COMPLETION OF MATHEMATICS HOMEWORK

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Abstract Homework is a complex phenomenon, and there are many factors that can influence its effectiveness. This study focused on the completion of mathematics homework. The survey was conducted in Slovenia on a sample of 192 students from the first three grades and 417 students from the last three grades of elementary education. Based on the obtained results, we conclude that the share of completed homework assignments and students' achievements are positively related. Our findings show that students mostly do not complete their homework because they are unable to do it; they do not know how to solve all of the assigned tasks. We believe there are at least two explanations: (a) they do not focus on homework and/or despair over homework before they even start doing it, and (b) they truly do not know how to solve tasks. Since there is a positive link between the time optimisation of doing mathematical homework and the share of completed mathematical tasks (between time optimisation and students' mathematical achievements as well), we believe that improving students' time optimisation of doing mathematical homework (better focus on work) could help with the aforementioned reason for not completing mathematical tasks.

Keywords: mathematics, homework, completion, time optimisation individualized mathematical homework.

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Introduction

Homework is often discussed among the general public, but unfortunately, this phenomenon is frequently a source of conflict between students, parents and teachers. While some think that homework is a necessary fact of life, others state that it is, undoubtedly, an unnecessary waste of time. There are several arguments against assigning homework in schools, such as the following: homework assignments consume too much of the child's free time, reduce the amount of time that children could spend with their families, lead to unhealthy levels of stress for children, to name a few (see Matei & Ciascai, 2015). However, there are some positive views about homework as well; it can refresh, expand and reinforce students' knowledge, it can help teach students responsibility, develop positive study skills and habits. (see Cooper, 1989; Kukk et al., 2015; Matei & Ciascai, 2015; Warton, 2001).

Such inconsistencies can be found not only in these opinions of general public, but also in empirical findings concerning the relationship between homework and students' achievement (Cooper, Robinson, et al., 2006; Fan et al., 2017). One of the possible reasons for the mentioned inconsistency of the results may lie in the diversity of homework characteristics, which can be specific to teachers, parents, students, and others.

From the students' point of view, several studies consider the number of homework assignments completed by students (the share of completed tasks), and it seems that this factor could be positively related to their achievements (Cooper, Lindsay, et al., 1998; Núñez et al., 2015; Núñez et al., 2015a). Therein arises a question of why students do not complete their homework. Namely, if we know that, then we can try to cancel out the mentioned reasons for uncompleted tasks and in this way try to improve students' academic achievements.

Theoretical framework

Homework is an interesting element of education for many authors; it has been studied in many papers (e.g. Cooper, Lindsay, et al., 1998; Cooper, Robinson, et al., 2006; Corno, 1996; Dettmers et al., 2010; de Jong et al., 2000; Dumont et al., 2012; Fan et al., 2017; Ferme & Lipovec, 2019; Fernández-Alonso et al., 2015; Hoover-

Dempsey et al., 2001; Núñez et al., 2015; Núñez et al., 2015a; Podgoršek et al., 2017; Trautwein et al., 2002).

According to Cooper, Robinson, et al. (2006), homework can be defined as tasks assigned to students by school teachers that are meant to be performed during non-school hours. Empirical findings that consider the relationship between homework and students' achievement have been very inconsistent (Cooper, Robinson, et al., 2006; Fan et al., 2017). While several studies suggest a positive relationship between the mentioned two variables (e.g. Fernández-Alonso et al., 2015), there are some studies that do not confirm that relationship or even report the negative correlation between some of the mathematics homework characteristics and students' achievements (de Jong et al., 2000; Trautwein et al., 2002). One of the possible reasons for this inconsistency of the results may lie in the diversity of homework characteristics.

Students themselves clearly play an important role in the effectiveness of homework. Several studies suggest that the number of homework assignments completed by students (the share of completed tasks) and students' achievements are positively related (Cooper, Lindsay, et al., 1998; Ferme & Lipovec, 2019; Núñez et al., 2015; Núñez et al., 2015a;).

