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C.D. Howe Institute COMMENTARY

SOCIAL POLICY

Understanding the Aboriginal/ Non-Aboriginal Gap in Student Performance:

Lessons From British Columbia

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In this issue...

There exist very large gaps between Aboriginal and non-Aboriginal student performance in most B.C. schools. However, Aboriginal students in some school districts perform remarkably well. What are these districts doing right? The authors draw lessons that may well apply across Canada.

THE STUDY IN BRIEF

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Across Canada, at least four out of five Aboriginal students attend provincially run schools; only one in five attend on-reserve, band-run schools. While Aboriginal student outcomes are better in provincial than in on-reserve schools, a large gap exists between performance of Aboriginal and non-Aboriginal students in most schools across Canada. Understanding why the gap exists and what strategies can reduce it is among the country's highest social policy priorities.

Based on a detailed study of Aboriginal student performance in B.C. provincial schools, the authors assess the relative importance of socioeconomic differences between Aboriginal and non-Aboriginal families and of in-school dynamics. While both these factors matter, the authors also find that some school districts stand out. Schools in these districts have achieved Aboriginal student outcomes much better than forecast, based on socioeconomic conditions and expected in-school dynamics.

What are these districts doing right? In sum, they emphasize Aboriginal education success as a long-term priority, involve Aboriginal leaders and the broader community, use objective data on Aboriginal student performance in design of policy and follow through on policy implementation.

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INDEPENDENT • REASONED • RELEVANT

When then-Prime-Minister Paul Martin, the provincial premiers and leaders of the major Aboriginal organizations met in Kelowna, B.C. in late 2005, they agreed on ways to improve Aboriginal life in four key areas: health, education, housing and relationships with government.

Among the few specific goals undertaken was to close the gap in high-school completion rates between Aboriginal and non-Aboriginal students within a decade.

However measured, that gap is very large. Once every five years, the census provides a snapshot of education outcomes among Canadians aged 15 years and older. The most recent data are from the 2006 census. Among the census groups measured, the youngest for which it is reasonable to expect high-school completion is that aged 20 to 24. (See Figure 1.)

Aboriginal education outcomes differ markedly across the three Aboriginal identity groups: North American Indian (or First Nation), Métis and Inuit. They also differ markedly across areas of residence. The largest Aboriginal/non-Aboriginal gaps exist among North American Indians living on-reserve, and among Inuit. For both groups, the high-school completion rate is less than 40 percent, and the gaps with similarly aged non-Aboriginals approach 50 percentage points.

Not illustrated in Figure 1 is the fact that completion rates are higher for women than men. For example, on-reserve, only 36 percent of men aged 20 to 24 have completed high school. For women, the comparable statistic is better, at 42 percent, but hardly encouraging. Among Indians living off-reserve and among Métis, the results are much better: more than 60 percent of the former and

nearly 75 percent of the latter have achieved high-school certification.

Proportionately, more Aboriginals than non-Aboriginals are returning to school and completing high school or equivalency after age 24. Hence, the national high-school completion gap among those aged 25 to 44, slightly more than 20 percentage points, is less than among those aged 20 to 24. (For a more extensive survey of Aboriginal education statistics, we refer readers to Richards 2008.)

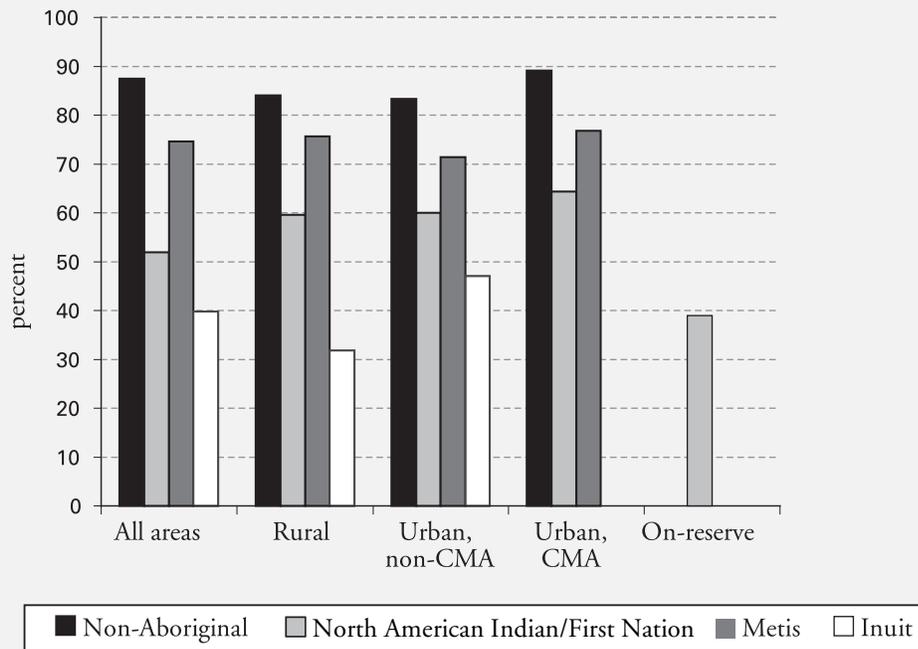
Many factors determine education accomplishment, among them family characteristics, peer effects among students and the relative importance attached to formal education by different cultures. Another major influence is school quality, broadly defined to include curriculum, teacher proficiency, strategies to engage parents and students, student evaluation options, facilities and teaching materials, etc. Gaps in high-school completion rates reflect the impact of all these factors.

In the short run, the only one of these factors readily amenable to public policy intervention is school quality. On-reserve, probably the highest priority is to professionalize education by the creation of Aboriginal-run school authorities, independent of individual band councils and able to administer a reasonable number of schools (a dozen or more). This *Commentary* focuses on education of Aboriginal children attending provincially run, off-reserve schools. More particularly, it makes the case for provincial governments to “scale up” the strategies of relatively successful school districts.

While the Aboriginal/non-Aboriginal gaps are smaller off-reserve than on-reserve, they remain large and weigh heavily in determining the aggregate gap, given the off- versus on-reserve distribution of the Aboriginal population. According to the 2006 census, three-quarters of all Aboriginals now live off-reserve. Their children attend provincially run schools. Furthermore, about one-third of all Aboriginal students living on-reserve – a higher ratio at the secondary than primary level – attend off-reserve provincial schools. Based on these ratios,

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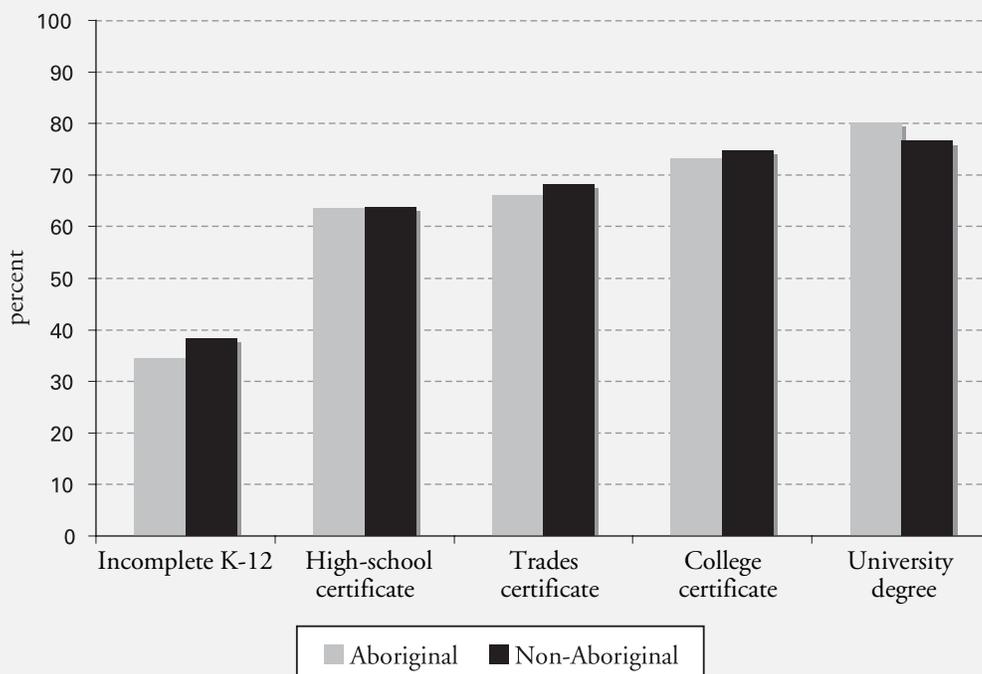
Figure 1: High-School Completion Rates, Age 20-24, by Area of Residence and Identity



Note: The figure omits several very small groups: Inuit living in CMAs and those living on-reserve who are not North American Indian by identity. These groups are included in the “all areas” total.

Source: Authors’ calculations from Canada (2008a).

Figure 2: Aboriginal and Non-Aboriginal Employment Rate, by Education Level, 2006



Source: Authors’ calculations from Canada (2008b).

on-reserve schools run by band councils are responsible at any point in time for educating probably one Aboriginal child in six; provincial governments are responsible for educating the other five.¹

In any industrial society, a marginalized community such as Aboriginals cannot escape poverty without a major ongoing undertaking by parents, teachers, relevant administrators and community leaders to close existing education gaps. If we use the image of education as a ladder, the first rung is adequate preparation for K-12 schooling. In the case of weak family education resources, early childhood education programs help.² A crucial further rung is successful mastery of the basic knowledge and skills imparted by a good primary and secondary education.

