Signposts of Success

Interpreting Ontario's Elementary School Test Scores

David Johnson

C.D. Howe Institute
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Policy Study 40

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I have had wonderful teachers in my life — people with whom I enjoyed learning. Their influence on me continues. Some are no longer alive except in the memories of their students. I bring to my mind one special teacher (there was often more than one) from each school I have attended, and mention by name Miss Hazel Curry (Binkley Public School); Mr. Don Thomas (Dalewood Public School); Mrs. Adele Trussler (Westdale Secondary School); Mr. Bill Lawrence (London Central Secondary School); Professor John Munro (University of Toronto); Professor David Laidler (University of Western Ontario); and Professor Olivier Blanchard (Harvard University and MIT). People who teach well have a lasting influence on their students. A book about teaching should be dedicated to good teachers. This one is.

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Foreword

In recent years, provincial governments have developed new approaches to improve accountability in their school systems. One method has been to develop provincewide standardized tests to assess the progress of students in key subject areas in the hope of shedding some light on how schools are faring in their primary mission of educating their students. Ontario introduced standardized testing for elementary schools in the 1996–97 academic year for reading, writing, and mathematics.

Standardized testing is, however, controversial. Critics argue that school rankings are based, not on schools' relative success in educating their students, but on school community socio-economic factors — such as parents' educational background and family income — that influence students' performance. Thus, some schools may be ranked unfairly low simply because they draw their students from poor neighbourhoods.

In this book, David Johnson makes an important contribution to the literature on standardized testing by separating socio-economic factors from other factors that explain students' performance. Professor Johnson develops a methodology to rank schools according to the degree to which their students' test scores vary from what would be predicted for schools in communities with similar socio-economic characteristics. This methodology permits the identification of schools whose students perform better than expected, allowing educators to look more carefully at other factors that might explain good performance — such as the principal's managerial ability, the quality of teaching, and the availablity of resources. Educators will no doubt greet this approach as good news: they *can* make a difference in the classroom.

The C.D. Howe Institute hopes this book will open up a broad debate about standardized testing. Professor Johnson's recommendations for improving the current approach to testing and the collection of useful data should also help schools enhance their students' learning experience.

The Institute is grateful to the Donner Canadian Foundation for its assistance with funding for the publication of this study. We also wish to thank Bill Robson and Yvan Guillemette for coordinating and reviewing the research, Barry A. Norris for editing the manuscript and preparing it for publication, and Wendy Longsworth and Kevin Doyle for their production assistance.

As with all C.D. Howe Institute publications, the analysis and opinions presented here are the responsibility of the author and do not necessarily reflect the views of the Institute's members or Board of Directors.

Jack M. Mintz
President and
Chief Executive Officer

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Tommy Wu has been a very helpful research assistant. Greg Lang and Megan Barr also provided excellent research assistance on the project. Jennifer Dickson, a former student in the Master in Arts, Business Economics at Wilfrid Laurier University, and I worked together on a pilot study of school assessment data with a small sample of schools in the Waterloo Regional District School Board. That work began this project.

Statistical assistance and advice were provided by Mike Veall, Terry Levesque, Tom Crossley, Rick Elliot, and the Statistical Consulting Service at the University of Waterloo. Howard Kim at the Ontario Ministry of Education and Kirsten McKnight at the Education Quality Accountability Office helped enormously in understanding and sorting the school files. Bo Wandscheider and Michelle Edwards at the University of Guelph's Tri-University Data Centre were invaluable in helping to handle the census files. Teachers and principals as well as staff at boards were helpful in making the school visits a success.

I would also like to acknowledge the assistance and helpful suggestions of the reviewers of this study, as well as those of my editor Barry A. Norris and the staff of the C.D. Howe Institute — particularly Jack Mintz, Bill Robson, and Yvan Guillemette.

Unavoidably, while writing this book, I thought about my own schooling, both its strengths and its weaknesses. Researching school testing touches many emotional nerves in Ontario. I am grateful for the patience shown by a variety of people. We all gingerly stepped through the minefield and worked together to try to understand the educational process better. There are no simple answers. I do not pretend to have the complete story — just a part of the picture. The errors in the analysis remain my responsibility, as are the conclusions and policy recommendations. The evidence is, however, inescapable: teachers and principals in local schools

make a difference in the average test scores of their students — a difference, moreover, that is not associated with the socio-economic characteristics of the school community.

David Johnson
January 2005

1 Can Provincewide Testing Identify Successful Schools?

Tests measure what students have learned. In elementary schools, students are assessed by their classroom teacher on their performance in reading, writing, and mathematics. These assessments identify the students' areas of strength and weakness. Everyone — parents, students, and teachers alike — takes such assessments for granted. Students take home written summaries, in the form of report cards, several times a year. In many households, the arrival of the report card is a significant event.

Teacher-written assessments of their own students are, then, an accepted part of the education system. Much more controversial, however, is the concept of standardized testing, where almost all students in the province work on the same material, which is then marked outside the local school to a uniform standard. Beginning in the 1996–97 academic year, Ontario introduced just such a standardized assessment of all its elementary students. The testing is carried out in May, graded over the summer, and returned to schools, students, and parents in the fall. At first, tests were administered only to Grade 3 students; two years after its introduction, testing was extended to Grade 6 students.

Opinions vary about the usefulness of these external assessments. The controversy really heats ups, however, when the external test results are averaged across students at each school, made available to the public, then used as a measure of the school's effectiveness. Is such a school report card useful? Are schools that contain students with higher average test results actually better schools? If better student test results are *not* an appropriate measure of a school's success, what is? Is the Ontario provincewide elementary assessment program useful?

