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Report Card on Quebec's Secondary Schools

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Introduction

Good schools meet the needs of their customers—parents, students, taxpayers, and employers. Only with those needs in mind can a relevant curriculum, effective teaching methods, and useful counselling services be designed and delivered. While Quebec's secondary schools may differ in the needs they serve, all schools must meet certain basic needs. Effective schools will ensure that their students master the skills and absorb the material presented in each course. They will design and execute lesson plans that take into account those differences in individual student characteristics inevitably present in every school. They will develop and use evaluation methods that provide accurate, timely feedback to students and parents regarding the student's progress. They will encourage their students to complete their secondary-school studies on time. They help their students prepare to take advantage of a variety of post-secondary opportunities.

The *Report Card on Quebec's Secondary Schools* (hereafter, *Report Card*) provides an annual, independent measurement of the extent to which each school meets some of these basic needs. By doing so, the *Report Card* serves several purposes.

The *Report Card* facilitates school improvement

Parents want better schools. Students want better schools. Teachers, counsellors, school administrators, superintendents, members of school boards, and officials in the Ministry of Education want better schools. Taxpayers and employers want better schools. But, how will the *Report Card* lead to better schools? Any serious attempt to improve an organization's results requires regular measurement of its output. Fifty years ago, Dr. Joseph Juran[1] and others reinforced the role of measurement in building more effective organizations. Juran recommended the adoption of a "quality spiral" approach to improvement. The approach is simple. The starting point in the spiral is the documentation of historical performance so that the schools will have a benchmark against which to improve. Once the benchmark is established, the school then adopts a short-term goal for improvement; develops a plan designed to achieve that goal; executes the plan; measures the results; revises the goal and/or plan as required; executes the plan and, thereafter, continues the spiral of action toward improvement into the future. It is to the continuous improvement of all Quebec schools that the *Report Card* is dedicated.

The use of the measurement of results as the basis for improvement is widespread. In many jurisdictions, relevant education-related data has become routinely available. For example, the United Kingdom's Department for Education and Employment annually produces and widely distributes detailed tables of performance-related measures for primary schools, secondary schools, and colleges.[2] Education authorities in Quebec, British Columbia, Alberta, and New Brunswick[3] annually release data related to K-12 school performance. However, the mere public availability of raw data is not sufficient. Experience gained in British Columbia and Alberta suggests that action toward improvement is encouraged when clear conclusions are drawn from the data and then disseminated broadly. Education authorities in California and Oregon apparently subscribe to this notion. Both have moved beyond simply collecting and publishing performance data. This year, California, under the authority of the Public Schools Accountability Act of 1999, used an *Academic Performance Index*[4] (a single statistic much like the *Report Card's* overall rating out of 10 (*Cote globale sur 10*) to rate its elementary, middle, and secondary schools. In Oregon,[5] the Department of Education rates each of its public schools from *Exceptional* to *Unacceptable* in student performance, student behaviour, and school characteristics. It then uses these three ratings as the basis for an overall school-performance rating.

In Canada, the Fraser Institute introduced the first secondary schools report card[6] in British Columbia in 1998, followed by the *Report Card on Alberta's High Schools* in 1999.[7] Now, the Montreal Economic Institute in partnership with the Fraser Institute introduces the inaugural edition of the *Report Card on Quebec's Secondary Schools*. It combines a variety of relevant, publicly available data to produce an academic rating for each of the province's secondary schools.

For each school, for the six school years 1993/1994 through 1998/1999, we calculated four indicators of school performance:

1 the average uniform examination mark received by the school's students on four important Secondary IV and Secondary V courses;[8]

2 the percentage of these courses that the students failed;

3 the difference between their average, raw examination mark and their average raw school mark in these four courses (inflation of grades); and,

4 the average difference in the inflation of grades between male and female students: within each school, it is a measure of how well boys' examination results match their school performance relative to how well girls' examination results match their school performance.

From these four indicators, each school's annual overall rating out of 10 (*Cote globale sur 10*) is determined. The overall ratings are intended to answer an important question: "How is your school doing?"

An indicator of the cohort graduation rate[9] at the school; a measure of any apparent trends over time in the results; and, background information on the school and its student body's average family characteristics complete the report.

The *Report Card* is designed to collect these objective indicators of school performance into one easily accessible public document so that all interested parties—parents, students, school administrators, teachers, and taxpayers—can analyze and compare the performance of individual schools.

Comparisons are at the heart of the improvement process.

- By comparing a school's latest results with those of earlier years, we can see if the school is improving—or not.
- By comparing a school's results with those of neighbouring schools or schools with similar characteristics, we can identify more successful schools and learn from them.
- Reference to overall provincial results establishes an individual school's level of achievement in a broader context.

Each of these comparisons is made simpler and more meaningful by the indicators, ratings, and rankings contained in the *Report Card*.

The *Report Card* can be used as the starting point for an annual review of the school's performance. This review should include all interested parties. The school community can decide whether each of the indicators is important. It can then decide whether the school's results are satisfactory. When the school is not performing to expectations, the school community can develop an action plan to improve the results. To the extent that the *Report Card* assists in planning for improvement and encourages significant action toward better results, it will have served its primary purpose.

The *Report Card* can help parents choose

Where parents can choose among several education providers for their children, the *Report Card* provides a valuable tool for use in the decision-making process. Because it makes comparisons easy, the *Report Card* alerts parents to those nearby schools at which students are having relatively more success academically. Parents can also determine whether or not schools of interest are improving over time. By first studying the *Report Card*, parents will be better prepared to ask relevant questions when they interview the principal and teachers at the schools under consideration. Of course, the choice of a school should not be made solely on the basis of any one source of information but the *Report Card* provides a detailed picture of each school that is not easily available elsewhere.

Taxpayers have a big stake in our schools

Finally, the vast majority of Quebec's students attend schools that are wholly or partially financed by taxpayers. For the school year 1998/1999, Quebec's elementary and secondary schools cost taxpayers approximately $7 billion in operating expenses and a further $450 million in capital expenditure. A public expenditure of such magnitude necessitates continued, independent measurement of the results flowing from that expenditure. The results should be easily available to any interested taxpayer.

What other features are being developed for future editions?

We could not encourage schools to engage in continuous improvement while not being equally committed to improvement of the *Report Card*. We plan to develop new indicators over the years that will make the *Report Card* more useful to parents, teachers, school administrators, and taxpayers. Among the new features under development are the following.

How long do students take to graduate from secondary school?

Earlier this year, the Ministry of Education released school-level data detailing the percentage of certain cohorts of students that graduated within the normal five years of entry into Secondary I. These

are important data that reflect the success schools have in assisting and encouraging their students to attend class, stay on task, and complete secondary school in a timely manner. Unfortunately, these data were not available for private schools for inclusion in this edition of the *Report Card*. We expect that the data will be available for all schools in time for the second edition of the *Report Card*. In the meantime, we have included this graduation data for the schools for which it is available. It is not included in the calculation of the overall rating (*Cote globale sur 10*).

