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An interdisciplinary approach to mathematical education

STUDY ON STUDENTS' AND THEIR PARENTS' ATTITUDE TOWARD MATHEMATICS

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InAMath - An interdisciplinary approach to mathematical education

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Study on students' and their parents' attitude toward mathematics

Sample

The current study examined the data of fifth-grade students and their parents from Croatia, Serbia, Bosnia and Herzegovina and Slovenia. The participants included 364 students (187 girls, 170 boys, and seven non-responding students), their mean age was 9,74 (SD = 0,485) and 296 parents (235 females and 61 males), their mean age was 40,67 (SD = 5,215). 161 students come from Croatia, 94 from Serbia, 66 from Bosnia and 43 from Slovenia (see Table 1).

Table 1: Sample Characteristics of Participants

	n	%
Gender (Student)		
Female	187	52,4
Male	170	47,6
Gender (Parent)		
Female	235	79,4
Male	61	20,6
Age		
8	1	0,3
9	88	26,8
10	235	71,6
11	3	0,9
12	1	0,3
State		
Croatia	161	44,2
Serbia	94	25,8
Bosnia	66	18,1
Slovenia	43	11,8

Measures

To measure students' attitude toward mathematics, 20 items were used (e.g., "I enjoy my math lessons"). The items used a 3-point Likert scale ranging from disagree (3) to agree (1).

To measure parents' attitude toward mathematics, 20 items were used (e.g., "I know the basic theories and concepts of mathematics"). The items used a 5-point Likert scale ranging from strongly disagree (5) to strongly agree (1).

Results

The results of the descriptive statistics of students' attitude towards mathematics and results of Kruskal-Wallis test are encapsulated in Table 2.

Table 2: Students' attitude towards mathematics

	Whole sample			Croatia		Serbia		Bosnia and Herzegovina		Slovenia		Kruskall-Wallis	
	N	M	SD	M	SD	M	SD	M	SD	M	SD	H	P
Maths is boring.	358	2,87	1,00	2,51	0,67	2,57	0,68	2,38	0,82	2,51	0,60	148,31	0,000
I enjoy my maths lessons.	358	2,08	1,09	1,65	0,68	1,68	0,74	1,73	0,85	1,95	0,84	152,85	0,000
Maths is an important subject.	358	1,58	0,92	1,21	0,55	1,13	0,37	1,15	0,40	1,51	0,78	220,62	0,000
I can not keep up with the work we do in maths.	358	3,07	0,97	2,75	0,53	2,77	0,51	2,70	0,63	2,34	0,73	199,31	0,000
I like maths.	358	1,98	1,09	1,59	0,69	1,49	0,73	1,71	0,82	1,78	0,61	164,07	0,000
I like maths more than my other school subjects.	358	2,57	1,17	2,21	0,77	2,08	0,88	2,38	0,78	2,17	0,74	150,66	0,000
Doing maths problems is fun.	358	1,94	1,08	1,53	0,66	1,47	0,70	1,65	0,81	1,88	0,71	167,63	0,000
I can not see why I have to do maths.	358	3,08	0,94	2,76	0,52	2,86	0,48	2,59	0,68	2,34	0,79	207,44	0,000
Maths is a useless subject.	358	3,24	0,87	2,90	0,39	2,97	0,23	2,80	0,50	2,63	0,70	270,43	0,000
Knowledge in mathematics comes in handy in everyday life and leisur	356	1,63	0,97	1,22	0,55	1,19	0,52	1,25	0,59	1,66	0,79	208,45	0,000
A good knowledge of mathematics will help me in my future job.	356	1,63	0,91	1,28	0,55	1,24	0,52	1,17	0,42	1,49	0,81	192,10	0,000
To be good at mathematics will help me in the remaining years at schc	356	1,53	0,91	1,16	0,48	1,09	0,38	1,13	0,45	1,46	0,81	233,73	0,000
I usually do well in mathematics.	356	1,96	0,98	1,61	0,65	1,60	0,69	1,47	0,69	1,73	0,74	153,05	0,000
Mathematics is harder for me than for many of my classmates.	356	2,85	1,08	2,54	0,66	2,45	0,70	2,66	0,60	2,15	0,62	176,54	0,000
I am just not good at mathematics.	356	2,97	1,02	2,59	0,61	2,68	0,59	2,69	0,66	2,44	0,67	170,62	0,000
I learn things quickly in mathematics.	356	1,98	1,02	1,63	0,73	1,60	0,75	1,48	0,69	1,80	0,75	144,84	0,000
Mathematics makes me nervous.	356	2,83	1,02	2,49	0,75	2,65	0,65	2,30	0,83	2,24	0,80	146,99	0,000
I am good at working out difficult mathematics problems.	356	2,36	1,04	2,06	0,74	1,99	0,77	1,89	0,78	2,00	0,67	138,87	0,000
My teacher tell me I am good at mathematics.	356	2,09	1,12	1,68	0,68	1,56	0,76	1,89	0,84	2,02	0,57	164,33	0,000
Mathematics is harder for me than any other subject	356	2,78	1,05	2,46	0,75	2,51	0,76	2,28	0,84	2,24	0,73	139,90	0,000