A measure of the importance of high-school completion is its effect on employment. Whether among Aboriginals or non-Aboriginals, the employment rate nearly doubles upon high-school certification and continues to rise, if more modestly, at higher rungs on the education ladder (See Figure 2). In turn, average incomes rise with the employment rate and education level. For a community to be prosperous, as understood in industrial societies, a majority must reach post-secondary education rungs on the ladder.³

In outline, this paper proceeds as follows. We first discuss the value of measuring Aboriginal student performance by examining British Columbia's province-wide tests in basic skills. In the second part, we assess the extent to which socioeconomic conditions, in-school dynamics and strategies pursued by regional school authorities explain the Aboriginal/non-Aboriginal gap in school performance. Finally, we report on our case study interviews with school district administrators, principals, teachers and Aboriginal leaders.

British Columbia's Foundations Skills Assessment

Basing policy on census data of high-school completion rates is the equivalent of closing the barn door after most of the cattle have fled. Some people achieve high-school equivalency after age 20, but not many. If school administrators are to improve education outcomes, they need timely evidence on students' performance at younger ages as they progress through the school system. There is a strong link between student performance in jurisdiction-wide tests on basic cognitive skills conducted at intervals during the K-12 cycle and subsequent high-school graduation (Hanushek 2002a).

British Columbia is the only Canadian jurisdiction that assembles and regularly publishes detailed school-level evidence on Aboriginal student progress during primary and secondary education. Since the 1999/2000 school year, all B.C. students in Grades 4 and 7 have taken basic cognitive skills tests in reading, writing and numeracy. The Foundation Skills Assessment (FSA) data used in this study include results by school and by various characteristics of student populations, including gender and Aboriginal identity.

Published FSA results classify student performance in terms of three grades: "exceeding expectations," "meeting expectations" and "not meeting expectations." The most commonly used summary statistic is the ratio of number of school test scores in which students meet or exceed expectations to the number of test scores in a particular school, school district or the entire province. (See the Glossary for a fuller description.)

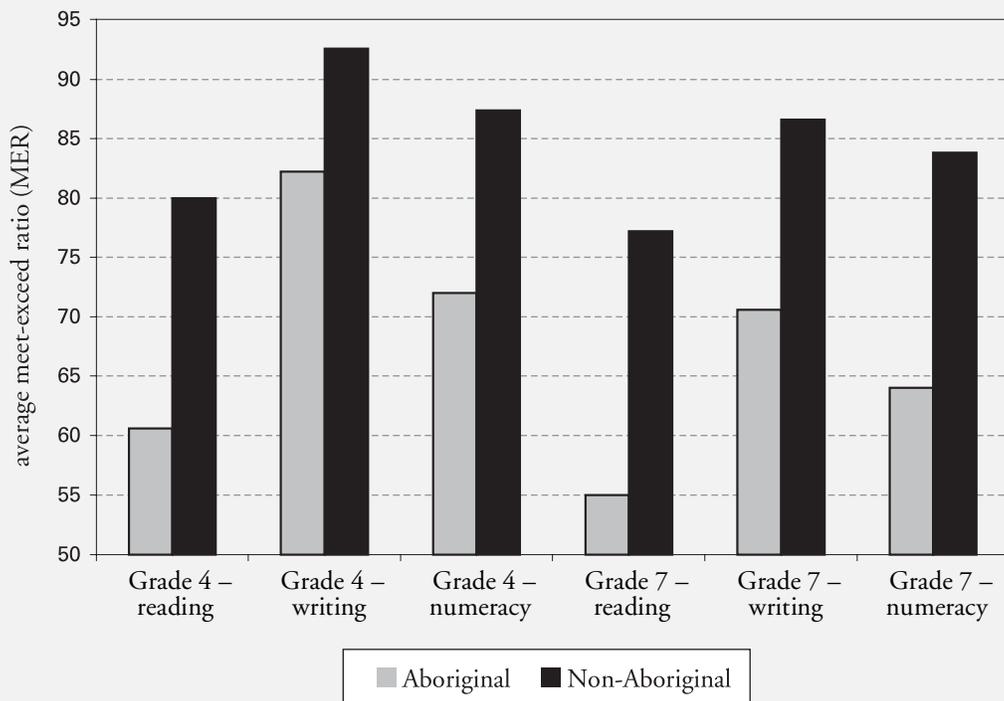
Figure 3 illustrates province-wide, meet-exceed ratios (MERs) over the five school years 2001/2002 to 2005/2006 in the three skills tested, for both Aboriginal and non-Aboriginal students. In the 2005/2006 academic year, 57,000 students, or 9.5

1 See Canada (2004, Table 3.2) for the distribution of reserve children between on- and off-reserve schools. We state "probably" because Statistics Canada acknowledges under-enumeration on-reserve. A lower bound to this estimate is that four of five Aboriginal students attend provincial schools.

2 A 2006 *Commentary* surveyed the evidence on evaluation of early childhood education programs (Richards and Brzozowski 2006).

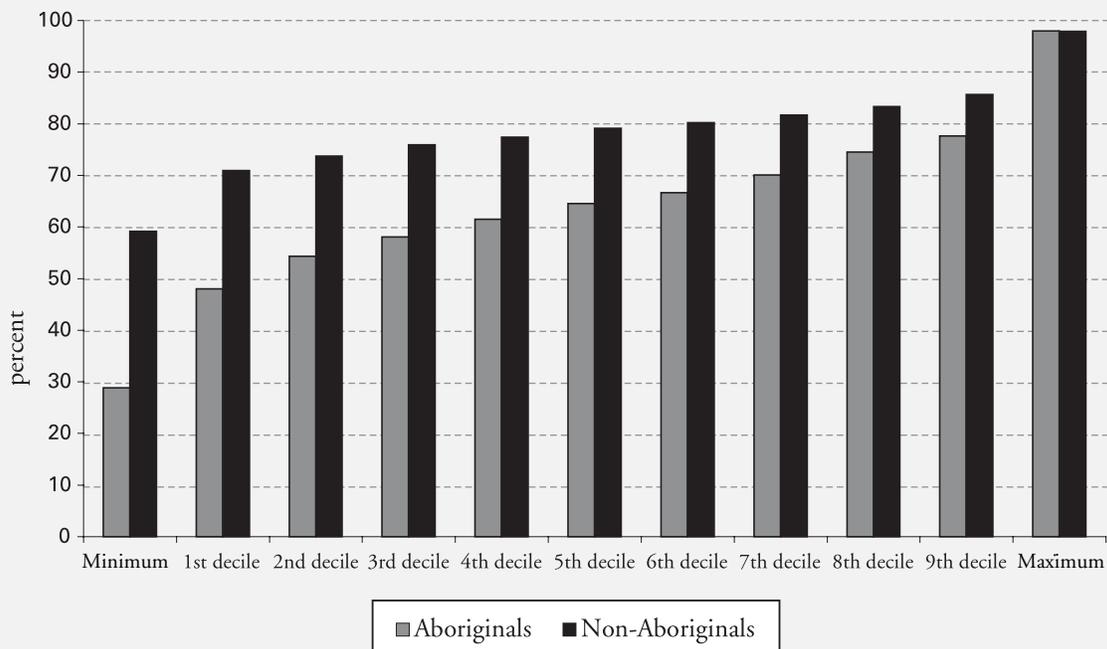
3 For a survey, based on the 2001 census, of the links between Aboriginal employment and education and income, see Richards (2006) and Sharpe et al. (2008). In their decomposition of the Aboriginal/non-Aboriginal disparity in annual wages among the employed, Sharpe and his colleagues attribute about three-tenths of the gap to differences in education levels. A further one-fifth of the difference is explained by the lower number of hours worked by Aboriginals.

Figure 3: Average FSA Performance, Aboriginal and Non-Aboriginal Students, by Subject and Grade, 2001/2002 – 2005/2006



Source: Authors' calculations from British Columbia (2006b).

Figure 4: Aboriginal and Non-Aboriginal School MER Scores, by Deciles and Maxima-Minima, 1999/2000 – 2003/2004 (366 schools)



Source: Authors' calculations from FSA data supplied by B.C. Education Ministry.

percent of all students in provincial schools, self-identified as Aboriginal. Of these students, one in five resided on-reserve, four in five off-reserve (British Columbia 2006b, 2-3). The Aboriginal/non-Aboriginal gap is largest in the case of reading, smallest for writing.

Already by Grade 4, a sizeable gap exists between average Aboriginal and non-Aboriginal student performance. And by Grade 7, the gap in all three skills increases. One policy implication to draw from the large gaps present at the Grade 4 level is the probable benefit to be derived from a well-funded, province-wide, early childhood education program targeted to Aboriginal children.

Understanding Aboriginal Results

In an attempt to explain Aboriginal student outcomes, we examined all B.C. schools satisfying two criteria: 1) the school reported more than 30 Aboriginal student scores over the years under review; 2) Statistics Canada was able to provide reasonable census socioeconomic data, disaggregated to the estimated school catchment area, for Aboriginal and non-Aboriginal families. The sample satisfying these criteria comprises 366 schools in 43 school districts. (Roughly half of the province's school districts are represented in the sample.)

For each of these schools, we examined school-level FSA results for the five school years 1999/2000 to 2003/2004. While the FSA school-level results were disaggregated by various dimensions (grade, skill area, student gender and whether or not the student self-identified as Aboriginal), the data do not identify individual students.

Aggregating scores for each school over the five years (1999/2000 to 2003/2004) for all grades and subjects, we generated two meet-exceed ratios per school, one for Aboriginal and another for non-Aboriginal students. Across the 366 schools, the average school-level Aboriginal MER is 63.8 percent; the average non-Aboriginal MER is 78.5 percent. The significance of this gap can be better appreciated by the fact that the Aboriginal average is at the second percentile of the non-Aboriginal dis-

tribution. In other words, 98 percent of the schools reported MERs for their non-Aboriginal students that were above the average value reported for Aboriginal students.

