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## Report Card on British Columbia's Secondary Schools 2001 Edition

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# Introduction

The *Report Card on British Columbia's Secondary Schools* collects a variety of relevant, objective indicators of school performance into one easily accessible public document so that all interested parties—parents, school administrators, teachers, students, and taxpayers—can analyze and compare the performance of individual schools. Since its introduction in 1998, however, the *Report Card* has often been criticized by teachers and education administrators as being too narrow in its focus and many discussions with these critics have ended in disagreement about a fundamental, very pertinent question: what is a school supposed to do?

## What is a school supposed to do?

Teaching children to read with understanding, to communicate with clarity, and to reason soundly is at the heart of our idea of an effective K-12 education system. It is with these basic skills in hand that children are able to develop the other abilities and attitudes that will allow them to become responsible and productive participants in the political and economic life of our country. If schools are unsuccessful in achieving these basic objectives, it is difficult to understand why they should continue to operate.

Yet, often during the last three years, educators have argued the importance of those aspects of the curriculum that the *Report Card* does not measure. They point to their schools' mission statements<sup>1</sup> as evidence of the breadth of purpose. These statements suggest that taxpayers are paying the schools to provide far more than academic

training. Schools have taken upon themselves the responsibility of teaching the fine arts to their students. They promise to instill in the students an understanding of sport as an important aspect of a well-rounded life. They declare that their graduates will fully appreciate their rights and responsibilities as citizens of Canada. Are educators delivering on their promises? Do they have the slightest idea of their degree of success?

Apparently not. At least, they have not yet provided us with any data that records their results in non-academic activities. Nor have they established their own annual reporting mechanisms so that parents, taxpayers, and other interested parties can compare and judge the schools in these areas. Why not? The results of teaching students fine arts, physical education, leadership, and citizenship can be measured. Yet, it appears that schools only report results that they are required to report. With a few important exceptions, the Ministry of Education does not require schools to report data on student performance. Perhaps, the Ministry does not think such information is sufficiently important.

If individual parents were paying for their student's education and if each could choose from a variety of education providers, then some might be willing to credit the promises made in school mission statements. Competition among schools would help to ensure performance. Other parents would require objective evidence of past success and expect regular report cards that measure school effectiveness against a variety of objectives in much the same way that the Consumers' Union<sup>2</sup> organization measures the performance of a wide variety of goods and services.

But, in British Columbia, it is taxpayers and not only the parents of today's students who foot the bill for the education of the next generation. As long as this is the case, taxpayers should have easy access to reports about the effectiveness of every school in all the areas for which funding is provided. The Ministry of Education should insist: "No results reporting. No funds. Period."

In the meantime, until more data becomes available to us, the *Report Card* will maintain its focus without apology.

### **What is new in this edition of the Report Card?**

#### **A new method of calculating the Overall rating out of 10 and the Trends indicator**

The *Report Card on British Columbia's Secondary Schools: 2001 Edition* is based on the same sets of data from the Ministry of Education as the previous editions. However, we have adopted a different method of calculating both the *Overall rating out of 10* and the *Trends* indicator. The raw data is first transformed into "standardized" or "Z" scores. This transformation is a well-accepted statistical method used to make differing sets of data more comparable. For example, by first standardizing the examination marks for all courses taken by students at a school, we can compare a school's most recent average examination mark with its historical results more accurately. This is particularly important as the number of years of data that we report increases. A detailed description of the method used to calculate the *Overall rating out of 10* is presented in Appendix 1.

Because the two methods of calculation can produce somewhat different results and to ensure that historical data remain comparable, we have recalculated the ratings for all eight years reported.

#### **The Gender gap indicator contributes to the Overall rating out of 10**

As we discussed in detail in the third edition of the *Report Card*,<sup>3</sup> there is widespread concern that, in some schools, boys and girls are not equally successful in academics. Last year we introduced a measure of this "gender gap." This year, we improved the indicator's design and included it in the calculation of the *Overall rating out of 10*. For the first time, each school's overall rating will be affected by the extent to which the school ensures that both boys and girls are able to succeed. The recalculation of all previous overall ratings allowed us to reflect the *Gender gap* in the historical results. The introduction of this new indicator will change some schools' past overall ratings.

#### **Tracking each school's results in English 12 from 1992/1993 through 1999/2000**

In this edition, we introduce a new feature that focuses on a school's success in a single subject over the entire period for which we have data. This year, we look closely at English 12. Each school's average examination mark and participation rate for the school years 1992/1993 through 1999/2000 are compared to the provincial average and the difference is reported. We also show in the column, *Trends*, any statistically significant change over six years in this difference.

