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Assessment Matters!

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Homework Alert: How much is enough?

It is back-to-school time, an opportunity for many parents, teachers, and students to broach the delicate issue of homework. What good does homework do? Should we push students to do it? How much is enough? These questions have become somewhat controversial in the world of education. Indeed, the relationship between homework and student performance is far from clear. Some research demonstrates positive effects of homework (Cooper, 1989; Marzano, Pickering, & Pollock, 2001), some points to negative effects (Kohn, 2006), and still other studies suggest minimal effects (Eren & Henderson, 2011). Moreover, these effects can vary according to subject and grade level, as well as the amount and type of homework assigned (Herrig, 2011).

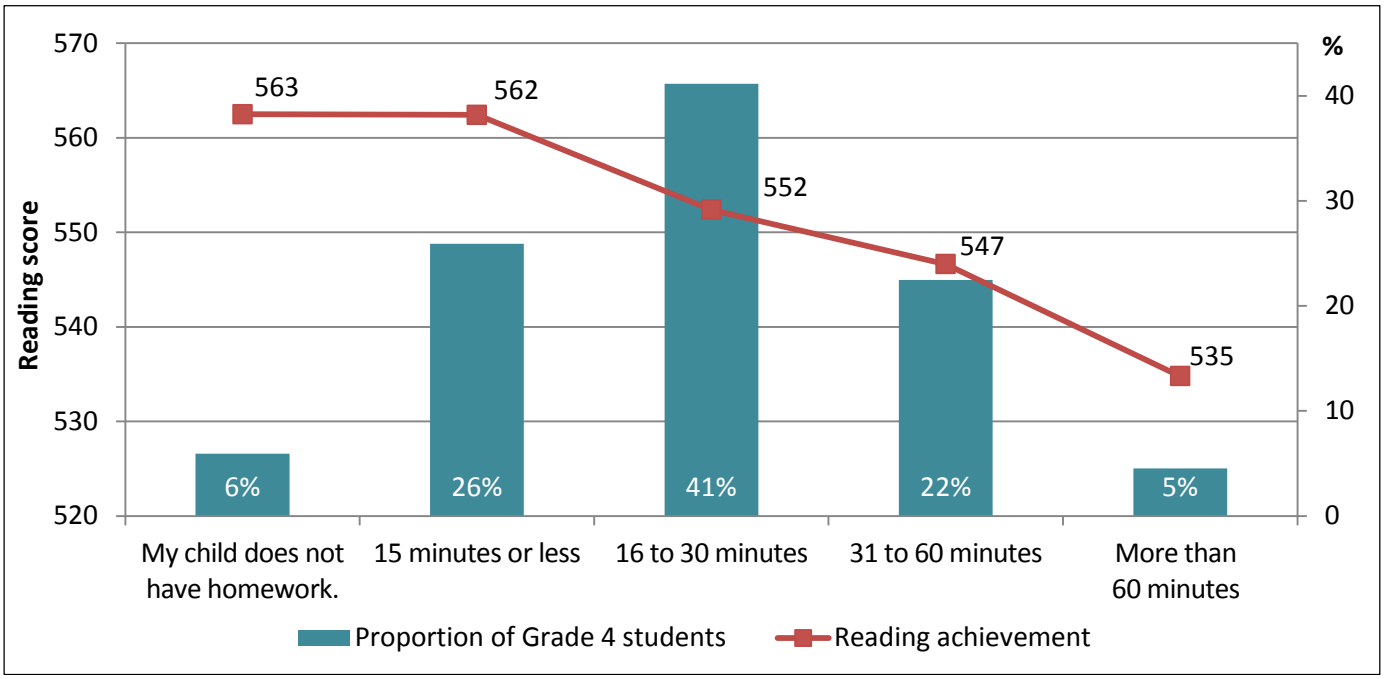
This issue of *Assessment Matters!* looks at evidence from different large-scale assessments in order to explore the relationship between homework and student achievement. Data were collected at three different grade levels: early, middle, and high school. First, Canadian data from the Progress in International Reading Literacy Study (PIRLS) are used to see how homework is linked to reading achievement in Grade 4 (early-grade level). Then, results from the Pan-Canadian Assessment Program (PCAP) help us consider the impact of homework on mathematics achievement in Grade 8/Secondary II (middle-grade level). Finally, data from the Programme for International Student Assessment (PISA) are analyzed to determine the link between homework and performance in mathematical literacy at age 15 (high-school level).