One important group in the elementary educational process, Ontario's elementary school teachers as represented by their federations — the Elementary Teachers' Federation of Ontario (ETFO) and the Ontario English Catholic Teachers' Association (OECTA) — is among those who oppose standardized testing in its current form. Teachers particularly dislike the publication of results averaged over students at individual schools since such results are often used, implicitly or explicitly, to rank schools. ETFO argues that "[t]he best way to judge schools is by visiting them and looking for evidence of learning and interest in learning," and claims that "average test scores are *more* indicative of the pooled characteristics of the students, such as socio-economic status" (ETFO 2001b, 1–2; emphasis added). In fact, slightly *less* than half the variation in schools' results can be associated with the pooled socio-economic characteristics of their students examined in this book. So a large part of the explanation for the variation must be, at least to some extent, the outcome of choices principals, teachers, boards, and parents have made for their schools.

OECTA comments that school-level results are "poor measures of school success," and argues that

> research has repeatedly demonstrated that the comparative advantages and challenges children face outside of school — like their parents' socio-economic status and level of education — have an enormous impact on school success. To judge schools' performance — even in a carefully delimited way — to judge only students' comparative performance on paper and pencil

> tests of reading, writing and mathematics at a certain stage of their schooling — on the basis of their raw scores is patently unfair. (OECTA 2002, 16.)

Everyone involved in the education system knows that students vary greatly according to the social and economic background of the households in which they live. In some schools, many students have well-educated parents. In others, there are many recent immigrants. Some schools are large, others are small. Some schools have many aboriginal students, others have none. Most people would agree that direct comparisons of the test results of schools with such disparate groups of students would be unfair to teachers, boards, students, and parents alike. The Fraser Institute's report cards (Cowley and Easton 2003, 2004) for Ontario elementary schools, as I show in Chapter 6, are in fact just such direct comparisons of test results between schools with disparate student populations. These report cards, in my view, are unfair and not very useful. But does this mean, as some argue, that a fair and useful comparison is impossible?

I argue that it is not — that a fair and useful ranking and comparison of Ontario's elementary schools is indeed possible. In this book, I attempt to outline such a methodology and answer critical questions about the role of standardized testing in Ontario's elementary education system.

Toward a Fair and Useful Comparison

A comparison should not look simply at absolute test results and suggest that a school containing students with a high average mark is a "good" school; rather, it should focus on the relative ranking of schools after taking into account variations in the characteristics of the communities in which the schools are located. In that way, one can compare schools whose students have similar socio-economic background, and identify schools that have had substantially

above-average assessment results over a number of years. This would be a useful and powerful exercise.

Moreover, we know enough about the backgrounds of Ontario's students to undertake such an exercise. As I outline in Chapter 6, one can predict the average assessment result over a number of years of a particular school based on both a wide variety of known socio-economic factors concerning the school's student body and the estimated relationships between those factors and test results at all Ontario elementary schools. The relevant factors include:

- the type of test and the year in which it was administered;
- the percentage of students living in single-parent families;
- the percentage of students speaking an official language at home;
- the percentage of students coming from an aboriginal background;
- the percentage of recent immigrants among students;
- the percentage of students living in detached homes;
- the average household income of students' household units;
- the percentage of students that moved in the past year;
- the percentage of students that moved in the past five years;
- the unemployment rate in the school community;
- the percentage of adults in the school community that has not completed high school; and
- the percentage of adults in the school community that has some university education.

Once these factors have been taken into account for all schools, one can make a valid comparison between two schools with the same *predicted* assessment results but widely varying *actual* results. By way of analogy, consider a series of temperature readings on a specific day — say, May 21 — in locations all over North America. Given 50 years of data, the average of those past 50 observations in each location would be a good predictor of the expected temperature on May 21 in that location. Depending on the actual reading

for that day, one can then state unequivocally that the temperature is either higher or lower than normal. In the same way, one can determine whether, over a period of, say, four years, a school's test scores are higher or lower than normal for that type of school. If the results are a *lot* higher, then we have identified a good school.

It should go without saying that the ability to identify relatively better schools is critical. Educational outcomes in elementary school are important: we want our children to be good readers and good writers, we want them to master the basic skills of mathematics, and we want them to move on to high school with these skills already in hand. We want this to happen for students from all social and economic backgrounds.

Once I had identified the schools that were clearly doing better than others of their type, I visited 13 of them and asked teachers, principals, and parents why they thought their school seemed to have a better learning environment than other schools with similar socio-economic characteristics.

Although much more work needs to be done to identify Ontario's successful and not-so-successful elementary schools and the reasons for their relative performance, I hope this book makes an important, if small, start on that project. If we can identify schools where good practices are making a difference, we can, in turn, identify those good practices. Just as important, we may be able to convince educators and parents that it is even possible to identify a good practice. I hope people who know a great deal more about elementary education than I do will follow in my footsteps and visit good schools to see how it is done.

A Summary of the Findings

In this section, I present a summary of my findings in a question-and-answer format that avoids some of the more technical details and, I hope, allows the reader to absorb the main conclusions of the study easily.

Question 1: Is it true that school assessment results from 1997 to 2001 show an improvement over time in the learning outcomes of elementary school students in Ontario?

It will frustrate readers to discover that this important question cannot be answered directly using the data in this project. The reason is that the aggregate level of achievement on any test depends on students' ability in a given year to master the material, the consistency of the test instrument over time, and the grading of the test material. A higher score could be the result of better learning by students, an easier test, or more relaxed grading of the same test. The available data simply cannot distinguish among these three possibilities.

Question 2: That is frustrating! Can nothing be said about whether Ontario students have actually improved over the four years of tests?