### **What plans do we have for future editions?**

#### **Measuring the value added by the school: The Foundation Skills Assessment Tests**

The annual Foundation Skills Assessment (FSA) tests measure students' ability in reading, writing, and mathematics at grades 4, 7, and 10. We plan to include the results from the grade 10 tests in the *Report Card*. By comparing grade 10 FSA results with the same cohort's results in English 12 and Mathematics 12, we hope to establish an estimate

of the “value added” by the school during the student’s final two years of secondary school.

**Anybody there? Taking the pulse of the school by measuring student attendance levels**

Since the province’s public school districts refused to provide us with data on student attendance, we requested the information under the Freedom of

Information Act. By fall of 2000, we had received historical data from almost all of the districts and are currently analyzing these data to determine its value. We will request the data for the school year 2000/2001 at the end of this school year and we plan to include a measure of student attendance for all schools in the 2002 edition of the *Report Card on British Columbia’s Secondary Schools*.



# Key academic indicators of school performance

The foundation of the *Report Card* is an overall rating of each school's academic performance. Building on data about student results provided by the Ministry of Education,<sup>4</sup> we rate each school on a scale from zero to 10. We base our overall rating of each school's academic performance on seven indicators:

- 1 average provincial examination mark
- 2 percentage of provincial examinations failed
- 3 difference between the school mark and examination mark in provincially examinable courses
- 4 difference between male and female students in the value of indicator (3) for English 12 only
- 5 difference between male and female students in the value of indicator (3) for Mathematics 12 only
- 6 provincially examinable courses taken per student
- 7 graduation rate.

We have selected this set of indicators because they provide systematic insight into a school's performance. 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.

## Three indicators of effective teaching

### 1 Average provincial examination mark

This indicator (in the tables *Average exam mark*) is the average percentage achieved by a school's students on the uniform final examinations in all of

the provincially examinable courses.<sup>5</sup> For each school, the indicator is the average of the mean scores achieved by the school's students in each of the provincial examinations at all sittings during the year, weighted by the relative number of students who wrote the examination.

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

### 2 Percentage of provincial examinations failed

For each school, this indicator (in the tables *Percentage of exams failed*) provides the rate of failure (as a percentage) in the provincial examinations. It was derived by dividing the sum, for each school, of all provincial examinations written where a failing grade was awarded by the total number of such examinations written by the students of that school.

In part, effective teaching can be measured by the ability of 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. A student need only successfully complete one provincially examinable course in order to graduate. Such a student's course of study may not include the prerequisites for all post-secondary educational options but it will be sufficient for graduation from secondary school. Thus, students enrol in the provincially examinable courses, in large measure, because they want to take them. Further, their success in grade 12 reflects to a certain extent how well students have been prepared in the lower grades. All of the 20 provincially examinable courses have prerequisite courses. Indeed, depending on the school, admission to the grade 12 course may require that the student have received a prescribed minimum grade in the prerequisite lower-level course. Since the decision to take provincially examinable courses is, for the most part, voluntary and requires demonstrated success in previous courses, it seems reasonable to use the percentage of examinations failed in these courses as an additional indicator of the effectiveness of the teaching in secondary schools.

### 3 Difference between school mark and examination mark

For each school, this indicator (in the tables *School vs exam mark difference*) gives the average of the absolute value of the difference between the average mark obtained on the provincial examinations and the average "school" mark—the accumulation of all the results from tests, essays, quizzes, and so on given in class—for all the provincially examinable courses.<sup>6</sup>

Effective teaching includes regular testing so that students may be aware of their progress. For such assessment to be useful, it must accurately reflect the student's understanding of the course. As a systematic policy, inflation of school-awarded grades will be counterproductive. Stu-

dents 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 gained through additional study. On the other hand, the systematic deflation of grades can work to the detriment of students in those situations where post-secondary admissions and scholarship awards are, in part, based on school assessments. Students may also lose interest in a subject when their actual understanding of the material is disparaged by inadequate recognition.

The effectiveness of school-based assessments can be determined by a comparison to external assessments of the students. In each provincially examinable course, a uniform examination is administered by the Ministry of Education, the same authority that designed the course. This examination will test the students' knowledge of the material contained in the course. If the marks assigned by the school are a reasonably accurate reflection of students' understanding, they should be roughly the same as the mark gained on the provincial examination. Thus, if a school has accurately assessed a student as consistently working at a C+ level, the student's examination result will be at a similar level. If, however, a school is consistently granting marks substantially different from those achieved by its students on the final examinations, then the school is not providing an accurate indicator of the extent to which knowledge of the course material is being acquired.

