



LESSONS IN LEARNING

Homework helps,
but not always

May 4, 2009

This Lessons in Learning is based on CCL's systematic review of research about homework, completed in spring 2009. The systematic review analyses 18 studies published from 2003 to 2007.

Homework: The recurring debate

Few issues in education affect as many families as homework. Its near-universal place in formal schooling leaves few students and parents untouched. Yet the history of homework is characterized by debate about both its effectiveness and legitimacy.

Attitudes toward homework move through cycles of enthusiasm and opposition.¹ Homework is popular in times of worry about the quality of learning among young people (e.g., in the late 1950s after the Soviet Union launched Sputnik) and unpopular when it is perceived as unduly oppressive (e.g., starting in the mid-1960s, alongside a number of societal factors, such as the rise of the civil rights movement, growing opposition to the U.S. war in Vietnam and the emergence of the youth culture).

It is difficult to say which view currently holds sway in Canada and the United States. In 2006, two books opposing homework were published and became quite popular—*The Homework Myth* and *The Case Against Homework*.^{2,3} A significant proportion of media reporting in Canada also tends to frame homework negatively.⁴ On the other hand, results of the Survey of Canadian Attitudes toward Learning indicate that Canadians feel homework is valuable.⁵ At the expert level, the debate between homework's proponents and detractors often turns personal and acrimonious.⁶

Lessons in Learning has previously addressed the topic with the February 2008 article "Parents' role in their children's homework," which highlights Harris Cooper's systematic review of homework research published between 1987 and 2003.⁷ Cooper's 2006 study indicated that, on balance, homework improves achievement. However, there are a number of caveats. Improvement is largest on unit tests (in other words, for promoting the short-term retention of content, rather than the long-term development of understanding) and homework appears to have little or no effect among elementary school students.

The Canadian Council on Learning endeavoured to bring Cooper's work up to date, completing a systematic review of evidence on the effectiveness of homework, focusing on literature published from 2003 to 2007.

Results of CCL's systematic review of evidence

CCL's review focused on 18 different studies that reported a total of 57 distinct achievement measures (e.g., overall grades; student marks on a standardized English test; student marks on a standardized math test; student marks on teacher-developed tests and projects) across six different subject areas. These distinct measures will be referred to as outcomes for the remainder of this article. Of the 18 studies reviewed, 14 were conducted in the United States and the remaining four in Germany. No Canadian studies of a similar nature were published during this period.

Studies assessing the net impact of homework

Of the 18 studies examined, 10 reported 32 outcomes that isolated the net impact of homework on achievement, examining the effect of time, frequency, effort and completion. Of these 10 net-impact studies, eight focused on students in grades eight through 12 and two focused on students in grades three through eight. In addition, eight of the 10 studies were strictly correlational, meaning the authors did not systematically vary the amount of homework students received. Instead, they used survey data and correlated eventual achievement with student responses about the time, frequency and effort they expended on homework.

Of the 32 outcomes enumerated, 24 (75%) showed a positive relationship between homework and subsequent achievement. Of these 24 outcomes, 16 were large enough (medium or large effect sizes) to suggest a substantial benefit from doing homework. Nonetheless, 25% of the outcomes—a non-trivial proportion—showed a negative (if small) relationship between homework and achievement. Figure 1 illustrates the distribution of the 32 outcomes across the observed spectrum of effect sizes. (Please see the “Effect size” text box for an explanation of this term.)

Effect size

When results of significance are reported, it is helpful to also report a corresponding effect size. The effect size reported here gives the reader a sense of the magnitude the effect that some factor (in this case homework) has on some outcome.