Table 2 presents descriptive statistics for twenty statements related to students' attitude towards mathematics. On average, the lowest agreement was expressed with the statement "Math is a useless subject." (M = 3,24), while the highest agreement belongs to the statement "Math is an important subject." (M = 1,58).

Regarding the differences between country and singular questionnaire items, the Kruskal-Wallis test was computed for every variable with all statistically significant differences found between students from Croatia, Serbia, Bosnia and Herzegovina and Slovenia in their attitudes toward mathematics.

Mann-Whitney test results examining gender differences across students' attitude toward mathematics are encapsulated in Table 3.

Table 3: Gender differences in student's attitudes toward mathematics

	Whole sample			Girls		Boys		Mann-Whitney	
	N	M	SD	M	SD	M	SD	U	P
Maths is boring.	358	2,87	1,00	2,89	0,97	2,43	0,77	15285,00	0,489
I enjoy my maths lessons.	358	2,08	1,09	2,04	1,09	1,71	0,74	15122,50	0,404
Maths is an important subject.	358	1,58	0,92	1,58	0,93	1,36	0,70	15856,00	0,961
I can not keep up with the work we do in maths.	358	3,07	0,97	3,05	0,98	2,61	0,65	15262,00	0,450
I like maths.	358	1,98	1,09	1,89	1,08	1,64	0,75	14285,00	0,079
I like maths more than my other school subjects.	358	2,57	1,17	2,45	1,19	2,10	0,83	13781,50	0,024
Doing maths problems is fun.	358	1,94	1,08	1,93	1,07	1,60	0,74	15643,50	0,783
I can not see why I have to do maths.	358	3,08	0,94	3,05	0,95	2,64	0,67	15479,00	0,608
Maths is a useless subject.	358	3,24	0,87	3,21	0,86	2,73	0,65	15216,50	0,349
Knowledge in mathematics comes in handy in everyday life and leisure time.	356	1,63	0,97	1,64	0,96	1,38	0,70	15223,00	0,540
A good knowledge of mathematics will help me in my future job.	356	1,63	0,91	1,62	0,89	1,41	0,70	15607,50	0,895
To be good at mathematics will help me in the remaining years at school.	356	1,53	0,91	1,53	0,89	1,34	0,70	15505,00	0,779
I usually do well in mathematics.	356	1,96	0,98	1,84	0,97	1,63	0,75	13543,50	0,017
Mathematics is harder for me than for many of my classmates.	356	2,85	1,08	2,84	1,09	2,46	0,70	15078,50	0,479
I am just not good at mathematics.	356	2,97	1,02	3,04	0,96	2,55	0,71	14388,50	0,125
I learn things quickly in mathematics.	356	1,98	1,02	1,94	1,02	1,69	0,78	14782,00	0,306
Mathematics makes me nervous.	356	2,83	1,02	2,86	0,99	2,46	0,75	15379,00	0,696
I am good at working out difficult mathematics problems.	356	2,36	1,04	2,25	0,99	1,92	0,73	13807,50	0,038
My teacher tell me I am good at mathematics.	356	2,09	1,12	1,99	1,06	1,68	0,72	14311,00	0,126
Mathematics is harder for me than any other subject	356	2,78	1,05	2,85	1,03	2,44	0,76	14775,00	0,284

Regarding the differences between genders and singular questionnaire items, the Mann-Whitney U test was computed for every variable with no statistically significant differences found between girls and boys in their attitudes toward mathematics except for items "I like maths more than my other school subjects." (M_{girls} = 2,45, M_{boys} = 2,10, P = 0,024), "I usually do well in mathematics." (M_{girls} = 1,84, M_{boys} = 1,63, P = 0,017) and "I am good at working out difficult mathematics problems." (M_{girls} = 2,25, M_{boys} = 1,92, P = 0,038).

The results of the descriptive statistics for parents' attitude towards mathematics and results of Kruskal-Wallis test are encapsulated in Table 4.