I can state only that, if the tests were designed correctly, were equally difficult in all years, and were graded consistently, then student achievement levels increased considerably between the 1998–99 and 2001–02 assessments. The goal of the current Liberal government of Ontario is for 75 percent of students to be able to meet the provincial standard by the 2007–08 academic year, but such a lofty goal is meaningful only if the tests remain equally difficult and are graded consistently over that time. It will be difficult to assess if either condition holds.

Question 3: That is hardly the most helpful answer! Doesn't any of the statistical evidence I am about to read tell me whether the assessment process was designed correctly and has been consistent over time?

Unfortunately, the study contains no direct evidence with which to answer this question, only shreds of indirect evidence. In my view, that indirect evidence broadly supports the conclusion that the tests were designed correctly. The fact that achievement results have risen slowly over time — as would be expected in a large and complex organization trying to effect improvement — is indirect

evidence that the observed increase in results may actually reflect better performance by students.

There is also evidence that the rate at which students are, for one reason or another, exempted from the assessment process is fairly consistent from one school board to another, which suggests, though weakly, that the assessments are administered consistently. The Education Quality and Accountability Office (EQAO), the independent, arm's-length agency of the Ontario government that administers the tests, apparently puts a great deal of effort into designing and pre-testing the assessments, then grading them consistently over time. In the end, however, it is up to education researchers, not an economist, to determine if EQAO is succeeding in that task.

Question 4: Do the answers to questions 1, 2, and 3 mean that the assessment process is useless?

Absolutely not! The assessment process is not useless. Students and classroom teachers get results for individuals, classes, and schools, which identify the strengths and weaknesses of individual students and schools at a detailed level. This information can clearly be put to good use. At the school level, the aggregate results can be used to compare outcomes across schools in a fair way, as this book explores.

Question 5: When I compare the achievement results of different schools in my community, I notice that the best results are obtained by schools whose students come from households where the parents are more affluent and better educated than average. Is it possible to measure the family background of students at elementary schools so that we can make a fairer comparison?

The answer to this question is a resounding yes! In academic years 1999–00, 2000–01, and 2001–02, the Ontario Ministry of Education collected the postal codes of all students in the province's elementary schools. By linking the location of students' homes through their postal code to very small geographic units of the census, one can, at little cost, draw a complete and accurate picture of the family

backgrounds of students at any elementary school in Ontario. Chapter 3 explains this process in detail.

Question 6: I have read that good assessment results occur only in schools whose students come from affluent, well-educated families. Is that true?

No, this is not true. There is certainly a strong relationship between a variety of social and economic variables that describe the school community and school achievement levels. But, and this is the most important finding of the study, *some schools with less affluent and less well educated parents have high achievement results, and some schools with affluent, well-educated parents have results that are not especially good given their school community*. This finding has important policy implications. Since family background evidently is not the only determinant of school achievement, we need to discover why schools with similar socio-economic characteristics perform differently on the tests year after year.

Question 7: What socio-economic factors play a role in predicting which schools will have high achievement levels?

Higher income levels and better-educated parents certainly raise achievement levels, but other variables — including language, unemployment, mobility, housing status, immigration, aboriginal status, and lone parenthood — matter as well.

Question 8: Can schools be ranked according to outcomes in a fair way?

Yes. As I show in Chapter 6, it is possible to create a score that identifies whether schools with similar socio-economic characteristics are performing better or worse than other schools where assessment results should be similar.

Question 9: What should I do when I discover a "good" school?

My basic answer is that you should visit the school and try to find out how it differs from similar schools. What does that school do that allows its students learn more? As a small step toward answer-

ing that question, I undertook short visits to 13 schools (in six school districts) that substantially outperform equivalent schools (see Chapter 7).

Question 10: What did you learn about "good" schools?

That is a difficult question to answer simply, and I refer the reader to Chapter 7 for details. However, the single most important lesson I learned was that, in a successful school, teachers in the primary division (kindergarten to Grade 3) work together as a team to approach the Grade 3 test. Teachers in the junior division (Grades 4 to 6) also work together as a team to approach the Grade 6 test, but to a lesser extent. I also learned that longer visits to such schools are certainly warranted.

Question 11: Is the EQAO assessment process good for Ontario schools?

The answer to this question has to be formed from a subjective assessment of both the evidence and the benefits and costs of the EQAO process. Although the monetary costs associated with the process are relatively small, the indirect costs are much higher. There is a wide range of benefits from the process, but these are difficult or impossible to quantify. My personal conclusion, which I explain in Chapter 8, is that the benefits outweigh the costs, and I would choose to continue with the assessment process.

Question 12: Could the EQAO assessment process be improved?

Yes. Chapter 8 contains my recommendations for improvement, but the three most important are as follows. First, since the tests cover accumulated knowledge from three (or more) years of material, they should be renamed the "Primary Assessment" and the "Junior Assessment." Students' results are the primary responsibility, not of the Grade 3 or Grade 6 teacher, but of the school's divisions and of the school as a whole. Renaming the tests would make it clear that they are a school project, not a grade project, and would change the dynamic around the assessment process in a useful way. Successful schools, in my view, have already made this change.

Second, the test data should be presented to the public in a more meaningful way that takes into account the nature of the assessment process. For example, there is no point in discussing results where the key variable is *not* the percentage of all students at a school that achieved a satisfactory level. EQAO's "Method 2" measures the percentage of students that actually wrote the test and that succeeded. Since a school could claim better results simply by exempting from the test more students who would not achieve a good score, Method 2 results are not useful. Moreover, the results could be presented in a way that de-emphasizes changes from year to year and instead emphasizes multiyear results at a school. It would also be very useful to have results that adjust for the socio-economic characteristics of the school community. Indeed, that is the exercise I undertake in this book.

Third, the assessment should take place as late as possible in the school year, as participants in the process clearly prefer.