Is anybody there? Taking the pulse of the school by measuring student attendance levels

Good school attendance—when it is matched with effective teaching—does matter, and measures of attendance should be part of any assessment of school effectiveness. First and foremost, regular attendance at school is an important driver of academic success. A study of students in undergraduate economics classes found that "the difference in performance between a student who attends regularly and one who attends sporadically is about a full letter grade." [10] The study provided compelling evidence that attendance itself was a determinant of success in the course. But, it is not just grades that suffer when students skip classes. Research shows that grade-school truancy may lead to dropping out of school, may be a precursor to delinquent and criminal activity, and places students at higher risk of being drawn into behaviours involving drugs, alcohol, or violence.[11] The same research cited the remarkable statistic that a three-week sweep for truants in Van Nuys, California reduced shoplifting arrests during the same period by 60%. Since attendance matters to students' success and welfare, a measure of the effectiveness of schools in promoting good attendance is undoubtedly a valid addition to the *Report Card*'s indicators of school performance.

Attendance data also provide a measure of the extent to which the school engages the students' interest. Secondary-school students will allocate their scarce time resources among school, leisure activities (both positive and negative in nature), and employment. The degree to which students make school their top priority will be reflected in the school's average attendance level. Schools where the attendance is high have found ways to motivate students to invest more time in their studies. If the school cannot compete with the local mall or play-centre, attendance rates will fall.

Since local school authorities are not required to submit student-attendance statistics to the Ministry of Education, such data must be gathered from each independent school and public school authority. We will request the assistance of these local school authorities so that we will be able to include student attendance data in the next edition of the *Report Card*.

A measure of academic effectiveness for secondary schools

The foundation of the *Report Card* is an overall rating of each school's academic performance. Building on student results data provided by the Ministry of Education, we rate each school on a scale from zero to 10.

How does the school perform on key academic indicators?

We base our overall rating of each school's academic performance on the students' results in four core academic courses. They are Secondary V level courses in the Language of Instruction and the Second Language and Secondary IV level courses in the History of Canada and Quebec and Physical Science. The results used as indicators are:

- Average uniform examination mark
- Percentage of courses failed
- School level grade inflation
- Difference between the results of male and female students on the previous measure.

We have selected this set of indicators because they provide systematic insight into a school's performance.[12] Because they are based on annually generated data, we can assess not only each school's performance in a year but also its improvement or deterioration over time.

Indicators of effective teaching

1 Average uniform examination mark

For each school, under the heading *Résultats aux épreuves* the table lists the average raw uniform examination mark achieved by its students in each of the four core courses at the June examination sitting in each school year. For the purposes of determining the trend, if any, over time and the overall rating out of 10 (*Cote globale sur 10*), the average marks for all four courses are combined to produce an overall average mark. Detailed explanations of the method used to calculate trends and the overall rating are included in the relevant sections below.

Examinations are designed to achieve a distribution of results reflecting the inevitable differences in students' mastery of the course work. Differences among students in interests, abilities, motivation, and work-habits will, of course, have some impact upon the final results. However, there are recognizable differences from school to school within a district in the average results on the uniform examinations. There is also variation within schools in the results obtained in different subject areas. Such differences in outcomes cannot be explained solely by the personal and family characteristics of the student body. It seems reasonable, therefore, to include these average uniform examination marks for each school as one indicator of effective teaching.

2 School level grade inflation

For each school, this indicator—noted in the tables as *Surestimation par l'école*—measures the extent to which the average "school" mark—the accumulation of all the results from tests, essays, quizzes and so on given in class—exceeds the average uniform examination mark obtained in the four core courses. Where a school's average examination mark is higher than the average school mark, the school is assigned a zero on this indicator.

Effective teaching includes regular testing of students' knowledge so that they may be aware of their progress. As a systematic policy, inflation of school-awarded grades will be counterproductive. Students who believe they are already successful when they are not will be less likely to invest the extra effort needed to master the course material. In the end, they will be poorer for not having achieved the level of understanding that they could have achieved through additional study.

The effectiveness of school-based assessments can be determined by a comparison to external assessments of the students. The same authority—the Ministry of Education—that designed the course administers the uniform examination. This examination will test the students' knowledge of the material contained in the course. If the marks assigned by the school reflect a level of achievement that the student subsequently achieves or exceeds on the uniform examination, then the school has not deceived the student into believing that learning has occurred when it has not. It seems reasonable, therefore, to use this indicator as a second measure of effective teaching.

Indicators of equitable teaching

Effective schools will ensure that all their students are assisted and encouraged to reach their potential regardless of any real or perceived disadvantages resulting from personal or family characteristics. At such schools, teachers will take into account the characteristics of their students when they develop and execute their lesson plans. In doing so, they will reduce the probability that systematic differences in achievement are experienced by sub-populations within the student body.

1 Percentage of uniform examinations failed

For each school, this indicator—noted in the tables as *Échec*—provides the rate of failure (as a percentage) in the four core courses. It was derived by dividing the sum, for each school, of all the core courses completed where a failing grade was awarded by the total number of such course completions by the students of that school.

In part, effective teaching can be measured by the ability of all the students to pass any uniform examination that is a requirement for successful completion of a course. Schools have the responsibility of preparing their students to pass these final examinations.

There is good reason to have confidence in this indicator as a measure of effective teaching. First, these courses are very important to students regardless of their post-secondary plans. In order to obtain a secondary-school diploma, students must successfully complete two of these courses (Language of Instruction, Secondary V level, and History of Québec and Canada, Secondary IV level). Anglophone students must also successfully complete French as a second language at the Secondary V level. Physical Science (Secondary IV level) is a prerequisite for a variety of CEGEP courses. Second, since each of these courses has prerequisite courses, their successful completion also reflects how well students have been prepared in the lower grades. Since successful completion of the courses is critical for all students and requires demonstrated success in previous courses, it seems reasonable to use the percentage of uniform examinations failed as an indicator of the effectiveness of the school in meeting the needs of all its students.

2 The Gender Gap indicator

In a recent study of gender differences in the academic results of British Columbia students, the authors found that "there appears to be no compelling evidence that girls and boys should, given effective teaching and counselling, experience differential rates of success." [13] However, the study revealed that in British Columbia,

> [g]irls receive higher grades on school-based assessments in *all* subjects *regardless of their relative performance on the provincial examinations*. The general rule seems to be that if an assessment or award is made at the school level, girls achieve better results than boys do.[14]

The data from Quebec's Ministry of Education upon which this study is based provides evidence that there are similar systematic differences in the results of these groups. For example, the 1998/1999 results show that, on average, female students score about 4½ percentage points higher on the examinations in Language of Instruction (Secondary V) than male students do, while on the examinations of Physical Science (Secondary IV), male and female students have roughly the same results. However, on school marks, female students out-score their male classmates in both courses—by about 6½ percentage points in Language of Instruction and by about 2 percentage points in Physical Science.

