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Issues Regarding the Relationship between Secondary School Students' Reporting on Homework and Math Results

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Abstract: *The study investigates in various aspects the link between the math homework of the students in the end of secondary classes and their school results. The research data were obtained using the questionnaire-based survey method applied online to a number of 89 secondary school students from a school in Romania with good results in the National Assessment. The data was analyzed using the SPSS program. The results show that, in order to complete their homework in mathematics, 77.5% of the students need help, which they require in school (28.1%) or outside it (49.4). The statistical analysis of these data shows a weak correlation in terms of collaboration between parents and children in order to achieve homework. Gender-based analysis of research data shows that there is no significant difference between boys and girls in relation to homework in mathematics. The results confirm the current trend for students to increasingly seek help from people outside the school. The study presents recommendations for deepening some aspects of the research, among which the identification of the causes that lead to the decrease of students' interest in the activity carried out in the school. The results of the research are valuable in the context of a shortage of research on this topic because they show an equal value of the effect in cases where students receive help in the classroom from the teacher compared to those in which they are helped by other people outside the school to solve the homework in mathematics.*

Keywords: *abstract thinking; math homework; school performance; additional explanations; teacher's help; curriculum change.*

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Introduction

Concern about the additional work done at home by students has taken new forms in recent decades, with increasing interest in achieving better results when completing a level of schooling or cycle of education. Educational investigations conducted internationally include analyses that look at the historical course (Trautwein & Köller, 2003) of these individual student work activities (Fan et al., 2017). At the same time, special attention is paid to the students' motivations and beliefs related to the mathematical discipline (Kikas et al., 2022; Nieminen et al., 2023), at different classes (Hine et al., 2023; Marchis, 2017; Way, 2023), but also the impact these activities have on the design of the teaching process (Getenet et al., 2023; McGraw et al., 2023; Tarasenkova et al., 2023) and the long-term results of students (Cooper et al., 2006). The research results indicate significant differences between the attitude towards homework considering students from different countries (Xu, 2023), in relation to the particularities of the educational environment and the cultural context (Chen & Stevenson, 1989; Sharma, 2023).

About the role of homework but also about their contribution in increasing the school performance of students, the investigations in Romania present details and nuances (Nicola, 2003) related to the general approach or customizations on educational subjects (Bocoş & Ionescu, 2017; (Şuteu et al., 2024). In Romania, all educational factors consider that the role of homework is very important for the student's educational success. In order to make pedagogical use of this situation, the mathematics didactics works recommend the use of homework as an evaluation method (Dan & Chiosa, 2008), in parallel with the general verification of students' knowledge (Păun, 2017).

Educational practice shows that most students confuse learning in a particular school subject with performing homework, although they agree that solving it leads to deepening the notions studied in the classroom and increasing school results (MEN, 2017). Under these circumstances, students often ask for additional help in solving homework, not only in class, but also outside of school work, from different people.

Because the role of the homework in mathematics is a distinct one, as it is for all subjects that constitute exam or competition tests, we proposed to carry out a research that would provide support for understanding some mechanisms related to the realization of the homework in this subject (Fernández-Alonso et al., 2015) and the link to good school results in secondary education.

Research purpose and methodology

Starting from the fact that the main function of the subject in mathematics is to support the achievement of good school results in the short term, but also in the long term, we proposed to analyze the relationship between the way in which the students of a prestigious school in Romania relate to the performance of homework, especially those with a high degree of difficulty in this educational discipline and different variables: the field in which the parents of the students work, the gender of the students, the school results in this educational discipline and the motivation for improving the results. We proposed to perform statistical analyses between different research data and variables.

The research is based on the descriptive and statistical analysis of the data obtained after the administration of a questionnaire to which 89 students answered, representing 84.76% of the total students in four classes at the end of secondary school (two seventh and two eighth grades, aged 13-15 years) from the Orthodox Theological Seminary in Alba Iulia, an educational unit in Alba county with very good results in Romania, where the percentage of passing the National Assessment exam for secondary school graduates annually exceeds the value of 95%. The questionnaire was applied online, and the data analysis was carried out through the SPSS program. The analysis was carried out by means of statistical indices, taking into account the type of variables.