### An indicator of consistency in teaching and assessment

#### The Gender gap indicators

Research<sup>7</sup> has shown systematic sex-based differences in academic results in British Columbia's secondary schools. These differences are particularly apparent where assessments are made by the local school rather than the Ministry of Education.

However, the same research found that “there appears to be no compelling evidence that girls and boys should, given effective teaching and counselling, experience differential rates of success.”<sup>8</sup> Further, “[t]he differences described by each indicator vary from school to school over a considerable range of values.”<sup>9</sup>

The *Gender gap* indicators measure the difference, if any, in the average Mathematics 12 and English 12 school marks for boys and girls when their respective average examination marks in the same courses are taken into account. For each course, the indicator value is determined according to the formula:

$$\frac{(\text{Female school mark} - \text{Female exam mark}) - (\text{Male school mark} - \text{Male exam mark})}{2}$$

The indicator reports the size of the difference and the more successful sex.

The *Gender gap* indicators are affected by at least two factors. If the components of the curriculum tested at the school level are different from those tested on the provincial examination, a high gender gap indicates that the favoured sex is, on average, more successful in acquiring the skills and knowledge embodied in those aspects of the curriculum tested at the school level. If the components of the curriculum tested at the school level are the same as those tested on the provincial examination, then a high gender gap indicates that the school-based assessment may be biased in favour of one sex or may include factors in the assessment other than understanding of the curriculum. In either case, schools experiencing high gender gaps should investigate classroom practice to determine why one sex receives better grades than the other.

## Two indicators of practical, well-informed counselling

While they are attending secondary school, students must make a number of decisions of considerable significance about their education. They

will, for instance, annually decide whether to begin or continue learning of a second language. Before grade 9, they are required to choose between different streams in Mathematics. In grade 12, they may face the choice of completing high school or abandoning it in favour of full-time work.

Will these young people make good decisions? It is unrealistic to presume that they can do so without advice. 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 educational choices.

The final two indicators used in the calculation of the *Overall rating out of 10* assess the counsel given by the schools by measuring the quality of the decisions taken by the students about their education. 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. These indicators measure the school's success in using the tools at its disposal to help students make good decisions about their education.

There are two very important decisions that senior students must make. First, they must decide whether or not to take a number of academically challenging provincially examinable courses. Second, having made it through school to the end of September in grade 12, they must decide whether to stick it out, do the work, and graduate with their class. Effective counselling will encourage students to make appropriate choices.

### 1 Provincially examinable courses taken per student

This indicator (in the tables *Exams taken per student*) measures the average number of provin-



cially examinable courses completed by the students at a school. It is derived by summing the participation rates for all the provincially examinable courses taken at that school. (The *participation rate* is the ratio, for a school, between the number of students writing the provincial examination in a particular subject and the number of students enrolled in grade 12.)

In their senior years, students have freedom to choose from a considerable variety of courses. Their choices will have an impact upon their literacy, numeracy, and analytical skills upon graduation. Their choices also affect the post-secondary options open to them.

Provincially examinable courses offer study at the senior level in a variety of core disciplines: English, Mathematics, the sciences, the humanities, and other languages. The Ministry has included courses in each discipline that reflect the post-secondary ambitions of different groups of students and, far from being courses only for a university-bound elite, these courses teach skills and knowledge that will benefit students no matter what they plan to do after graduation. Further, it is the marks obtained in these courses that are commonly used by post-secondary institutions—institutes of technology and community colleges as well as universities—to assess the applicant's readiness for further study and for admission to programs with limited enrolment. Thus, for most students a decision to take advantage of these courses is a good one and a school that is successful in encouraging students to take these courses shows that it offers practical, well-informed counselling.

## 2 Graduation rate

This indicator compares the number of "potential" graduates enrolled in the school on September 30 with the number of students who actually graduate by the end of the same school year. Only those enrollees who are capable of graduating with their class within the current school year are included in the count of potential graduates.

Graduation from secondary school retains considerable value since it increases options for post-secondary education. Further, graduates from secondary school who decide to enter the work-force immediately will, on average, find more job opportunities than those who have not graduated.