The gender-gap indicators (*écarte sexes*) demonstrate the extra gain in their results that female students in most schools enjoy on school-based assessments. The indicators are calculated as follows:

1 Calculate the difference for female students between the raw school score and the raw uniform examination score on each of two courses—Physical Science (Secondary IV) and Language of Instruction (Secondary V).

2 Calculate the same difference for male students.

3 Calculated the difference between the result in (1) and (2).

When all six years of data are considered, female students were favoured more than 75% of the time in Language of Instruction courses and 65% of the time in the Physical Science course. Why are female students seemingly at an advantage over male students in the school-based assessments regardless of their relative examination results? Do these results reflect real differences in learning or a systematic bias in school-based assessment procedures? In either case, schools with a low gender gap are more successful than are others in helping students of both genders to reach their potential.

In general, how is the school doing academically?

Overall rating out of 10 (*Cote globale sur 10*)

While each of the indicators is important, it is almost always the case that any school does better on some indicators than on others. So, just as a teacher must make a decision about a student's overall performance, we need an overall indicator of school performance. Just as teachers combine test scores, homework, and class participation to rate a student, we have combined all the indicators to produce an overall school rating.

To derive this rating, the results for each of the indicators, for each of the six years, were first standardized. Standardization is a statistical procedure whereby sets of raw data with different characteristics are converted into sets of values with "standard" statistical properties. Standardized values can be combined and compared.

The standardized data were then combined as required to produce five standardized scores for each school, for each year:

1 *Résultats aux épreuves* This is the combined average uniform examination mark achieved by the students at the school in all the courses that were considered in this study and for which results data was received from the Ministry of Education.

2 *Échec* This is the combined rate of failure experienced by the students at the school in these same courses.

3 *Surestimation par l'école* This is the combined average number of percentage points by which the mark assigned to the students by the school exceeds the mark achieved by the same students on the uniform final examination in these same courses.

4 *Écart sexes : langue maternelle* This is the combined average number of percentage points by which the genders differ in the calculated difference between the school mark and the uniform examination mark in the Language of Instruction (Secondary V).

5 *Écart sexes : sciences physiques* This is the combined average number of percentage points by which the genders differ in the calculated difference between the school mark and the uniform examination mark in Physical Science (Secondary IV).

The five standardized scores were then weighted and combined to produce an overall standardized score. Finally, this score was converted into an overall rating out of 10. (Explanatory notes on the calculation of the overall rating out of 10 are contained in Appendix 1.) Noted in the tables as *Cote globale sur 10*, the overall rating out of 10 answers the question, "In general, how is the school doing, academically?"

It is from this overall rating out of 10 that the school's provincial rank and its rank within the administrative region are determined.

Other indicators of school performance

The *Report Card* also includes a number of indicators that, while they do not contribute to the overall rating out of 10 (*Cote globale sur 10*), can provide useful information about each school's effectiveness.

Is the school improving academically? The Trend indicator (*Tendances*)

On all but the graduation rate indicator (*Diplomation*; see below), the *Report Card* provides six years of data for most schools. Unlike a simple snapshot of one year's results, this historical record provides evidence of change (or lack thereof) over time. However, it can sometimes be difficult to determine whether a school's performance is improving or deteriorating simply by scanning several years of data. This is particularly the case in the measurement of examination results. In one year, a relatively easy annual uniform examination may produce a high average mark and a low failure rate. In the following year, the opposite may occur. It can, therefore, be difficult to tell whether an individual school's results are changing over time due to real change in the school's performance or to differences in the make-up of the annual examination.

To detect trends in the performance indicators more easily , we developed a trend indicator (*Tendances*). It uses regression analysis to identify those dimensions in which the standardized scores achieved by the school show a statistically significant change.[15] In these circumstances, it is likely that the school's results have actually changed relative to the results of other schools. Because trend calculation is very uncertain when only a small number of data points is available, trends are calculated only in those circumstances where five years of data are available.

Do students at the school complete their studies at secondary school in a timely fashion?

During the high-school years, students must make a number of decisions of considerable significance about their education. They will choose the priority that they will assign to their studies. They will chose among optional courses. They will plan their post-secondary education or careers.

Will these young people make good decisions? It is unrealistic to presume that they can do so without advice, encouragement, and support. What practical, well-informed counselling can they call upon? While parents, in the main, are willing to help, many lack the information they need to be able to provide good advice. It falls, therefore, to the schools to shoulder some responsibility for advising students and their parents about these and other educational choices. Of course, wise students will seek guidance not only from the counsellors designated by the schools but also from teachers and administrators, parents, and other relatives. Where students have strong support from family and community, the school's responsibility for counselling may be lighter; where students do not have such strong support, the school's role may be more challenging. The indicator for graduation rate (*Diplomation*) measures the school's success in using the tools at its disposal to help students make good decisions about their education.

One of the most important decisions that students must make is to stay in school and complete their secondary studies in a timely fashion. There are many justifications for doing otherwise. "The few courses I need can be picked up later." "I'm going to fail anyway, so why try?" "There's a job that pays $12.25 an hour available right now, so I can't afford to stay in school." The list is conveniently long.

A secondary-school diploma retains considerable value since it increases options for post-secondary education. Further, graduates from secondary school who decide to enter the workforce immediately will, on average, find more job opportunities than those who have not graduated. Moreover, for the majority of students, the minimum requirements for receipt of a diploma are not particularly onerous. The chance that students will not earn their diploma solely because they are unable to meet the intellectual demands of the curriculum is, therefore, relatively small. Nevertheless, the graduation rate (*Diplomation*) varies quite widely from school to school throughout the province.

The graduation rate (shown in the tables as *Diplomation*) reports the percentage of the school's incoming Secondary I class that graduated within five years (the normal length of time for completion of the secondary-school program). The result is reported in the year of graduation.

While there are factors not related to education—absence or emigration from the school or province, sickness, death, and the like—that can affect the data, there is no reason to expect these factors to influence particular schools systematically. Accordingly, we take variations in the graduation rate to be an indicator of the extent to which students are being well coached in their educational choices.

As noted above, this indicator has not been used in the calculation of the overall rating out of 10 (*Cote globale sur 10*) because it is at present only available for public schools. We plan to consider using this indicator in calculating the overall rating next year, when, we believe, it will be available for private schools as well.

To what extent do socio-economic factors affect the school's overall rating out of 10?