A Guide to the Rest of the Study

In the remainder of this study, I explain how a long and careful look at the assessment data leads to the answers I gave above. Chapter 2 provides the background of the elementary school assessment process, including some history, reactions to assessments, and estimates of their monetary cost. Chapter 3 describes in detail the process used to create a socio-economic description of each elementary school. Then, Chapter 4 presents estimates of the association between a school community's socio-economic variables and the school's level of achievement on the assessments.

In Chapter 5, I offer a brief discussion of the reasons students are exempted from the assessment process, which provides indirect evidence of the consistency with which that process is applied across Ontario's elementary schools.

Chapter 6 further explains how I created relative rankings for equivalent schools. Suppose the students of two different schools come from communities where the mix of socio-economic factors

leads one to expect the two schools to have similar assessment scores. If their scores differ over a number of years — if one school regularly outperforms the other — then it is possible to devise relative rankings for the two schools. I rank the schools in one school board using this relative system and compare my results with the ranking the Fraser Institute has devised for the same schools. I show that any ranking — such as the Fraser Institute's — that depends mostly on the absolute level of assessment results and fails to take into account variations in the schools' socio-economic context is, in large part, a ranking of the schools' socio-economic status, and thus is of limited use.

In Chapter 7, I report on the visits I made to 13 "good" schools in 6 school boards — schools that perform relatively better, in terms of their absolute assessment results, than similar schools in the province. I visited schools that were expected to perform well and that did even better than expected, as well as schools that were not expected to do well but that exceeded expectations. I spoke to principals, teachers, and parents at these outstanding schools and simply report what they told me.

Finally, in Chapter 8, I offer my own opinions and conclusions about Ontario's assessment process for elementary schools, and I close with a set of recommendations that I believe would improve the process. These recommendations are directed mainly to EQAO and to the local schools, since I am much less confident of my ability to make recommendations at the school board level. Instead, I pose a number of questions for school boards that arose from my research and my visits to schools.

This book has a variety of audiences in mind. Some readers may be interested in the use of postal codes and census data in Chapter 3. Others may want to know a lot about the statistical properties of assessment data I analyze in Chapter 4. Some may care only about exemptions, discussed in Chapter 5, while others will want to go immediately to the school-ranking process in Chapter 6. Still others may want to read only about the visits to "good" schools, described in Chapter 7. And some may be interested only in my conclusions from this research, found in Chapter 8.

I hope these various audiences can find the material that is of most interest to them; the summaries that appear at the end of Chapters 2 through 7 should aid their search.

Finally, for readers who wish to examine my data in detail, the database and individual school data are available from the C.D. Howe Institute's web site at: www.cdhowe.org.

8 Conclusions

In writing the last chapter of this book, I had two goals in mind. One was to present the traditional summary usually found at the end of a piece of academic writing. This is appropriate since the book is, first, an academic and statistical study of the results of the standardized assessments conducted by the Education Quality and Accountability Office (EQAO) in Ontario elementary schools. Thus, I outline the various statistical results I generated that extend the interpretation of school-level assessment results, and I summarize what principals, teachers, and parents at a number of "good" schools — those that perform better than schools with similar socio-economic characteristics — told me about how their schools function.

My second goal, however, was less traditional, at least in my experience of writing as an economist: I was determined to offer my own conclusions from the research, even if it meant exposing my own biases. Thus, although I believe my conclusions follow from the results of the statistical research and from what I heard during my school visits, they cannot all be "proved" to be correct. I offer my own evaluation of the elementary school assessment process operated by EQAO, and I recommend changes where I see room for improvement. I make no claim to be an expert in how an elementary school

or school board works, and I write as an outsider to much of the elementary education process. I leave it to the reader to judge the usefulness and appropriateness of this perspective.

Lessons from the Statistical Analysis

Four clear lessons can be drawn from the statistical analysis of school-level EQAO results.

First, *average test results change from year to year*. It is impossible, however, to determine whether an increase in the average across a large sample of schools is the result of an easier test, easier grading of the same test, or a general improvement in students' ability to complete the test. This does *not* mean that the assessment process is useless. If one assumes that the tests are roughly equal in difficulty and graded in a similar way from year to year, increased scores would be the result of improvements in students' ability; there is no direct evidence for or against the validity of this assumption. But even if one is unwilling to make such an assumption, the data can still be interpreted in a meaningful way.

Second, *it is possible to construct a relative ranking of schools*. A school's test results can be adjusted to take into account the socio-economic characteristics of the community from which the school draws its students, as well as the year-to-year variability in the test results. Such a relative ranking compares schools with similar composite characteristics to see if some schools have systematically better results than others over a period of years — in other words, to identify "good" schools.

Third, *the role of context — the socio-economic characteristics of the parents who send children to an elementary school — is important, but it is not the only determining factor in a school's success*. Postal codes and census data can be used to generate a multidimensional measure of context, and the list of variables that are important in a statistical sense is quite large. Yet such context variables explain perhaps 40 to 50 percent of the variation in results across schools when a four-year average of results is studied. Even allowing for the possible importance of variables omitted from this analysis, it seems certain

that a school's test results depend very much on what happens at the school.

Fourth, *it is much more meaningful to average a school's test results over a number of years than to look at changes from year to year*. The results may vary substantially from year to year simply because the number of students in a class or in a grade is quite small, and better or worse scores by a handful of students can have a significant statistical effect. Averaging cancels out such effects.

In addition to these four major conclusions from the statistical analysis, one can draw two somewhat less important lessons. First, since the relative importance of context variables — particularly the relationship between test results and parents' level of education — differs between Grade 3 and Grade 6, it is important to study results from the two grades separately. Second, the rate at which students are exempted from tests varies sufficiently — from one board to another, from one school to another, and from one academic year to another — to cast serious doubt on the usefulness of any methodology, such as EQAO's Method 2, that does not take exemptions into account. Student performance should be measured using the percentage of *all* students, not just that of students who took the test.