A feature of these results is the much higher dispersion across schools in terms of MERs for Aboriginal relative to non-Aboriginal students. The standard deviation for Aboriginal MERs is 11.7 percentage points, nearly twice the comparable 6.0 percentage points for the non-Aboriginal MER distribution. Figure 4 shows the Aboriginal and non-Aboriginal school MERs by decile. At the top (9th) decile, the gap between Aboriginal and non-Aboriginal scores is only 8.0 percentage points. At the bottom (1st) decile, it is a distressingly large 23.9 percentage points.⁴

The MER results can be disaggregated by gender as well as by racial identity. Figure 5 illustrates the top and bottom deciles of the ensuing four distributions. Measured at the ninth deciles, the maximum gap occurs between non-Aboriginal girls and Aboriginal boys, 12.2 percentage points. At the bottom deciles, the performance gaps are larger: the greatest, again between non-Aboriginal girls and Aboriginal boys, is 33.1 points.

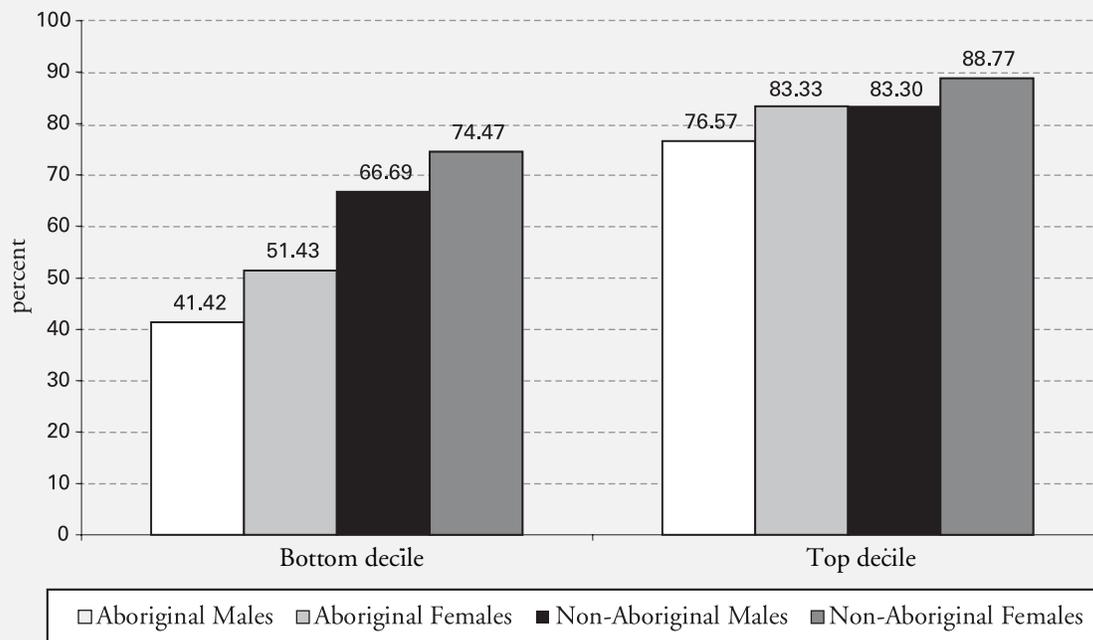
In system-wide performance tests on core academic skills, B.C. girls, as elsewhere, typically outperform boys. At the ninth deciles, whatever explains boys' weaker performance relative to girls has as much impact as do obstacles to Aboriginal student success. The top decile value for Aboriginal girls exceeds, if only slightly, that for non-Aboriginal boys. By contrast, at the bottom deciles, the gaps based on racial identity clearly exceed those based on gender.

Socioeconomic Gradients

In assessing the role of socioeconomic conditions, we have estimated each school's catchment area in terms of the relevant census enumeration areas defined by Statistics Canada. For each estimated catchment area, we have generated average 2001 Census data based on whether families self-identify as Aboriginal. This procedure generated summary

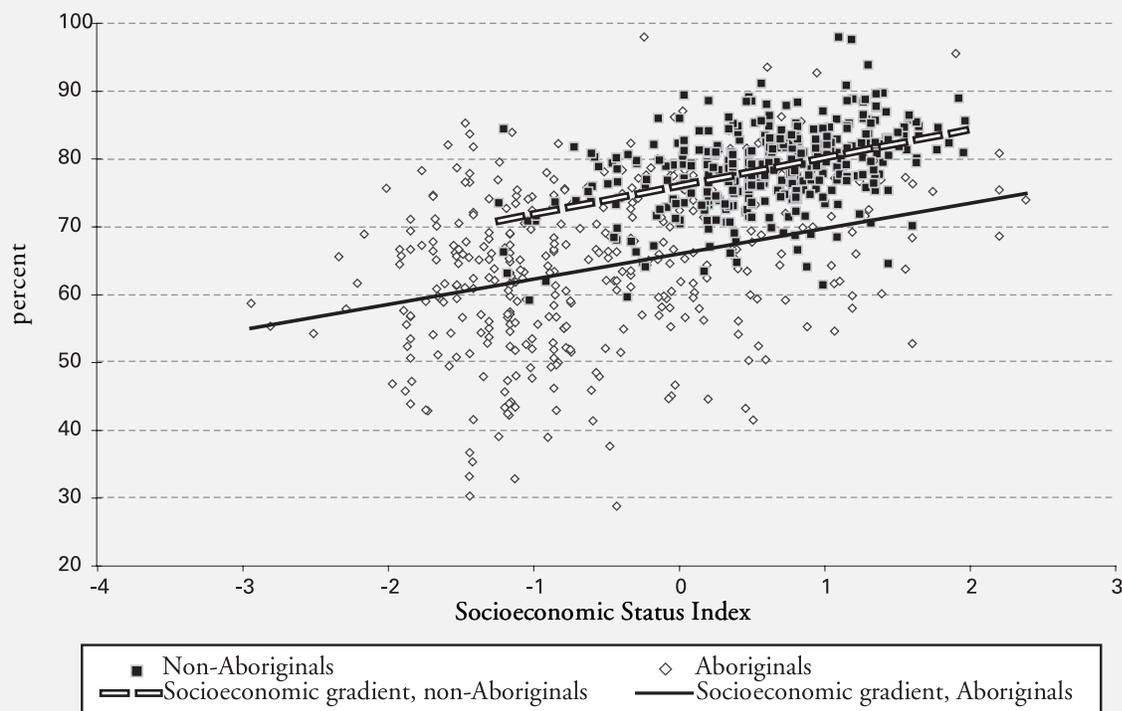
⁴ Note that each distribution ranks school MERs independently. Hence, the school rankings change, in general, between paired MER distributions illustrated in Figures 4 and 5.

Figure 5: Aboriginal and Non-Aboriginal School MERs, 1999/2000 – 2003/2004, Bottom and Top Deciles, by Gender (366 Schools)



Source: Authors' calculations from FSA data supplied by B.C. Education Ministry.

Figure 6: Aboriginal and Non-Aboriginal School Meet-Exceed Ratios (MERs), by Socioeconomic Status Index (366 schools)



Sources Authors' calculations from data prepared by Statistics Canada (2007) and British Columbia (2006a).

data on 732 catchment area populations, two per school. (See Appendix for further elaboration of procedure adopted.)

The two most important socioeconomic variables pertinent to children's education prospects are parental education and family income. We constructed a simple index summarizing the average socioeconomic status (SES) of each catchment population using census data on these two variables.⁵ The index is normalized such that the average value for the 732 catchment populations is zero. For the 366 Aboriginal populations, the average is -0.59. Given an equal number of Aboriginal and non-Aboriginal populations, the non-Aboriginal average index value is, by construction, 0.59.

Figure 6 plots the 732 school MERs (two per school, one for Aboriginal and another for non-Aboriginal students) against their respective SES index values. Superimposed on this scatterplot are two socioeconomic gradients. (These are simply regressions of school MERs, for Aboriginal and for non-Aboriginal scores, on the relevant SES index values.)

The gradients provide an initial summary of the impact of catchment socioeconomic conditions on school outcomes. If the two gradients coincided and possessed a shallow slope, this would indicate that the racial distinction does not matter and that differences in catchment socioeconomic conditions have little impact on student outcomes. Such is clearly not the case.

The gradients have similar slopes. For both Aboriginal and non-Aboriginal families, improvements in socioeconomic status are associated with a similar expected improvement in school performance. For example, Aboriginal parents in a catchment area at the top decile of the SES index can expect their children's school to achieve a MER 10 percentage points above a school whose catchment area's Aboriginal population is at the bottom decile.⁶

Obviously, the Aboriginal gradient lies below the analogous non-Aboriginal gradient. At the average SES index (equal to zero), the expected Aboriginal MER is 66 percent. All but three percent of schools report a higher non-Aboriginal MER. At a SES

index value of zero, the expected non-Aboriginal MER is 76 percent; 69 percent of schools report a higher non-Aboriginal MER.

Multivariate Regression Analysis

We can summarize the discussion of gradients by saying that socioeconomic conditions help us understand some of what's going on, but not a lot; other dynamics matter as well. In this section, we proceed to a more comprehensive regression analysis in an attempt to explain Aboriginal student performance as a function of three sets of variables:

SOCIOECONOMIC VARIABLES: For the Aboriginal and non-Aboriginal catchment populations of each school, we have available 2001 Census data on six variables – education level of family members, employment rate, prevalence of single parenthood, median family income, poverty rates defined in terms of percent below the Statistics Canada after-tax, low-income cutoff (LICO), and mobility rate.

