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G.R.I.M. (Department of Mathematics, University of Palermo, Italy)

HOW THE PERFORMANCE IN PRIMARY SCHOOL MATHEMATICS INFLUENCE STUDENTS’ SCHOOL-ROUTE IN DIFFICULT TERRITORIAL AREAS: THE CASE OF A 18 SMALL-ISLANDS COMPLEX IN GREECE

Chrysanthi Skoumpourdi & Francois Kalavasis

University of the Aegean, kara@rhodes.aegean.gr kalabas@rhodes.aegean.gr

ABSTRACT

Researches have shown that factors like the performance in the various stages of education influence the attrition rate of students from compulsory education and that the majority of students that abandon school, declared weakness in mathematics.

In this paper we aim to investigate how the performance in Primary School Mathematics has influenced the student’ and his/her family’ decision for the continuity of the school route, especially when this route, in order to be completed, demands a serious family support or removal and residence in another area or in another island, as it is in the case of the Dodecanese 18 islands complex in Greece.

Our initial hypothesis was that “students not good in maths” were not encouraged to continue their school route. Our research’ results present this relation but in an inversed way: ‘good’ students in Primary School Mathematics either complete their school route or interrupt it but return (in evening schools) for a second chance.

INTRODUCTION

This work is a part of a broader research project¹ which aims to investigate the interaction between mathematical education and school failure in the case of a Greek 18 islands complex (the Dodecanese Islands). It is also a continuation of last year’s poster presentation in CIEAEM 57 in Piazza Armerina.

In this paper we aim to investigate how the performance in Primary School Mathematics has influenced the student’ and his/er family’ decision for the continuity of the school route, especially when this route in order to be completed demands removal and residence in another area or in another island (Skoumpourdi, 2004; Stathopoulou & Skoumpourdi, 2004; Kalavassis et al., 2005; Kafoussi & Chaviaris, 2006; Skoumpourdi & Kapelou, 2006; Stathopoulou & Chaviaris, 2006).

Researches in national level show that:

- that factors like the performance in the various stages of education influence the attrition rate of students from compulsory education (Drettakis 1993)

¹ “*The interaction between mathematics education and school failure in island areas: interpretation and confrontation in the case of the Dodecanese Islands*”.(Pythagoras): This research program is funded by 3rd CSF of EEC.

- the majority of students that abandon school, declared weakness in mathematics (OVE, 1996).
- students' mathematical performance has great differentiations depending on socio-cultural factors
- the attrition rate of students has great differentiations depending on the geographical areas
- capital's area has the smallest percentage of students who abandon school, while the island's area, (especially Ionian, Crete and the Dodecanese Islands) the biggest
- socio-geographical factors influence indirectly the cognitive-mathematical domain and vice versa (Athanasiadis & Kokkalidis, 2003).

The Dodecanese Islands where we focus our study, is a configuration of 18 islands in the South-East of Greece (the bigger island named Rhodes has about 100.000 inhabitants and the smallest named Marathi has 3 inhabitants). In many occasions when children from this area decide to follow the complete school-route (kindergarten, primary school, gymnasium, lyceum) they have to change community or island (Chaviaris & Skoumpourdi, 2005).

Hence, our initial hypothesis was that “students not good in maths” were not encouraged to continue their school route, especially when this option demands a serious family support or removal.

METHODOLOGY

The research project is realized according to the following phases:

1. registration and elaboration of educational data and conditions in the Dodecanese islands and the performance of the population in school mathematics the last 15 years,
2. choice of student's population from evening high schools (gymnasium and lyceum) for more deep research with structured questionnaire,
3. criteria of choice and selection of students as case-study according to their personal school-routes with semi-structured interviews,
4. comparison of the data elaboration results of the questionnaires as well as of the semi-structured interviews, in order to investigate the relation between students' development in mathematics education and school failure.

To verify our initial hypothesis we should contact students that abandoned their school-route after the primary education. However, it is difficult to find such students because it is necessary to visit non educational structures, like workplaces and houses. For this reason a research was carried out in evening high schools in the Dodecanese islands (phase 2 methodology). This decision was based on the fact that:

- in this kind of schools the students are workers and the majority had interrupted their studies for a long or a short period (in our data this interruption lasted approximately 10 years) and
- classes have an age span from between 12 to 30 or more.