What I Heard at Visits to "Good" Schools

As a follow-up to my statistical analysis of assessment results, I visited 13 "good" schools — schools whose results over a four-year period were usually better than 90 percent of schools with similar socio-economic community characteristics. On the basis of what I heard during my interviews with principals, teachers, and parents, "good" schools have the following characteristics.

- At "good" schools, teachers work together as a team — of particular importance in the primary division, which includes Grade 3.
- "Good" schools prepare their students thoroughly for the tests.
- In the primary division, "good" schools make use of learning resources such as mathematics manipulatives and levelled books.

- "Good" schools make good use of volunteers.
- "Good" schools with lower socio-economic characteristics rely on the principal's leadership on discipline and behaviour.
- "Good" schools have strong extra-curricular programs.
- "Good" schools communicate effectively with parents about expectations, homework, and the role of parents.
- "Good" schools generally do not sacrifice other important school activities to concentrate on improving assessment scores, although some teachers worry about reductions in activities related to the arts, music, drama, social studies, and science.

My Views of the Effectiveness of the Assessment Process

Is the EQAO assessment process "good" for Ontario's elementary school system? Such a straightforward policy question deserves an equally straightforward answer, yet one is not easy to come by. As an economist, my inclination is first to weigh the benefits and costs of the assessment process.

Benefits of the EQAO Process

The benefits of the EQAO process seem quite clear. First, although a great deal of emphasis has been placed on the reporting of overall results, the largest benefit is also the least visible: the process fleshes out the curriculum expectations for students for the end of the primary and junior divisions.[1] Without assessments, it would be more difficult for teachers to know what the expectations were for students across the province. Over time, the EQAO process has generated a reasonable clear standard of satisfactory or excellent

1 Several persons involved in this process suggested to me that the EQAO assessments and the curriculum are not aligned, although this opinion was not widely expressed at the schools I visited. The question clearly requires further investigation. The only document I could find that addresses this issue seems to suggest that the 1998 Grade 3 assessment reasonably matched the 1998 Grade 3 curriculum (see Ireland 1998).

academic work, which schools can use to identify weaknesses in students and in the coverage of their teaching and design responses to those weaknesses.

A second benefit, which an economist's mindset finds it easy to see, is that the EQAO process provides an external check on the organization. The buzzword is "accountability": any organization needs a mechanism to ensure that its goals are met. A business that has no customers has not met its goals. A university that attracts only weak students or whose faculty fail to obtain outside research grants has not met its goals. A hospital or nursing home whose patients die at a higher rate than expected has not met its goals — indeed, such an institution would be the subject of an investigation. One could argue that, before the EQAO assessment process began, no such external, public checks on Ontario's publicly funded elementary school system were in place. When facing a difficult or "problem" student, teachers (and university faculty members) always have some incentive to mark "too easy" — it is less trouble and less confrontational, and the problem is simply passed on to the next teacher. Now, if the assessment process reveals that the marking of a particular teacher or school varies greatly from that of EQAO, this is useful information for the teacher, the principal, the school board, and the student's parents.

A third benefit of the EQAO process is that, over time, it has provided high-quality teaching material that teachers have put to effective use, particularly in the mathematics curriculum, which is much more demanding and challenging than it used to be.

A fourth benefit is that teachers who choose to spend part of the summer as EQAO markers report this activity to be useful for their professional development, for several reasons. They saw a very large sample of student work, they saw how other teachers marked, and they saw the curriculum in action in a very broad sense. For the teachers involved, double-marking represents a significant learning opportunity, as I can personally attest from my own teaching career.

A fifth benefit is that the assessment results allow the kind of school-level evaluation of outcomes that I have undertaken in this book and the discovery of factors contributing to schools' success

that are at variance with the assertions of some within the education community. In addition, my visits to "good" schools are an example of what can be done after careful analysis of the data. More visits and more research would clearly be helpful, particularly on why some schools perform very badly on assessments relative to similar schools.

Costs of the EQAO Process

The EQAO process also has costs, both monetary and nonmonetary. As I noted in Chapter 2, the monetary costs of the EQAO process are not zero, but neither are they large enough to represent a "waste" of resources on testing that would be better spent on creating thousands of new teaching or educational assistant positions, as some teachers and parents mistakenly assume. Abandoning EQAO testing would save the average 300-student elementary school just $7,500.[2] Clearly, such an amount would not begin to approach the cost of even a single staff position.

As for nonmonetary costs, one general class of costs relates to poor analysis of the school-level data. If unnecessary actions follow from a poor analysis of the data, they waste resources. Suppose, for example, that, purely by chance, a school has a poor writing result one year. If, in response, the school unnecessarily invests a great deal of time and energy in improving its students' writing, these resources are wasted. Year-over-year results contain so much noise that a rapid response to a fluctuation in an individual year is not appropriate. Teachers know this about the EQAO data — either as a mathematical property or intuitively — but it may be difficult to explain this statistical fact to parents and to the public as a whole.

A second potential cost associated with misinterpreted data involves parents' responses to results. Unless school-level results are presented in context, parents might be tempted to move in order to place their children in a school that seems "good" on the

2 For the 2001–02 academic year, the EQAO budget was approximately $50 million for 2.1 million elementary and secondary school students, or about $25 per student.

basis of absolute rankings, but that, in fact, performs poorly relative to schools with similar socio-economic characteristics. It is not clear which school would actually produce a better result for their child, but the money parents spent moving to find a "good" school would be wasted.