For instance, Núñez et al. (2015) conducted a study in Spain, among 454 students aged between 10 and 16 years. Along with others, the researchers posed the following question to the students: "Some students complete all of their homework, and others only complete some of it. And you? How much of your homework do you do ... usually/in a typical week/on a typical weekend?" The students provided their answers using 5-point Likert-type scale ranging from 1 (*I don't do any of my homework*) to 5 (*I do all of my homework*). Based on their answers, the researchers discovered that the amount of homework completed positively and significantly predicts students' academic achievement (measured via students' final academic grades). In addition, Ferme and Lipovec (2019) conducted a study limited to mathematics only. They examined the share of completed mathematical homework and it connected with students' knowledge. Participants of this study were students from the first, second, and third grades of elementary school from Slovenia (N = 192). It was discovered that almost 20 % of students do not complete all (or almost all) tasks from the tasks in assigned homework. Based on the results, they believe

that the share of completed tasks and students' self-reported mathematics grades are positively related.

The reasons for homework incompletion were investigated in several papers (see Glazer & Williams, 2001; Hinchey, 1996; Hong et al., 2011; Hudson & Kendall, 2002; Morgenweck, 2006). For example, Hong et al. (2011) found out that students from China (grade 10) most frequently do not complete their mathematical homework, because of its large amount, difficulty and their tardiness/laziness, while Hinchey (1996) mentioned the lack of students' time and their beliefs about the pointlessness of homework. Furthermore, Morgenweck (2006) found out that the most common reasons for students' incompletion of homework assignments include students' forgetting assignments or homework material, lack of students' time, students not understanding the assignments, and their unwillingness and extracurricular activities. According to Hudson and Kendall (2002), other possible reasons for uncompleted assignments include forgetting to complete homework, and anxiety (for instance, worrying about completing it inaccurately). Note that these authors also mentioned unsuitable difficulty of tasks (Hudson & Kendall, 2002). Forgetting homework and not understanding the tasks is mentioned by Glazer and Williams (2001) as well.

One of the possible factors that can positively affect the share of completed tasks by students is better quality of homework time management (time optimisation, focusing on work). Namely, it seems that the mentioned two variables are positively related (Ferme & Lipovec, 2019; Núñez et al., 2015; Núñez et al., 2015a; Xu, 2011). In addition, the quality of time optimisation, expressed as focusing on work while doing homework, is positively related to students' achievement (Ferme & Lipovec, 2019; Núñez et al., 2015; Núñez et al., 2015a;).

Furthermore, since several authors (Hong et al., 2011; Hudson & Kendall, 2002; Morgenweck, 2006) mentioned that students do not complete their homework assignments due to their difficulty (or not understanding of tasks), maybe there is need for more individualized tasks. It seems that teachers do not individualize mathematical homework often (Lipovec & Ferme, 2018). In addition, Murillo and Martínez-Garrido (2013) reported that the individualized homework is positively related to students' achievements.

Research problem

The aim of the study is to examine the rate of completing mathematical homework among students, reveal their reasons for not completing the given tasks, and based on the findings, provide some suggestions for school and home work.

We have set forth the following research questions.

1. What is the share of mathematical homework tasks completed by students?
2. What is the relationship between mathematical homework completion and students' mathematical achievement?
3. Why is mathematical homework not completed?
4. Are students distracted by other factors while doing homework (how students optimize the time while doing mathematical homework)?
5. How frequently do students receive individualized mathematical homework?

Methodology

We have used the methods of quantitative empirical pedagogical research.

The survey, conducted at the end of 2018, was carried out on the basis of completed questionnaires of 609 students from Slovenia. The students were guided by authors when completing the questionnaire. This means that each of the questions posed to the students and/or each of the offered answers was precisely explained to students.

Data obtained from questionnaires was analysed using IBM SPSS Statistics 25. We used the following statistical tests: the chi-squared test, tests for independent samples and Spearman's rank correlation coefficient test.

Sample

The participants of our study were students from Slovenia (N = 609). We have randomly chosen schools from Slovenia and asked them to cooperate in our study. Then, the data were obtained from students of the selected schools who decided to take part in the study.

192 students from the first three grades (first, second, and third grade), and 417 students from the last three grades of elementary education (seventh, eighth, and ninth grade) in Slovenia participated in our study. Note that, in Slovenia, first-graders starting school are 5 years and 8 months to 6 years and 8 months old. The structures of the partial samples are presented in Tables 1 and 2.