The socio-economic indicators

Educators can and should take into account the abilities, interests, and backgrounds of their students when they design their lesson plans and deliver the curriculum. By doing so, they can minimize the effect of any disadvantages that their students may have. The *Report Card* includes two indicators related to socio-economic factors. Average parental income (shown in the tables as *Revenus des parents*) enables us to identify schools that are roughly similar to each other with respect to the economic background of their students. The socio-economic factor (shown in the tables as *Effet socio-économique*) suggests the extent to which the overall rating out of 10 (*Cote globale sur 10*) can be attributed to those socio-economic characteristics with which it was significantly associated.

The socio-economic factor was derived as follows. First, using the Ministry of Education's enrolment data sorted by postal code and socio-economic data derived from the 1996 Census and provided by Statistics Canada,[16] we established a profile of the student body's home characteristics for each of the schools in the *Report Card*. We then used multiple regression—a tool used in statistical analysis—to determine the home and school characteristics that were associated with variations in school performance as measured by the overall rating out of 10 (*Cote globale sur 10*).

Taking into account all of these variables simultaneously, we identified several family characteristics that possessed a statistically significant association with the overall rating: the percentage of families in which the mother (in two parent families) or the lone parent (in single parent families) claims no knowledge of either official language; the average parental employment income (expressed as the value's natural logarithm); and the average age of the mother (in two parent families) or the lone parent (in single parent families). Higher values for the first variable were associated with lower overall ratings. Higher values of the latter two variables were associated with higher overall ratings.

We used a formula derived from the regression analysis to re-calculate the overall rating for each school taking into account the values of these socio-economic characteristics. That difference between the actual overall rating and the re-calculated rating is reported in the tables as the Socio-economic effect (shown in the tables as *Effet socio-économique*). Compare, for example, the socio-economic effect at three schools in the Quebec administrative region. Séminaire Saint-François achieved an overall rating for 1998/1999 of 8.7 but its socio-economic effect of 1.0 suggests that 1.0 rating point is accounted for by the relatively advantageous family characteristics of the students. When that effect is taken into account, the school's rating would be only 7.7 out of 10. The school's rating is higher than it otherwise might be because of socio-economic characteristics.

At École Vanier, on the other hand, the school's actual rating (4.2 out of 10) is being negatively effected by socio-economic effects. If these are taken into account, the school's rating would be recalculated upward by the amount of the socio-economic factor (*Effet socio-économique*) of –1.0. Finally, at Polyvalente Saint-Aubin, its overall rating out of 10 appears not to be affected by socio-economic characteristics.

This measure of the socio-economic background of a school's student body is presented with two important notes of caution. First, when all the schools in the *Report Card* are considered, only a small amount of the variation among schools in the overall rating is associated with the socio-economic factors studied. Clearly, many other factors—including good teaching, counselling, and school administration—contribute to the effectiveness of schools. Second, these statistical measures describe past relationships between socio-economic characteristics and a measure of school effectiveness. It should not be inferred that these relationships will or should remain static. The more effectively the school enables all of its students to succeed, the weaker will be the relationship between the home characteristics of its students and

their academic success. Thus, these socio-economic indicators should not be used as an excuse or rationale for poor school performance.

Results of the multiple regression analysis used to derive this socio-economic indicator can be found in Appendix 2.

Notes

1 A good overview of the role of chief operating officers in quality and improvement can be found in J.M. Juran, *Juran on Leadership for Quality: An Executive Handbook* (New York: The Free Press, 1989).

2 Department for Education and Employment web site: www.dfee.gov.uk/perform.htm (January 17, 2000).

3 See, for instance, www.meq.gouv.qc.ca/GR-PUB/m_englis.htm or www.meq.gouv.qc.ca/sanction/epreuv99/ index.html for a selection of data from Quebec on student outcomes.

4 For further information, see www.cde.ca.gov/psaa/api/.

5 For further information, see www.ode.state.or.us/ReportCard/.

6 Peter Cowley, Stephen Easton, and Michael Walker, *A Secondary Schools Report Card for British Columbia*, Public Policy Sources 9 (Vancouver, BC: The Fraser Institute, 1998).

7 Peter Cowley and Stephen Easton, *The 1999 Report Card on Alberta's High Schools*, Public Policy Sources 29 (Vancouver, BC: The Fraser Institute, 2000).

8 The uniform examinations results that are presented and analyzed in this paper are: Language of Instruction (Secondary V level), English or French; Second Language (Secondary V level), English or French; Physical Science (Secondary IV level); and History of Québec and Canada (Secondary IV level). The term "uniform examination" refers to those examinations set and administered by the Ministry of Education in courses that are required for certification of studies or that are pre-requisites for important post-secondary courses.

9 The cohort graduation rate measures the percentage of students entering the school at the Secondary I level who graduate in the normal time of five years.

10 David Romer, Do Students Go to Class? Should They? *The Journal of Economic Perspectives* 7, 3 (Summer 1993): pages 167–74; at p. 167.

11 Eileen Garry, *Truancy: First Step to a Lifetime of Problems* (Washington, DC: Office of Juvenile Justice and Delinquency Prevention, October 1996).

12 The student data from which the various indicators in this *Report Card* are derived are contained in databases maintained or controlled by the Government of Quebec, Ministry of Education.

13 Peter Cowley and Stephen Easton, *Boys, Girls, and Grades: Academic Gender Balance in British Columbia's Secondary Schools*, Public Policy Sources 22 (Vancouver, BC: Fraser Institute, 1999): page 7.

14 Cowley and Easton, *Boys, Girls, and Grades*: page 5.

15 In this context we have used the 90% confidence level to determine statistical significance.

16 Data from Census 1996 for the custom geographies used in the development of the socio-economic measures were provided by Statistics Canada.

Getting the most out of the detailed school results

The tables provide a great deal of information, all of which is worth attention. As a general rule, we recommend that all the statistics presented be considered. No one number—indicator data, the overall rating, or provincial ranking—can provide as much information as the whole set. Parents choosing a school will have to decide which, if any, of these measures of academic achievement is important to them. Then, the data may form the basis of questions that parents ask of teachers and administrators at the school. Similarly, during the process of improvement planning, the school community may consider each number in the same way: Is it important to us? Do we want to improve this aspect of our school's performance? If so, how can improvement be accomplished?

Look at the table at the bottom of this page. The items in the upper left-hand corner of the table provide information about the school and its students. Vincent Massey Collegiate in Montreal is a anglophone public school with a total enrolment (*Nombre d'élèves*) of 575 students. We include the enrolment number to remind readers to exercise caution when considering the data for schools with relatively small enrolments. One would expect greater variation in the results of schools with smaller enrolments.