In the early grades, more time spent on homework does not mean higher performance…

For the PIRLS 2011 assessment, over 18,000 parents and primary caregivers of Grade 4 students across the country responded to the *Learning to Read Survey*. As part of this survey, respondents were asked to indicate how long their children spent on homework each day. Based on their responses, it was determined that over 70 per cent of Grade 4 students spend less than 30 minutes a day on homework. As seen in Chart 1 below, in the early years, there is an inverse relationship between the amount of time spent on homework and reading achievement. This could mean that students who struggle with school work need to spend more time on homework, but it could also mean that in the early years, spending a lot of time on homework every day will not yield positive results.

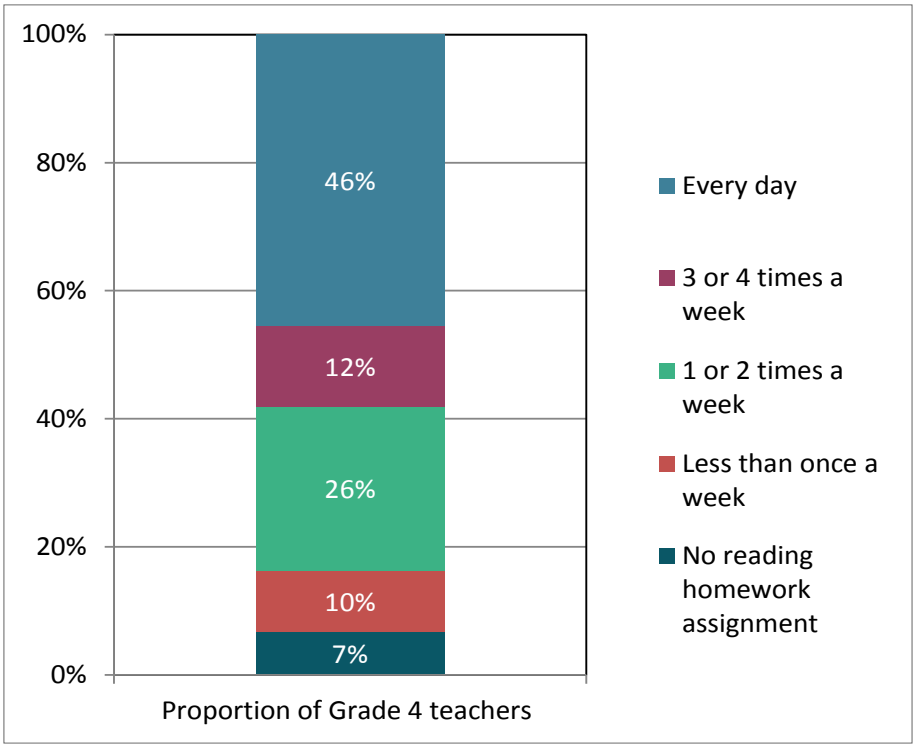
It should be noted, however, that homework can be assigned for reasons other than achievement. Some teachers give homework for the sake of students' self-discipline. Indeed, recent research shows that homework plays an important role in developing self-regulation processes such as goal-setting, self-efficacy, self-reflection, time management, and delay of gratification (Ramdass & Zimmerman, 2011). Thus, small amounts of homework may still benefit young students by fostering a sense of self-discipline and responsibility and preparing them for upper grades.