Table 1 describes the partial sample of students from the first three grades of elementary education. It presents the share of students from each grade, presents the share of students with respect to the gender and gives the information about students' mathematical knowledge. Students' mathematical knowledge for students from the first three grades of elementary education was measured via their self-assessment grade (of their mathematical knowledge).

Table 1: Sample structure for students from the first, second, and third grade

		f	*f* %
N		192	100.0
Grade	1st	35	18.2
	2nd	63	32.8
	3rd	91	47.4
Gender	Male	80	41.7
	Female	112	58.3
Self-assessment grade	Less than 5*	80	41.7
	5	107	55.7

Table 2 describes the partial sample of students from the last three grades of elementary education. It presents the share of students from each grade, the share of students with respect to the gender and provides the information about students' mathematical knowledge. In this case, the students' mathematical knowledge was measured via students' final grades in mathematics, which were obtained in the previous school year.

Table 2: Sample structure for students from the seventh, eighth, and ninth grade

		f	*f* %
N		417	100,0
Grade	7th	138	33.1
	8th	143	34.3
	9th	136	32.6
Gender	Male	190	45.6
	Female	227	54.4
Final grade in mathematics	1 or 2	81	19.4
	3	118	28.3
	4	116	27.8
	5	101	24.2

Instrument

An anonymous questionnaire comprised questions about students' basic data (class, gender), questions regarding their mathematical knowledge, and questions related to some characteristics of mathematical homework. Students' mathematical knowledge was measured via self-assessment of their mathematical knowledge (for students from the first three grades of elementary education) or via the final mathematics grade in the previous school year as reported by students (from the last three grades of elementary education). Questions about the characteristics of mathematical homework included the share of completed tasks in homework, the reasons for uncompleted tasks, the level of time optimisation and the frequency of individualized tasks.

The following are the questions from the questionnaire (only the ones related to mathematics homework characteristics).

How many tasks do you usually complete from the tasks in the assigned homework?

a) None or almost none.
b) Approximately half of them.
c) All or almost all.

Why don't you complete all of your math homework?

"I do not complete math homework because …" (You can choose more answers.)

a) I have not got enough time (because of other activities);
b) it is too extensive;
c) I cannot do it (I do not know how to do all the tasks);
d) I cannot do it (I do not know how to do all the tasks), even if someone helps me;
e) I forget to complete it;
f) it is not interesting;
g) no one checks if I completed it;
h) I would rather do other things (for instance, spend the time with my friends);
i) I am tired (I have no energy);
j) I do not have the motivation to start doing my homework;
k) other: ____.

Are you, when doing homework for mathematics, distracted by other things (such as cell phones, talking to other people, television)?

Do you think about other things, while doing homework for mathematics?

a) I do not do homework.
b) Other things always distract me. I often think about other things.
c) Other things sometimes distract me. I sometimes think about other things.
d) While doing mathematical homework I think only about the homework. Nothing distracts me.

How often does everyone in your class get the same mathematical homework?

a) Never.
b) Sometimes.
c) Often.
d) Always.

Research results

In the continuation of this paper, we will use the abbreviation MHW – mathematical homework.

The share of completed tasks of MHW

First, we consider the results pertaining to the share of the completed tasks of MHW. As it was mentioned, we posed the following question to the students: "How many tasks do you usually complete from the tasks in the assigned homework?" Students chose one of the three possible answers (None or almost none, Approximately half of them; All or almost all). Tables 3 and 4 present the frequency of students' responses to the question.

The majority of the students from the first three grades, 81,3 %, usually complete all or almost all of MHW. The share of such students from the last three grades is less than 64 %. On the other hand, there is more than 5 % of students from the last three grades of elementary education who complete none or almost none of the assigned homework tasks. Note that the share of such students from the first three grades is less than 2 %.