The Parents' average employment income (*Revenus des parents*) for the families of students at Vincent Massey is $36,200—nearly $9,000 lower than the average for all schools. This indicator can be used to identify other schools whose students have similar economic backgrounds. The socio-economic effect indicator (*Effet socio-économique*, found opposite the parents' average employment income) provides a more interesting and useful comparison among schools. Using both economic and social factors, it shows that family characteristics of Vincent Massey's student body account for about –1.0 rating points in its overall rating (*Cote globale*) out of 10. That is, the school's overall rating out of 10 would be 1 rating point higher (or about 9.8) when socio-economic factors are taken into account. This indicator can be used to compare the impact of student family characteristics on the results at different schools.

Below the Parents' average employment income are the indicators of academic performance (*Performance scolaire*). Note that all the results data—with the exception of the overall rating out of 10—are expressed in percentage points. Where there were insufficient data available with which to calculate an indicator, "nd" appears in the tables.

First, look at the statistics for the current school year 1998/1999 (labelled *1999*). Referring to the table, All Schools Average, below on page 14, notice how the school's average examination marks (*Résultats aux épreuves*) compare to the average values. The examination results at Vincent Massey exceed the average for all schools in all four courses. The school's examination failure rate (*Échec*) of just 3.4% is much lower than average for all schools of 15.2%. These two indicators suggest that, on average, the teachers at the school have been relatively effective in teaching the material contained in these core courses. The school also did better than average on the measurement of grade inflation by the school (*Surestimation par l'école*). This shows that at Vincent Massey, the school-based assessments are reasonably accurate predictors of the subsequent uniform examination mark received. Finally, at Vincent Massey, school-based assessments tend not to favour one sex over the other (see *Écarte sexes*).

VINCENT MASSEY COLLEGIATE						1999	1995-1999
Secteur public anglophone					Rang provincial:	41 / 476	103 / 450
Nombre d'élèves:	575				Rang régional:	22 / 136	43 / 131
Revenus des parents:	36 200 $				Effet socio-économique:	-1,0	nd
Performance scolaire	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**Tendances**
Résultats aux épreuves (%)							▲
Langue maternelle	71,7	68,2	70,3	71,1	70,1	76,5	
Langue seconde	78,4	75,4	83,0	85,4	78,5	83,2	
Histoire	69,6	76,7	70,2	77,2	87,7	82,1	
Sciences physiques	37,1	64,2	56,0	64,7	82,7	80,5	
Échec (%)	13,6	10,5	9,9	4,1	6,1	3,4	▲
Surestimation par l'école (%)	6,1	3,2	3,7	1,1	0,7	1,4	▲
Écart sexes (%): langue maternelle	F 2,3	M 0,1	M 0,3	F 0,1	F 1,1	F 0,8	
sciences physiques	F 5,5	nd	M 15,3	F 18,0	F 1,4	F 1,9	
Diplomation (%)	nd	nd	93,7	91,7	93,9	99,1	
Cote globale (sur 10)	**6,0**	**6,8**	**6,6**	**7,6**	**7,7**	**8,8**	▲

The overall rating out of 10 (*Cote globale sur 10*) (Vincent Massey scored 8.8 in 1998/1999) takes into account the school's performance on all of the indicators discussed in the previous paragraph. The school's provincial academic ranking of 41st out of 476 (*Rang provincial*, shown in the top right-hand corner of the table) is based on this overall rating. The 1999 ranking is substantially better than Vincent Massey's ranking for the period from 1995 to 1999, 103rd out of 450). A better ranking in the current year as compared to the five-year average is a sign of improvement. Directly below the provincial ranking, is the school's rank in its district (*Rang régional*) for the latest year and for the last five years.

Now, what can we learn from the statistics for previous years taken as a whole? Trends (*Tendances*) were calculated for the average examination mark for all four courses combined (*Résultats aux épreuves*), the failure rate (*Échec*), indicator of grade inflation by the school (*Surestimation par l'école*), the two gender gap indicators (*Écart sexes*), and the overall rating out of 10 (*Cote globale sur 10*). Since, the graduation rate (*Diplomation*) was not used in the overall rating out of 10 and since no data were available for private schools, trends were not calculated.

Improvement, if any, over the last five years for each indicator and the overall rating is noted with an upward pointing arrow (▲) in the last column of the row. A downward pointing arrow (▼) is used to note that the school is very likely experiencing a deterioration in performance. The arrows are only used where a statistically significant trend is detected. In this context, the term "statistically significant" means that, nine times out of 10, the trend that is noted is real; that is, it would not have happened just by chance. Because the trends are based on standardized scores rather than the raw data in the table, changes outside of the school's control—like year-to-year variations in the difficulty of the examinations—have been taken into account. Where no upward or downward pointing arrow appears, no significant change has occurred over the reported period or trends were not calculated due to lack of sufficient data.

In the table for Vincent Massey Collegiate, the Trend indicator (*Tendances*) shows that, relative to other schools in the province, Vincent Massey is improving in average examination mark (*Résultats aux épreuves*), the failure rate (*Échec*), and the indicator of grade inflation by the school (*Surestimation par l'école*). The gender gap indicators (*Écart sexes*) show no improvement or decline. As a result of these changes over time, the overall rating out of 10 (*Cote globale sur 10*) has improved significantly.

Important note on interpreting the Trend indicator (*Tendances*)

In two instances—average examination mark (*Résultats aux épreuves*) and overall rating out of 10 (*Cote globale sur 10*)—an upward pointing arrow (▲) will accompany increasing values in the statistics. For example, increasing values for the average mark indicate improvement. For the other four indicators—failure rate (*Échec*), grade inflation by the school (*Surestimation par l'école*), and the two gender gap indicators (*Écart sexes*), an upward pointing arrow will accompany decreasing values in the statistics. For example, a decreasing rate of failure also indicates improvement.

Overall, the school community at Vincent Massey should be pleased with the steady improvement in school performance over the last five years. Indeed, of the indicators for which trends were calculated, Vincent Massey improved in all but the gender-gap measures. Values for the latter were substantially better than average in Language of Instruction (*langue maternelle*) and just a little below average in Physical Science (*sciences physiques*). Overall, this is a very good *Report Card* for Vincent Massey Collegiate.

Important Notes to the Detailed Tables

Note 1

Not all the province's secondary schools are included in the tables or the ranking. Excluded are schools at which fewer than 15 students were enrolled in Secondary V. These schools do not generate a sufficiently large set of student data to allow a fair and reasonable analysis and presentation of the results. Also excluded from the ratings and rankings are adult education centres; continuing education facilities; schools that cater largely to non-resident foreign students; schools for which insufficient data is available, and certain alternative schools.

The exclusion of a school from the *Report Card* should in no way be construed as a judgement of the school's effectiveness.

Note 2

Where there were insufficient data available with which to calculate an indicator or where a school was not in operation during a specific year, "nd" appears in the tables.