CHART 1 **PIRLS 2011[1] – Reading achievement scores by amount of time spent per day on homework (as reported by parents or primary caregivers)**



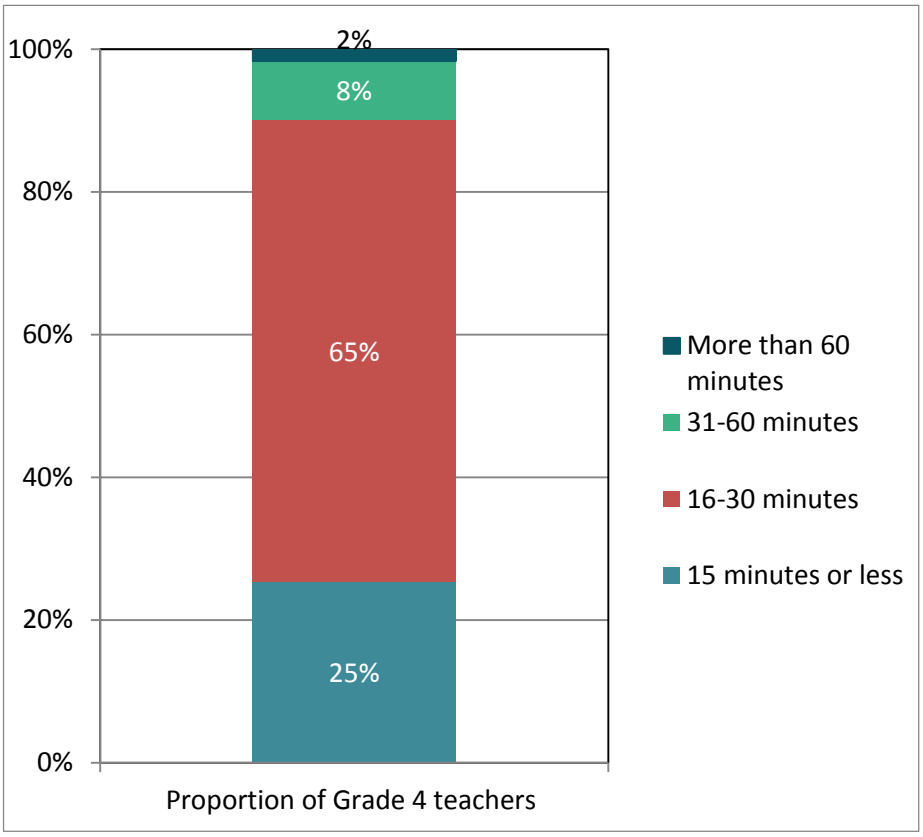
In addition to parental data, PIRLS 2011 also collected information from teachers. For instance, classroom teachers of the same Grade 4 students were asked two questions: "How often do you assign reading as part of homework (for any subject)?" and "In general, how much time do you expect students to spend on homework involving *reading* (for any subject) each time you assign it?" Interestingly, while most teachers assign reading as homework every day or almost every day (see Chart 2), over 90 per cent of teachers expect their students to spend no more than 30 minutes on this homework (see Chart 3). Thus, in line with student achievement results, Canadian teachers seem to understand that "more does not necessarily mean better," and that small amounts of (reading) homework might be optimal for younger students.

CHART 2 **PIRLS 2011 – Frequency of reading homework (for any subject) assigned by Grade 4 teachers**



[1] The PIRLS results are reported on a scale with an international average of 500 and a standard deviation of 100. The Canadian average was 548 in 2011.