Table 3: The share of completed tasks of MHW for students from the first, second, and third grade

How many tasks do you usually complete from the tasks in the assigned homework?	*f*	*f* %
None or almost none.	3	1.6
Approximately half of them.	33	17.2
All or almost all.	156	81.3

Table 4: The share of completed tasks of MHW for students from the seventh, eighth, and ninth grade

How many tasks do you usually complete from the tasks in the assigned homework?	*f*	*f* %
None or almost none.	22	5.3
Approximately half of them.	129	30.9
All or almost all.	266	63.8

The share of completed tasks and students' mathematical achievement

In order to reveal the relationship between the share of completed tasks and students' mathematical achievement, we obtained the completion index. It was calculated as an average of the completed tasks, where one represented none or almost none completed tasks and three all or almost all completed tasks. The indexes of final grades in mathematics for students with different self-assessed grades are presented in Tables 5 and 6.

Table 5 shows completion indexes (averages with standard deviations) for students from the first three grades of elementary education. As written, the completion index for all of the mentioned students is 2.80. More precisely, the index is 2.69 for students with a self-assessed grade of 4 or less, and it is 2.90 for students with a self-assessed grade of 5.

Table 5: Completion indexes for students from the first, second and third grade

	1st, 2nd, 3rd – grade
Completion index	2.80 (0.441)
Students with a self-assessed grade of 4 or less	2.69 (0.542)
Students with a self-assessed grade of 5	2.90 (0.305)

Based on the result of the statistical chi-square test, we found out that the two variables, the students' self-assessed grade (5 or at most 4) and the completion index, are related ($p = .004$, $\chi^2 = 10.837$). Moreover, based on the indexes written in the Table 5 and based on the fact that the task completion indexes are statistically different for students with a self-assessed grade of less than 5 and for those with a self-assessed grade of 5 ($p = .002$, $t = 3.112$), we believe that the relationship between the mentioned two variables is positive (in the case of the students from first, second, and third grade).

Table 6: Completion indexes for students from the seventh, eighth, and ninth grade

	7^{th}, 8^{th}, 9^{th} – grade
Completion index	2.59 (0.591)
Students with the final grade 1 or 2	2.21 (0.586)
Students with the final grade 3	2.48 (0.610)
Students with the final grade 4	2.75 (0.491)
Students with the final grade 5	2.82 (0.498)

Table 6 presents completion indexes (averages with standard deviations) for students from the last three grades of elementary education. The completion index for all of the mentioned students is 2.59. In Table 6, completion indexes for students with different final grades are written as well.

Again, based on the result of chi-square test, we found out that the variables students' final grade in mathematics and completion index are related ($p = .000$, $\chi^2 = 81.990$). In addition, the relationship is positive ($p = .000$, $\varrho = 0.410$).

Reasons for the incompletion of mathematical homework

Furthermore, we were interested in students' reasons for not completing MHW. We offered the students a list of reasons and they could choose multiple answers, or add their own reasons.

The list of reasons for the incompletion of mathematical homework is the following.

a) I have not got enough time (because of other activities);
b) it is too extensive;
c) I cannot do it (I do not know how to do all the tasks);
d) I cannot do it (I do not know how to do all the tasks), even if someone help me;
e) I forget to complete it;
f) it is not interesting;
g) no one checks if I completed it;
h) I rather do the other things (for instance, spend the time with my friends);
i) I am tired (I have no energy);
j) I do not have the motivation to start doing my homework;

k) other: ____.

Tables 7 and 8 present the most common reasons for incompletion of mathematical homework as reported by students. The majority of students (from the first three and the last three grades combined) do not complete their homework because they cannot do it, namely, they do not know how to solve the given tasks.

Table 7: Reasons for the incompletion of MHW for students from the first, second, and third grade

Students from the first, second, and third grade	f %
I cannot do it (I do not know how to do all tasks).	21.9
I have not got enough time (because of other activities).	16.7
I forget to complete it.	16.7

Table 8: Reasons for incompletion of MHW for students from the seventh, eighth, and ninth grade

Students from the seventh, eighth, and ninth grade	f %
I cannot do it (I do not know how to do all the tasks).	64.5
I forget to complete it.	36.0
I am tired (I have no energy).	31.2

The time optimisation in doing MHW

Further, we consider students' level of time optimisation while they are doing their MHW (focusing on work while doing MHW). This characteristic of mathematical homework was expressed by students through the answer to the following question: "Are you, when doing homework for mathematics, distracted by other things (such as cell phones, talking to other people, television)? Do you think about other things, while doing homework for mathematics?" We offered the students four possible answers and they could choose one of them.

