



LESSONS IN LEARNING

Making sense of the
class size debate

September 14, 2005

School class sizes are a hot-button issue. On the eve of the new school year, the C.D. Howe Institute issued a commentary on school class size in which it argues “small isn’t better.” The Globe and Mail responded with an editorial favouring smaller class sizes. The volley between the Globe and C.D. Howe is just the most recent skirmish in a debate that has raged for decades.

Who cares about class size?

Few topics generate as much vigorous debate as class size. Parents seeking the best conditions for their children are typically ardent supporters of small class sizes. So, too, are teachers for whom class sizes are a workload issue and a factor affecting student learning. School principals are less sanguine. The reaction from school board officials, trustees, and policy-makers conscious of the costs of reducing class sizes ranges from sceptical to hostile. The debate has raged for more than a half century and has provoked bitter divisions between proponents and opponents.

Smaller class sizes - what does the research say?

Everyone concerned about student learning has asked at one time or another: *What, if any, are the benefits of small classes?* Educational researchers Bruce Biddle and David Berliner (2002) undertook a broad examination of research into class size from a variety of investigative traditions – small field studies, surveys, econometric studies and large field experiments – and explained their contributions, strengths and limitations. Based on their review of research from a variety of sources addressing a vast landscape, they conclude that:

- When it is planned thoughtfully and funded adequately, long-term exposure to small classes in the early grades generates substantial advantages for students in American schools, and those extra gains are greater the longer students are exposed to those classes;
- Extra gains from small classes in the early grades are larger when class size is reduced to less than 20 students;

Talking Past Each Other: Class size vs. pupil-teacher or student-educator ratio

Research is capable of contributing to our understanding of this controversial subject only if the question the research addresses is clearly stated and the terminology unambiguous. One of the main sources of ambiguity is the confusion of class size with the pupil-teacher ratio. Some analysts are either unaware of, or overlook, the difference.

Class size refers to the specific number of students enrolled in a particular teacher’s classroom. *Pupil-teacher ratio* refers to the total number of students enrolled in a school (or district) divided by all of the teachers in the school (or district). Schools typically have instructional staff members who do not manage a classroom grouping of students. A school’s librarian, the vice principal and principal, and teachers who provide support outside a classroom for learners facing challenges also count as teachers for the purpose of determining the pupil-teacher ratio of a school or school district. There is a vast difference between the number of students a teacher instructs each day (class size) and the total number of students in a school divided by the total number of teachers working in that school in teaching, administrative and educational support functions.

- Extra gains from small classes in the early grades are found for various academic topics and for both traditional measures of student achievement and other indicators of student success;
- Extra gains from small classes in the early grades are retained when students are returned to standard-size classrooms, and these gains are still present in the upper grades and the middle and high school years;
- Although extra gains from small classes in the early grades appear for all types of students (and seem to apply equally to boys and girls), they are greater for students who have traditionally been educationally disadvantaged;
- Initial results indicate that the greater gains associated with small classes in the early grades for students who have traditionally been educationally disadvantaged are also carried forward into the upper grades and beyond; and
- Evidence for the possible advantages of small classes in the upper grades and high school is so far inconclusive. (Biddle and Berliner, 2002, 14)

Are the benefits of class size reductions worth the cost?

While it is unlikely to quell the passions the topic has engendered, research can shed some light on the controversy and inform the decisions that school officials and policy makers must make. Research can tell us the cost of a given effect produced by changes in class size and enable a comparison of the costs and benefits of alternative means of achieving a common outcome such as improved reading or mathematics achievement.

The results of research investigating such matters as the impact of class size on student achievement can be expressed in an effect size. The effect size tells how much increase or decrease in student achievement can be attributed to changes in class size, expressed in standard deviation units. Using such information, the cost of achieving a particular result can be calculated by linking the cost of making the changes to the given effect size. They could also compare the costs of other changes that produced similar effect sizes.

