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# Toward Higher Equity in Canadian Education: Results from PCAP 2010

The argument is commonly made that jurisdictions should strive not only for high average achievement but also for greater equity in achievement between its schools and its students. Indeed, as the April edition of *PISA in Focus* notes (OECD, 2013), overall performance on a test is only one measure of the effectiveness of an education system; a much clearer indicator of this effectiveness would be *the degree of variation in student achievement between schools* and *between students*. This measure reflects how much it matters which school a student attends, and it can signal social inequities related to school features (e.g., resources, teacher qualifications, school culture) and student characteristics (e.g., socioeconomic background, immigrant background or the language spoken at home).

The variation in performance between students and schools has been analyzed in both national and international assessment programs, and Canada is regularly characterized as one of the few countries to show relatively high achievement and high equity. In this brief synopsis, we report results of the PCAP-2010 study, which examine the differences between schools and between students in mathematics performance of Grade 8 students in Canada. These differences are examined in two ways: first, through the differences in *variance* across jurisdictions, and second, through differences between the highest- and lowest-scoring groups of students within each jurisdiction.

## MATHEMATICS ACHIEVEMENT VARIATION WITHIN JURISDICTIONS

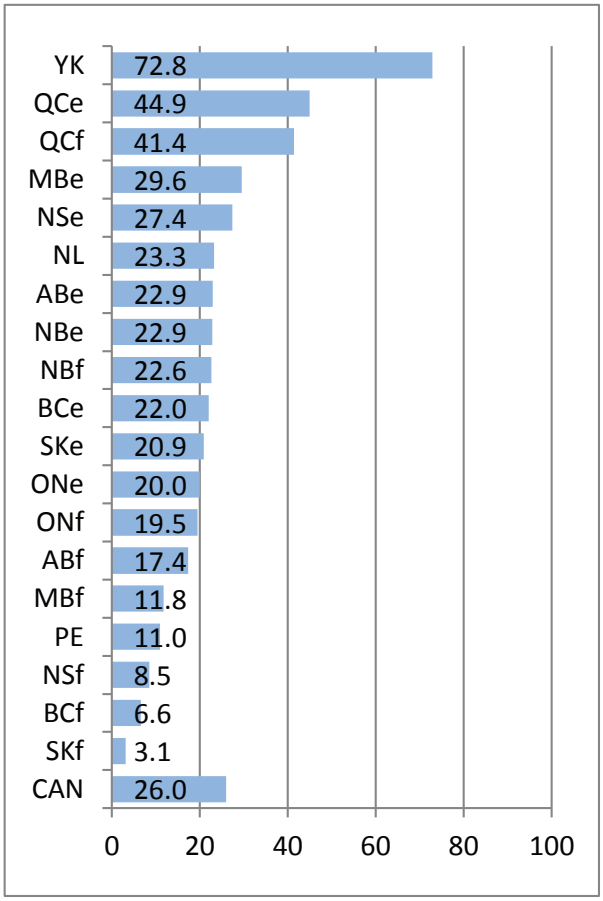
An analysis of *total variance* based on PCAP 2010 indicates that most Canadian students have similar levels of mathematics proficiency, with about half the jurisdictions having total variance close to (within about 5 per cent) the Canadian average. None of the jurisdictions shows much greater inequality among students than is typical for Canada. This finding is in line with other national and international results, indicating relatively high equity in Canadian performance (Brochu et al., 2011; CMEC, in press; Knighton et al., 2010).

A more detailed analysis of variation of achievement between schools, however, shows a more diverse picture. As shown in the following chart, the *between-school variance* accounts for 26 per cent of the total variation in mathematics performance in Canada, meaning that over one-quarter of the observed variation occurs across schools, and, therefore, about three-quarters across students. This between-school variance is slightly higher than that reported by PCAP-13 2007 and PISA 2009 for reading performance (Brochu et al., 2011; CMEC, in press).

In PCAP 2010, Yukon stands out as having the highest variation across schools (close to three-quarters of its total variance). The two Quebec sub-populations, English and French, also show relatively high between-school variation (over 40 per cent). The interpretation would

be that schools in these jurisdictions vary considerably in terms of the differences in outcomes of the school systems, making horizontal differentiation (differences in instruction) a more prominent issue (OECD, 2010). The lowest variations across schools are observed in three small francophone populations: Saskatchewan-French, Nova Scotia-French, and British Columbia-French (less than 10 percent), implying that the schools in these jurisdictions are quite alike, no matter what the variation may be between students within the schools.*