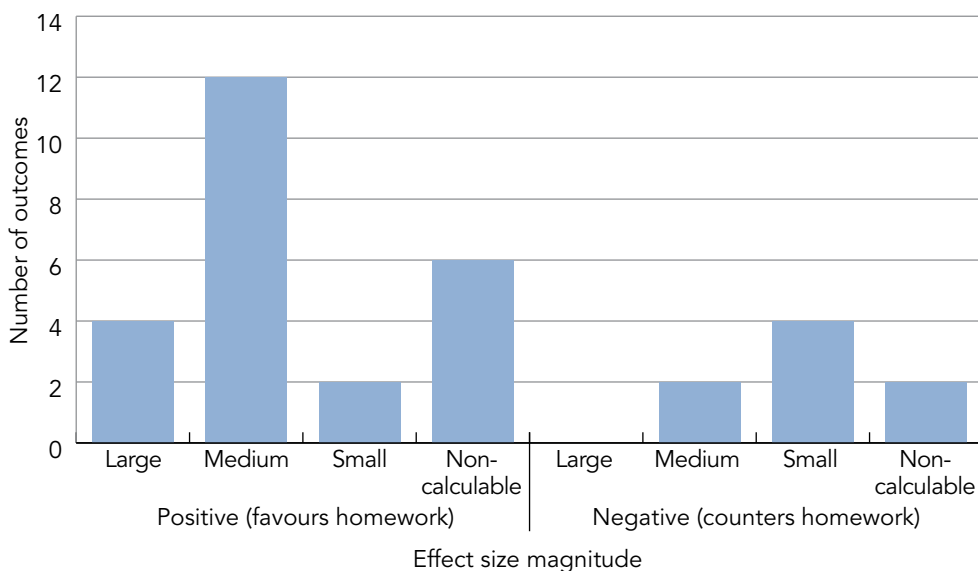
In some cases, authors of the studies reviewed do not provide the statistics necessary to allow for the calculation of effect sizes. In other cases, such as the ones referred to in Figure 1, the authors used statistical models, particularly multi-level models, that do not provide data that are amenable to effect size calculations. One can still confidently report the levels and direction (i.e. positive or negative) of significance; however, it was not possible to calculate the effect size magnitude without contacting the author and asking for additional data.

It should also be noted that, unlike tests of significance, effect sizes are calculated independent of the sample size. This means a study that used a small sample size and found non-significant results may still result in the calculation of a medium effect-size. Of course the opposite is also true. A result may be statistically significant, yet the effect size may be extremely small.

For more on this issue, see Effect size substantive interpretation guidelines: Issues in the interpretation of effect sizes, published by What Works Clearinghouse in Washington D.C.

Figure 1:

Distribution of outcomes and effect size magnitudes found in 10 studies looking at homework's net impact



Source: Canadian Council on Learning, *A systematic review of literature examining the impact of homework on academic achievement* (Ottawa: 2009)

While the majority of evidence favours homework, it remains important to explain the contradictions illustrated in Figure 1. Examining the factors underlying these contradictions reveals some important nuances in the research on homework.

Negative effects tend to occur in analyses that simply correlate time spent on homework with individual student achievement. Because weaker students may spend more time doing homework, either as a remedial activity or simply because it takes them longer to complete their homework, time on homework can be associated with lower achievement. This may be particularly true in lower grades,⁸ and indeed negative correlations were revealed in one study that analyzed achievement data of Grade 4 students from 26 countries.

Because homework is sometimes a remedial activity where weaker students do more of it, controlling for classroom or school-level effects is important when trying to understand its effectiveness. In other words, do classes that spend more time on homework achieve higher results, on average, than classes that spend less time? From our analysis of the research, the answer appears to be yes. Within classes, weak students do more homework—as a remedial activity—than strong students, thereby creating a negative correlation between homework and achievement. But between classes, the class that has more homework assigned to it achieves at a higher level, on average.

Even this assertion must be tempered with the caveat that most research does not control for the types of students who enrol in certain classes or schools. For

example, it is very possible that the types of classes and schools assigning more homework are already populated by a larger than average proportion of high-achieving students. This may be particularly true in European countries, such as Germany, where secondary schooling is highly stratified, or streamed according to ability.⁹