To illustrate, Levin (1984) and his colleagues combined research synthesis techniques and cost-effectiveness instruments to compare the cost-effectiveness of four educational interventions to improve elementary mathematics and reading achievement: cross-age tutoring, computer-assisted instruction; class size reductions, and increases to instructional time. Although the study is twenty years old, it provides an example of how one can assess the cost-effectiveness of such practices as class size by calculating the size of the effect achieved per \$100 cost per student.

The Canadian class size context

Class size is arguably the most frequently investigated issue in education in developed countries around the world and one of the most contentious as well. It is surprising that, despite the volume of research and the debate it engenders, there is comparatively little class size research in Canada and only limited research that seeks to compare the cost-benefit ratio of educational interventions such as class size aimed at improving student success. Despite the small volume of Canadian research, many Canadian jurisdictions have articulated and implemented policies regarding class size.

In some jurisdictions (Yukon is one example) class sizes are determined by a collective agreement between the Yukon Government and the Yukon Teachers' Association. In that jurisdiction, class size maximums are set at 20 students for kindergarten; 23 students in grades one to three; 26 students in grades four to nine; and 28 students in grades 10 through 12. In home economics and industrial education classes (where safety is a factor), class sizes have been set at 16 students per class.

In other jurisdictions, class size limitations or reductions are set by public policy rather than collective bargaining. For example, Ontario is pursuing class size reductions as part of its efforts to improve student literacy in the primary grades. In May 2005, Ontario's Premier, Dalton McGuinty, said, "We want all of our children to get the individual attention they need to succeed in the important early grades." According to Ontario's Minister of Education, plans are on track to ensure that there are no more than 20 students in any junior kindergarten to grade three class in the province by the 2007-2008 school year.

Table 1:
The Student/Educator Ratio in Canada

Table one from Statistics Canada contains the ratio of students to educators in public schools across the nation. The student/educator ratio is Canada's equivalent of the pupil-teacher ratio. The ratio of students to educators is typically lower than the actual class sizes reported by the provinces and territories. For example, in the most recent data available from Newfoundland, that jurisdiction reports that, in 2004-2005, class sizes from kindergarten to grade three averaged 18.3; in grades four to six, the average was 20.9; and in grades seven to nine, the average was 23.3. At the other end of the country, BC reported that, in 2004-2005, its average class size from kindergarten to grade 7 was 23.2.

BC's School Act directs school boards to ensure that, in the aggregate, the average size of kindergarten classes is 19 students, 21 students for grades one to three, and 30 students for grades four through 12. Cognizant that aggregate averages could mask significant variation in size, BC's School Act requires that kindergarten classes do not exceed 22 students in any given class and 24 students in grades one to three. What these figures make clear is that there is a vast difference between the student enrolment in a teacher's class and the ratio of the total number of students in a school, district or province to the total number of teachers or educators. Unless a clear distinction is made between the two, it was difficult to interpret research results correctly.

Alberta's government committed itself to reducing class sizes by 2006-2007 across the grade range. It plans an average of 17 students from kindergarten to grade three; 23 students from grades four through six; 25 students from grades seven to nine; and 27 students from grades ten through twelve. Nova Scotia, like Ontario, has limited its class size initiative to the early years.

Class size lessons in learning

1. Smaller is better in the primary grades.

The best evidence is that smaller classes in the early years of schooling make a difference, thereby validating the instincts of parents who try to ensure that their young children begin school in the smallest classes they can find. Furthermore, the benefits accrued from smaller class sizes in the early years of schooling continue throughout the youngster's school career.