Note 3

You can compare a school's results with these average results for all the schools in the *Report Card*.

Because they are based on aggregated standard scores, the overall ratings out of 10 (*Cote globale sur 10*) in the table, All Schools Average, will not change appreciably over time. Where applicable, trends indicated in this table only are based on the raw data, not standardized scores.

Where to find the detailed results tables

The table showing the detailed results for the schools will be found on pages 15 to 139 of the French version of this study, *Bulletin des écoles secondaires du Québec*.

AVERAGE FOR ALL SCHOOLS						1999	1995-1999
Sector					Provincial rank:		
Enrollment:	792				Regional rank:		
Parents' income:	45 000$				Socio-economic effect:	0	
Academic Performance	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**Trend**
Average uniform exam marks (%)							
First language	72,0	71,4	72,9	75,3	68,6	74,7	
Second language	77,2	76,3	77,4	76,9	81,1	79,7	▲
History	68,0	69,9	68,3	66,1	75,1	70,3	
Physical sciences	48,4	61,7	64,2	61,6	73,3	69,1	
Percentage of uniform exams failed (%)	18,6	18,2	15,9	15,9	14,5	15,2	▲
School-level grade inflation (%)	3,2	2,1	2,1	3,0	1,8	2,4	
Gender gap (%): first language	F 1,6	F 1,7	F 1,9	F 1,9	F 1,8	F 2,0	
physical sciences	F 1,6	F 2,1	F 3,3	F 1,3	E 0,0	F 1,7	
Graduation rate (%)	nd	nd	59,2	58,6	58,2	59,0	
Overall rating out of ten	6,3	6,3	6,3	6,3	6,3	6,2	

Ranking the schools: how to use the table

In this table, *Classement des écoles*, schools are ranked (in the column, *Rang provincial,* on the left of the table) in descending order (from 1 to 474) according to their academic performance as measured by the overall rating out of 10 (shown in the column, *Cote globale*, on the right hand side of the table) for the school year 1998/1999. Each school's average ranking over the last five years and average overall rating out of 10 over the last five years are also listed. The higher the overall rating out of 10, the higher the rank awarded to the school. Where schools tied in the overall rating, they were awarded the same rank. Where fewer than five years of data were available "nd" appears in the table.

Not all the province's high schools are included in the tables or the ranking. Excluded are schools at which fewer than 15 students were enrolled in Secondary V. These schools do not generate a sufficiently large set of student data to allow a fair and reasonable analysis and presentation of the results.

Also excluded from the ratings and rankings are centres for adult education; continuing education programs; schools that cater largely to non-resident foreign students; and certain alternative schools that do not offer a full high-school program.

The exclusion of a school from the *Report Card* should in no way be construed as a judgement of the school's effectiveness.

Where to find the ranking table

The table showing the ranking of the schools will be found on pages 141 to 154 of the French version of this study, *Bulletin des écoles secondaires du Québec*.

Appendix 1: Calculating the overall rating out of 10

The overall rating out of 10 (*Cote globale sur 10*) is intended to answer the question: "In general, how is the school doing, academically?" In order to answer this question a number of aggregations of a variety of data sets, many with dissimilar distributions, must be accomplished. Further, since the overall rating out of 10 is a key indicator of improvement over time, the method of its derivation must take into account that even the annual values within a given data set may not share statistical characteristics. For example, the mean and standard deviation of the distribution of average examination marks across schools in Language of Instruction studies may vary between English and French and within either subject from year to year. Thus the need for aggregation of dissimilar data and for comparability of data with data sets year-over-year dictated the use of standardized data for the calculation of the overall rating out of 10.

The following is a simplified description of the procedure used to convert each year's raw indicator data provided by the Ministry of Education into the overall rating out of 10 contained in the detailed tables.

1 Results in the English and French versions of History of Québec and Canada (Secondary IV) were aggregated to produce a weighted average examination mark, fail rate, and rate of grade inflation rate by the school without standardizing since we have no reason to believe that the French and English versions of the same examination are dissimilar. The two versions of Physical Science (Secondary IV) were aggregated in the same way. Note that the calculation of weighted average results use enrolment proportions as the weighting factor.

2 All the results were then standardized by solving the equation $Z = (X - m)/s$, where X is the individual school's mean result; m is the mean of the all-schools distribution of results and s is the standard deviation of the same all-schools distribution.

3 Since the French as a Second Language (Secondary V) and English as a Second Language (Secondary V) courses each have several distinct parts that are examined, for each course the results for these components were aggregated to produce weighted average indicator results for the course. The weighted average results for each of the two courses were then re-standardized.

4 All the aggregated standardized results as well as the two results for Language of Instruction (these two distinct data sets did not need to be aggregated prior to the calculation of the overall results) were then aggregated to produce overall average weighted average examination mark, failure rate, grade inflation by schools, and indicators of gender gap in the Language of Instruction and Physical Science. These weighted average overall results were again re-standardized.

5 The five overall results were then combined to produce a weighted average summary standardized score for the school. The weightings used in these calculations were Examination marks (50%), Fail rate (30%), grade inflation by schools (10%), and combined gender-gap indicators (10%).

6 This summary standardized score was standardized.

This standardized score was converted into an overall rating between zero and 10 as follows:

7 The maximum and minimum standardized scores were set at 2.0 and –3.29 respectively. Scores equal to, or greater than, 2.0 will receive the maximum overall rating of 10. This cut-off was chosen because the occasional, although infrequent, occurrence of scores above 2.0 (two standard deviations above the mean) allows the possibility that more than one school in a given year can be awarded a "10 out of 10." Scores equal to, or less than, –3.29 will receive the minimum overall rating of 0 (zero). Schools with scores below –3.29 are likely outliers—a statistical term used to denote members of a population that appear to have characteristics substantially different from the rest of the population. We therefore chose to set the minimum score so as to disregard such extreme differences.

8 The resulting standardized scores were converted into overall ratings according to the formula: $OR = \mu + (\sigma * StanScore)$, where OR is the resulting overall rating; μ is the average calculated according to the formula $\mu = (ORmin - 10\ (Zmin / Zmax)) / (1 - (Zmin / Zmax))$; $\sigma = (10 - \mu) / Zmax$; and StanScore is

the standardized score calculated in (5) above and adjusted as required for minimum and maximum values as noted in (7) above. As noted in (6) above, ORmin equals zero. As noted in (7) above, Zmin equals –3.29; and Zmax equals 2.0.

9 Finally, the derived overall rating is rounded to one decimal place to reflect the significant number of decimal places found in the original raw data.

Note that the overall rating out of 10, based as it is on standardized scores, is a relative rating. That is, in order for a school to show improvement in its overall rating, it must improve more than the average. If it improves, but at a rate less than the average, it will show a decline in its rating.