Table 9 presents the answers of students from the first three grades of elementary education. Only 40.1 % of students from the first three grades completely focus on mathematical homework while doing it, where nothing distracts them (therefore, their level of time optimisation while doing mathematical homework is high). On the other hand, there is almost 10 % of students who reported that they do not focus

solely on work while doing mathematical homework. Namely, other things always distract them, and they often think about other things.

Table 9: Time optimisation for students from the first, second, and third grade

Are you, when doing homework for mathematics, distracted by other things (such as cell phones, talking to other people, television)? Do you think about other things, while doing homework for mathematics?	*f*	*f* %
I do not do homework.	1	0.5
Other things always distract me. I often think about other things.	19	9.9
Other things sometimes distract me. I sometimes think about other things.	95	49.5
While doing mathematical homework I think only about the homework. Nothing distracts me.	77	40.1

Next, Table 10 presents the results of the time optimisation while doing mathematical homework for students from the last three grades of elementary education. As seen, only 14.4 % of students from the last three grades reported that they focus completely on mathematical homework while doing it and nothing distracts them. Similar as for the students from the first three grades, there is almost 10 % of students from the last three grades who do not focus solely on work while doing mathematical homework.

Table 10: Time optimisation for students from the seventh, eighth, and ninth grade

Are you, when doing homework for mathematics, distracted by other things (such as cell phones, talking to other people, television)? Do you think about other things, while doing homework for mathematics?	*f*	*f* %
I do not do homework.	20	4.8
Other things always distract me. I often think about other things.	37	8.9
Other things sometimes distract me. I sometimes think about other things.	300	71.9
While doing mathematical homework I think only about the homework. Nothing distracts me.	60	14.4

The time optimisation while doing MHW, the share of completed tasks of MHW and students' mathematical achievement

We found out that the time optimisation (for students who do MHW) and the share of completed tasks are related for students from the first three grades (p = .000, $\chi^2_{(lr)}$ = 21.176). In this case the correlation is positive (ϱ = 0.304, p = .000). We also calculated the task completion indexes for students with different levels of time optimisation. These indexes are written in Table 11. They indicate the above-written conclusions.

Table 11: Time optimisation and completion of MHW for students from the first, second, and third grade

Time optimisation	Task completion index (1–3)
Other things always distract me. I often think about other things.	2.42
Other things sometimes distract me. I sometimes think about other things.	2.77
While doing mathematical homework I think only about the homework. Nothing distracts me.	2.94

Furthermore, for students from the first three grades of elementary education the variables time optimisation (for students who do MHW) and students' self-assessed grade are related as well (p = .008, $\chi^2_{(lr)}$ = 9.730).

We calculated the average of the students' self-assessed grades for students with different levels of time optimisation. Their grades are written in Table 12. Furthermore, we found out that the average of the students' self-assessed grade (5 or less than 5) is statistically different for students with different levels of time optimisation (p = .007; F = 5.05). Based on these findings and the results written in Table 12, we believe that the level of time optimisation is in positive correlation with the students' mathematical achievement (which is, in this case, measured via the students' self-assessment of their mathematical knowledge).

Table 12: Time optimisation and students' mathematical achievement for students from the first, second, and third grade

Time optimisation	Average students' self-assessed grade (1–5)
Other things always distract me. I often think about other things.	3.71
Other things sometimes distract me. I sometimes think about other things.	4.44
While doing mathematical homework I think only about the homework. Nothing distracts me.	4.67

For students from the last three grades of elementary education the results are similar. Namely, the level of time optimisation (for students who do MHW) and the share of completed tasks are related (p = .000, $\chi^2 = 34.468$). The correlation is positive (ϱ = 0.426, p = .000). These findings are supported by the results written in Table 13, which shows the task completion indexes for students with different levels of time optimisation.

Table 13: Time optimisation and completion of MHW for students from the seventh, eighth, and ninth grade

Time optimisation	Task completion index (1–3)
Other things always distract me. I often think about other things.	2.27
Other things sometimes distract me. I sometimes think about other things.	2.66
While doing mathematical homework I think only about the homework. Nothing distracts me.	2.83

Moreover, the statistical chi-squared test shows that the variables time optimisation (for students who do MHW) and students' final grade in mathematics are also related (p = .000, χ^2 = 19.938). Based on the result of the correlation test, we believe that the correlation is positive in this case as well (ϱ = 0.183, p = .001). The findings are supported with the results written in Table 14. We calculated the average of students' final grades in mathematics for students with different levels of time optimisation. Our calculations are presented in Table 14.

