

Appendix 1: Rationale for Inclusion of Indicators

Three Indicators of Effective Teaching

1 Average provincial examination mark

This indicator is the average mark (a percentage) achieved by a school's students on the provincial final examinations in all of the provincially examinable grade 12 courses. Since all students are expected to have access to the same curriculum and, with one exception, students take provincially examinable subjects voluntarily, this average mark reflects how well they were prepared for the provincial examinations. The degree to which they are prepared is their responsibility and that of their teachers and, more generally, the school.

For each school, the indicator is the average of the mean scores achieved by the school's students in each of the provincially examinable courses at all sittings during the year, weighted by the relative number of writers of each of the examinations. Under the Ministry's policy on rewriting examinations, it is possible for a student to write an examination in a given course more than once. In 1996/1997, approximately 5.5 percent of all the examinations written were re-writes. Since this option is available to any student wishing to gain a higher mark, we do not think that re-writes effect the legitimacy of this indicator.

Rationale for inclusion

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 inevitably 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 provincial examinations. There is also variation within schools in the results obtained in different subject areas. Differences in outcomes cannot be explained solely by the characteristics of the student body unless we believe that all teaching is valueless. It seems reasonable, therefore, to include the average examination mark for each school as an indicator of effective teaching.

2 Percentage of provincial examinations failed

For each school, this indicator provides the rate of failure (as a percentage) in the provincially examinable courses. It was derived by dividing the sum, for each school, of all provincial examinations that received a failing grade by the total number of provincial final examinations written by the students of that school.

Rationale for inclusion

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. There are 19 provincially examinable grade-12 courses in British Columbia¹ and schools have the responsibility of preparing their students to pass these final examinations.

1 Provincially examinable courses during the period 1992 to 1997: 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, Mandarin 12, Mathematics 12, Physics 12, Spanish 12. In the 1997/98 school year, three new courses—Technical and Professional Communications 12, Applications of Mathematics 12, and Punjabi 12—were added to the list of examinable subjects and Latin 12 was struck off.

There is good reason to have confidence in this indicator as a measure of effective teaching. With a single exception, the courses for which a provincial examination must be written are not required for graduation. A student who is doing poorly can graduate without writing any of these examinations. Such a student's course of study may not include the prerequisites for post-secondary education but it will be sufficient for graduation from secondary school. Thus, students enroll in the provincially examinable courses because they want to take them.

Further, the rate of failure reflects how well students have been prepared in the lower grades. Of the 19 provincially examinable courses, all but three—Geology, Geography, and History—have prerequisite courses in the same subject. Indeed, admission to the Grade 12 course very often requires that the student have received a prescribed minimum grade in the prerequisite lower-level course.

Since the decision to take examinable courses is voluntary and requires demonstrated success in previous courses, it seems reasonable to use the percentage of examinations failed in these courses to judge the effectiveness of the teaching in secondary schools.

3 Difference between examination mark and school mark

For each school, this indicator gives the average of the absolute value of the difference between the average mark obtained on the provincial examinations and the average final "school" mark—the accumulation of all the results from tests, essays, quizzes and so on given in class—for all the provincially examinable grade 12 courses.

Rationale for inclusion

It is an integral component of teaching to test students' knowledge and provide clear feedback so

that they may be aware of their progress. For such assessment to be useful, it must accurately reflect the student's understanding of the course material. As a systematic policy, inflation of 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 their comparison to other assessments of the students. The provincial final examination is administered by the same authority that designed the course. This examination will test whether students have learned the material for which the course was designed. If the marks assigned by the school are an 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 higher than those achieved by its students on the final examinations, then the school is not providing an accurate indicator of the way in which the knowledge of the course material is being acquired.

Two Indicators of Practical, Well-Informed Counselling

During the high-school years, students must make a number of decisions of considerable significance about their education. As early as grade 8, they may be required to choose between different streams in Mathematics and English. Soon after, they will decide whether to continue learning a second language. A year or

two later, they may face the choice of completing secondary school or abandoning it in favour of full-time work.