Research results

a) Relationship mathematics homework – the field in which the parents of the students work

The main variable of the research is the "mathematics homework", to which we have attached five categories, in an ascending order, from "Not at all" to "Independent", by coding the answer variants proposed to the students in the questionnaire. Table 1 presents the frequency of answers, in the form of numbers and percentages, to the question: "What do you do when you have difficulty solving your homework?".

Table 1. Ways to relate students to mathematics homework

Utterances	Coding	Number	Percentage
I come with the homework not done.	1. Not at all	4	4,5
I ask a colleague to give it to me to copy.	2. Copied	9	10,1
I ask the teacher for further explanation during the next class.	3. Teacher help in the classroom	25	28,1
I ask someone (colleague, parents, siblings, tutor teacher etc.) to explain it to me and then I do it myself.	4. Help from other people	44	49,4
I redo the class exercises until I understand, and then I do the homework myself.	5. Independent	7	7,9
Total		**89**	**100**

The highest percentage values are found in the answers "Teacher help in the classroom" (28,1%) and "Help from other people" (49,4%) of the respondents. The almost linear increase in the percentages from "Not at all" (4,5%) to "Help from other people" (49,4%) is followed by a decrease of more than 40% for the "Independent" response variant (7,9%).

The high percentage of students who ask for help in solving problems with increased difficulty led us to research the relationship between homework and the field in which their parents work. One of the items of the questionnaire asked the students to choose one of the variants of the question "Do your parents work in areas that use mathematics?". The results for the three answer variants (Table 2) are: 1. None – 53,9%; 2. One – 27%; 3. Both (19,1%). So, for 46,1%, at least one of the parents has to do with aspects in the field of mathematics daily.

Given that we have two ordinal variables, we used the encodings for each of them, already mentioned, and calculated Sommer's asymmetric statistical indicator *d*, to see if there is an association between them (Tables 2 and 3). We considered *the field in which parents work* as an independent variable (IV), and *homework* dependent variable (DV) and we analysed to what extent changes in IV values cause a change in DV values.

Data from *Table 2. Homework-Crosstabulation Domain* we will analyse them by column, by reference to the field in which the parents work, where the sum of the percentages is 100%. On the "Total" column we find the percentage values for the entire sample of subjects, from Table 1.

Table 2. Homework-Crosstabulation Domain

			Domain related to mathematics			Total
			None	**One**	**Both**	
Homework	Not at all	Count	4	0	0	4
		Expected Count	2,2	1,1	,8	4,0
		% within domain	8,3%	0,0%	0,0%	4,5%
		Adjusted Residual	1,9	-1,2	-1,0	
	Copied	Count	5	3	1	9
		Expected Count	4,9	2,4	1,7	9,0
		% within domain	10,4%	12,5%	5,9%	10,1%
		Adjusted Residual	,1	,5	-,6	
	Teacher in class	Count	14	7	4	25
		Expected Count	13,5	6,7	4,8	25,0
		% within domain	29,3%	29,2%	23,5%	28,1%
		Adjusted Residual	,2	,1	-,5	
	Help from other people	Count	21	13	10	44
		Expected Count	23,7	11,9	8,4	44,0
		% within domain	43,8%	54,2%	58,8%	49,4%
		Adjusted Residual	-1,2	,5	,9	
	Independent	Count	4	1	2	7
		Expected Count	3,8	1,9	1,3	7,0
		% within domain	8,3%	4,2%	11,8%	7,9%
		Adjusted Residual	,2	-,8	,7	
Total		Count	48	24	17	89
		% within Total	**53,9%**	**27%**	**19,1%**	**100%**
		Expected Count	48,0	24,0	17,0	89,0
		% within domain	100,0%	100,0%	100,0%	100,0%

From the analysis of the answers of students whose parents do not work in areas where they use mathematics, we note that in this category all those who come with the homework not done fit (8,3%) as well as those who ask in a smaller percentage help from other people (43,8%). For students for whom at least one of the parents works in a field that uses mathematics, we see a greater tendency to copy the homework (12,1%) and a small percentage of students who work independently (4,2%). In the case of these respondents, the highest percentage of students asking for additional explanations from the class teacher (29,3%) is recorded. In the situation of respondents with both parents working in a field related to mathematics, we note that almost 60% of them seek help from other people and almost 12% work independently.

In Table 3 Directional Measures are presented the values for Sommer's asymmetric statistical indicator *d*.