Table 14*:* Time optimisation and students' mathematical achievement for students from the seventh, eighth, and ninth grade

Time optimisation	Average students' final grade (1–5)
Other things always distract me. I often think about other things.	3.22
Other things sometimes distract me. I sometimes think about other things.	3.54
While doing mathematical homework I think only about the homework. Nothing distracts me.	4.03

The frequency of individualized mathematical homework

Finally, we considered the frequency of individualized MHW. We posed the following question to the students: "How often does everyone in your class get the same mathematical homework?" Students could choose one of the four possible answers (*always*, *often*, *sometimes*, *never*). Their responses are presented in Table 15 and in Table 16.

Table 15 presents the responses of students from the first three grades of elementary education. As shown, the majority of the students, 87.5 %, from the first, second, or third grade, reported that everyone in their class always or often receives the same mathematical homework.

Table 15: The frequency of individualized MHW for students from the first, second, and third grade

How often does everyone in your class get the same mathematical homework?	*f*	*f* %
Always	119	62.0
Often	49	25.5
Sometimes	23	12.0
Never	1	0.5

Table 16 presents the responses of students from the last three grades of elementary education. Again, the majority of students, 91.6 %, reported that everyone in their class always or often receive the same mathematical homework. Note that in this case the share of such students is higher as in the case of the students from the first three grades of elementary education. Based on these results, we hypothesise that the frequency of individualized MHW is decidedly low.

Table 16: The frequency of individualized MHW for students from the seventh, eighth, and ninth grade

How often does everyone in your class get the same mathematical homework?	*f*	*f* %
Always	263	63.1
Often	119	28.5
Sometimes	28	6.7
Never	7	1.7

Discussion and Conclusion

Several studies suggest that the amount of homework completed by students is positively related to their achievements (Cooper, Lindsay, et al., 1998; Núñez et al., 2015; Núñez et al., 2015a). Our findings are in accordance with these results. Based on the executed statistical tests, we hypothesise that the relationship between the share of the tasks completed by students and their achievements is positive for students from the first, second, and third grade of elementary education. In addition, the students' final grade in mathematics and the completion index are related for students from the last three grades of elementary education ($p = .000$, $\chi^2 = 81.990$). Based on the results of Spearman's rank correlation coefficient test, we discovered that the mentioned relationship is positive ($p = .000$, $\varrho = 0.410$). Furthermore, we found out that more than 18 % of students from the first three grades of elementary education do not complete all or almost all of the tasks in the assigned homework. The share of such students from the last three grades of elementary education is more than 36 %. Based on the mentioned and repeatedly indicated positive relation between the share of completed tasks and students' achievements, we think that there is need (and opportunity) for improvement of these results. One of the ways for that is expanding the knowledge on the reasons for uncompleted tasks as reported by students.

The most common reason for MHW incompletion of students from the first and from the last three grades of elementary education is the following: they do not complete their homework assignment because they cannot do it, namely, they do not know how to solve all tasks. This has already been mentioned by several other authors (Glazer & Williams, 2001; Hong et al., 2011; Hudson & Kendall, 2002; Morgenweck, 2006). There are at least two explanations for these reasons: (a) students do not know how to solve tasks, because they do not really focus on them,

and/or they despair over homework before they really start doing it, or (b) they really do not know how to solve tasks.