Will these 13- or 14-year-old students 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 about their educational choices.

Indicators of well-informed counselling 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. (These courses enable students to keep the maximum number of options for post-secondary education.) Second, having made it through school to the end of September in grade 12, they must decide whether or not to stick it out, do the work, and graduate with their class.

A decision in the negative would be comfortable for a student, especially one who lacks the kind of support that we are trying to measure. Stu-

dents can quite easily rationalize taking less rigorous courses in grade 12 on the basis that these courses more closely parallel their present interests. Likewise, there are all sorts of reasons that can be advanced for deferring graduation: "The few courses needed can be picked up later." "I'm going to fail anyway, so why try?" "There's a job that pays \$15.82 an hour available right now, so I can't afford to graduate." The list is conveniently long. The decisions to be measured have been chosen because students without well-informed counsel may well give the more comfortable, negative answers.

1 Graduation rate

This indicator is provided by the Ministry of Education and is calculated as follows. The Ministry makes an estimate of the number of grade-12 students in each school who, by virtue of their successful completion of lower-level courses and their enrollment in a sufficient number of courses to enable them to graduate, can, provided that they pass the appropriate courses during the current year, graduate with their class. The Ministry then measures the number of those who actually graduate and calculates this number as a percentage of its earlier estimate.

Rationale for inclusion

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 likely find more job opportunities than those who have not graduated.

By completing the eleven years of schooling in preparation for the final year of secondary school and graduation, students have already demonstrated a reasonable ability to handle the basic courses offered by the school. Moreover, the requirements for graduation are not

onerous. The chance that students will not graduate solely because of poor academic performance is very 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.

2 Provincial examinable courses taken per student

This indicator measures the average number of provincially examinable courses taken by the students at a school. It is derived by first summing the number of students at each school who wrote the provincial examination in each examinable course and then dividing that sum by the grade-12 enrollment in that school on September 30th.

Rationale for inclusion

In their senior years, students—especially in the public schools—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 variety of options open to them for post-secondary study.

Provincially examinable courses offer study at the senior level in a variety of core disciplines: English language, the sciences, Mathematics,

History, and other languages. 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 and community colleges as well as universities—to assess the applicant's readiness for further study and for admission to programs with limited enrollment. 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.

Overall Rating Out of 10

The overall rating of school performance answers the question, "In general, how is the school doing, academically?" To derive this rating, the results for all the years were converted into a grade out of 10. This was accomplished using the following procedure. For each indicator, the base-year (1992/93) results were sorted from highest to lowest. They were then divided into 10 ranges and each range was assigned a grade between 10 and 1. The range that included the top 10 percent of the highest scores was given a 10; the next range, a 9; and so on. The results from each additional year were then assigned the number grade corresponding to the range of values established in the base-year into which each fell.

The number grades for the five indicators were then averaged to produce the annual overall rating for each school. The decile range tables for each of the indicators are provided in Appendix 3.

Appendix 2: Parent's Average Education

As we noted above, one criticism of the first edition, *A Secondary Schools Report Card for British Columbia*, was that it failed to provide some indication of the sort of homes from which the school's students came. Commentators felt that without such information, it was unfair to compare schools. The students at one school might come from affluent families with well-educated and supportive parents while students at another school might come from quite different homes.

While we believe that innate ability is found in all kinds of environments, we would agree that some children come to school better prepared or more receptive to learning than others and that this is, in part, a result of the student's home environment. However, the school's administration and its educators are undoubtedly aware of the general socio-economic background from which their students come. Such awareness should lead them to develop and use methods of teaching and counselling that take this background into account.