IN-SCHOOL VARIABLES: Here, we make use of the school-level MER among non-Aboriginal students and the number of Aboriginal test scores in the school.

DISTRICT EFFECT VARIABLES: We examine whether particular school districts may systematically influence Aboriginal student performance in constituent schools.

Regression analysis looks at the effect of one or more independent variables (in this case, socioeconomic variables, variables reflecting in-school dynamics and so on) on a dependent variable (in this case, a transformation of the school Aboriginal MER). (See Appendix 2 for further detail.)

As mentioned, family income and parental education level are the most important among socioeconomic variables. In combination, the maximum explanatory power (known as an R-squared statistic) of the socioeconomic variables alone is 0.09, achieved by regressions (1) and (2) in Appendix 2. The first explains Aboriginal education outcomes in terms of

5 This index is standard normal, with equal weighting for each variable.

6 This calculation assumes the Aboriginal gradient slope of 3.73 and that the Aboriginal catchment area SES index rises from -1.28 to 1.28.

Aboriginal family income and parental education; the second relies on the simple SES index introduced above. The education variable can be considered a measure of the knowledge or human capital that family members can bring to bear to help their children's education progress. The income variable measures the family command over relevant resources (including parental time available to aid children's studies) that money can buy.

Turn now to in-school dynamics. Do Aboriginal students perform better in "good schools" measured by superior performance among the school's non-Aboriginal students? Other factors constant, do Aboriginal students perform better or worse when there are many Aboriginal students in the school? Regression (3) includes the non-Aboriginal MER and the count of Aboriginal scores.⁷ The explanatory power of this regression is superior to either of the first two.

In these 366 schools, Aboriginal students are performing better in "good schools" where non-Aboriginal students are performing well. This is not surprising. There is strong evidence on the importance of academically stronger students raising the performance of their peers. A relevant example is a study (McEwan 2004) of indigenous education outcomes in Bolivia and Chile. Children whose mothers had secondary education not only achieved higher scores themselves, but their presence increased overall school scores.

Discussion of the second question is more complex. Many studies – for example the comprehensive survey of Native American education by William Demmert (2006) – stress the value of Aboriginal teachers and a school curriculum geared to Aboriginal experience. These school characteristics are, in general, more prevalent in schools

with large Aboriginal student populations. However, the presence of many Aboriginal students relative to the number of non-Aboriginal students or in absolute size may encourage formation of a school subculture with low academic expectations. McEwan (2004), for one, found modest negative effects on school outcomes the higher the indigenous share of a school's population.⁸

We estimated this potentially negative peer effect in two ways: first, with the Aboriginal share of test scores in a school and then with the actual number of Aboriginal test scores in a school. Both variables produced similar results, but the more significant of the two was the number of Aboriginal scores. If we hold constant other variables (and subject to note seven), Aboriginal children in these B.C. schools can be expected to perform less well when either the share or the count of Aboriginal scores in their school rises.

The implication of these results is that peer effects are more important than socioeconomic conditions in explaining the observed MER gap. However, that conclusion should be qualified. The Aboriginal count variable is negatively correlated ($r = -0.22$) with the Aboriginal SES index and, in addition to measuring negative peer effects, it may be capturing socioeconomic effects.

At present, much of the "entrepreneurship" around Aboriginal education policy is taking place below the radar screen at the level of particular school districts. In B.C., the overall policy picture is one of broad provincial direction on Aboriginal education programs. Provided their decisions fall within the guidelines of ministry-approved policy, school districts have discretion in determining the content and direction of their programs. (See Figure 7 for location of B.C. school districts.)

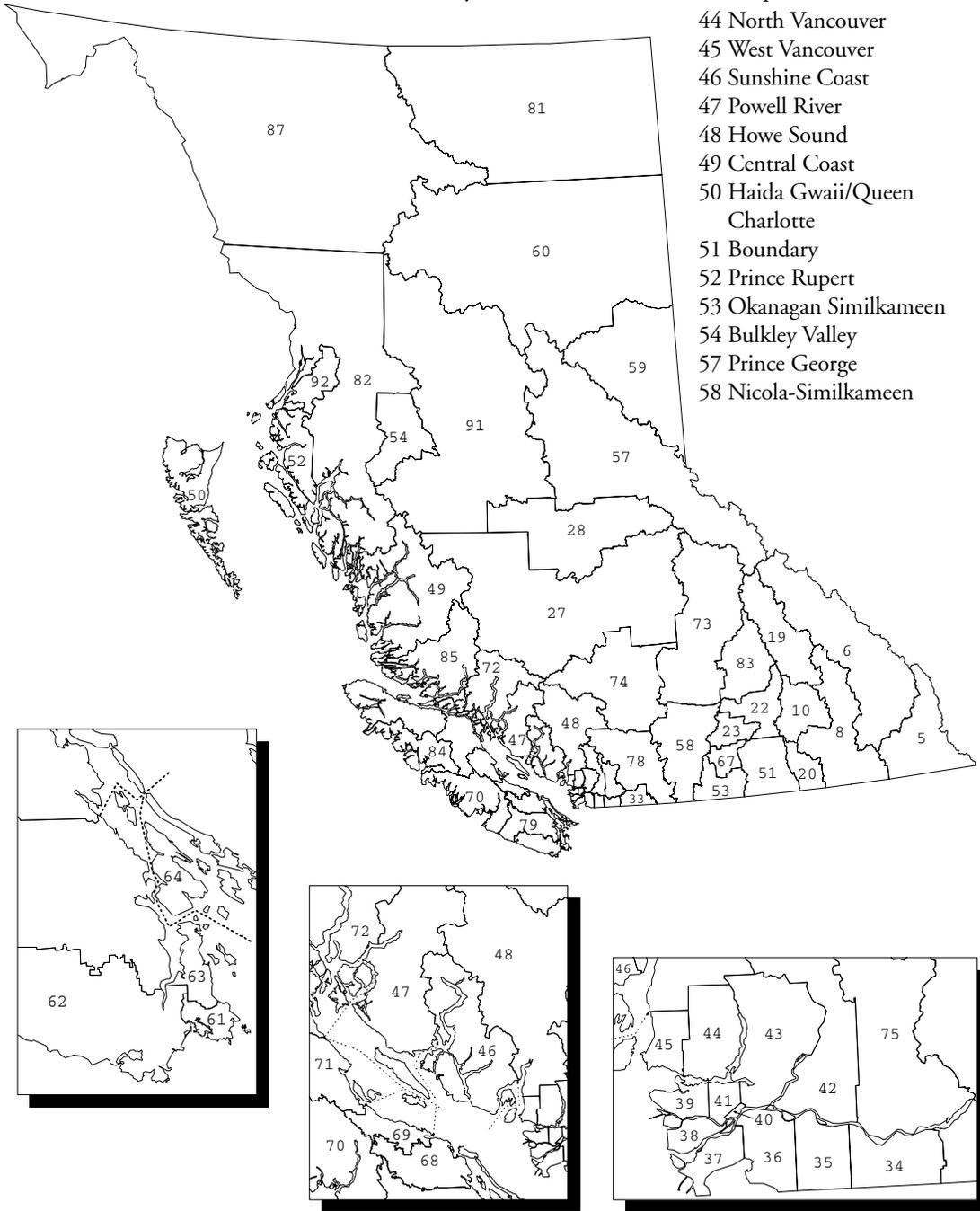
7 Unobserved variables may well influence both the Aboriginal and non-Aboriginal MER. Hence, an OLS regression is subject to bias. To avoid this bias, we used the non-Aboriginal SES index of the school catchment population as the instrument for the non-Aboriginal MER. Its correlation with the non-Aboriginal MER is fairly high ($r = 0.42$), and it is only weakly correlated ($r = 0.16$) with the Aboriginal MER. As instrumented, the non-Aboriginal MER variable is a function of socioeconomic conditions in the non-Aboriginal catchment populations, which in turn are positively correlated with Aboriginal catchment population conditions ($r = 0.29$). Hence, the non-Aboriginal MER variable may be capturing, to some extent, the impact of Aboriginal socioeconomic conditions.

There is evidence that the effect of the count variable is non-linear. Modelled as a quadratic, the incremental effect of increasing the Aboriginal count declines in absolute value as the number of Aboriginal scores rises, and ultimately turns positive. Across all but two schools included in the sample, a larger count means a lower forecast Aboriginal MER. Based on the coefficient values of regression (4), the incremental peer effect turns positive when the Aboriginal count exceeds 511.

8 Hanushek (2002b) provides a useful survey of this literature. Friesen and Krauth (2007) found no adverse peer effects in their study of Aboriginal student FSA outcomes in B.C. schools. On the other hand, Cooley (2007) studied white and non-white students in North Carolina public elementary schools and concluded that desegregating peer groups leads to small reductions in interracial achievement gaps.