Indeed, results taken out of context might mislead not just the public but teachers as well. Some might be tempted to seek a transfer to a school with absolutely high assessment results; others, at "good" schools in communities with lower socio-economic characteristics, might become frustrated by the inability of people to understand just how uneven the playing field is and also seek to move. In either case, resources spent on teacher placement and training are wasted.

The solution to problems associated with responses to the poor analysis and presentation of EQAO assessment data is to analyze the school-level data properly — a straightforward and not very costly task — and to improve the presentation of the data and their accompanying explanation.

Another potential nonmonetary cost of EQAO testing relates to the distribution of curriculum effort. In other words, if the material stressed in the EQAO assessment (literacy and numeracy) makes it impossible to cover other equally important areas of the curriculum, as some teachers and parents fear, this must be considered a cost of the EQAO process. Does the reduced time spent on art, music, seasonal activities, science, and social studies represent a large cost? The majority of teachers I interviewed did not think so. In any event, it is my personal opinion that an elementary school should be willing to emphasize literacy and numeracy, foundations without which nothing else is possible. I might even place this "cost" as a benefit of the EQAO process.[3]

Some argue that the EQAO process imposes nonmonetary costs in terms of stress on students. At the "good" schools I visited, however, this was simply not a majority view. Doing well on the assess-

3 The best mission statement I have ever seen, and one of the few that could actually be connected to actions, is that of the Boston-Townsend School, in the Grand Erie District School Board. "We learn to read, we read to learn" seems to me to summarize concisely what should be the main goal of an elementary school.

ment meant learning to approach it in a well-prepared manner that made it a comfortable process. Again, one might even regard this not as a cost but as a significant benefit. Grade 6 students, in particular, are old enough to benefit from such a preparation process — after all, they are about to enter senior public school and high school, where this type of test situation will be a standard part of their lives for years. Perhaps a practice assessment in a low-stakes setting is a good idea.

The assessments also impose stress on teaching staff, some of which relates to how the data are analyzed and presented. At the one school where teachers refused to answer my questionnaire, substantial resentment remained, seven years after the fact, about the imposition of the EQAO process on the elementary school system. Although teachers at most schools had some legitimate complaints about the process and useful suggestions for its improvement, my perception is that most recognized its benefits.

I do wonder about the attitudes of teachers in schools I did not visit. Remember that all the schools I visited did very well on the tests and were committed to investing time and resources to prepare for them. Do teachers in other schools also find the EQAO process useful, or are those who angrily refused to respond to my queries representative of a much larger group? In any event, it is my own opinion that (to quote a popular television show) "resistance is futile." Some type of elementary school assessment is now the norm in North America. It seems very unlikely that taxpayers will be convinced to spend billions of dollars on education without some type of accountability for quality. To remove the EQAO assessment process without replacing it with another, similar process would be perceived as returning to a system without accountability.

A Concluding Comment

After weighing the costs and benefits of the EQAO process, I conclude that enough good things are coming out of the process to outweigh the bad things. I freely admit this is a subjective conclusion, not a quantitative conclusion of the type more favoured in economic

analysis. I view the monetary costs as relatively small compared with the likely net benefits. And I heard enough sensible criticism of the EQAO process as it now stands to be able to offer some suggestions for improvements that are both possible and practical.

Recommendations for Improving the EQAO Process

The research I have presented in this book points to a variety of ways in which the EQAO process could be improved. I realize that my research, even though it draws on substantial statistical and analytical experience, hardly places me in the same category as someone who has spent a lifetime studying elementary schools. I know that, in suggesting improvements, I risk criticism from participants in the elementary school system, who might with some justice point to my position as an "ivory tower university professor" (see Box 8.1 for an attempt at a pre-emptive defence). Yet debate is part of the policy process. Reasonable people can disagree about the usefulness and feasibility of my suggestions, and if they encourage further discussion that leads to even one improvement, the public policy process will have been successful.

I present two sets of recommendations, one aimed at EQAO itself, the other at principals, teachers, and parents of Ontario's elementary school children.

Policy Suggestions for EQAO

My first and foremost recommendation for EQAO, following a strong and clear message from teachers at every school I visited, is to push back the date on which assessments are conducted during the academic year — as teachers told me, "the later the better." Doing so would put less pressure on teachers to complete the curriculum before the assessments are held.

Second, again following advice I received from teachers, simplify and clarify the language used in the assessments — in one teacher's memorable phrase, "avoid wonky questions."

Box 8.1: ***Is There a Case for an EQAO for Universities? The View from the Ivory Tower***

Is it hypocritical for someone who sits in the proverbial university ivory tower to make recommendations about improving the elementary school system while assuming all is well in his own sector of the educational process? Universities, as with all institutions that I have ever been involved with, do some things well and others poorly, and change comes slowly and with difficulty.

Suppose Ontario decided to create an Educational Quality and Accountability Office for Universities (EQAOU) — and one might as well include colleges, too. Would such an entity be necessary? The answer is both yes and no. I would argue that it would be less necessary for universities because they are already accountable to their various granting agencies for the quality and quantity of their research. Universities also already issue some public information — albeit mostly involuntarily in response to public pressure generated by the well-known *Maclean's* magazine survey, which is a private market solution to university accountability issues. Moreover, universities compete for students on the basis of both quality of service and price, both of which are new accountability issues for the university sector. Had I been told ten years ago that my university would be competing openly for students on such bases, I would not have believed it. And if such accountability mechanisms are effective, then the case for an EQAOU is weak.