We feel it is appropriate, therefore, to test each school's effectiveness in countering any disadvantages students might have. To do this we used the following technique. First, using enrollment data from the Ministry of Education sorted by school and by postal code and a custom-built 1996 Census data-table supplied by Statistics Canada, we determined the average values for each school for several family characteristics. Using multiple regression analysis we determined which of the characteristics varied in association with the indicator, Average provincial exam mark. As the table on page 80 shows, the characteristic most closely associated with school outcomes was the average number of years of

education of the female parent or the lone parent (in single parent families). We have therefore adopted this value as our indicator of the general home background of the school's students. (In the Detailed Tables, it is called "Parent's avg. education (yrs.)."

In the multiple regression, once parent's average education was part of the analysis, families' earned income was not associated with school performance in a statistically significant way. While regression with the average examination mark as the dependent variable revealed a possible association with average parental income from government transfer payments that was statistically significant at a 90 percent level, over the range of values of the independent variable, average examination mark varied by only about four percentage points. Thus, changes in transfer income will have little impact on the actual differences in performance even if one takes the lower level of statistical significance as acceptable. In contrast, the average mark varies by about 12 percent over the range of the variable, parent's average education. The statistical significance of the association was above the 95 percent level.

How can the average years of parents' education be used to help us in interpreting school performance? It is useful in several ways. For instance, by using the formula for the slope of the regression line, a forecast of a given school's performance on one of the indicators could be made. Comparison of this forecast to the actual result would roughly indicate the effectiveness of the school's efforts to take its student's background into account in teaching and counselling. Likewise, comparisons can be made among schools with similar values for parent's average

The Association of Various Socio-Economic Characteristics with Average Examination Mark

Regression Statistics			
Multiple R	0.66		
R Square	0.43		
Adjusted R Square	0.39		
Standard Error	3.10		
Observations	221		
Coefficients of the Independent Variables			
	Coefficients	t Stat	P-value
Intercept	34.62	7.70	*
%LP2	0.02	0.62	
APEI2	0.01	0.25	
APGTPI2	0.32	1.73	**
AvgEd	2.33	6.35	*
Key to Independent Variable Names			
%LP2	% of target families with only one parent.		
APEI2	Average target family parental income from employment (\$000s)		
APGTPI2	Average target family parental income from government transfer payments (\$000s)		
AvgEd	Average number of years of education of the principal parent (PP)		
Notes			
(1) All independent variables are derived from 1996 Census data (Enumeration Area) level. Data was weighted according to by-postal code enrollment data provided by the Ministry of Education.			
(2) Principal Parent (PP) means the female parent in two parent families and the lone parent in single parent families.			
(3) * = significant at 99% level; ** = significant at 90% level.			

education to identify those that are more successful in this effort than others. Over time, the index will track changes in the student body's environment that may help school officials in their improvement planning.

We urge caution in the use of the value for parental education. We believe that a student's background is a factor to be taken into account. We do not believe that a disadvantaged background

dooms children to poor performance. As we will note in other studies now being prepared for publication, research indicates that schools can be effective in offsetting such social disadvantages. We would be distressed to learn that this value was being used as an excuse for poor school performance. We hope that school officials and parents alike will use this indicator simply as another tool in the development and implementation of plans for improving their schools.

Appendix 3: Decile Range Tables

Base Year (1992-1993) Decile Floor Values

Decile Range	Floor Values				
	Average provincial exam mark	Percentage of provincial exams failed	Difference between exam mark and school mark	Graduation Rate	Provincial examinable courses taken per student
10	71.02	6.20	3.37	96.86	3.49
9	69.00	8.01	4.18	91.82	3.00
8	67.89	9.73	4.82	89.10	2.79
7	66.76	11.11	5.19	87.32	2.62
6	65.74	12.61	5.77	85.25	2.48
5	64.42	14.96	6.38	83.18	2.35
4	63.48	16.41	7.09	81.00	2.22
3	62.42	19.03	8.37	78.60	2.08
2	60.19	23.53	10.31	74.10	1.86
1	44.99	65.61	16.64	25.00	0.64

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