2.9%
Total	1435	100%	525	100%

* In 32 returned questionnaires (5.7% of the respondents), there was no information about the geographical region of schools.

6.2 Comments on Data Processing

In this section we comment on some problems that were encountered during the data processing and led to 'missing values', as well as to the construction of additional variables and categories. It is worth mentioning that less than 45% of the returned questionnaires were flawless. The problems encountered and the solutions given to them are briefly discussed below.

- **Erroneous Data:** In some questionnaires it was observed that the sum of the number of students in each grade category was larger than the number of students that have passed the class (previously asked). This inconsistency was, probably, due to misinterpretation of the questions, and the corresponding answers were treated as missing values. In some other cases, a different categorization of grades was used. Again these answers could not be incorporated in our analysis and were regarded as missing.

- **«Students that passed the class with grade 9.5»:** In almost half of the questionnaires we observed that the number of students assigned to the three grade categories (19+, 15-19, 10-15) did not sum up to the number of students passing the class (previously asked) but was smaller than that. In some of these questionnaires it was mentioned that in the school year 1998-99, which was the first year of implementation of the new educational system, there were some beneficial adjustments which allowed a number of students to pass the class even if their grade was smaller than 10. For this reason we created another grade category which referred to this group of students (labelled as '10-') and was the difference between the number of students that passed the class and the sum of the

three other grade categories. That method was used in all questionnaires with that type of deviation in answers. However, that clarification was not present in all the questionnaires with deviation, which suggests that we should be cautious with our data, since a bias may have been introduced.

- **Inconsistency of variables:** Another type of probable "inconsistency" observed was that, often, the total number of students in a class was larger than the sum of those who passed and those who failed in the exam. In the current analysis, we assume that the difference is due to the fact that there is, also, a number of students that did not show-up for the exam as well as some that dropped out of schools or that didn't pass the class not because of their bad performance on the exams but because they had too many absences. Here, we ignore those students and all the percentages that we use are calculated based on the students that took part in the exams (i.e. the sum of the students that passed and those that failed). In any case, the differences between the total number of students and the number of examined students is not large (1% for the 10^{th} grade and 0.6% for the 11^{th} grade).

6.3 Questionnaire

The questionnaire that was sent to schools and which allowed us to gather the information necessary for the aims of our study was the following:

1. School :

Telephone No:

2. Total number of students in the school during academic year 1998-1999 : ☐

10th Grade

3. Number of students in the 10th grade during the school year 1998-1999: ☐
4. Number of students in the 10th grade that passed the class: ☐
5. Number of students in the 10th grade that did not pass the exams of June 1999: ☐
6. Number **or** percentage of students in the 10th grade that did not pass the class the **previous** school year 1997-98: ☐ or ☐ %

11th Grade

7. Number of students in the 11th grade in the school year 1998-99: ☐
8. Number of students in the 11th grade that passed the class in 1999: ☐
9. Number **or** percentage of students in the 11th grade that are going to be re-examined in September 1999: ☐
10. Number **or** percentage of students in the 11th grade that did not pass the class the **previous** school year 1997-98: ☐ or ☐ %
11. Number **or** percentage of students in the 11th grade with mean grade equal to or larger that 19: ☐ or ☐ %
12. Number **or** percentage of students in the 11th grade with mean grade between 15 (included) and 19 (not included): ☐ or ☐ %
13. Number **or** percentage of students in the 11th grade with mean grade between 10 (included) and 15 (not included): ☐ or ☐ %

After filling in the data, please return the questionnaire using the enclosed envelope.