2. Reduce class sizes carefully.

Judging from the initiatives they are pursuing, jurisdictions like Ontario and Alberta recognize that the benefits of smaller classes are greater when class sizes are reduced to 20 or fewer children. They are anticipating that the enduring benefits demonstrated by studies in the US will accrue to Canadian youngsters, and hoping that, as also shown by the US studies, students facing challenges will benefit most. But careful planning is important. California pursued an aggressive class size reduction policy, ignoring the fact that the system could not provide a sufficient number of qualified teachers. The gains anticipated from smaller classes did not materialize as expected because the classes were often staffed by inexperienced teachers who would not meet the more rigorous standards of certification in Canada.

3. Monitor the impact of class size reduction.

The class size reductions underway in various Canadian jurisdictions should be accompanied by research initiatives to give us a better sense of the impact of smaller class sizes in the Canadian context. Ideally, such research should follow the children who are the beneficiaries of reduced class sizes to assess the long-term impact of class size on students and the implications of the impact on the wider society.

4. Determine the cost benefits ratio of class size reductions.

Canada needs more research about the impact of class size and class size reductions on student learning. The research should also include attention to cost-benefit analyses that will enable decision-makers to determine the return on investment of class size reductions and other educational interventions designed to improve student achievement, such as cross-age or volunteer tutoring; pull-out programs for students at risk; specialized programs such as reading recovery; the deployment of teacher assistants, etc.

Table 1:
Student-educator ratio in public elementary and secondary schools,¹
Canada and jurisdictions, 1996-1997 to 2002-2003

CAN.	NL	PEI	NS	NB	QC	ON	MB	SK	AB	BC	YT	NWT ²	
1996-1997	15.9	14.9	16.9	17.5	17.0	14.7	15.8	15.4	16.8	18.5	16.9	13.0	17.6
1997-1998	16.5	14.7	16.9	17.3	17.1	15.2	16.8	15.3	16.7	18.1	17.0	13.0	17.9
1998-1999	16.2	14.6	16.7	16.6	17.1	15.0	16.5	15.3	16.3	17.9	16.7	12.6	18.4
1999-2000	16.2	14.3	16.6	16.5	16.8	14.8	16.6	15.4	16.2	18.0	16.6	12.1	18.1
2000-2001	16.1	13.9	16.2	16.5	16.7	14.6	16.5	15.4	15.9	17.9	16.3	11.9	16.8
2001-2002	16.1	13.4	15.9	16.5	16.9	14.6	16.7	14.9	15.4	17.3	16.3	11.7	16.2
2002-2003	..	13.5	15.6	16.2	16.6	14.3	16.7	14.9	15.1	17.5	17.1	11.8	16.3

.. Not available for a specific reference period

... Not applicable

1. These data are for public schools only and do not include private schools, federal schools and schools for the visually and hearing impaired. As a result, figures reported in this table are not comparable to figures reported in PCEIP 2003.

Source: *Summary public school indicators for the provinces and territories, 1996-1997 to 2002-2003*, Catalogue no. 81-595-MIE2004022

Statistics Canada. 2003. *Education indicators in Canada: Report of the Pan-Canadian Education Indicators Program*. Catalogue no. 81-582-XIE. Ottawa Table Revised June 29, 2005

This table was updated June 29, 2005.