The first explanation is based on our finding that only 40 % of students from the first three grades and only 14.4 % of students from the last three grades of elementary education focus entirely on doing MHW (they think only about the MHW and nothing distracts them). In addition, we found out that the quality of the students' time optimisation (focusing of work) and the share of completed tasks are positively related ($\varrho = 0.304$, $p = .000$) for students from the first three grades ($\varrho = 0.426$, $p = .000$ for students from the last three grades), which is in accordance with the results of several other studies (Ferme & Lipovec, 2019; Núñez et al., 2015; Núñez et al., 2015a; Xu, 2011). Moreover, our results reveal that the variables time optimisation (for students who do MHW) and students' mathematical achievement are also positively related. Specifically, for students from the last three grades of elementary education, final grades in mathematics are positively related to the levels of time optimisation ($p = .001$, $\varrho = 0.183$). For better understanding of the described situation (for students from the last three grades of elementary education), see Figure 1. It shows the described positive relationships between MHW completion, time optimisation of doing MHW and students' mathematics achievement for students from the last three grades of elementary education. The positive relationships between the mentioned variables exist also for students from the first three grades of elementary education. Based on these findings, we think that better time optimisation of doing MHW (higher level of focusing on work) could help students with the above-mentioned reasons for uncompleted tasks. As written, the other common reasons for uncompleted tasks as reported by students from the first three or from the last three grades of elementary education are the following: students' lack of time for doing homework (due to other activities), forgetting to complete homework, and their lack of energy (tiredness). The role of all of these may be reduced with better time optimisation. Hence, we suggest as it has already been suggested by Núñez et al. (2015): students need to be trained in effective homework time optimisation. In addition, since homework is done at home, maybe parents could help with the improvement of their child's quality of time optimisation (for instance, by providing a quiet room for doing homework, ensuring time for doing homework).

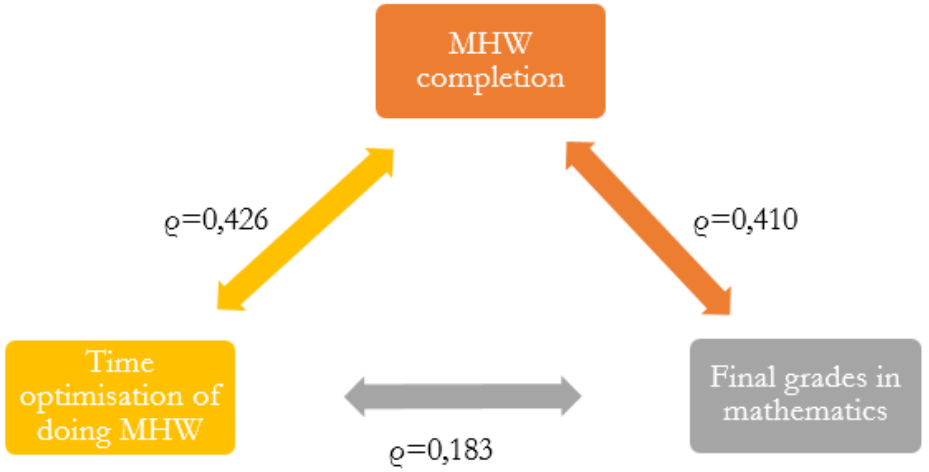

Figure 1: Relationships between MHW completion, time optimisation in doing MHW and students' mathematics achievement for students from the last three grades of elementary education

Situation b) is based on our findings on the frequency of individualized MHW. Namely, more that 87 % of students from the first three grades and more that 91 % of students from the last three grades of elementary education reported that everyone in their class always or often receives the same mathematical homework. Therefore, the share of individualized MHW tasks is low. Recall that Murillo and Martínez-Garrido (2013) reported that the individualized homework is positively related to students' achievements. Hence, we think that there is need for more individualized tasks as well.

Our study reveals that most times students do not complete their homework because they cannot do it (do not know how to). Based on our findings, we conclude that there are at least two different explanations for this: (a) the students do not know how to solve tasks, because they do not really focus on them and/or they despair over homework before they really start doing it and (b) they really do not know how to solve tasks. Based on our results on the positive relationship between time optimisation in doing MHW and the share of completed tasks (and also between time optimisation in doing MHW and students' mathematical achievement), we believe that improving students' time optimisation in doing MHW (a better focus on work) could help with the mentioned reason for uncompleted tasks. Hence, we

suggest encouraging students in their efforts towards effective homework time optimisation. On the other hand, since the share of individualized MHW tasks is low and some authors report that the individualized homework is positively related to students' achievements, more individualized homework could help as well.

In conclusion, our study reveals some new findings about the completion of mathematical homework, but due to the complexity of the phenomenon of homework, more in-depth research will be needed. We believe that additional research is needed to cover a wider spectrum of factors which can affect the completion of MHW.

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