By completing the 11 years of schooling in preparation for the final secondary school year, students have already demonstrated a reasonable ability to handle the basic courses offered by the school. Moreover, for the majority of students, the minimum requirements for graduation are not onerous. The chance that students will not graduate solely because they are unable to meet the intellectual demands of the curriculum is, therefore, relatively small.

Nevertheless, the graduation rate varies quite widely from school to school throughout the province. While there are factors not related to education—emigration from the 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.

### **In general, how is the school doing academically?**

#### **The Overall rating out of 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 (in the tables *Overall rating out of 10*). 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. The overall rating of school performance answers the question, "In general, how is the school doing, academically?"

To derive this rating, the results for each of the indicators, for each of the eight 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 readily be combined and compared.

The standardized data were then combined as required to produce seven standardized scores—one for each indicator—for each school, for each

year. The seven standardized scores were weighted and combined to produce an overall standardized score. Finally, this score was converted into an overall rating out of 10. It is from this *Overall rating out of 10* that the school's provincial rank is determined. For schools teaching only one sex, there are, of course, no results for the *Gender gap* indicators. In these cases the *Overall rating* is derived using the remaining five indicators. (See Appendix 1 for explanatory notes on the calculation of the *Overall rating out of 10*.)



# Other indicators of school performance

Since the inception of the *Report Card*, we have added other indicators that—while they are not used to derive the *Overall rating out of 10*—add more information on the school's effectiveness.

## The Socio-economic indicator

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 overcome disadvantages that their students may have. The socio-economic indicator enables us to identify schools that are successful in spite of adverse conditions faced by their students at home. Similarly, it identifies schools where students with a relatively positive home situation appear not to be reaching their presumed potential.

The socio-economic indicator was derived as follows. First, using Ministry of Education enrolment data sorted by postal code and census data provided by Statistics Canada, 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 analysis to determine which of the home characteristics were associated with variations in school performance as measured by the *Overall rating out of 10*. Taking into account all of the socio-economic variables simultaneously, we identified one characteristic that was significantly associated with the *Overall rating*: the average number of years of education of the most educated parent in a two-parent family (or of the

lone parent in a single-parent family). When a school had more highly educated parents, the *Overall rating* at the school was likely to be higher. We have adopted this statistic—noted in the tables as *Parents' average education (yrs.)*—as the socio-economic indicator for this edition of the *Report Card*.<sup>10</sup>

As a measure of the success with which each school took into account the socio-economic characteristics of the student body, we used the formula derived from the regression analysis to predict the *Overall rating* for each school. We then reported the difference between the actual *Overall rating* and this predicted value in each school's results table.

For example, during the 1999/2000 school year, Fraser Valley Christian High School in Surrey achieved an *Overall rating* of 7.2 and yet, when the family characteristics of the student body are taken into account, the school was expected to achieve a rating of only about 5.9. On the other hand, at Guildford Park Secondary, also in Surrey, while its actual *Overall rating* was just 4.7, its predicted rating was 5.3. This measurement suggests that Fraser Valley Christian is more successful than Guildford Park in enabling all of its students to reach their potential.

This measure of the effect of the socio-economic background of a school's student body is presented with two important notes of caution. First, only about one-third of the variation among schools in the overall rating is associated with socio-economic factors. Clearly, many other factors—including good teaching, counselling, and school administration—contribute to the effectiveness of schools. Second, the statistical measures used describe past relationships between a socio-economic characteris-

tic 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. Indeed, the extent to which students' family characteristics are associated with student results varies from province to province. In Alberta, for instance, similar analysis showed that parental education accounted for only about eleven percent of the between school variation in the *Overall rating*.<sup>11</sup> While further analysis is required, this difference indicates that, on average, schools in Alberta may be more effective in ensuring that all students succeed regardless of their family background. Thus, this socio-economic indicator should not be used as an excuse or rationale for poor school performance. The effective school will produce good results, regardless of the family background of its students.

### **Is the school improving academically? The Trends indicator**

For all the indicators, the *Report Card* provides eight years of data. Unlike a simple snapshot of one year's results, this historical record provides evidence of change (or lack of change) 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.

In order to detect trends in the performance indicators more easily, we developed the *Trends* indicator. It uses statistical analysis to identify those dimensions of school performance in which there has been real change rather than a fluctuation in results caused by random occurrences. In addition, this year, the standardized scores rather than raw data are used to determine the trends. Since standardizing makes historical data more comparable, this change may make the *Trends* indicator more reliable. Because calculation of trends is uncertain when only a small number of data points

is available, a trend is indicated only in those circumstances where at least six years of data are available and where it is determined to be statistically significant. 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.