There are 4 evening high schools in this area which are situated in the 3 of the 18 islands (2 in Rhodes, 1 in Kalymnos and 1 in Kos). Our sample was consistent of 344 evening school students (204 from gymnasium and 140 from lyceum). These students are more vulnerable to social changes because, on one hand, they are involved in the professional work, in social and family responsibilities and, on the other hand, because of the particular educational path they have followed. Only 15% and 16% of students for Gymnasium and Lyceum respectively had the appropriate age for the corresponding stage of education. The other 85% from Gymnasium and Lyceum are students who abandon school some years ago (1year – 30 years or more) (table 1).

Age	Evening Schools	
	Gymnasium	Lyceum
12-15	30 (15%)	0
15-18	79 (39%)	23 (16%)
18-25	29 (14%)	49 (35%)
25-30	25 (12%)	25 (18%)
30 or more	29 (14%)	35 (25%)
Didn't answer	12 (6%)	8 (6%)
Total	204	140

Table 1

SOME RESULTS

From the phase 2 research' structured questionnaire results, we present in this paper the combination of the factor **a**:

- a.** student's school routes: 10 different main categories,
 with two factors **b** and **c** that describe the estimation of the mathematical performance:
- b.** the image that students have of themselves (self-evaluation) of their performance in primary school mathematics: 3 categories and
- c.** the image that students have of what 'others' (school and family environment) have for his/her performance in primary school mathematics: 3 categories.

The tables 2, 3 and 4 present the cxb, axb and axc factors' combinations respectively.

Evaluation Mathematics	in	Self-evaluation		
		Weak	Middle	Good
Weak		21 (55%)	<u>21 (11%)</u>	<u>8 (8%)</u>
Middle		14 (37%)	105 (55%)	41 (39%)
Good		<u>3 (7%)</u>	66 (34%)	55 (53%)
Total		38	192	104

Table 2: Distribution of the relation between each student’s evaluation in primary school mathematics from “others” and student’s self evaluation

In table 2 we can see that the majority of the students evaluate themselves, in primary school mathematics using the same characterization like the ‘others’ do (55%, 55%, 53%).

Students who evaluate themselves as “weak” (37% and 7% respectively) say that “others” evaluate them as ‘middle’ and as ‘good’. Those who evaluate themselves as “middle” mention that “others” evaluate them as ‘weak’ (11%) and as ‘good’ (34%) and the rest who evaluate themselves as “good” wrote that “others” evaluate them as ‘weak’ and as ‘middle’ (8% and 39% respectively).

From the last line of table 2, it is obvious that ‘good’ and ‘middle’ students in primary school mathematics prevail.

Table 3 shows that most of the students (35% and 15% respectively) who changed place either in the main Island or in another Island from Primary School to Gymnasium have evaluated themselves as ‘middle’ in primary school mathematics. In addition most students (57%) who changed place on the main Island after the period of compulsory education have evaluated themselves as ‘middle’ in primary school mathematics. In particular we can see that:

- 33 (65%) students have changed place in the main Island from Primary School to Gymnasium; 11 (22%) of them evaluated themselves as ‘good’ in primary school mathematics, 18 (35%) as ‘middle’ and only 4 (8%) evaluated themselves as ‘weak’.
- 13 (25%) students have changed Island from Primary School to Gymnasium; 2 (4%) of them evaluated themselves as ‘good’ in primary school mathematics, 8 (15%) of them as ‘middle’ and the rest 3 (6%) evaluated themselves as ‘weak’.
- 20 (95%) students have changed place on the main Island after the period of compulsory education; 7 (33%) of them evaluated themselves as ‘good’ in primary school mathematics, 12 (57%) of them as ‘middle’ and only 1 student (5%) evaluated him/herself as ‘weak’.