Appendix 2: Why do schools differ in their overall ratings?

The effectiveness of a school likely depends on a great many factors such as: the quality of the school's principal, teachers, and counsellors; the capacity and motivation of its students; the physical resources and technology at the disposal of the school; the regulatory environment in which the school operates; curriculum; the enthusiasm for, and participation in, school life displayed by the parents. Each of those factors could explain a part of the observed differences in each school's academic results. Verifying and quantifying the relationship between each of these variables and school performance is beyond the scope of this *Report Card*. However, since it is often suggested that school rankings are merely the reflection of the wealth accumulated by the families of each school's students, a start must be made to systematically quantify the association between socio-economic variables and school performance. By combining 1996 Census data with enrolment data sorted by postal code and by-school, we have developed a reasonable socio-economic profile of the student families for each of the schools in the *Report Card*. A start has been made.

First, we studied the relationship between socio-economic factors, certain factors of school organization, and the overall rating out of 10. Next, the same relationships were explored with several of the individual indicators that make up the overall rating. Finally, the effect of school size (total student enrolment) was considered.

Association of socio-economic and institutional characteristics of schools with the overall rating out of 10

A standard multiple regression was performed between the overall rating out of 10 as the dependent variable and seven independent variables—five relevant, student family socio-economic characteristics derived from 1996 Census data and two school organizational variables.

Analysis was performed using Version 10.0.0 of SPSS (www.spss.com). Following preliminary analysis of the results, logarithmic transformation of three variables—APEINC, APGTP and ENROLMENT—was calculated to reduce skewness and improve normality, linearity, and homoscedasticity of residuals.

Twenty-nine univariate and multivariate outliers were dropped from the analysis, leaving a sam-

Key to names of independent variables

%LPAR: % of target families in which there is only one parent that resides in the home

%PPNKOL: % of target families in which the principal parent claims no knowledge of either official language

AVGAGEPP: average age of the principal parent in the target families

APEINC: average parental employment income

LNAPEINC: Logarithm of APEINC

APGTP: Average Parental Governmental Transfer Payment Income

LNAPGTP: Logarithm of APGTP

AUTHTYPE: Public or private school management

ENROLMENT: Total enrolment in the school

LNENROLMENT: the logarithm of ENROLMENT

ple of $N = 449$ for subsequent analysis. APEINC was strongly correlated to the average number of years of education of the most educated parent. The following analyses use only APEINC as an independent variable, but either can be used in place of the other with similar effect. Table 1 displays the correlations among the variables, the unstandardized regression coefficients (B), and intercept, the standardized regression coefficients (β), the partial correlations (sr^2_i), R2, and adjusted R2.

The R statistic for the regression was significantly different from zero. The model explained 39% of the variance and five independent variables demonstrated statistically significant associations with the overall rating.

Organizational variables, AUTHTYPE and LNENROLMENT, are the two most powerful explanatory variables. They account for 26.4% of the total variance in the ratings, a minimum of 68% of the explained variance of the model ((0.206 + .058) / 0.39) and 91 % of the unique variability of the model ((0.264) / 0.29), measured by the sum of their sr^2 coefficients divided by the total unique variability. In comparison, the three most explanatory socio-economic variables, %PPNKOL, AVGAGEPP and LNAPEINC, the only significant socio-economic variables, cumulated 2.4% of the total variance in the ratings, 6.2% of the explained variance of the model (0.024 / 0.39) and 8.3% of the unique variability of the model ((0.007 + 0.008 + 0.009) / 0.29).

Specifically, under the same socio-economic conditions, private management of schools adds 2.1 to the overall rating out of 10 compared to public management. It should be noted that the concept of management includes a variety of conditions such as Ministry regulation and subsidies (which are different for public and private sectors); the educational policies and teaching practices of the school; and its policy regarding student admission. In particular, because the selection policies of Quebec's secondary schools are not yet documented, we cannot assume that the contribution of the school management factor is solely the result of good management or teaching practices. At present, we must accept that selective admissions policies in any school may have a considerable affect on the overall rating. Nevertheless, school organization and management characteristics must be considered to be independent variables worthy of further study.

The finding that organizational variables apparently contribute more than socio-economic variables to the explanation of overall rating is important. It suggests that variables controlled by the Ministry and by administrators of schools, such as the type of management employed and the size of enrolment, may have a greater influence on the overall rating out of 10 than socio-economic family characteristics such as the family's structure, income, parent age, or language used or understood. It strongly suggests that underachievement by students or schools is not a problem without a solution. Changes in policy and management may improve outcomes. In short, schools matter.

Even family income (measured here by LNAPEINC), the variable that is most often cited

Table 1 Standard multiple regression of socio-economic and organizational variables on the overall rating out of 10

Variables	Overall rating (DV)	% LPAR	%PPNKOL	AVGAGEPP	LNAPEInc	LNAPGTP	AUTHTYPE	LNENROLMENT	B	β	sr^2 (unique)
%LPAR	–.189								.00012	.005	
%PPNKOL	–.127	.538							–.147*	–.107	.007
AVGAGEPP	.321	–.214	.062						.197*	.116	.008
LNAPEINC	.398	–.458	–.190	.562					1.246*	.198	.009
LNAPGTP	–.344	.230	.099	–.558	–.817				.948	.131	
AUTHTYPE	.524	–.126	.054	.310	.424	-.370			2.074**	.169	.206
LNENROLMENT	.099	.061	–.126	.026	–.022	–.142	–.305		.568**	.088	.058
								Intercept	–29.57		
Means	5.99	20.53	.747	40.56	10.69	8.57	1.28				$R^2 = .39^A$
Standard deviations	1.72	7.05	1.26	1.01	.275	.240	.450				Adj. $R^2 = .38$
											R = .63**

Notes: *p < .05; **p < .01; [A]Unique variability = .29; shared variability = .10.

as a leading contributor, is far less powerful in unique variability than organizational variables. It should be noted, however, that the Pearson correlation coefficient (.424) between LNAPEINC and AUTHTYPE shows a possibility of an indirect effect of income that a special multiple regression analyzing the parents' choice of school confirms. The probability of choosing a private school is shown to be positively associated with income. This is an indirect effect of income on the overall rating that is not included in the unique variability of the income variable. Income's indirect effect would be confirmed if it was excluded from the model and the result was an increase in the unique variability of AUTHTYPE.

Thus, income may play a greater role in the shared variability than is suggested by this preliminary analysis. However, the unique contribution of AUTHTYPE to the overall rating cannot be overlooked. Even if higher income contributes to more frequent choice of private schools, it is still the characteristics of those schools that provide the best explanation for their performance in the overall rating.

Finally, the age of the principal parent (the mother in two-parent families) and the principal parent's knowledge of official language appear to play a significant role.