Table 3. Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers'd	Symmetric	,130	,091	1,411	,158
		Homework Dependent	,136	,096	1,411	,158
		Dependent Domain	,124	,088	1,411	,158

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

The result for DV homework is d = 0,136, p = 0,158 > 0,05, which means that there is no association between variables: the increase in parents' math skills does not lead to a qualitative increase in the way students relate to the homework. Basically, these results reflect poor collaboration between parents and children in terms of homework.

b) Relationship mathematics homework - gender of students

In the sample of the research, the gender distribution is as follows: 47,2% girls and 52,8% boys. The persistence of some stereotypes, including the assertion that girls are more conscientious than boys, on the one hand, but also the fact that more research reflects the diminution of gender differences on more and more educational aspects (Opriş & Opriş, 2012), led us to investigate the extent to which the gender of students influences the behaviour of students in relation to mathematics homework.

So we considered the gender the independent variable (IV) and the mathematics homework the dependent variable (DV) and calculated the Lamda coefficient, to see if the association is statistically significant.

Table 4. Homework-gender Crosstabulation

			Gender		Total
			Girl	Boy	
Homework	Not at all	Count	2	2	4
		Expected Count	1,9	2,1	4,0
		% within Gender	4,8%	4,3%	4,5%
		Adjusted Residual	,1	-,1	
	Copied	Count	3	6	9
		Expected Count	4,2	4,8	9,0
		% within Gender	7,1%	12,8%	10,1%
		Adjusted Residual	-,9	,9	
	Teacher in class	Count	11	14	25
		Expected Count	11,8	13,2	25,0
		% within Gender	26,2%	29,8%	28,1%
		Adjusted Residual	-,4	,4	
	Help from other people	Count	24	20	44
		Expected Count	20,8	23,2	44,0
		% within Gender	57,1%	42,6%	49,4%
		Adjusted Residual	1,4	-1,4	
	Independent	Count	2	5	7
		Expected Count	3,3	3,7	7,0
		% within Gender	4,8%	10,6%	7,9%
		Adjusted Residual	-1,0	1,0	
Total		Count	42	47	89
		Expected Count	42,0	47,0	89,0
		% within Gender	100,0%	100,0%	100,0%

Table 5. Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Lambda	Symmetric	,046	,078	,578	,563
		Homework Dependent	,000	,000	.[c]	.[c]
		Gender Dependent	,095	,157	,578	,563
	Goodman and Kruskal tau	Homework Dependent	,011	,015		,421[d]
		Gender Dependent	,031	,035		,608[d]

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Cannot be computed because the asymptotic standard error equals zero.
d. Based on chi-square approximation

Data in Table 4 *Homework-gender Crosstabulation* reveals percentage values for the five categories of reporting to the homework very close in value for the two samples. For girls, the highest value is recorded for help provided by another person (57,1%), almost 15 percentage points higher than the value for this category for boys (42,6%). For all other categories, gender differences are less than 10%.

From Table 4 we observe that the adjusted standardized residues do not exceed the range [-2, 2], and from Table 5 Directional Measures we see that for DV *Homework* the value of the Lambda coefficient is $\lambda = 0$, a fact that leads us to believe that there is no association between the two variables, *Homework – Genre*. The same thing is observed If we analyse the values for the coefficient Goodman and Kruskal tau (τ), on the Homework Dependent line. The value is $\tau = 0{,}011$, at the threshold of significance $p = 0{,}421$, $p > 0{,}05$.

We also applied the Mann-Withey U nonparametric test (Labăr, 2008), where the dependent variable is *homework*, and the independent variable is *gender* to check whether the students' reporting on the homework is influenced by the gender of the students, more precisely, whether there are significant differences between girls and boys.

Table 6. Ranks

	Gender	N	Mean Rank	Sum of Ranks
Homework	1,00	42	46,24	1942,00
	2,00	47	43,89	2063,00
	Total	89		

Table 7. Test Statistics[a]

	Homework
Mann-Whitney U	935,000
Wilcoxon W	2063,000
Z	-,462
Asymp. Sig. (2-tailed)	,644

a. Grouping Variable: 1-girl 2-boy

The results from tables 6 and 7 show that there are no significant differences according to gender in relation to the students' reporting on the homework, $U = 935$, $z = -0{,}462$, $p = 0{,}644$, $p > 0{,}05$, girls pay the same attention to doing the homework as boys, the difference between the average ranks being $46{,}24 – 43{,}89 = 2{,}35$.

c) Relation to mathematics homework-the average obtained by students

We analysed the connection between the mathematics homework and the average in this subject using the method of Anova One-Way variance analysis.