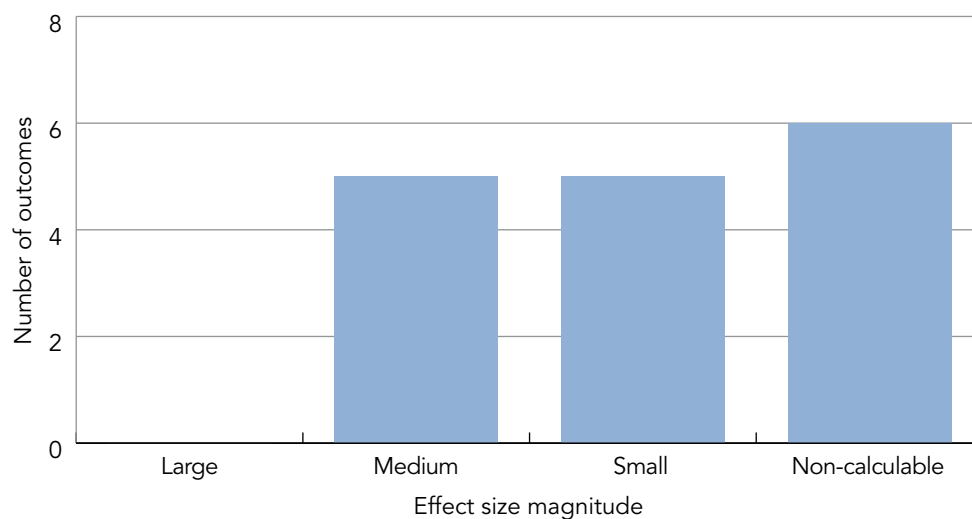
Other analyses within these net-impact studies indicate that, when predicting achievement, the self-reported frequency, effort and completion of homework are more important than the time spent on homework. Furthermore, in some studies, doing homework seemed to accrue more benefit to lower achieving students than to higher achieving students.

Pedagogically enhanced homework

Another set of analyses examined the type of homework completed. Five U.S. studies examined the types of homework assigned to compare the effects of pedagogical enhancements with regular homework practices. These enhancements included web-enhanced assignments, answer-supplied math homework, self-regulated homework, homework assignments based on learning style and a homework intervention program.¹⁰

Of the 16 outcomes reported, 10 allowed for the calculation of an effect size (see Figure 2). Regardless of the intervention, the pedagogical enhancements moderately improved student achievement, as indicated by the five medium and five small effect sizes, and the six positive but incalculable effects.

Figure 2:
Distribution of outcomes and effect size magnitudes found in 5 studies examining homework using pedagogical enhancements



Source: Source: Canadian Council on Learning, *A systematic review of literature examining the impact of homework on academic achievement* (Ottawa: 2009)

Note: Of the 10 calculable effect sizes, all were positive, meaning all were associated with higher educational achievement.

These studies demonstrate that homework with an enhanced pedagogical technique is likely to increase academic achievement and unlikely to impede it. Common across the interventions was a component of meta-cognition or constructive learning. In other words, these homework assignments demanded active learning, rather than rote repetition of classroom material.

Lessons in learning: Effective homework practices

Active engagement

Homework that demands active student engagement is more likely to be effective. A meta-cognitive component, where the students must think about their own learning—such as deciding which strategy to use for a particular mathematics word problem—may be an important part of this engagement. This was the primary finding of the pedagogical enhancement studies—a result that is complemented by the net-impact studies where effort is found to be more important than time spent doing homework. When students actively focus on their homework, their achievement increases. While not surprising (active engagement is typically considered a core principle of teaching and learning), many students' experience of homework suggests it is a principle that homework assignments do not necessarily exemplify.

Judicious assignment of homework

Up to a point, classes and schools that assign more homework appear to produce students with better achievement than classes and schools that assign less. As common sense indicates, classes where students do more homework seem to produce students with higher scores. Nonetheless, some studies indicate a point of diminishing returns for amount of homework assigned. For example, Cooper states that “for junior-high students the positive relation appeared for even small amounts of time on homework (less than one hour per night) but disappeared entirely after students reported doing between one and two hours each night.”¹¹

Furthermore, the studies that reveal a relationship between achievement and amount of homework assigned are correlational and cannot control for other possible causes of the correlation—most notably that students in classes and schools assigning the most homework might be higher achieving for other reasons. Overall, empirical evidence connecting homework quantity to higher achievement is qualified, which suggests that teachers and schools be judicious in their homework assignments. With regard to homework load, CCL's review found no evidence to suggest anything to counter Cooper's general rule of thumb: any assigned homework at the end of the school day should not exceed 10 minutes per grade level per day (i.e. a Grade 8 should receive no more than 80 minutes of homework per day).¹²

Homework will affect different students differently

Homework will likely produce different results in different student groups. Older students, (i.e. Grade 8 and above) seem most likely to benefit from doing homework. The evidence we reviewed either did not examine, or did not suggest, homework benefits for younger students. Almost all the 'net impact' homework studies were conducted on older students; the one study examining young students revealed a negative correlation between homework and achievement.