CHART 3 PIRLS 2011 – Expectations of Grade 4 teachers regarding time spent on homework involving reading

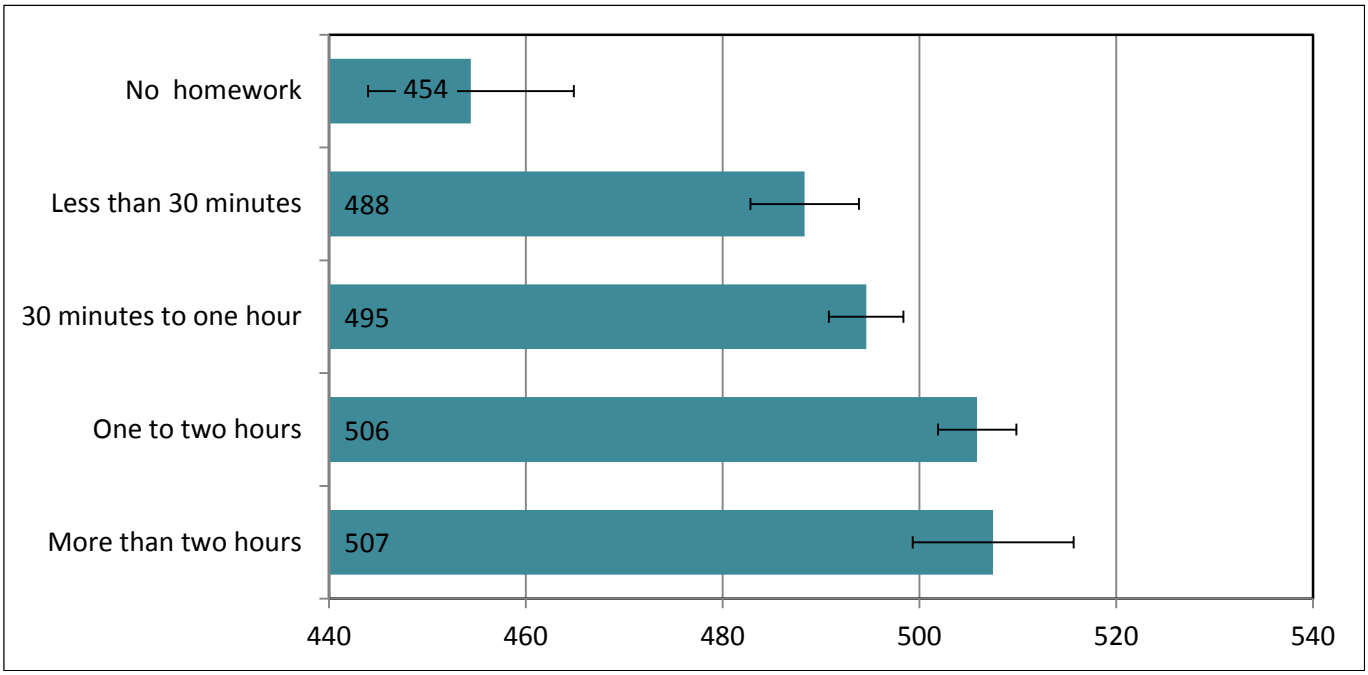


In the middle grades, spending no time at all on homework is related to weaker mathematics achievement

Approximately 2,000 Grade 8/Secondary II mathematics teachers responded to the PCAP 2010 Teacher Questionnaire. As part of this assessment, teachers were asked to indicate how much time they expected their students to spend on mathematics homework on a weekly basis. Very few (6 per cent) expected their students to spend no time at all on homework, and very few (8 per cent) were at the other extreme, expecting their students to spend more than two hours on math homework every week. Approximately 70 per cent of teachers expected their students to do between 30 minutes and two hours of math homework every week.

There was also a generally positive but weak relationship between the amount of time teachers expect their students to spend on homework and student mathematics achievement: the more time spent on homework that teachers expect, the higher the student performance is. As seen in Chart 4, the most significant difference in terms of achievement is between students who have no homework at all and those who do. Thus, in the middle grades, having no homework at all has a negative impact on achievement. In addition, the data suggest that there might be a saturation point, as more than one hour of mathematics homework per week yielded virtually no gain in performance. This result is in line with research showing that too much homework in the middle grades may diminish its effectiveness (Cooper, Robinson, & Patall, 2006).