Figure 7: British Columbia School Districts

- | | | | |
|----------------------|----------------------|--------------------------------|---------------------------|
| 5 Southeast Kootenay | 23 Central Okanagan | 37 Delta | 59 Peace River South |
| 6 Rocky Mountain | 27 Cariboo-Chilcotin | 38 Richmond | 60 Peace River North |
| 8 Kootenay Lake | 28 Quesnel | 39 Vancouver | 61 Greater Victoria |
| 10 Arrow Lakes | 33 Chilliwack | 40 New Westminster | 62 Sooke |
| 19 Revelstoke | 34 Abbotsford | 41 Burnaby | 63 Saanich |
| 20 Kootenay-Columbia | 35 Langley | 42 Maple Ridge-Pitt Meadows | 64 Gulf Islands |
| 22 Vernon | 36 Surrey | 43 Coquitlam | 67 Okanagan Skaha |
| | | 44 North Vancouver | 68 Nanaimo-Ladysmith |
| | | 45 West Vancouver | 69 Qualicum |
| | | 46 Sunshine Coast | 70 Alberni |
| | | 47 Powell River | 71 Comox Valley |
| | | 48 Howe Sound | 72 Campbell River |
| | | 49 Central Coast | 73 Kamloops/Thompson |
| | | 50 Haida Gwaii/Queen Charlotte | 74 Gold Trail |
| | | 51 Boundary | 75 Mission |
| | | 52 Prince Rupert | 78 Fraser-Cascade |
| | | 53 Okanagan Similkameen | 79 Cowichan Valley |
| | | 54 Bulkley Valley | 81 Fort Nelson |
| | | 57 Prince George | 82 Coast Mountains |
| | | 58 Nicola-Similkameen | 83 North Okanagan-Shuswap |
| | | | 84 Vancouver Island West |
| | | | 85 Vancouver Island North |
| | | | 87 Stikine |
| | | | 91 Nechako Lakes |
| | | | 92 Nisga'a |



Source: B.C. Stats. available online at: <http://www.bcestats.gov.bc.ca/DATA/pop/maps/SDmap.asp>.

Table 1: Decomposition of the Aboriginal/non-Aboriginal MER Gap

Reduction of MER gap arising from	(percent of gap)
Elimination of gap in average SES index values ^a	17.7
Elimination of negative peer effect ^b	47.5
Replication of positive, district-fixed effect in District 67 among all districts ^c	66.6

Notes:

The gap between the observed average non-Aboriginal and Aboriginal MER is 14.7 percentage points (78.5 - 63.8). The calculations use the forecast Aboriginal MER at average regressor values as the benchmark. Each line gives the result from changing the indicated regressors, expressed as a percentage of the Aboriginal/non-Aboriginal gap.

a. The Aboriginal SES index rises from its actual average of -0.59 to 0.59, the average among non-Aboriginal catchment populations.

b. The Aboriginal test-count variable falls from its actual average of 141 to a value of 0. Equivalently, the coefficients on the Aboriginal count variables fall to zero.

c. District 67 recorded the largest positive school-district effect. This scenario envisions all districts achieving a comparable positive effect. (Under this scenario, the district schools remain subject to the other variables affecting forecast Aboriginal MER performance.)

What evidence is there that district initiatives matter? If we allow for a potentially significant effect of all districts on Aboriginal test scores in their respective schools, it turns out that 10 districts impacted Aboriginal student performance – either positively or negatively – in a statistically significant manner. Regression (4), which estimates the magnitude of the district effect on Aboriginal student MERs in these 10 districts, substantially increases the explanatory power relative to regression (3), which ignores district-level effects. In two of the 10 districts (containing a total of 16 schools), Aboriginal student performance is above forecast values based on the regression specification. In the other eight districts (containing a total of 36 schools), Aboriginal performance is below analogous forecast values.

Table 1 summarizes an exercise in decomposing the Aboriginal/non-Aboriginal MER gap, based on regression (4) coefficients. For example, if the Aboriginal SES index value equalled that prevailing among non-Aboriginal catchment populations, then the forecast Aboriginal MER would rise sufficiently to reduce the actual 14.7 percentage point gap by nearly one-fifth (17.7 percent). If the negative peer effect could be eliminated, it would reduce the gap by nearly half (47.5 percent). If all school districts could perform as well as Okanagan Skaha (district 67), then – without any other changes in the

forecast impact of socioeconomic conditions and in-school dynamics – two-thirds (66.6 percent) of the gap would be eliminated. All else equal, a one percentage point increase in the non-Aboriginal MER in a school is associated with a 0.8 percentage point increase in the school's Aboriginal MER.

From this regression exercise arise three broad policy recommendations:

- School boards should be cautious about concentrating Aboriginal students in one or a few schools. In general, concentration has lowered academic outcomes across the province for Aboriginal students.
- Providing Aboriginal parents with information about the academic performance of schools and enabling them to choose a “good school” with high non-Aboriginal student performance may well improve overall outcomes for Aboriginal students.
- There are lessons to learn from the strategies of school boards with superior performance.

These recommendations are very general. Why the pronounced negative peer effect? Why do some schools perform remarkably better – or worse – than forecast via the regressions? In the next section, we explore in more detail how school districts impact Aboriginal student outcomes.

What Are School Districts Doing?

In a recent survey of studies on how school districts impact education outcomes, Stephen Anderson (2006) concludes that effective districts exercise comprehensive leadership over reform strategies although elements differ from one case to another. His findings run counter to the belief that there exists a single optimal set of reforms for success.

In an earlier study, Patrick Maguire (2003) drew a similar conclusion. He looked at four Alberta school districts that had demonstrated marked improvement in student performance over the years 1998 to 2003 in Alberta's equivalent to B.C.'s Foundation Skills Assessment tests. Student performance was measured among all students, not Aboriginals in particular. His conclusions about the elements of success:

- Vision statements (for the school district) that were more sharply focused on student learning, more widely promulgated and internalized at all levels.
- More links with community partners and agencies capable of supporting students.
- A collective culture in which school administrators and teachers took pride in their district because they shared in its planning, decision-making and achievements.
- The determination to measure schools against district-level expectations, not the parochial yardsticks of individual principals or teachers.
- Greater emphasis on improving the understanding and use of assessment data among school staff.
- Successful implementation of a curriculum-based, collaboratively developed and instruction-embedded model of staff development. (Maguire 2003,10.)

Another study – this one conducted in the US – selected five districts that had achieved significant improvement in performance in math and/or reading over a minimum of three years among students from low-income catchments. The authors came up with a similar formula for success:

- Districts had the courage to acknowledge poor performance and the will to seek solutions.
- Districts put in place a system-wide approach to improving instruction – one that articulated cur-

riculum content and provided instructional supports.

- Districts instilled visions that focused on student learning and guided instructional improvement.
- Districts made decisions based on data, not instinct.
- Districts adopted new approaches to professional development that involved a coherent and district-organized set of strategies to improve instruction.
- Districts redefined leadership roles.
- Districts committed to sustaining reform over the long haul (Togneri and Anderson 2003, 4-5).

Table 2 unpacks the evidence implicit in regression (4) on the potential importance of B.C. district-level strategies. In the short run, administrators in any district must take the socioeconomic status of school catchment populations and the geographic distribution of Aboriginal students across their district as more-or-less fixed.

Each of the 366 designated schools is classified as to whether its actual Aboriginal MER exceeds or falls short of that forecast. The forecast is based on the relevant values of the socioeconomic and in-school variables and coefficients generated by regression (4), ignoring any district-level effects. In turn, the schools are aggregated into their respective school districts. The table ranks the school districts in terms of the proportion of district schools performing better than forecast.

The range – from none to 100 percent – in the proportion of schools that outperform forecast Aboriginal MERs is clearly large. There are 85 schools in the top 10 school districts, 60 of which perform above forecast levels. In the bottom 10 districts, there are 44 schools, only two of which perform above forecast levels.

The evidence provided by the district fixed-effect regression (4) is suggestive. It does not indicate what these districts are doing, either to enhance or retard Aboriginal student performance. Furthermore, the fixed-effect variables may be capturing unspecified, geographically specific factors, in which case the link to district strategies is spurious.

To go beyond the statistical analysis, we conducted interviews with district personnel and stakeholders in eight provincial school districts at the close of the 2006/2007 school year. Districts were selected to represent demographic variations. For example,

Table 2: School Districts, Ranked by Share of Schools with Aboriginal MER above Forecast

District Name	1 Aboriginal MER (percent)	2 Non-Aboriginal MER (percent)	3 District MER gap (1-2)	4 Number of Schools Above Forecast	5 Number of Schools Below Forecast	6 Percent Above Forecast MER [4/(4+5)]
Kootenay-Columbia	73.1	76.3	3.1	3	0	100.0
Abbotsford ^a	72.5	79.2	6.7	9	2	81.8
Okanagan Skaha ^a	75.1	80.2	5.1	4	1	80.0
Fraser-Cascade	68.6	83.9	15.3	4	1	80.0
Comox Valley	68.2	78.9	10.7	7	3	70.0
Kamloops/Thompson	67.5	81.3	13.7	11	5	68.8
Kootenay Lake	75.4	83.3	7.8	2	1	66.7
Coquitlam	70.8	80.0	9.2	7	4	63.6
Vernon	63.5	77.2	13.6	5	3	62.5
Central Okanagan	66.3	79.3	13.0	8	5	61.5
Prince Rupert	59.8	81.5	21.6	6	4	60.0
Qualicum	71.8	79.9	8.1	3	2	60.0
Peace River South	57.6	76.1	18.5	4	3	57.1
Maple Ridge-Pitt Meadows	71.0	80.0	9.0	7	6	53.8
Chilliwack	60.1	77.7	17.6	8	7	53.3
Southeast Kootenay	58.7	77.7	19.0	3	3	50.0
Quesnel	63.9	75.1	11.2	6	6	50.0
Delta	68.3	86.3	18.0	1	1	50.0
Vancouver	58.4	78.4	20.0	5	5	50.0
New Westminster	70.3	80.2	10.0	1	1	50.0
Peace River North	65.7	81.2	15.6	5	5	50.0
Campbell River	62.0	77.1	15.1	5	5	50.0
Cariboo-Chilcotin	60.1	80.4	20.3	5	6	45.5
Prince George	59.2	79.0	19.9	13	18	41.9
Langley	63.8	78.3	14.6	5	7	41.7
Nanaimo-Ladysmith	57.7	76.1	18.3	8	12	40.0
Surrey	61.4	73.1	11.6	9	15	37.5
Burnaby ^b	59.2	77.8	18.6	1	2	33.3
North Okanagan-Shuswap	68.7	82.5	13.7	2	4	33.3
Revelstoke	70.6	75.9	5.3	1	2	33.3
Coast Mountains ^b	51.1	75.9	24.8	3	7	30.0
Mission	65.6	78.3	12.7	2	5	28.6
Alberni	55.3	77.7	22.5	2	6	25.0
Sooke	60.5	75.6	15.1	1	5	16.7
Greater Victoria	52.6	75.3	22.7	1	6	14.3
North Vancouver ^b	49.3	80.9	31.6	0	2	0.0
Powell River ^b	57.7	78.7	20.9	0	3	0.0
Howe Sound ^b	52.1	72.3	20.2	0	3	0.0
Bulkley Valley	53.4	82.2	28.8	0	3	0.0
Nicola-Similkameen	57.0	76.1	19.1	0	5	0.0
Saanich ^b	35.6	82.9	47.4	0	3	0.0
Cowichan Valley ^b	44.5	75.5	30.9	0	8	0.0
Vancouver Island North ^b	49.8	75.9	26.1	0	4	0.0