Table 8. Descriptives

Average in mathematics

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Not at all	4	5,2500	,50000	,25000	4,4544	6,0456	5,00	6,00
Copied	9	7,1111	1,26930	,42310	6,1354	8,0868	5,00	9,00
Teacher in class	25	8,2800	1,06145	,21229	7,8419	8,7181	6,00	10,00
Help from other people	44	8,2500	1,54205	,23247	7,7812	8,7188	5,00	10,00
Independent	7	7,5714	1,51186	,57143	6,1732	8,9697	5,00	10,00
Total	89	7,9551	1,50688	,15973	7,6376	8,2725	5,00	10,00

Table 9. Test of Homogeneity of Variances

Average in mathematics

Levene Statistic	df1	df2	Sig.
2,341	4	84	,062

Tables 8 and 9 show us the fact that we have five deeply unequal groups in number, with different averages, but respecting the condition of homogeneity of variances (Levene test $F(4, 84) = 2,341$, $p = 0,62$, $p > 0,05$), so we can apply the ANOVA method.

Table 10. ANOVA

Average in mathematics

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	43,177	4	10,794	5,788	,000
Within Groups	156,643	84	1,865		
Total	199,820	88			

The result in the omnibus F test and the significance threshold in the ANOVA main table has the value $F (4, 84) = 5,788$, $p < 0,05$, which means that there are significant differences between the groups in terms of the average in mathematics according to the students' reporting on homework.

From Table 8 Descriptives we note that the highest average is that of the students who receive classroom help from their teacher (M = 8,28), and the lowest average was calculated for students who do not constantly do homework (M = 5,25).

To find out between which of the groups of students there are significant differences, we will apply a post hoc test. Taking into account that we have homogeneous dispersions and deeply unequal groups of subjects, we will apply the Hochberg GT2 test (Table 11), which under these conditions is stronger than the Turkey test.

Table 11. Multiple Comparisons

Dependent Variable: average in mathematics
Hochberg

(I) Homework	(J) Homework	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Not at all	Copied	-1,86111	,82061	,226	-4,2171	,4949
	Teacher in class	-3,03000*	,73539	,001	-5,1413	-,9187
	Help from other people	-3,00000*	,71315	,001	-5,0475	-,9525
	Independent	-2,32143	,85592	,077	-4,7788	,1359
Copied	not at all	1,86111	,82061	,226	-,4949	4,2171
	Teacher in class	-1,16889	,53084	,260	-2,6929	,3552
	Help from other people	-1,13889	,49958	,220	-2,5732	,2954
	Independent	-,46032	,68819	,999	-2,4361	1,5155
Teacher in class	Not at all	3,03000*	,73539	,001	,9187	5,1413
	Copied	1,16889	,53084	,260	-,3552	2,6929
	Help from other people	,03000	,34201	1,000	-,9519	1,0119
	Independent	,70857	,58395	,918	-,9679	2,3851
Help from other people	Not at all	3,00000*	,71315	,001	,9525	5,0475
	Copied	1,13889	,49958	,220	-,2954	2,5732
	Teacher in class	-,03000	,34201	1,000	-1,0119	,9519
	Independent	,67857	,55568	,915	-,9168	2,2739
Independent	Not at all	2,32143	,85592	,077	-,1359	4,7788
	Copied	,46032	,68819	,999	-1,5155	2,4361
	Teacher in class	-,70857	,58395	,918	-2,3851	,9679
	Help from other people	-,67857	,55568	,915	-2,2739	,9168

*. The mean difference is significant at the 0,05 level.

In the first column the matrix of intergroup comparisons is shown, and in the second column the differences of averages corresponding to each comparison-pairs are shown. We analyse only the statistically significant differences that are denoted by asterisk (*) and consider only the differences for positive values: 3-1 (teacher's help – not at all) and 4-1 (help from other people – not at all), respectively. We will calculate the value of the coefficient t according to the formula below, on the basis of which we will calculate the size of the effect, for each significant comparison.