Table 4: Parents' attitude towards mathematics

	Whole sample			Croatia		Serbia		Bosnia and Herzegovina		Slovenia		Kruskall-Wallis	
	N	M	SD	M	SD	M	SD	M	SD	M	SD	H	P
I have sufficient knowledge about mathematics.	296	2,13	0,86	2,14	0,79	2,04	0,82	2,32	0,95	1,78	0,95	9,44	0,024
I can use a subject-specific way of thinking in mathematics.	295	2,16	0,87	2,00	0,74	2,42	1,04	2,25	0,87	2,00	0,74	10,14	0,017
I know the basic theories and concepts of mathematics.	296	1,84	0,67	1,88	0,67	1,82	0,64	1,86	0,74	1,65	0,49	2,50	0,476
Mathematics is applicable to real word.	295	1,72	0,76	1,69	0,81	1,56	0,53	2,05	0,84	1,48	0,73	17,12	<,001
Most occupations need skills in math.	296	1,93	0,92	1,88	0,86	1,92	0,89	2,11	1,02	1,70	1,06	5,14	0,162
I do not like people to think I am smart in math.	296	3,32	0,99	3,36	0,89	3,78	0,90	2,91	0,97	2,78	1,20	37,49	<,001
During math class, I was interested.	295	2,20	1,02	2,23	1,03	2,12	1,05	2,18	0,92	2,39	1,20	1,38	0,709
I use math in some way every day.	296	1,73	0,84	1,79	0,84	1,60	0,73	1,74	0,92	1,78	0,90	2,80	0,424
I feel confident when I help my child with math.	296	1,97	0,83	2,00	0,81	1,87	0,75	2,02	0,85	2,04	1,11	1,64	0,651
My child's teacher is enthusiastic about teaching math.	296	2,05	0,89	1,84	0,75	2,14	0,77	2,32	0,91	2,17	1,53	21,12	<,001
My child is good at mathematics.	296	1,95	0,84	1,81	0,78	2,10	0,84	2,02	0,94	2,04	0,88	6,99	0,072
Compared with other children, my child has an innate talent in mathematics.	296	2,90	0,96	2,77	0,94	3,03	0,90	2,98	1,02	2,96	0,98	3,73	0,293
I think my child will be successful in mathematics this school year.	296	1,96	0,82	1,90	0,76	2,05	0,86	1,92	0,92	2,04	0,83	1,97	0,579
It is okay if my child gets below a C in math.	293	3,18	1,25	2,81	1,22	3,75	1,15	3,32	1,15	3,04	1,33	29,57	<,001

Table 4 presents descriptive statistics for fourteen statements related to parents' attitude towards mathematics. On average, the lowest agreement was expressed with the statement "I do not like people to think I am smart in math." (M = 3,32), while the highest agreement was expressed with the statement "Mathematics is applicable to real word." (M = 1,72).

Regarding the differences between countries and singular questionnaire items, the Kruskal-Wallis test was computed for every variable with statistically significant differences found between parents from Croatia, Serbia, Bosnia and Herzegovina and Slovenia in their attitudes toward mathematics for six items (see Table 4).

The results of the descriptive statistics and results of Kruskal-Wallis test for parents' attitude towards usefulness of mathematics are encapsulated in Table 5.

Table 5: Parents' attitude towards usefulness of mathematics

	Whole sample			Croatia		Serbia		Bosnia and Herzegovina		Slovenia		Kruskall-Wallis	
	N	M	SD	M	SD	M	SD	M	SD	M	SD	H	P
How useful will mathematics be for your child in general?	295	1,51	0,59	1,55	0,64	1,38	0,49	1,52	0,56	1,68	0,65	5,347	0,148
How useful will mathematics be for your child's school life?	295	1,55	0,61	1,57	0,58	1,40	0,54	1,44	0,56	2,23	0,69	27,989	<,001
How useful will mathematics be for your child's future career?	295	1,72	0,67	1,75	0,64	1,75	0,75	1,61	0,63	1,68	0,65	2,447	0,485

Table 5 presents descriptive statistics for three items related to parents' attitude towards usefulness of mathematics. On average, the lowest agreement was expressed with usefulness of mathematics for child's future career (M = 1,72), while the highest agreement was expressed with usefulness of mathematics for child in general (M = 1,51).

Regarding the differences between country and singular questionnaire items, the Kruskal-Wallis test was computed for all three variables with no statistically significant differences found between parents from Croatia, Serbia, Bosnia and Herzegovina and Slovenia except for item "How useful will mathematics be for your child's school life?" ($P < 0,001$).