Notes:

Forecast values based on regression (4) specification of socioeconomic conditions and in-school dynamics and coefficients, ignoring fixed effects estimated for 10 districts.

a. School districts whose school Aboriginal MER scores are significantly above forecast values.

b. School districts whose school Aboriginal MER scores are significantly below forecast values.

Source: Authors' calculations from FSA data supplied by B.C. Education Ministry.

Table 3: Correspondence of District MER Rankings and Policy Initiatives in Aboriginal Education

		Date of First Enhancement Agreement ^c	Existence of Joint District-Community Advisory Committee ^d	Existence of "Frontline Educator" Committee ^e	Publishing of Annual Reports ^f
High-Performing ^a	District 1	1999	Yes (since 1994, institutionalized as a council)	Yes	Yes
	District 2	2001	Yes (since 1989, institutionalized as a council)	Yes	Yes
	District 3	In process	Yes (since 1994)	Yes (not yet regularized)	Yes
	District 4	In process	Yes	No	No
Low-Performing ^b	District 5	2008	Yes	No	No
	District 6	In early stages	Yes (separate committees for different First Nations communities)	No	No
	District 7	2006	Yes	Yes	No

Notes:

- a. Fifty percent or more of district schools included in the sample realized school-level MERs above forecast (see Table 2).
- b. Fewer than 50 percent of district schools included in the sample realized school-level MERs above forecast.
- c. This is the date of signing of the Aboriginal Education Enhancement Agreement among the district, local Aboriginal communities and the B.C. Ministry of Education. Note that Districts 1 and 2 have now implemented their second Enhancement Agreement, which represents a longer commitment to Aboriginal education.
- d. The existence of a joint district-community advisory committee is a measure of collaboration between the district and local Aboriginal representatives. Although all districts included have such a committee, they have been in operation in the top three districts for more than 10 years and are more highly institutionalized in terms of decision-making responsibilities.
- e. The existence of a "frontline educator" committee is a measure of coordination between the district and individual schools. These committees (of teachers, principals, support workers and band education councillors) meet regularly and are responsible for directing their findings up to the district-level, decision-making body and down to the school level.
- f. The publishing of regular reports on Aboriginal education is a measure of transparency and accountability in terms of attaining specific goals.

Aboriginal students constitute from 4 percent to 98 percent of the student body, depending on the district.

Total student district enrolment also varies from some 500 to 65,000 students. To respect confidentiality, we have not named these eight districts, three of which are located in the Fraser River valley (Lower Mainland), one in the southern interior and four in the northwest.⁹ In terms of the Table 2 ranking, some districts placed high; others low. Interviewees included district principals of Aboriginal education, an administrator of a district First Nations education council, school support workers, band councillors, an Aboriginal school board trustee and the former director of the Aboriginal Education Branch of the provincial Ministry of Education.

A brief word on the B.C. context: in 1994/1995, the province began targeted education funding for Aboriginal programs, with each district's funding based on its total Aboriginal student enrolment. School districts must demonstrate that such funding is spent on "Aboriginal language and culture programs, Aboriginal support services or other Ministry-approved Aboriginal programs" (British Columbia 2003). Loss of funding may occur where districts are unable to account for expenditures.

The Ministry of Education also requires all school districts to develop and implement Aboriginal Education Enhancement Agreements, which are working documents among districts, local Aboriginal communities and the Ministry. As their name suggests, these agreements are designed to enhance the academic achievement of Aboriginal students and to improve collaboration between districts and Aboriginal communities.

Our interview conclusions are based on a relatively simple exercise: we compared responses on key questions, grouped them based on identified themes and cross-referenced them with the rankings based on percent of district schools with MERs above forecast. We then analyzed the correspondence between above-forecast rankings and four criteria designed to measure the extent of district leadership in Aboriginal education: 1) the date that the district's first Enhancement Agreement was signed; 2) the existence of a joint decision-making body between the district and its Aboriginal communities; 3) the existence of a committee of educators to mediate between the district and individual schools; and 4) the publishing of regular reports on the achievement of measurable targets (see Table 3).

⁹ Of the eight districts where interviews were conducted, only seven had corresponding data from Table 2.

Although this approach does not capture all dimensions on which districts differ, nor the specific effects of such differences on student performance, our conclusions are supported by other district-level studies (Maguire 2003; Togneri and Anderson 2003). This comparative exercise also suggests that effective district policies play an important political role in creating and sustaining leadership and coordination around Aboriginal education. Those districts that ranked “high” in above-forecast rankings are those that demonstrate the most consistency and history across measures of district leadership and coordination.

From these district comparisons, we concluded that collaboration between school-district personnel and local Aboriginal communities is a prerequisite to improved academic outcomes. While many districts recognize this, others remain reluctant to share decision-making. Moreover, as Table 3 illustrates, districts differ in how institutionalized this joint decision-making has become. The involvement of Aboriginal communities has important beneficial consequences not only with respect to the responsiveness of programs to Aboriginal students, but also in terms of buy-in from Aboriginal families and the local Aboriginal leadership.

In some respects, districts with more ambitious Aboriginal student programming have independently developed similar collaborative paths with local Aboriginal communities. Certain districts appear much further along than others in this dynamic. District personnel active in Aboriginal student programming may be unaware of programs deemed effective by other districts, since information-sharing is limited – especially between districts that are not geographically close to each other.

Another important piece of the equation is the role of individual schools. Although most program decisions are made by districts, there are differences in “take up” at the school level. District decision-makers point to the importance of commitment by school-level administrators and teachers in incorporating Aboriginal content into curriculum, improving relations with Aboriginal families and community members, and transforming expectations in schools.

Despite the crucial roles played by teachers and principals, school-level procedures appear largely ad hoc. Unless committed teachers and administrators are present and active, district policies will not lead to fundamental school engagements. Note that in the top two districts in Table 3, members of a committee of “frontline” educators are tasked with reporting findings and recommendations up to the district level and down to individual schools. This overall picture is consistent with the finding reported above of wide variance among districts in the percent of schools performing above or below forecast Aboriginal MERs and also with the limited ability of socioeconomic conditions to explain Aboriginal student performance.

When comparing the districts involved in the survey, similarities emerge in core programs offered to Aboriginal students. In all, the performance of key staff – district principals of Aboriginal education, Aboriginal support workers and counsellors, and teachers assigned to curriculum development and academic support – is crucial. Academic skill-development and literacy programs, ranging from full-day kindergarten to summer reading programs and in-class, small-group instruction – also figure prominently in all districts.

Language instruction and Aboriginal culture programs represent another dimension of programming. Curriculum development is required for both the revitalization of First Nations language instruction and for the inclusion of Aboriginal culture and history in classrooms. Also important are events that bring Aboriginal community members into schools to promote cross-cultural awareness. Such occasions may take the form of “elders-in-residence” programs or cultural presentations.

What sets districts apart from one another appears less related to the programs themselves, although these undoubtedly matter. More significant are how decisions are formulated and how decision-makers and stakeholders interact. In other words, the differences among schools and districts are best captured by the differences in how priorities are translated into action. Some of the key features are outlined below.

INFLUENCE OF KEY DISTRICT-LEVEL ACTORS

Many districts have created the position of district principal of Aboriginal education to provide leadership on the ground, and to spearhead the monitoring and improvement of Aboriginal programming. Although districts with these positions are not necessarily more committed to Aboriginal education than those without, interviewees did speak of the importance of a “principal” in the context of district politics and hierarchy. As relatively high-ranking positions charged with district-wide coordination, district principals appear to signal to schools and to the wider community that the district considers Aboriginal education a high priority.

Support workers dedicated to Aboriginal students represent another group in district-level programming that may be having a positive impact.¹⁰ Support workers may be assigned to a single school or to multiple schools, depending on the Aboriginal student population. A subtle distinction is whether support workers provide services primarily to Aboriginal students, or to the entire school community in terms of better cross-cultural awareness.

More successful districts point to the benefit of relationship-building between Aboriginal and non-Aboriginal communities. This exercise aims to overcome both the effects of any community racism as well as the mistrust of formal schooling that exists among some Aboriginals. It is a misconception to consider such exercises as directed solely at Aboriginal students. They are equally important in creating for non-Aboriginal students and teachers an understanding of Canadian Aboriginal heritage and in creating a culturally sensitive school environment.