For the pair "teacher's help-not at all" we have:

$$t_H = \frac{MD}{SE} = \frac{3{,}03}{0{,}73} = 4{,}15$$

$$r = \sqrt{\frac{t^2}{F(df_1) + df_2}}$$

$$r = \frac{4{,}15}{\sqrt{5{,}78 \cdot 4 + 84}} = \frac{4{,}15}{10{,}35} = 0{,}40$$

For the pair "help from other people-not at all" we have:

$$t_H = \frac{MD}{SE} = \frac{3{,}00}{0{,}71} = 4{,}2$$

$$r = \sqrt{\frac{t^2}{F(df_1) + df_2}}$$

$$r = \frac{4{,}2}{\sqrt{5{,}78 \cdot 4 + 84}} = \frac{4{,}2}{10{,}35} = 0{,}40$$

Students who ask the teacher for help in the classroom perform better in mathematics to a significantly greater extent compared to students who do not do their homework (Hochberg t = 4,15, p = 0,001, r = 0,40). Likewise, those who ask other people for help, versus those who do not do their homework (Hochberg t = 4,20, p = 0,001, r = 0,40). According to Cohen, the size of the effect in both situations is medium to strong.

In another plan, the equal value of the effect in the case of the two comparisons shows that the results of the students supported by the teacher in the classroom through additional explanations are similar to the situations in

which the students are helped in the realization of the homework by other people.

d) Relationship homework in mathematics-motivations for learning in mathematics

One of the items of the questionnaire asked students to specify an aspect that would motivate them to learn more in mathematics. We grouped the students' answers into three categories and noted, for each of them, the percentage of students who proposed them:

1-Curriculum-related motivations (decrease in the volume of information, decrease in the number of class hours per week) – 53,9%;

2-motivations related to mathematical skills (if I were more talented at mathematics, if I understood notions more easily) – 32,6%;

3-motivations related to methodological aspects (if we worked more on groups, if competition among students would be stimulated)-13,5%.

Given that much of the students' free time is devoted to solving homework, we analysed the relationship *homework – motivations for learning mathematics*, the data being listed in Table 12. We will analyse the data in rows, for each category of reporting on the homework.

Table 12. Homework * Crosstabulation Motivations

			Motivations			Total
			1.00	2.00	3.00	
Homework	Not at all	Count	3	1	0	4
		% within Homework	75,0%	25,0%	0,0%	100,0%
	Copied	Count	6	3	0	9
		% within Homework	66,7%	33,3%	0,0%	100,0%
	Teacher in class	Count	13	9	3	25
		% within Homework	52,0%	36,0%	12,0%	100,0%
	Help from other people	Count	20	15	9	44
		% within Homework	45,5%	34,1%	20,5%	100,0%
	Independent	Count	6	1	0	7
		% within Homework	85,7%	14,3%	0,0%	100,0%
Total		Count	48	29	12	89
		% within Homework	53,9%	32,6%	13,5%	100,0%

Regardless of how they relate to the homework, 53.9% of the surveyed students believe that they would be motivate to learn more in mathematics by things related to the curriculum: the decrease in the volume of information and the number of classes per week. A third of students (32.6%) believe that learning in mathematics is related to the aptitude for this educational discipline and believe that if they were more talented they would have better results. The difference of 13.5% is given by students who believe that changing some ways of working in the classroom (working on groups, stimulating competition between students) would motivate them to learn more in mathematics.

For three of the categories related to the homework: Not at all, Copied, Independent, more than two thirds of students believe that changes in the curriculum would motivate them to learn more in mathematics. Moreover, in these groups, we do not find any students who specify methodological aspects as motivations for learning mathematics.

If we refer to students who ask the teacher for help in the classroom and those who ask other people for help, we note that the percentages for the three categories of motivations are very close, with differences of less than 10 points.

Limitation of the study

The research was conducted with students from four classes from a secondary school in the urban area of Romania, with good results in the National Assessments. However, given the growing international interest in increasing students' school performance and the large number of students receiving additional training in different subjects in school or individually outside of school activity, we believe that our analyses are relevant for the target subject category and for current trends in the school area. The research has international significance for teachers who encounter students or their parents with similar motivations or mindsets.