References

- Does class size in first grade relate to children's academic and social performance or observed classroom processes?(2004). *Developmental Psychology*, 40(5), 651-664.
- Bennett, N. (1998). Class size and the quality of educational outcomes. *Journal of Child Psychology & Psychiatry*, 39(6), 797-804.
- Betts, J. R., & Shkolnik, J. L. (1999). The behavioral effects of variations in class size: The case of math teachers. *Educational Evaluation & Policy Analysis*, 21(2), 193-213.
- Biddle, B. J., & Berliner, D. C. (2002). What research says about small classes and their effects. In *pursuit of better schools: What research says*.
- Blatchford, P., Baines, E., & Kutnick, P. (2001). Classroom contexts: Connections between class size and within class grouping. *The British Journal of Educational Psychology*, 71(pt2), 283-302.
- Blatchford, P., Goldstein, H., Martin, C., & Browne, W. (2002). A study of class size effects in english school reception year classes. *British Educational Research Journal*, 28(2), 169-185.
- Cahen, L. S., & Filby, N. N. (1979). The class Size/Achievement issue: New evidence and a research plan. *Phi Delta Kappan*, 60(7), 492.
- Deutsch, F. M. (2003). How small classes benefit high school students. *NASSP Bulletin*, 87, 35-44.
- Gilman, D. A., Swan, E. T., & Stone, W. (1988). The educational effects of a state supported reduced class size program: A comprehensive evaluation of indiana's project prime time at the north gibson school corporation. *Contemporary Education*, 59, 112-116.
- Glass, G. V. (1982). Meta-analysis: An approach to the synthesis of research results. *Journal of Research in Science Teaching*, 19(2), 93-112.
- Glass, G. V. (1980). On criticism of our class Size/Student achievement research: No points conceded. *Phi Delta Kappan*, 62(4), 242-244.
- Glass, G. V., & And Others. (1982). School class size: Research and policy.
- Glass, G. V., & Smith, M. L. (1979). Meta-analysis of research on class size and achievement. *Educational Evaluation and Policy Analysis*, 1(1), 2-16.
- Glass, G. V., & Smith, M. L. (1978). Meta-analysis of research on the relationship of class-size and achievement. the class size and instruction project.
- Hanushek, E.A. (February 1998). The Evidence on Class Size. Occasional Paper 98-1.
- Haughey, Margaret, Snart, Fern, Costa, D., & Jose. (2001). Literacy achievement in small grade 1 classes in high-poverty environments. *Canadian Journal of Education*, 26(3), n/a.
- Hedges, L. V., & Stock, W. (1983). The effects of class size: An examination of rival hypotheses. *American Educational Research Journal*, 20(1), 63-65.
- Klein, K. (1985). The research on class size. *Phi Delta Kappan*, 66(8), 578-580.

- Levin, H. M., & And Others. (1984). Cost-effectiveness of four educational interventions.
- McGiverin, J., & And Others. (1989). A meta-analysis of the relation between class size and achievement. *Elementary School Journal*, 90(1), 47-56.
- McIntyre, W. G., & Marion, S. F. (1989). The relationship of class size to student achievement: What the research says. occasional paper series no. 3.
- Mitchell, D. E., & Mitchell, R. E. (2003). The political economy of education policy: The case of class size reduction. *Peabody Journal of Education*, 78(4), 120-152.
- Pong, S., & Pallas, A. (2001). Class size and eighth-grade math achievement in the United States and abroad. *Educational Evaluation & Policy Analysis*, 23(3), 251-273.
- Preece, P. F. W. (1987). Class size and learning: A theoretical model. *Journal of Educational Research*, 80(6), 377-379.
- Robinson, G. E., & Wittebols, J. H. (1986). Class size research: A related cluster analysis for decision making. ERS research brief.
- Shapson, S. M., & And Others. (1980). An experimental study of the effects of class size. *American Educational Research Journal*, 17(2), 141-152.
- Simpson, S. N. (1980). Comment on "meta-analysis of research on class size and achievement.". *Educational Evaluation and Policy Analysis*, 2(3), 81-83.
- Slavin, R. (1990). Class size and student achievement: Is smaller better? *Contemporary Education*, 62(1), 6-12.
- Smith, M. L., & Glass, G. V. (1980). Meta-analysis of research on class size and its relationship to attitudes and instruction. *American Educational Research Journal*, 17(4), 419-433.
- Varble, M. E., & Gilman, D. A. (1988). A study of the relationship between class size and achievement.
- Yan, W., & Lin, Q. (2005). Effects of class size and length of day on kindergartners' academic achievement: Findings from early childhood longitudinal study. *Early Education and Development*, 16(1), 49-68.
- Ziegler, S. (1997). Class size, academic achievement and public policy. *Connections*, 1(1)