INFLUENCE OF ABORIGINAL COMMUNITIES

Higher-performing districts benefit from good working relationships with Aboriginal stakeholders who are themselves committed to improving educational outcomes for Aboriginal children. In those districts ranked “low” in Table 3, these working relationships are more tenuous, either because of cultural differences among Aboriginal leaders or

because of unwillingness and rigidity on the part of non-Aboriginal district personnel. Interviewees also spoke of difficulties specific to urban areas, including the high mobility of families living in low-income neighbourhoods. Although these difficulties exist throughout urban school districts, they are most acute in inner-city schools.

All persons interviewed spoke of the importance of trust building and the forging of consensus among the local Aboriginal leadership. Two major issues appear to be at play. First, in some districts the legacy of Aboriginal exclusion from decision-making in the public school system is much more acute than in others. Second, it is an advantage for a school district if high-profile Aboriginal leaders have championed the importance of education and have advocated change.

SHARED DECISION-MAKING

Arguably, the most crucial element of decision-making is the connection between district personnel and Aboriginal communities, particularly those Aboriginals in leadership roles. In more successful districts, there is a relatively long history of shared decision-making and the promotion of “ownership” over funding and program decisions among local Aboriginal communities. In others, decision-making is fractured and marked by mistrust.

In those districts with effective decision-making, not only are Aboriginal communities involved, but they may also be responsible for oversight of funding allocations. The extent of shared control over the purse strings is symbolic of the overall degree of collaboration between district officials and local Aboriginal communities.

In districts characterized by high levels of shared decision-making, two effects are visible: first, the creation of influential positions dedicated to Aboriginal education and, second, the willingness of school-district authorities to shift ownership of decision-making to Aboriginal communities. Successful collaboration is also enhanced in those districts where local Aboriginal leaders place high importance on core educational outcomes in the basics of reading, writing and arithmetic.

¹⁰ We acknowledge, however, that debate exists about the actual impact of support workers on educational outcomes, and this is an area where further research would be beneficial in specifying the roles that support workers do and should play.

CONSENSUS AMONG ALL PARTIES, PARTICULARLY TEACHERS, ON PRIORITIZING ABORIGINAL EDUCATION

Interviewees spoke of the role played by teachers in either aiding or hindering the implementation and development of collaborative relationships. Some district personnel pointed to the actions of local teachers' unions in obstructing Aboriginal community members from classroom instruction. More broadly, some teachers appear reluctant to modify teaching practices.

This is not to suggest that teachers hold exclusive responsibility for improving the outcomes of Aboriginal students. Indeed, at the district level, superintendents, board members, union leaders and principals all play crucial roles in formulating and implementing programs and in creating the will to improve instruction for Aboriginal students. It is important to recognize, however, that the improvement of educational outcomes among Aboriginal students is simply unattainable without buy-in from teachers.

ATTENTION TO DATA AND INNOVATIVE PROGRAMMING

The potential to change the learning environment for the better is enhanced when the factors discussed above – influence, shared decision-making and teacher buy-in – converge in the creation of programs. The top districts have increased the number of Aboriginal teachers, a goal shared by nearly all those interviewed. These districts are also involved with university research projects aimed at rethinking educational practices to address the needs of Aboriginal learners. Innovative programming tends to emerge when district-level actors are endeavouring to meet specific objectives that they themselves have set, rather than simply adhering to provincial guidelines.

Although all districts must collect specified data for provincial reporting purposes, those that rank highest in Table 3 are more systematic in monitoring a broader spectrum of performance measures, such as attendance, and use this exercise to push for district-wide and school-based improvements. All districts cite FSA results and other district- or ministry-generated achievement measures as ways of monitoring enhancement agreements and overall student progress. They all

refer to closing the gap between Aboriginal and non-Aboriginal student performance. However, higher-performing districts are far more willing than others to evaluate programs using assessment data and to create new data aimed at measuring specific dimensions of student performance.

Conclusion

We have introduced several recommendations arising from our own and others' statistical analyses: early childhood education programs targeted to at-risk groups improve student performance, especially in early grades; school-district policies that concentrate Aboriginal students in one or a few schools will probably yield disappointing outcomes; enabling Aboriginal families to choose a "good school" with high non-Aboriginal student performance may improve overall outcomes; and, finally, there are lessons to learn from school districts displaying superior performance.

After allowing for socioeconomic characteristics and in-school dynamics, some districts appear to play critical roles in creating impressive Aboriginal education outcomes; other districts are achieving much less impressive outcomes.

These district-level roles appear less precise than the policies often associated with education reform, such as school choice or accountability measures. Successful district leadership and coordination may be accomplished in a variety of ways. This poses a challenge in attempting to generalize what successful districts are doing right. Nonetheless, assessing district-level strategies is almost certainly worth greater policymaking attention. We conclude with the following four themes.

CREATING THE WILL TO CHANGE

Leadership matters. Among the more successful districts, administrators directly address Aboriginal education issues. Ideally, the district superintendent is ready to spearhead change, the district appoints a relatively high-ranking coordinator of Aboriginal programming, teachers and school-level administrators share the desire to change and there are decision-making bodies in place to coordinate and support reforms.

INVOLVING COMMUNITY STAKEHOLDERS

Improvements to student performance are more likely if Aboriginal stakeholders are incorporated into decision-making structures. Although all of the district-level personnel interviewed emphasized involvement by Aboriginal community members, the higher-performing districts were more visibly successful in realizing this objective. There are also gains to be achieved by encouraging participation of the broader community, especially parents and relatives, in the school system.

FORMULATING AND IMPLEMENTING NEW OPTIONS

The formulation of program options is where “the rubber hits the road.” This exercise aligns the parties involved – district staff, teachers, principals, families, Aboriginal leaders and the wider community. The ability to implement new programs, once adopted, is also crucial.

SETTING TARGETS FOR IMPROVEMENT

A feature of successful districts is their use of performance measures – to celebrate the achievements attained and to exert continued pressure for further improvement. Lower-performing districts are less likely to make data public, presumably for fear that they will be used as a means of shaming specific schools and the district as a whole. Yet, recall the adage that policymakers pursue goals that are measured. Access to clear pictures of student performance is necessary in setting measurable goals and in strengthening ownership over their realization.

In sum, relatively successful districts emphasize Aboriginal education success as a long-term priority, involve Aboriginal leaders and the broader community, use objective data on Aboriginal student performance in design of policy and follow through on policy implementation.

Our investigation strongly suggests that the school district represents an important foundation on which to base improvements. District-level strategies are not the only piece in the puzzle surrounding Aboriginal student outcomes. They are, however, an area where greater policymaking attention should be devoted.

Glossary

Catchment Area. The catchment area for a school located in a large urban centre is the census tract in which the school is located plus adjacent census tracts from which the school is assumed to draw students. The catchment area for a school in a medium or small urban area is defined as the individual school's census subdivision and adjacent census subdivisions.

Census Subdivision and Census Tract. A census subdivision is a municipality or other area considered to be equivalent to a municipality for statistical reporting purposes (for example, a reserve or an unorganized territory). Census tracts are small areas in cities of 50,000 or more that are relatively stable and usually have a population of 2,500 to 8,000.

Economic and Census Family. The economic family concept requires only that family members be related by blood, marriage, common-law or adoption. On the other hand, the census family concept requires that one member be a male or female spouse, a male or female common-law partner, a male or female lone parent, or a child with a parent present. Note that all members of census families are members of economic families.

Economic Reference Person. Statistics Canada designates one person in each economic family as the reference person. For example, the male spouse or partner is designated as the reference person in couple families. In lone parent families, the male or female lone parent is the reference person. In same-sex couple families, the first person in the couple listed on the questionnaire is the reference person.

Foundation Skills Assessment (FSA). This is the B.C. education ministry's annual province-wide assessment of students' academic skills in reading comprehension, writing and numeracy. Originally, the ministry administered FSA tests in grades four, seven and ten; now, only in grades four and seven.

Meet-exceed Ratio (MER). Published FSA results classify student performance in terms of three broad grades: exceeding expectations, meeting expectations and not meeting expectations. The most frequently used statistic to summarize outcomes in any population is the meet-exceed ratio, defined as the proportion of test scores that either meets or exceeds expectations. For this study, FSA results have been aggregated across the three subjects and relevant grades within particular schools. Hence, the MERs refer to results at the level of schools or larger populations. The school-level FSA scores can be disaggregated by several characteristics of students within the school: gender, grade, subject and racial identity (Aboriginal or non-Aboriginal).

Socioeconomic Gradients. They are a summary measure of the impact of socioeconomic status on performance of a jurisdiction's school system. More specifically, gradients measure student education performance in a jurisdiction as a function of the socioeconomic status of students' families. In our study, data are aggregated to the level of average school performance and average socioeconomic conditions in the estimated school catchment populations. In any comparative analysis of student performance, the shallower the slope of the gradient, the better the school system's ability to overcome socioeconomic disadvantage; the higher the gradient curve, the more effective is the system in teaching children at the measured stage in their careers.

Socioeconomic Status Index (SES). For this study, we summarized socioeconomic conditions in school catchment populations via a simple index constructed from an equal weighting of two sub-indices defined over the 732 catchment populations, one Aboriginal and one non-Aboriginal for each of 366 schools in the sample. Each sub-index was constructed as a standard normal variable (zero mean and unit standard deviation). The SES index, formed from the sum of the two others, is also constructed as standard normal.