Lower achieving students also appear to have the most to gain from homework. Research focusing on individual students reveals larger gains among lower achievers,¹³ and the studies focusing on entire schools indicate that students from low-performing schools benefit more from homework than those at high-performing schools.¹⁴

The homework debate is complex and research examining homework's effect on student achievement is varied. In short, homework is more likely to be effective and improve academic outcomes when assignments are engaging, relevant and meaningful, because it forces students to actively focus on their homework tasks. In addition, given Cooper's finding on diminishing returns, thoughtful consideration needs to be given to the amount of homework assigned, particularly for students at the elementary and junior high-school levels.

References

- ¹ H. Cooper, J.C. Robinson, & E.A. Patall, "Does homework improve academic achievement? A synthesis of research, 1987-2003." *Review of Educational Research*, 76(1), 1 (2006)
- ² A. Kohn, *The homework myth: Why our kids get too much of a bad thing* (Cambridge, MA: Da Capo Life Long; Bennett & Kalish, 2007).
- ³ S. Bennett, and N. Kalish, *The case against homework: How homework is hurting our children and what we can do about it* (New York: Crown Publishers, 2006).
- ⁴ Canadian Council on Learning, *A systematic review of literature examining the impact of homework on academic achievement* (Ottawa: 2009), pp. 46–47.
- ⁵ Canadian Council on Learning. "Canadian attitudes toward homework," *2007 Survey of Canadian Attitudes toward Learning: Results for elementary and secondary school learning*, (Ottawa: 2007), www.ccl-cca.ca.
- ⁶ R. Marzano, and D. Pickering, "Errors and allegations about research on homework," *Phi Delta Kappan*, 88 (7), 507-513 (2007).
- ⁷ H. Cooper, J.C. Robinson, and E.A. Patall, "Does homework improve academic achievement? A synthesis of research, 1987-2003."
- ⁸ H. Cooper, *The battle over homework: common ground for administrators, teachers, and parents* (Thousand Oaks, CA: Corwin Press, 2007).
- ⁹ G.N. Marks, "Are between- and within-school differences in student performance largely due to socio-economic background? Evidence from 30 countries." *Education Research*, Vol. 48(1) (2006), pp. 21–40.
- ¹⁰ Examples of types of pedagogically enhanced homework: 1) "Self-regulated" refers to Meyer's study where at-risk youth were taught organizational and self-monitoring strategies to aid them in completing their homework. 2) The learning-style intervention consisted of providing students with information about the different types of learning styles (the way in which students process, internalize, and retain new information) and then giving homework prescriptions based on their completion of a learning styles instrument. 3) The homework intervention program (HIP) referred to here consists of a comprehensive program that included an advisory period each day, teacher training, and a focus on communication and co-operation between teachers, parents, and students. HIP contained guidelines that each teacher not assign more than 15 minutes of homework each night and that no more than two tests be given on one day. Non-completion of homework was not tolerated, which was evidenced by the fact that students were detained during their elective time to complete homework that was not done the night before. Parents were included in the HIP through conferences with students, teachers, and counsellors. Parents could also access a telephone hotline or a website for homework and class information.

- ¹¹ H. Cooper, J.C. Robinson, and E.A. Patall, "Does homework improve academic achievement? A synthesis of research, 1987-2003."
- ¹² H. Cooper, J.C. Robinson, and E.A. Patall, "Does homework improve academic achievement? A synthesis of research, 1987-2003."
- ¹³ O. Eren, and Daniel J. Henderson, "The impact of homework on student achievement," *Econometrics Journal*, 11, 326-348 (2006).
- ¹⁴ S. McMullen, *The Impact of Homework Time on Academic Achievement*, www.learndoeearn.org/For-Educators/Impact_of_Homework_Time.pdf, accessed April 2, 2009.