Discussion

Recent research (Apostu & Goia, 2023) shows that the decision of the students at the end of the secondary school cycle to follow a certain specialization within a high school constantly depends on several factors, the most important being: the skills in a certain field, the educational offer in the area where the students live, the life prospects that they have, their parents or other people who can influence their decision, but to a large extent the choice also depends on the results of the National Assessment exam, after

the eighth grade. In this context, beyond the talent of each person for one subject or another, it is important that teachers help students to become aware of the fact that mathematics (one of the two subjects in the national assessment, along with the Romanian language) is not memorized, but is learned through intense study, through the development of interest (Chileva, 2022; Yunus & Ali, 2009), solving and practicing with the help of the teacher (Beghetto & Baxter, 2012) some exercises and problems, based on working algorithms (Ay, 2023). Research data confirm that the results in mathematics depend on the independent work of the student (Grodner & Rupp, 2011), on independent work at home (Neilson, 2005), especially if one wants to achieve very good school results (Betts, 1997).

In Romania, given the reserves that many students and parents have towards this self-employment (MEN, 2017), one of the major challenges for adolescents and preadolescents, related or not to school activity (Opriş, 2020), is the significant time they have to devote to homework. The status of this activity of the student is regulated in Romania at the level of educational policy documents and indicates that the homework involves independent work and collaboration between teachers of different educational disciplines, so that the individual workload at home does not exceed two hours during a day (MENCS, 2016). However, no action is taken to verify the compliance with this measure. In Romania, in recent decades, parents' concern to provide children with additional training, with a private teacher, after the regular school program or on weekends increased, in order to ensure them a better preparation for national assessments. The practice has been started since the communist regime and it brings significant financial costs for parents. Mathematics is also among the subjects of education in which students frequently benefit from such training. That is why our research also aimed to provide data on the school results that students have in these contexts.

The design and research tool were developed in compliance with the academic guidelines on research ethics and was submitted for prior approval to the Ethics Committee of the school where the research was conducted, which considered that the entire research approach complies with the norms of research ethics, including ensuring the anonymity of the participants. Also, the parents of the research participants were informed about the whole approach, about the fact that the participation of children is not mandatory and that their consent is needed, as well as about the possibility of withdrawing children from the research without further consequences on their status, at any stage.

Conclusions

Data from respondents involved in our research show that more than three quarters of students seek help from people when they have difficulty solving math homework, be it the classroom teacher (28.1%) or other people (49.4%). 10.1% of the students copy the homework, 7.9% work independently. There is also a percentage of students (4.5%) who constantly come up with their homework not done. If we were to make a profile for each category, then we can say that the students who come with the homework not done are from families where none of the parents use in their professional activity knowledge in the field of mathematics, they are in equal percentages girls and boys, in lower percentages they have poor results in mathematics (M = 5,25) and three quarters believe that the decrease in the volume of information and the number of classes could motivate them to learn more in mathematics.

For more than half of the students who copy the homework, parents work in areas related to mathematics, there are twice as many boys as girls, have average results in mathematics (M = 7,11) and consider in a percentage of 66,7% that the curricular changes (in favour of decongestion of content and decrease in the number of classes) would have positive effects on learning in mathematics. If we analyse the data from a statistical perspective, the conclusion is that for the variables the field in which the parents work, respectively the gender of the students, although there are certain differences, they are not statistically significant.

The highest average was recorded in case of the students who ask the teacher for explanations in the classroom (M = 8,28), in close percentages depending on the field in which the parents work and on the basis of gender. Here we find the highest percentage of students who think that if they were more talented in mathematics they would learn better. Students who ask other people for help in solving homework have a profile very close to that of students who ask the teacher for help at school. The only research results that reveal significant statistical differences between variables are those given by the relationship homework – average in mathematics. Both for the pair "Help from other people – Not at all" and for the pair "Teacher's help – Not at all", the value of r = 0,40, shows a medium to strong effect in terms of help given to students by certain people in achieving school performance.

Respondents who say they don't need help from their classroom teacher or someone else outside school score average math scores (M = 7.57). In this case there are no significant differences in relation to the topic

between girls and boys. Also, in the case of these respondents, the vast majority believe that they can have better results in mathematics if the number of hours in this school subject changes and the volume of information transmitted by teachers decreases.

Future research directions

The research shows that it is necessary to value the classroom teacher more in relation to other people who provide help to students, given the research findings that indicate the similarity of the two groups of students in relation to the homework and the averages obtained in mathematics. The importance of family support to secondary school students is confirmed (Kikas et al., 2022), but the link between the success in mathematics and the help provided by the parents of the students is not confirmed by statistical analysis. Also, the research confirms similar investigations in the field, which indicate better organization of teaching time (Awofala, 2019) as a major chance for increasing the performance obtained by students in mathematics.