- Education sub-index. This index is derived from the share of families in the catchment population whose most educated member has a trades certificate or higher education level.
- Income sub-index. This index is derived from the median family income of each catchment area population.

Appendix 1: Data Sources and Preparation

The B.C. Ministry of Education provided school-level Foundation Skills Assessment (FSA) scores for more than 1,000 schools for each of the five school years between 1999/2000 and 2003/2004. For this study, we extracted all schools with a minimum of 30 Aboriginal scores. This reduced the population of relevant schools to 609. Within each of these schools, the FSA results have been aggregated over all five years, for all test subjects and for all relevant grades. The school-level scores are disaggregated, for some purposes, by gender and racial identity (Aboriginal or non-Aboriginal).

Estimated school catchment areas have been constructed by matching the street address and postal code of each school with the Statistics Canada Postal Code Conversion File to identify the relevant census tract or census subdivision. This information is used to determine adjacent postal codes with the help of Statistics Canada's Census Geography Reference Maps. Adjacent codes are census tracts or subdivisions located geographically close to the census tract or subdivision in question. Each school has a defined catchment area comprising one to six codes. Secondary schools have larger catchment areas than do elementary schools. In general, catchment areas are more easily defined in large urban areas with census tracts. The construction of catchment area estimates is less precise in small towns and rural areas in which census subdivisions cover larger geographic areas. A total of 134 schools have been eliminated as they are located where catchment areas could not be constructed.

For the remaining 475 schools, Statistics Canada prepared a custom tabulation using the 20 percent sample database of the 2001 census. The tabulated data pertain to economic families

residing in the estimated catchment areas with children between the ages of 8 and 17. For these families, Statistics Canada provided the following socioeconomic information, disaggregated by catchment area and by racial identity (Aboriginal or non-Aboriginal):

- Education level. The highest level of education of the most educated family member. The hierarchy of education levels are as follows: without high-school certificate, high-school certificate, some post-secondary education, trades certificate, college certificate and university degree.
- Median family income. Total income includes all sources: employment income, income from government transfers, pension income, investment income and any other money income.
- Mobility. The number of families where a child moved within a census subdivision or from another subdivision in the year prior to the census.
- Family structure. The number of lone-parent, couple and other families.
- After-tax, low-income, cut-off (LICO) rate: The LICO statistic provides a measure of the severity of poverty in a catchment area.
- Employment: Total number of families with at least one employed economic family member.

Some catchment area populations are small and the tabulation generated unreliable income and education data. Due to such problems, we eliminated 109 schools. This reduced the final sample size on which the analysis is based to 366 schools.

Appendix 2: Alternate Regressions to Explain Aboriginal Foundation Skills Assessment Scores across 366 British Columbia Schools

Dependent Variable: Aboriginal Meet-Exceed Ratio (MER)				
	(1)	(2)	(3)	(4)
Number of Aboriginal test scores			-.00349 (-4.40)	-.00264 (-3.84)
Square of number of Aboriginal test scores			3.53E-06 (2.45)	2.58E-06 (2.06)
Aboriginal families with trades and above as highest education level (percent)	.00687 (3.45)			
Median Aboriginal family income (dollars)	7.79E-06 (4.06)			
Aboriginal SES index value		.185 (6.26)	.125 (4.56)	.0972 (4.04)
Non-Aboriginal meet-exceed ratio (MER) ^a			.0176 (1.68)	.0348 (3.96)
School District Fixed Effects				
Abbotsford school district				.284 (2.36)
Burnaby school district				-.484 (-2.11)
North Vancouver school district				-.729 (-2.62)
Powell River school district				-.507 (-2.23)
Howe Sound school district				-.619 (-2.62)
Saanich school district				-1.21 (-5.18)
Okanagan Skaha school district				.424 (2.39)
Cowichan Valley school district				-.550 (-3.90)
Coast Mountains school district				-.308 (-2.36)
Vancouver Island North school district				-.506 (-2.56)
Adjusted R-squared	.09	.09	.35	.53

Notes:

In all cases, the estimation assumes the impact of individual variables on Aboriginal MER follows a logistic curve. The dependent variable is the log of the odds ratio of the Aboriginal MER in the respective schools. Unlike the logistic curve, whose range lies between 0 and 1, the range of the log of the odds ratio is from negative infinity to positive infinity. The actual regressions are conducted by OLS. The coefficients indicate the impact of incremental changes of regressors on the log of the odds ratio. T-statistics are in parentheses.

a. The non-Aboriginal, meet-exceed ratio is instrumented on the non-Aboriginal socioeconomic index.

Sources: Authors' Calculations from Foundation Skills Assessment Data and Statistics Canada.

References

- Anderson, S. 2006. "The School District's Role in Educational Change." *International Journal of Educational Reform*. 15 (1): 13-37.
- British Columbia. 2003. *Policy Document: K-12 Funding – Aboriginal Education*. Victoria: Ministry of Education. Available at http://www.bced.gov.bc.ca/policy/policies/funding_abed.htm.
- British Columbia. 2006a. Foundation Skills Assessment data, 1999/2000 to 2003/2004, Ministry of Education.
- British Columbia. 2006b. *Aboriginal Report, 2005/06: How Are We Doing?* Victoria: Ministry of Education. Available at <http://www.bced.gov.bc.ca/abed/performance.htm>.
- British Columbia. 2007. "Foundation Skills Assessment (FSA)." Available at <http://www.bced.gov.bc.ca/assessment/fsa/>.
- Canada. 2001a. *2001 Census Dictionary*. Ottawa: Statistics Canada. Available at <http://www12.statcan.ca/english/census01/Products/Reference/dict/index.htm#dictionary>.
- Canada. 2001b. *Illustrated Glossary*. Ottawa: Statistics Canada. Available at: http://geodepot.statcan.ca/Diss/Reference/COGG/Index_e.cfm.
- Canada. 2001c. *Reference Maps*. Ottawa: Statistics Canada. Available at: http://geodepot.statcan.ca/Diss/Maps/ReferenceMaps/index_e.cfm.
- Canada. 2004. *Basic Departmental Data 2003*. Ottawa: Department of Indian Affairs and Northern Development.
- Canada. 2007. Custom tabulation of 2001 census data, prepared by Statistics Canada.
- Canada. 2008a. "Aboriginal Identity (8), Area of Residence (6), Age Groups (12) and Sex (3) for the Population of Canada, Provinces and Territories, 2006 Census – 20% Sample Data." *Aboriginal Peoples, 2006 Census*. 97-558 XWE2006006. Ottawa: Statistics Canada. Available at <http://www.statcan.ca/bsolc/english/bsolc?catno=97-558-X2006006>.
- Canada. 2008b. "Labour Force Activity (8), Aboriginal Identity (8), Highest Certificate, Diploma or Degree (14), Area of Residence (6), Age Groups (12A) and Sex (3) for the Population 15 Years and Over of Canada, Provinces and Territories, 2006 Census – 20% Sample Data." *Aboriginal Peoples, 2006 Census*. 97-560-XWE2006031. Available at <http://www.statcan.ca:80/bsolc/english/bsolc?catno=97-560-XCB2006031>.
- Cooley, J. 2008. "Desegregation and the Achievement Gap: Do Diverse Peers Help?" November. Unpublished. Available at <http://www.ssc.wisc.edu/~jcooley>.
- Demmert, William, and Peggy McCardle. 2006. "Improving the Education of Native American Children." *Journal of American Indian Education*. Vol. 45 No.3.
- Friesen, Jane, and Brian Krauth. 2007. "An empirical exploration of aboriginal student test scores in British Columbia." Paper presented at the Canadian Labour Market and Skills Researcher Network (CLSRN) Workshop on Education and Training, Queen's University, Kingston. September 17.
- Hanushek, Eric. 2002a. *The Long Run Importance of School Quality*. NBER Working Paper 9071. Cambridge, MA: National Bureau of Economic Research.
- Hanushek, Eric. 2002b. *Publicly Provided Education*. NBER Working Paper 8799. Cambridge, MA: National Bureau of Economic Research.
- McEwan, Patrick. 2004. "The Indigenous Test Score Gap in Bolivia and Chile." *Economic Development and Cultural Change*. October.
- Maguire, P. 2003. *District Practices and Student Achievement: Lessons from Alberta*. Kelowna, B.C.: Society for the Advancement of Excellence in Education. Summary available at: http://www.sae.ca/index.php?option=com_content&task=view&id=596&Itemid=95.
- Richards, John. 2006. *Creating Choices: Rethinking Aboriginal Policy*. Policy Study 43. Toronto: C.D. Howe Institute. Available at <http://www.cdhowe.org>.
- Richards, John, and Matthew Brzozowski. 2006. "Let's Walk Before We Run: Cautionary Advice on Childcare." *Commentary* 237. Toronto: C.D. Howe Institute. Available at <http://www.cdhowe.org>.
- Richards, John. 2008. "Closing the Aboriginal/non-Aboriginal Education Gaps." C.D. Howe Institute Backgrounder 116. Available at <http://www.cdhowe.org>.
- Sharpe, Andrew, Jean-Francois Arsenault and Simon Lapointe. 2008. *The Potential Contribution of Aboriginal Canadians to Productivity and Output Growth in Canada: An Update to 2006-2026*. Paper presented at Canadian Economics Association annual meeting, University of British Columbia, Vancouver, June 8. Available at <http://www.csls.ca>.
- Togneri, W., and S. Anderson. 2003. *Beyond Islands of Excellence: What Districts Can Do to Improve Instruction and Achievement in All Schools – A Leadership Brief*. Baltimore: Association for Supervision and Curriculum Development.

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