Appendix 1: Calculating the *Overall rating out of 10*

The *Overall rating out of 10* is intended to answer the question, "In general, how is the school doing, academically?" The following is a simplified description of the procedure used to convert the raw indicator data into the *Overall rating out of 10*.

1 Course by course, the average achievement test marks and failure rates for each school were standardized by calculating Z, which is defined by:

$$Z = (X - \mu) / \sigma$$

where X is the individual school's result, μ is the mean of the all-schools distribution of results, and σ is the standard deviation of the same all-schools distribution.

2. The course-by-course standardized data were then aggregated where required to produce weighted average indicator values. The weighting used was the number of student writers in each course at the school relative to the total number of student writers of the relevant tests.

3 These weighted average results were then re-standardized.

4 The *Gender gap* indicators were calculated using the raw data and then standardized as described in step 1 above.

5 The seven standardized indicator results were then combined to produce a weighted average summary standardized score for the school. The weightings used in these calculations were *Average exam mark* (for each of the four subject areas)—12.5%; *Percentage of exams failed*—30%; *grade 6 gender gap: Language Arts*—10%; *grade 6 gender gap: Mathematics*—10%. For schools for which there were no gender-gap results in either of the two courses, the *Percentage of exams failed* was weighted at 50%.

6 This summary standardized score was re-standardized.

This standardized score was converted into an overall rating between 0 and 10 as follows:

7 The allowable maximum and minimum standardized scores were set at 2.2 and –3.29 respectively. Scores equal to, or greater than 2.2 receive an overall rating of 10. This cut-off was chosen because it allows more than one school in a given year to be awarded 10 out of 10. Scores of equal to or less than –3.29 will receive the lowest overall rating of 0. Schools with scores below –3.29 are likely to be 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 chose, therefore, 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:

$OR = \mu (\sigma * \text{StanScore})$

where *OR* is the resulting *Overall rating*, μ is the average calculated according to the formula:

$\mu = (OR_{min} - 10 (Z_{min} / Z_{max})) / (1 - (Z_{min} / Z_{max}))$,

where σ is the standard deviation calculated according to the formula:

$\sigma = (10 - \mu) / Z_{max}$,

and StanScore is the standardized score calculated in (6) above and adjusted as required for minimum and maximum values as noted in (7) above. As noted in (7) above, OR_{min} equals zero, Z_{min} equals –3.29; and Z_{max} equals 2.2.

9 Finally, the derived *Overall rating* is rounded to one place of the decimal to reflect the significant number of places of the decimal 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.

About the authors

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. It was replaced by www.parentsguide.com 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, The 1999 Report Card on Alberta's High Schools, and Boys, Girls, and Grades: Academic Gender Balance in British Columbia's Secondary Schools.* In 2000, he was co-author of new editions of the *Report Card*s for Alberta and British Columbia and of the first edition of the *Bulletin des écoles secondaires du Québec: Édition 2000/Report Card on Quebec's Secondary Schools*. In 2001, he was author of the first edition of the *Report Card on Ontario's Secondary Schools* and was co-author of new editions of the Report Cards for Alberta, British Columbia, and Quebec. He continues the development and publication of school performance measurement studies for The Fraser Institute.

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