### **How does the school's English program compare to the provincial average?**

While the basic academic indicators and the *Overall rating* described above give an overview of the effectiveness of the school's academic programs, they do not tell us anything about the effectiveness of specific academic departments within the school.

For example, at Elgin Park Secondary in Surrey, the average examination mark for the 1999/2000 school year was four percentage points above the provincial average. However, the school's average mark in English 12 exceeded the provincial average by nearly seven percentage points.

To provide a closer look at results in individual courses, we have introduced a new feature. Each year, we plan to focus on the school's results in one of the eight most frequently written provincially examinable courses. This year the *Report Card* shows how each school performed in English 12 compared to the province as a whole in each of the last eight years. First, the difference between the school's average mark and the provincial average mark is reported. Second, the school and provincial participation rates in the course are compared. The average examination mark must be viewed with the participation rate in mind. If a school has a very high average mark but a low participation rate, it may mean that only those students with a history of high achievement in the course are encouraged to take it. Finally, the results are analyzed to determine whether the school is improving relative to the province as a whole or not. Significant improvement or deterioration over time is reported in the *Trends* column.



# Notes

- 1 See, for example, the mission statement of the Vancouver School Board (digital document: [www.vsb.bc.ca/information-about-vsb-services/aboutourschoolsystem/index.html](http://www.vsb.bc.ca/information-about-vsb-services/aboutourschoolsystem/index.html), February 12, 2001).
- 2 See the Consumers Union web site: [www.consumersunion.org/](http://www.consumersunion.org/).
- 3 Peter Cowley and Stephen Easton, *Third Annual Report Card on British Columbia's Secondary Schools*, Studies in Education Policy (Vancouver, BC: The Fraser Institute, 2000), page 4.
- 4 The data from which these indicators are derived is contained in publicly accessible databases maintained by the Ministry for two purposes. School-level statistics describing student enrolment, programs offered, and certain characteristics of the school district provide the basis for determining the annual per-student operating grant each district will receive. Analysis of this same material aids Ministry staff in the assessment and planning of proposed capital projects as well as general policy planning. This data is collected by the Data Management and Student Certification Branch and much of it is available to the public on the Branch's web site (<http://www.bced.gov.bc.ca/k12datareports/>). The nature and extent of the data is indicated by the School Level Data Collection Manuals also available on this web site. Statistics on individual student performance are captured so that the Ministry is able to produce a transcript of marks for each student upon graduation from grade 12. This transcript lists all the grade 11 and grade 12 courses that the student attempted and the results achieved. These results include the school mark for all such courses as well as the provincial examination mark for any provincially examinable grade 12 courses. Summary data files (at the school, district, and provincial levels) are available for public perusal on the Branch's web site ([www.bced.gov.bc.ca/exams/stand-rep.htm](http://www.bced.gov.bc.ca/exams/stand-rep.htm)). Values for the relevant statistics, for all public and independent secondary schools, for each of the seven school years between September 1992 to August 2000 are provided by the Ministry.
- 5 The following provincially examinable courses were offered for at least some of the years between 1992/1993 and 1999/2000: Applications of Mathematics 12, Applications of Physics 12, Biology 12, Chemistry 12, Communications 12, English 12, English Literature 12, French 12, Français Langue 12, Geography 12, Geology 12, German 12, History 12, Japanese 12, Latin 12 (discontinued in 1997/1998), Mandarin 12, Principles of Mathematics 12, Physics 12, Punjabi 12, Spanish 12 and Technical and Professional Communications 12. Students enrolled in schools run by the Francophone Education Authority may write some of these examination in French.
- 6 A student's final mark for a provincially examinable course is derived from both the mark received on the course's uniform provincial examination and a mark provided by the school. The final mark is the weighted average of the examination mark that accounts for 40% and the school mark that accounts for the remaining 60%.

- 7 Peter Cowley and Stephen Easton, *Boys, Girls, and Grades: Academic Gender Balance in British Columbia's Secondary Schools*, Public Policy Sources 22 (Vancouver, BC: The Fraser Institute, 1999).
- 8 Cowley and Easton, *Boys, Girls, and Grades*: page 7.
- 9 Cowley and Easton, *Boys, Girls, and Grades*: page 17.
- 10 Cowley and Easton, *Third Annual Report Card*: page 12, 119.
- 11 Peter Cowley and Stephen Easton, *Second Annual Report Card on Alberta's High Schools*, Studies in Education Policy (Vancouver, BC: The Fraser Institute, 2000).