Explanation for examination marks, failure rate, grade inflation by schools and graduation rate

The overall rating out of 10 is a composite index of four indicators. Are examination marks (EM), the failure rate (FR), and grade inflation by schools (SVEMD) explained by the same factors as the overall rating? In-depth analysis of these indicators is required for a better understanding of the overall rating. Table 2 shows the condensed results of a standard regression considering three of these variables as well as a graduation rate statistic that we plan to include in the calculation of the overall rating next year. More in-depth analysis will also include the gender-gap indicators.

As the overall rating out of 10 draws heavily (50%) on the examination marks, it is not surprising that one finds similar results in a regression of examination marks as one finds in a regression of the overall rating. A regression of examination results (EM) has almost the same R2 and sr^2 coefficients. Private management adds more than one standard deviation to the overall standardized examination scores. In this model, only the language variable, %PPNKOL, does not display a statistically significant association with the dependent variable.

A regression of the failure rate produces much the same results.

Probably due to the truncated nature of the distribution of SVEMD (less than half of schools inflate marks), this model is less effective. But the three strongest variables, LNENROLMENT, AUTHTYPE, and LNAPEINC still show significant associations with the dependent variable.

The graduation rate will be an important measure of school performance because it reflects the success of a cohort of students over their secondary-school career. It measures on-going school effectiveness over five years. However, the model shows relatively weaker explanatory power. One explanation for this, of course, is that since no data are as yet available for private schools, we cannot take the AUTHTYPE variable into account. The significance of the exclusion of AUTHTYPE is clear. If it were dropped from the EM model, we would have to subtract .211 (sr^2 value of AUTHTYPE in the EM model) from the R2 coefficient of .41, not so far from what the GR model obtained.

In conclusion, we can say that three of the four indicators used in the overall rating act in a roughly similar fashion. They are pushed or pulled in the same direction by variations in the same independent variables.

The special issue of school size

Of some importance in the GR model is the negative sign of the significant effect of school size, measured by LNENROLMENT. This variable acts in the opposite direction to that observed in the EM model. Bigger schools in the other models were associated with greater success. That does not seem to be the case when graduation rate data is considered. More study is certainly called for.

Table 3 shows the results of two standard regressions on examination marks for public and private schools.

Because school size plays a significant role in the examination-marks model for all schools, we expected that a similar effect would be observed when subgroups of schools were considered. Table 3 shows that the size of the school's enrolment has an effect in the two subgroups considered here. LNENROLMENT explained 2.6% of the total variance in examination marks in public schools. But the same variable explained 23.4% of the total variance in private schools. It would appear that the strong effect of the school size in the examination-marks regression results reported in table 2 (4.7% of the total variance explained) was dramatically influenced

Table 2 Standard multiple regression of socio-economic and organizational variables on examination marks, failure rate, grade inflation by schools, and graduation rate

Dependent variables	Examination marks		Failure rate		Mark inflation by school		Graduation rate (public schools only)	
Independent variables	B	sr^2 (unique)	B	sr^2 (unique)	B	sr^2 (unique)	B	sr^2 (unique)
%LPAR	.000		.000		.000		.000	
%PPNKOL	–.007		–.106*	.012	–.006		.005	
AVGAGEPP	.111*	.008	.102*	.007	.006		.210**	.035
LNAPEINC	.733**	.010	.617*	.007	.822**	.013	.929*	.017
LNAPGTP	.502		.622*	.006	.588		.009	
AUTHTYPE	1.20**	.211	1.22**	.218	.516**	.043	N/A	
LNENROLMENT	.291**	.047	.316**	.054	.347**	.072	–.159*	.013
N	451		449		449		255	
R^2	.41		.38		.16		.14	
Adj. R^2	.40		.37		.15		.12	
R	.64*		.62*		.40*		.38*	

Notes: *p < .05; **p < .01.

Table 3 Standard multiple regression on examination marks for public and private schools

	Public Schools		Private Schools	
Independent variables	B	sr^2 (unique)	B	sr^2 (unique)
%LPAR	.000		–.002	
%PPNKOL	–.101**	.019	.004	
AVGAGEPP	.009*	.011	.171	
LNAPEINC	.641*	.013	.807	
LNAPGTP	.515		.548	
LNENROLMENT	.173**	.026	.690**	.234
Average Enrolment	931		518	
N	329		129	
R^2	.11		.40	
Adj. R^2	.09		.37	
R	.33*		.63*	

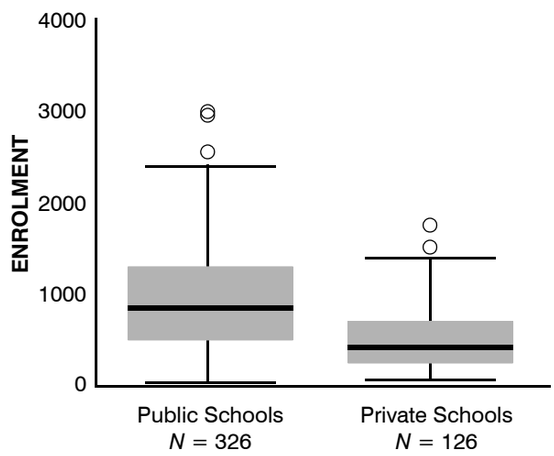
Notes: *p < .05; **p < .01

by the much stronger effect of the school size in the private sector.

In the case of public schools, the influence of school size is ambiguous. First, note that the average public school has an enrolment of 931 students versus just 518 students in the average private school (see figure 1). This factor in itself may account for the diminished influence of school size in the public schools. Certainly, much more work can be done to determine the effect of school size on performance.

Why do private schools seem to improve with enrolment size? As we have noted before, much more work can be done with these data.

Figure 1 Distributions of enrolments at public and private schools



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Peter Cowley is the Director of School Performance Studies at the Fraser Institute. Upon graduation from the University of British Columbia (B.Comm. 1974), Mr Cowley accepted a marketing post with Proctor and Gamble in Toronto. He later returned to Vancouver to begin a long career in marketing and general management in the furniture-manufacturing sector. During his assignments in general management, process improvement was a special focus and interest. In 1994, Mr Cowley wrote and published *The Parent's Guide*, a popular handbook for parents of British Columbia's secondary-school students. The Parent's Guide web site replaced the handbook in 1995. In 1998, Mr Cowley was co-author of the Fraser Institute's *A Secondary Schools Report Card for British Columbia*. This was followed in 1999 by *The 1999 Report Card on British Columbia's Secondary Schools; Boys, Girls, and Grades: Academic Gender Balance in British Columbia's Secondary Schools;* and *The 1999 Report Card on Alberta's High Schools*. His most recent work is the *Second Annual Report Card on Alberta's High Schools* that was published in March of this year. He continues his research on education and related issues for the Fraser Institute.

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