CHART 1 **Percentage of variation between schools**




## *MATHEMATICS INTERQUARTILE RANGE*

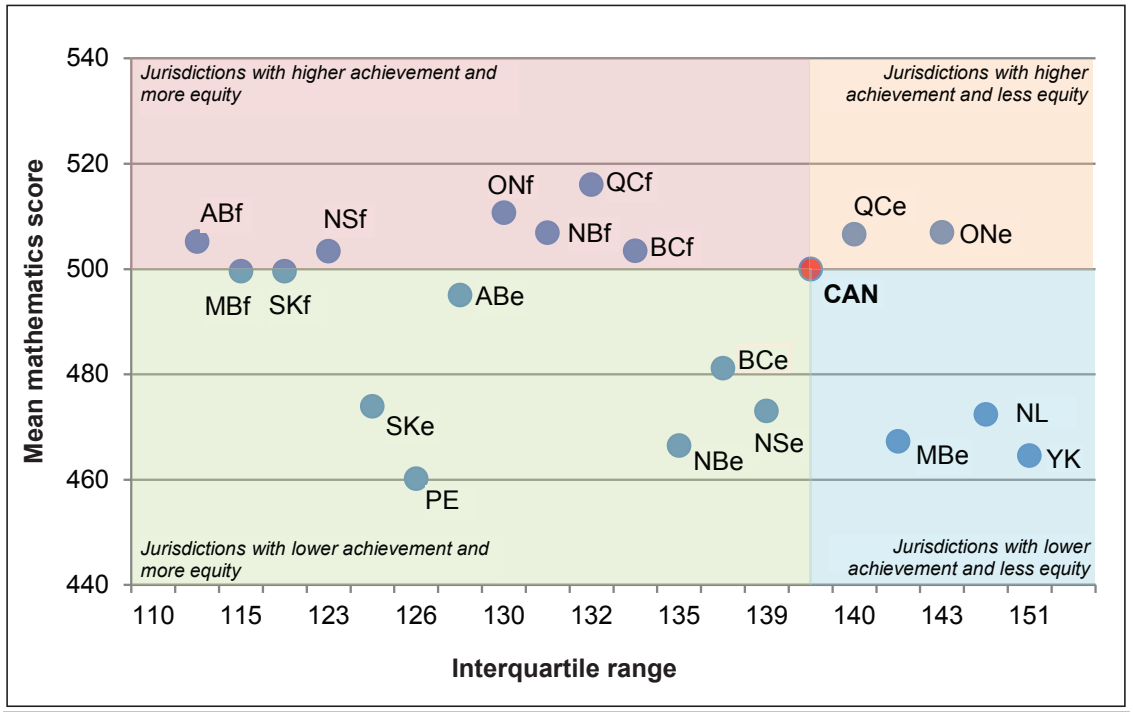
In addition to the variance analysis, PCAP 2010 analyzed the gap between the lowest- and the highest-performing students. The score distributions were divided into quartiles, and then the cut score for each quartile was computed. The *interquartile range* — defined as the difference between the cut points for the 25th and 75th quartiles — was then used as an index of the equity of educational outcomes (Knighton et al., 2010). This is a "reverse index" of equity, with larger difference indicating less equity.

The largest interquartile range was observed in Yukon (151 points), and the smallest ranges were in the four small francophone populations: Alberta-French, Manitoba-French, Saskatchewan-French, and Nova Scotia-French (fewer than 123 points).

Of course, high equity does not mean much if it is not accompanied by high achievement. For this reason, a relationship between achievement and equity was examined for each jurisdiction (see Chart 2).

* Care must be taken when interpreting results in smaller jurisdictions with a small number of schools, as their results are prone to instability over time and may not be replicated in other assessments.

CHART 2 **Mean mathematics achievement and interquartile achievement range by jurisdiction**




Overall, there is a negative correlation between achievement and interquartile range ($r = -0.33$). Since the index of interquartile range is "reverse," this correlation means that higher mathematics scores are related to greater equity.

As can be observed in Chart 2, there are two opposite clusters of jurisdictions when compared to the Canadian mean:

- the cluster with more equity and relatively higher achievement: francophone jurisdictions;
- the cluster with less equity and relatively lower achievement: Manitoba-English, Newfoundland and Labrador, and Yukon.

## CONCLUSION

PCAP-2010 results show that although Canada has a high level of equity from an international perspective, there is still a considerable difference between school outcomes in some jurisdictions. All students deserve equitable access to meaningful mathematics learning. Therefore, education policies should target practices that promote both excellence and equity, and not only in mathematics, but in education as a whole.

Further **PCAP-2010 results** are available in the ***PCAP-2010 Contextual Report on Student Achievement in Mathematics*** which is available at: http://www.cmec.ca/Publications/Lists/Publications/Attachments/287/PCAP-Context-Report-EN.pdf

## *References*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