School-route	Self-Evaluation	Without removal	Removal during the period of compulsory education	Removal after the compulsory education	Removal during the period of compulsory education in the same island		Removal during the period of compulsory education in another island		Removal after the period of compulsory education		Another type of removal
					From Kindergarten to Primary School	From Primary School to Gymnasium	From Kindergarten to Primary School	From Primary School to Gymnasium	In the main Island	In another Island	
Weak	24 (11%)	7 (14%)	2 (10%)	0	4 (8%)	0	3 (6%)	1 (5%)	1 (5%)	5	
Middle	128 (57%)	29 (57%)	12 (57%)	3 (6%)	18 (35%)	0	8 (15%)	12 (57%)	0	23	
Good	71 (32%)	15 (29%)	7 (33%)	2 (4%)	11 (22%)	0	2 (4%)	7 (33%)	0	8	
Total	223	51	21	5 (10%)	33 (65%)	0	13 (25%)	20 (95%)	1 (5%)	36	

Table 3: Distribution of the relation between each student’s self evaluation in primary school mathematics and student’s school-route

School-route	Evaluation	Without removal	Removal during the period of compulsory education	Removal after the period of compulsory education	Removal during the period of compulsory education in the same island		Removal during the period of compulsory education in another island		Removal after the period of compulsory education		Another type of removal
					Kindergarten to Primary School	Primary School to Gymnasium	Kindergarten to Primary School	Primary School to Gymnasium	In the main Island	In another Island	
Weak	32	9	3	1	5	0	3	2	1	6	
	(14%)	(17%)	(14%)	(2%)	(10%)		(6%)	(10%)	(5%)		
Middle	107	26	7	1	17	0	8	7		18	
	(48%)	(50%)	(33%)	(2%)	(32%)		(15%)	(33%)			
Good	85	17	11	3	11	0	3	11		12	
	(38%)	(33%)	(53%)	(6%)	(21%)		(6%)	(52%)			
Total	224	52	21	5	33	0	14	20	1		
				(10%)	(63%)		(27%)	(95%)	(5%)		

Table 4: Distribution of the relation between each student’s evaluation in primary school mathematics from “others” and student’s school-route

Table 4, respectively, shows that students’ big majority (32% and 15% respectively) who changed place either on the main Island or on another Island from Primary School to Gymnasium have mentioned that they were evaluated from “others” as ‘middle’ students in primary school mathematics. In addition most students (52%) who changed place on the main Island after the period of compulsory education have mentioned that they were evaluated from “others” as ‘good’ students in primary school mathematics.

Table 3 and 4 shows that students’ big majority who changed place either on the main Island or on another Island from Primary School to Gymnasium have mentioned that they were evaluated from “others” and have evaluated themselves as ‘middle’ in primary school mathematics.

In addition most students who changed place on the main Island after the period of compulsory education have mentioned that although they were evaluated from “others” as ‘good’ students in primary school mathematics they have evaluated themselves as ‘middle’.

CONCLUSIONS

From the analyzed results it is obvious that ‘good’ and ‘middle’ students in Primary School Mathematics even if they abandon school they return to complete their school route. These students with ‘good’ image for their performance in primary school mathematics have reinforced self-confidence and that helps them in their decision to restart and continue the school-route.

We must modify now our initial hypothesis. Our new hypothesis is that ‘good’ students in Primary School Mathematics either complete their school route or interrupt it but return (in evening schools) for a second chance.

From this result we can suggest a proposal for the aims of mathematical education in the case of geographical areas that have similar characteristics with the Dodecanese 18 small islands complex. We propose a qualitative change or extension of the primary school mathematics’ aims, so as to include the aim of student’s self-confidence reinforcement. In our opinion this may be one of the main factors which could help students to complete their school route, even if for some reason have abandoned it. It is crucial to elaborate the form and the content of the mathematical activities for primary school students of these geographical areas, in order to:

- reinforce their self estimation in mathematics,
- involve their families in these activities so as to reinforce the families evaluation regarding their children cognitive capacities.

For a further discussion about the interaction of the factors of the performance in primary school mathematics and of the completion of the school-route in difficult territorial situations, we could propose the following points:

1. Student’s school performance is inscribed in the following dynamics of conflicts (Chabanne):
 - a. conflicts between the need of the student to construct an individual identity and that of the acceptance from the family system and of the integration in a social group to which one is identified,
 - b. conflicts between each student’s self-image and the image others have for him/her (in the school, in the family, in his social environment)
2. The difficulties during the school are usually related with each student’s cognitive process and the evolution of the conflicts mentioned (1.a, 1.b).

The decisions of the families and of the school institutions concerning the educative future or the no-future of the students (Chilland, 1983), are relied on these dynamics of conflicts.

This situation becomes more crucial in our case study, when the participation in the education system (from 4 to 18 years old) demands the removal of the family or the student, to another community or another island (table 3 & 4).

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