CHART 4 PCAP 2010[2] – Mean mathematics scores by teacher-expected minutes per week of mathematics homework



On a related note, Grade 8/Secondary II students were asked to indicate how much time per week they spend on mathematics homework. The results revealed a noticeable difference between what teachers expected and what students actually did. Although only one-fifth of Grade 8/Secondary II teachers expect students to spend less than 30 minutes per week on their math homework, over one-third of Canadian students (35 per cent) actually spend less than 30 minutes on math homework. These results suggest that teachers do not always get what they expect, with some students spending less time on homework than desired. This may also suggest that parents could play a more active role in their children's student life by discussing homework expectations in middle school with their children's teachers and monitoring their children's homework.

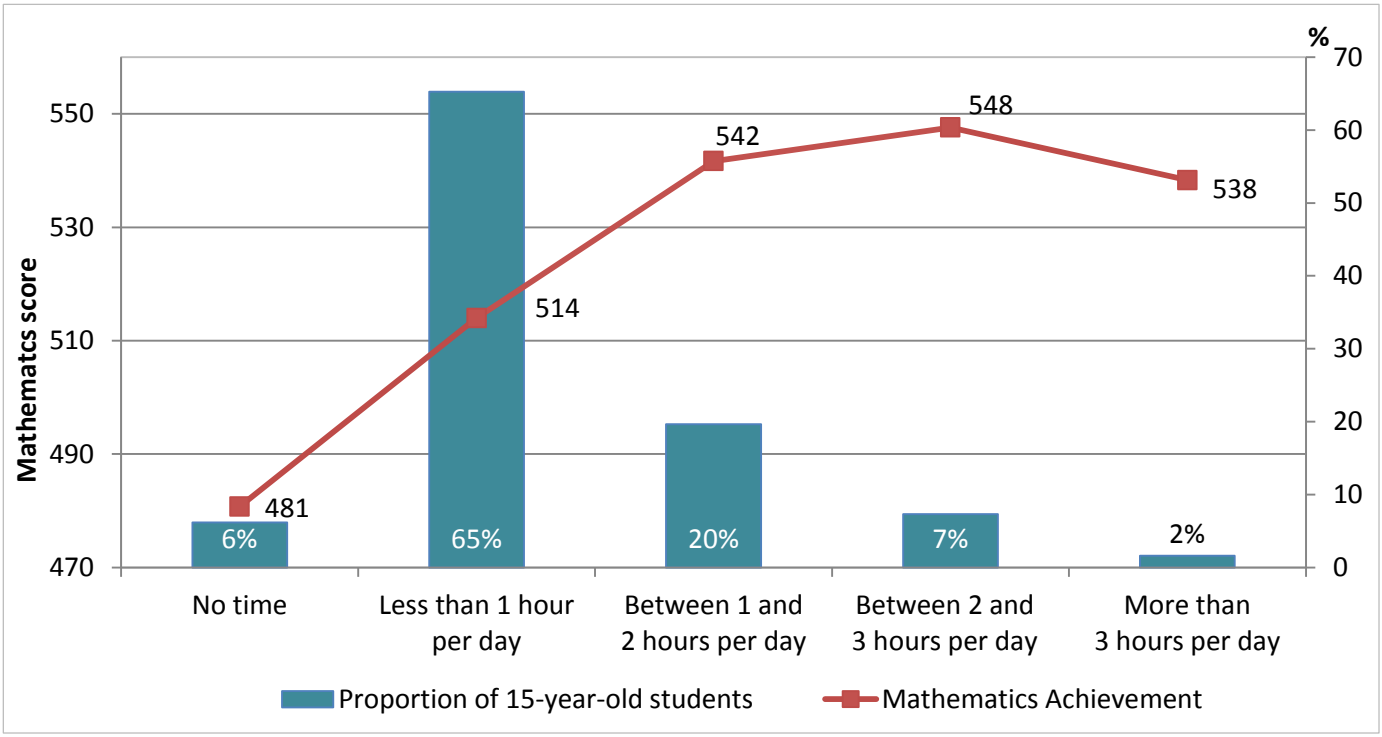
High-school students who spend some time every day on homework perform much better in mathematics than those who do not