As for the case in favour of an EQAOU, I would point out that universities are not very accountable for the quality of teaching they offer undergraduates. Although universities compete for them, such students can obtain virtually no useful information on the quality of undergraduate teaching as they select which institution to attend. An EQAOU could thus be a tool for improving quality and accountability in undergraduate teaching. As is the EQAO process with teachers, an EQAOU likely would be unpopular with my professorial colleagues, but even unpopular policies can improve public outcomes. For example, the office could require universities to post teaching evaluations for lecture courses, or that the evaluations be comparable or even identical across universities, as in the case of EQAO's standardized assessment. Indeed, just such an evaluation of undergraduate teaching — the Students Evaluation of Educational Quality — is already freely available and well-respected worldwide. Clearly, there is room for public policy improvement in this area, and an EQAOU might easily accomplish that task.

Third, rename the Grade 3 and Grade 6 assessments the "Primary Assessment" and the "Junior Assessment." On the face of it, this is merely a cosmetic change, which would have the happy advantage of being cheap, but it would also take some of the pressure off Grade 3 and Grade 6 teachers by making it extremely clear that the results of the assessment are owned by the entire staff at a school.

Fourth, change the way in which the school data are presented. Here, I have three concrete suggestions:

- Abandon presenting so-called Method 2 results; they are a distraction and they increase incentives for schools to manipulate the process by which students are exempted from taking assessments.
- In addition to presenting Method 1 results and exemption rates, EQAO could present results by school in the form of three-year averages, the current three years, and the previous three years, and as deviations from the provincial average as well as in the form of levels. Such a presentation would offer a much fairer picture of improvements at a school over time and remove some of the effects of year-to-year variations in the class.
- Place the school's socio-economic context variables — that is, the school community's characteristics — in the public domain.

Fifth, do a better job of explaining to the public, and even to teachers, the value to the educational process of responses at the school level to long-term, multi-year weaknesses in specific areas of the curriculum as identified by the assessments. EQAO should also stress the value for accountability in having an outside marker for a *small* portion of a student's work.

Finally, work harder to clarify the actual monetary costs of EQAO's operation, since teachers and parents appear to believe that those costs are much higher than they really are.

Policy Suggestions for Principals, Teachers, and Parents

My suggestions for principals, teachers, and parents could be viewed in two ways. First, they could be considered as the salient lessons

I learned at "good" schools turned into policy ideas. Second, they could be seen as questions that parents could ask about their particular school: is this activity or concept in place at the school, and if not, why not?

I present the following suggestions approximately in their order of importance.

First, schools should recognize the enormous value of having teachers work as a team in both the primary and junior divisions. Although this may be more difficult at a larger school where there are double or even triple classes across grades, the needs of both teachers and students are better met within such a framework.

Second, schools should ensure that teachers have the learning resources they need. As noted previously, teachers at "good" schools cited levelled books and mathematics manipulatives as particularly helpful tools.

Third, schools should recognize the important role volunteers can play. Moreover, it is not enough simply to have volunteers; volunteers must be trained and directed to useful tasks — primary programs in reading, for example — in order to make a real contribution to assessment results. Volunteers need to feel their time is used well and focused on the needs of students. Parent volunteers probably should not be placed in the same classrooms as their children, otherwise they could be a distraction; moreover, such volunteers should be encouraged to think of themselves as helping the school community as a whole, not just their own child.

Fourth, schools in communities with lower socio-economic characteristics, where parent volunteer resources may be more limited, should make greater use of volunteers from local high schools, colleges, and universities and from among retired people in the community.

Fifth, parents on school councils should try to find a balance between being "supportive" and being "demanding." Ask the school to explain specific weaknesses in assessment results that show up over a number of years, but understand that a large fluctuation from one year to the next is a common statistical feature of the data.

Sixth, both parents and teachers should ensure that students approach assessments as a low-key, calm activity and with confidence that they have been well prepared.

Seventh, schools should communicate effectively with parents on a regular basis.

Eighth, parents should not be obsessed with test results. "Good" schools are those with balance and strong extracurricular activities that require parental input and support. Teachers appreciate that kind of support.

Finally, schools should give added importance to daily physical education, despite the difficulty of scheduling such activity in the school day. The benefits, at both the primary and junior levels, would be worthwhile.

Questions for School Boards

In thinking of improvements arising from my research, I found that decisionmakers at local school boards presented the most difficulty. School boards face special problems. For example, management is tightly constrained by collective agreements, meaning that school boards are unlikely to be able to change the rules and allow principals more autonomy in their selection of staff as they attempt to build effective teams. In addition, major financial decisions are often taken (by government) that are beyond the direct influence of school board decisionmakers.

For this group, then, I would be more confident phrasing my ideas as questions than as suggestions, roughly in order of their apparent practicality.

First, is the "normal" length of time a principal spends at an elementary school appropriate? From my school visits, I sensed strongly that, given the much slower turnover of teaching staff and the time it takes to build effective teams of teachers, principals are not given the opportunity to stay long enough to have much impact. In addition, I learned from my meetings with a number of

school councils that, although school boards believe, in theory, that councils should play an active consultative role in the process of selecting principals, most pay little more than lip-service to the idea. If a proposed new principal had to offer an explicit statement of his or her vision for the school and was given enough time to implement that vision, would more schools develop effective teams of primary and junior teachers?

Second, are boards spending enough money on professional development? Teachers at the schools I visited appreciated high-quality professional development, and felt it was money well spent.

Third, should school boards ensure that every school contains at least one teacher — and preferably two, one for Grade 3 and one for Grade 6 — with experience marking EQAO assessments? It was clear from my school visits that such teachers served as a useful resource for other teachers. How could a board implement such a suggestion? Perhaps it could offer a monetary incentive to encourage teachers with EQAO marking experience to transfer to schools with no such people on staff. A monetary incentive might also encourage younger, lower-paid teachers to undertake EQAO marking during the summer. Perhaps EQAO marking could be considered useful experience when boards offer new teachers permanent contracts.