For the future, we aim to develop this research in order to obtain relevant data on how additional training with a private teacher leads to a decrease in students' interest in classroom lessons, and thus the effectiveness of training in school. We are also interested in identifying a possible relationship between the understanding of specific terms, the social/cultural environment from which students come, and the results in mathematics.

References

Apostu, O., & Goia, D. (coord.). (2023). *Neparticiparea elevilor la Evaluarea Națională de la finalul clasei a VIII-a 2023. Raport de cercetare* [Non-participation of students in the National Assessment at the end of the eighth grade 2023. Research report]. ME-CNPEE. https://www.ise.ro/wp-content/uploads/2024/01/Raport-neparticipare-EvN-2023-isbn.pdf

Awofala, A.-O. A. (2019). Correlates of senior secondary school students' mathematics achievement. *Educatia 21 Journal, 17*, 15-25. https://doi.org/10.24193/ed21.2019.17.02

Ay, Z. S. (2023). Comparison of 3rd grade mathematics classes in terms of mathematics curriculum and their implementation in the classroom environment: the case of Turkey and Canada (the Province of Ontario). *Pedagogika-Pedagogy, 95*(4), 500-519. https://doi.org/10.53656/ped2023-4.06

Beghetto, R. A., & Baxter, J. A. (2012). Exploring student beliefs and understanding in elementary science and mathematics. *Journal of Research in Science Teaching, 49*(7), 942-960. https://doi.org/10.1002/tea.21018

Betts, J. R. (1997). *The role of homework in improving school quality*. Working Paper, University of California. https://www.semanticscholar.org/paper/THE-ROLE-OF-HOMEWORK-IN-IMPROVING-SCHOOL-QUALITY-Betts/9ecf87a0a45714d91f8a7901676c367ade5a67ff

Bocoş, M. D., & Ionescu M. (2017). *Tratat de didactica moderna*. Paralela 45.

Chen, C., & Stevenson, H. W. (1989). Homework: A cross-cultural examination. *Child Development*, *60*(3), 551-561. https://doi.org/10.2307/1130721

Chileva, V. (2022). Increasing the level of mathematical knowledge of first grade students through working with collected data by himself. *Pedagogika-Pedagogy, 94*(1), 103-121. https://doi.org/10.53656/ped2022-1.09

Cooper, H., Robinson, J. C., & Patall, E. A. (2006). Does homework improve academic achievement? A synthesis of research, 1987–2003. *Review of Educational Research, 76*(1), 1-62. https://doi.org/10.3102/00346543076001001

Dan, C. T., & Chiosa, S. T. (2008). *Didactica matematicii*. Universitaria.

Fan, H., Xu, J., Cai, Z., He, J., & Fan, X. (2017). Homework and students' achievement in math and science: A 30-year meta-analysis, 1986–2015. *Educational Research Review, 20*, 35-54. https://doi.org/10.1016/j.edurev.2016.11.003

Fernández-Alonso, R., Suárez-Álvarez, J., & Muñiz, J. (2015). Adolescents' homework performance in mathematics and science: Personal factors and teaching practices. *Journal of Educational Psychology, 107*, 1075-1085. https://doi.org/10.1037/edu0000032

Getenet, S., Fielding, J., Hay, I., & Callingham, R. (2023). Describing a teacher's pedagogical mathematical knowledge in STEM teaching. *Mathematics Education Research Journal.* https://doi.org/10.1007/s13394-023-00480-y

Grodner, A., & Rupp, N.-G. (2013). The role of homework in student learning outcomes: evidence from a field experiment. *The Journal of Economic Education, 44*(2), 93-109. https://doi.org/10.1080/00220485.2013.770334

Hine, G., Forlin, C., & Chivers, P. (2023). Influences on student decisions to enrol in higher-level mathematics courses. *Mathematics Education Research Journal.* https://doi.org/10.1007/s13394-023-00467-9

Kikas, E., Madamurk, K., & Silinskas, G. (2022). Parental homework-help profiles throughout grades 6 – 9: Relations to motivation and mathematics skills. *Frontiers in Education, 7*. https://doi.org/10.3389/feduc.2022.914992

Labăr, A. V. (2008). *SPSS pentru educație*. Polirom.