In 2012, OECD surveyed over half-a-million 15-year-olds in over 65 countries, including over 20,000 in Canada. One of the questions students were asked related to how much time they spend on homework. As seen in Chart 5, over 70 per cent of Canadian 15-year-olds spend less than one hour on homework every day (or less than seven hours per week on average). The PISA data show that spending more time on homework every day is related to a significantly higher achievement in mathematics,[3] with the results being quite stable once a student has reached the two-hour threshold. Obviously, high-school students need to allocate their homework time effectively across the demands of multiple subject areas. What this two-hour threshold suggests is that it may be preferable to invest a limited amount of time to a given subject on a regular basis rather than none at all or a lot of time on a single subject.

[2] The PCAP 2010 results are reported on a scale with a Canadian average of 500 and a standard deviation of 100.

[3] Based on PISA 2012, the relationship between homework and achievement is identical in reading and in science.

CHART 5 PISA 2012[4] – Mathematics achievement scores by amount of time spent on homework (as reported by students)



Conclusion

For the most part, the results presented in this issue of *Assessment Matters!* support the conventional wisdom that everything is good in moderation.

In the early grades, more time spent on homework does not mean higher reading performance. Most Grade 4 teachers across Canada assign short but regular homework.

At the middle-grade level, there seem to be some differences between the amount of homework expected by teachers and the amount of homework that students actually do. At that grade level, it is also quite clear that the performance in mathematics of students who don't do homework at all is significantly lower than the performance of those who do.

Finally, most high-school students seem to devote a limited amount of time to homework (less than one hour per day). As was the case at the middle-grade level, our results suggest that the return on investment is optimal for those students who spend some time every day on their subject-specific homework by balancing the multiple demands of each subject area.

Overall, results from large-scale assessments seem to be consistent with other research suggesting that older students benefit more from homework than younger students do (Muhlenbruck, Cooper, Nye, & Lindsay, 2000).

[4] The PISA results are reported on a scale with an international average of 500 and a standard deviation of 100. The Canadian average was 518 in 2012.

Further results are available at the sites below:

PIRLS 2011 – Canada in Context:
http://cmec.ca/Publications/Lists/Publications/Attachments/294/PIRLS_2011_EN.pdf

PCAP 2010 – Contextual Report on Student Achievement in Mathematics:
http://www.cmec.ca/Publications/Lists/Publications/Attachments/287/PCAP-Context-Report-EN.pdf

Measuring up: Canadian Results of the OECD PISA Study (2012):
http://cmec.ca/Publications/Lists/Publications/Attachments/318/PISA2012_CanadianReport_EN_Web.pdf

References

Cooper, H. (1989). *Homework*. White Plains, NY: Longman.

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.

Eren, O., & Henderson, D.J. (2011). Are We Wasting Our Children's Time by Giving Them More Homework? *Economics of Education Review*, *30*, 950–961.

Herrig, R.W. (2011). Homework Research Gives Insight to Improving Teaching Practice. STEM white paper. Retrieved from https://www.mheonline.com/glencoemath/pdf/homework_research.pdf

Kohn, A. (2006). Abusing Research: The Study of Homework and Other Examples. *Phi Delta Kappan*, *88*(1), 8–22.

Marzano, R. J., Pickering, D.J. & Pollock, J. E. (2001). *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement*. ASCD.

Muhlenbruck, L., Cooper, H. M., Nye, B., & Lindsay, J. J. (2000). Homework and achievement: Explaining the different strengths of relation at the elementary and secondary school levels. *Social Psychology of Education*, *3*, 295–317.

Ramdass, D. & Zimmerman, B. (2011). Developing self-regulation skills: The important role of homework. *Journal of Advanced Academics, 22*(2), 194–218.