Fourth, should there be a limit on the amount of time a teacher stays at the same school? Although there are benefits to a school's having experienced teachers who have worked together for a long time, those fortunate enough to find positions in schools serving communities with high socio-economic characteristics are understandably reluctant to move to more difficult teaching positions in schools in less desirable neighbourhoods. At the same time, the less desirable schools have the least parental support and are usually staffed with the least experienced teachers. To an outsider, this allocation of teaching experience and talent does not seem best for the children in the system. Could some kind of mandatory movement of teachers help spread experienced teachers around to a larger variety of schools? Would this help principals build effective teams of teachers?

Fifth, how do boards allocate resources among schools in communities with very different socio-economic characteristics? Do more resources find their way into weaker schools and if so, by what process? Some boards I visited concentrated their early literacy efforts in schools with higher needs, but have these extra resources made a difference? It is my hope that the analysis in this book will help school board decisionmakers determine the answer to that question. I recognize, of course, that this type of policy recommendation walks a knife edge. Schools in communities with higher socio-economic characteristics need to be well equipped and well funded to remain attractive to affluent parents; if sufficiently large resources are diverted from such schools to poorer schools, affluent parents might be more likely to consider private alternatives for their children, with consequent loss of significant and important political support by the publicly financed system. The balance point would be hard to find. One could, for example, fund all schools equally, in the sense of providing the same number of dollars per student or maintaining similar ratios of students to teachers. It is reasonably clear, however, that such a "fair" approach would not generate "equality of opportunity" for students whose relative lack of home resources puts them at a disadvantage compared with children from more affluent homes. One of this study's findings is that context variables do make a difference to students' results on standardized assessments — all students are *not* equally good at reading, writing, and mathematics, regardless of their socio-economic backgrounds. It seems to me that students from less advantaged backgrounds might benefit greatly from the transfer of some resources from "rich" schools to "poor" schools within a board — in the form of, for example, smaller classes or more Educational Assistant resources in weaker schools. A large "rich" school with minimal discipline problems might not need a vice-principal, but a smaller, "poor" school might require one desperately. In short, although such strategies may already be in place in some schools, boards need to think more about how to allocate their resources more effectively, and take appropriate action.

A Final Note

There is no doubt that the introduction of the EQAO assessment process has had an enormous effect on Ontario's elementary schools. In this book, I have attempted to interpret in a variety of ways the vast amount of data the assessment process has provided from the 1998–99 through 2001–02 academic years. Using those assessment results and substantial census information on the socio-economic characteristics of school communities, I have described a method of identifying schools that do better on the tests than other schools in communities with similar characteristics. I visited a number these "good" schools, and I have summarized what principals, teachers, and parents told me about how their schools operate. Finally, I have suggested some possible areas of improvement and ventured some questions that participants in the EQAO process might wish to consider.

I hope administrators, teachers, parents, and, ultimately, students find this contribution to be useful.

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David Johnson is Professor of Economics at the School of Business and Economics at Wilfrid Laurier University. He was educated in the Ontario public school system in Hamilton and London, then at the University of Toronto, the University of Western Ontario, and Harvard University.

To be upfront on one issue, both Johnson children attended public schools in the Waterloo Region District School Board and, for a year, taxpayer-supported schools in the Cambridgeshire (England) Local Education Authority to the end of Grade 6. After Grade 6, both children attended Rockway Mennonite Collegiate in Kitchener, a school operated by the Mennonite Conference of Eastern Canada without direct taxpayer support. The decision by the Johnson children and their parents to support Rockway Mennonite Collegiate was not a reflection of the quality of education offered at the Waterloo Region District School Board. Rather, their decision reflected the approach Rockway is able to take to meet the whole needs of a student — spiritual, physical, and intellectual — in the context of the Mennonite church community.

Most of Dr. Johnson's previous research is in the areas of macroeconomics, monetary economics, and international finance. However, he became interested in the processing and interpretation of elementary school assessment data. After identifying schools that outperform similar schools, it became impossible for him to resist the desire to visit these schools to find out more about them.

Research in economics, Dr. Johnson says, is about asking questions that can contribute to the public policy debate and to better outcomes.

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Signposts to Success

Interpreting Ontario's Elementary School Test Scores

David Johnson

In the 1996-97 academic year, Ontario introduced standardized testing in reading writing, and mathematics for all elementary school students in the province, at first for those in Grade 3 and later extended to those in Grade 6 as well. Considerable controversy surrounds these tests, particularly when the results are used to create report cards on each school's effectiveness. Many critics argue that school rankings are based, not on the school's relative success in teaching students, but on the socio-economic characteristics of the community from which the school draws its students, thus unfairly giving lower rankings to schools in poorer neighbourhoods.

Are school report cards, in fact, useful? Are schools that contain students with higher average test results actually better schools? If better student test results are not an appropriate measure of a school's success, what is? Is the provincewide elementary assessment program itself useful?

In this trailblazing book, David Johnson shows that socio-economic factors do not explain all the differences in school rankings on test scores - that principals' managerial talents, the quality of teaching, and the resources available to the school also affect students' achievement scores. This is good news for educators, because it means they can make a difference in the classroom.

David Johnson is Professor of Economics at the School of Business and Economics, Wilfrid Laurier University. Most of Dr. Johnson's research has been in the areas of macroeconomics, monetary economics, and international finance, but he became interested in the processing and interpretation of elementary school assessment data. After identifying schools that outperform similar schools, it became impossible for him to resist the desire to visit them to find out what made them better. Research in economics, Dr. Johnson says, is about asking questions that can contribute to the public policy debate and to better outcomes.

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