Marchis. I. (2017). Pre-Service Primary school teachers' spatial abilities. *Acta Didactica Napocensia 10*(2), 123-130. https://doi.org/10.24193/adn.10.2.10

McGraw, R., Fernandes, A., Wolfe, J.A., & Jarnutowski, B., (2023). Unpacking mathematics preservice teachers' conceptions of equity. *Mathematics Education Research Journal.* https://doi.org/10.1007/s13394-023-00463-z

Ministerul Educaţiei Naţionale (MEN). (2017). *Temele pentru acasă.* https://www.ise.ro/wp-content/uploads/2017/12/Raport_Teme-acasa_final.pdf

Ministerul Educaţiei Naţionale şi Cercetării Ştiinţifice (MENCS). (2016). *Ordin privind temele pentru acasă în învăţământul preuniversitar, nr. 5893.* https://www.edu.ro/sites/default/files/OMENCS%205893%20teme.pdf

Neilson, W. (2005). Homework and performance for time-constrained students. *Economics Bulletin, 9*, 1-6. https://web.utk.edu/~wneilson/EB-Homework.pdf

Nicola, I. (2003). *Tratat de pedagogie şcolară.* Aramis.

Nieminen, J. H., Bagger, A., Padilla, A., & Tan, P. (2023). Student in mathematics assessment research: A critical review. *Journal for Research in Mathematics Education, 54*(5), 317-341. https://doi.org/10.5951/jresematheduc-2022-0030

Opriş, D. (2020). Pragmatism and identity crises during the personal development of adolescents. Case Study. *Journal of Educational Sciences & Psychology, X*(2), 74-82. http://jesp.upg-ploiesti.ro/index.php?option=com_phocadownload&view=file&id=587:pragmatism-and-identity-crises-during-the-personal-development-of-adolescents-case-study&Itemid=16

Opriş, D., & Opriş, M. (2012). Teenagers'models of understanding suffering. *European Journal of Science and Theology, 8*(suppl. 2), 173-182. http://www.ejst.tuiasi.ro/Files/33/Opris%20%2818%29.pdf

Păun, E. (2017). *Pedagogie. Provocări şi dileme privind şcoala şi profesia didactică.* Polirom.

Robas, V. R., Madariaga, J. M., & Villarroel, J. D. (2020). Secondary education students' beliefs about mathematics and their repercussions on motivation. *Mathematics, 8*(3), 368. https://doi.org/10.3390/math8030368

Sharma, S. (2023). Promoting statistical thinking in year 12 multilingual classrooms: a collaborative study. *Mathematics Education Research Journal.* https://doi.org/10.1007/s13394-023-00472-y

Şuteu, L., Cristea, M., Magdaş, I., & Ciascai, L. (2024). Investigating the relationship between metacognition and STREAM education in science: an exploratory study. *Revista Românească pentru Educaţie Multidimensională, 16*(1), 30-45. https://doi.org/10.18662/rrem/16.1/810

Tarasenkova, N., Akulenko, I., Hnezdilova, K., Chashechnikova, O., Kirman, V., Serdiuk, Z., Kolomiets, O., & Zaporozhets, A. (2023). Efficient questioning in teaching mathematics: teachers' attitudes and practices. *Revista Românească pentru Educaţie Multidimensională, 15*(1), 216-246. https://doi.org/10.18662/rrem/15.1/694

Trautwein, U., & Köller, O. (2003). The relationship between homework and achievement – Still much of a mystery. *Educational Psychology Review, 15*(2), 115-145. http://www.jstor.org/stable/23361516

Way, J. (2023). Approaches to investigating young children's mathematical activity. *Mathematics Education Research Journal, 35*, 281–286. https://doi.org/10.1007/s13394-023-00464-y

Xu, J. (2023). Student interest in mathematics homework: Do peer interest and homework approaches matter? *Psychology in the Schools, 60*(10), 4011-4028. https://doi.org/10.1002/pits.22963

Yunus, A. S., & Ali, W. Z. W. (2009). Motivation in the learning of mathematics. *European Journal of Social Sciences, 7*(4), 93-101. https://www.researchgate.net/publication/265996639_Motivation_in_the_Learning_of_Mathematics