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SOCIAL POLICY

Ontario's Best Public Schools: 2009-2011

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- This study compares student outcomes at Ontario elementary schools where students come from similar socio-economic backgrounds, revealing "good" schools where principals, teachers and staff are making a noticeably positive difference to student performance.
- The resulting school ratings, by percentile, are useful not only to parents, but also to teachers, school board administrators and education officials who wish to identify schools whose practices deserve imitation.
- Several schools achieve positive student outcomes that exceed the expectations suggested by socio-economic factors. Another thought-provoking finding is that students who attend middle schools starting in Grade 6 underperform compared to similar students at other elementary schools.

How do parents, teachers, taxpayers and school administrators know if children are attending a good school? This *e-brief* helps to answer that question by comparing outcomes at schools where students come from similar backgrounds. In other words, we compare schools on an "apples to apples" basis, and identify "good" schools where principals, teachers and staff are making a positive difference to student performance.

In Ontario, the Education Quality and Accountability Office (EQAO) conducts an annual assessment of Primary Division (Grade 3) and Junior Division (Grade 6) learning. While useful in themselves, these results don't take into account the reality that schools across the province have very different types of students with different backgrounds. Some schools, for example, draw their students mostly from parents with high levels of educational attainment while other schools contain large immigrant or aboriginal populations. A school with strong EQAO results could simply be a school where students come from more advantaged backgrounds.



This *e-brief* shows that differences in student background explain about half of the wide variation in EQAO results across Ontario schools. Notably, it also shows that the 10 percent of students in Ontario who entered a middle school in Grade 6 have a pass rate that is 5 percentage points lower on the Junior assessment than other Grade 6 students with similar social and economic characteristics. This result suggests that the academic role of middle schools should be reconsidered. Johnson (2010) and Dhuey (2012) find a similar result in British Columbia.

Measuring School Performance

The EQAO scores students' performance out of four and reports the number of all students at each school writing the Primary and Junior assessment who achieve at Levels 1, 2, 3 and 4, as well as those who do not write the assessment. Results are withheld if there are fewer than 15 students at that school in that grade. In EQAO tests of reading, writing and mathematics, a student meets or exceeds the provincial standard if he or she achieves a Level 3 or a Level 4 on an assessment. The percentage of all students reaching this standard is sometimes called the school's pass rate on that assessment.¹ The province has a target that 75 percent of all students should achieve the provincial standard by grade $6.^2$ A "good school" might be defined as a school achieving this target.

Signposts of Success (2005) and subsequent C.D. Howe Institute reports provide an alternative definition of a "good school": one that does better than predicted based on its student population. We first calculate an adjusted pass rate, which is the school pass rate in each year minus the provincial average pass rate in that year, averaged over three school years and the three assessments.³ For example, Derby Public School in the Bluewater District School Board (DSB) has an adjusted pass rate of zero in the Primary assessment because its students obtained the average score in Ontario over the three years of data (see Figure 1).

At each school we then predict the school's adjusted pass rate on the assessment based on many socioeconomic factors, such as the proportion of recent immigrants at the school or the average education level of adults in the students' neighbourhoods. There are two sources of data on student social and economic characteristics: the 2006 Census and data collected by EQAO directly from the students participating in the assessments.⁴ Schools where students arrive with advantages are expected to do better. For the schools along the upward sloping line in Figure 1, the actual value of the adjusted pass rate is the same as the predicted value.

A school like Copper Cliff Public School (Rainbow DSB), for example, has social and economic factors that predict an adjusted pass rate 10 percentage points less than the provincial average adjusted pass rate. In contrast, Britannia Public School (Peel DSB) is predicted to have a pass rate 10 percentage points higher than the provincial average.

¹ It is important that all students are in the denominator in the calculation of the pass rate. Schools then cannot affect the pass rate by having weaker students not write the assessment.

² See http://www.edu.gov.on.ca/eng/literacynumeracy/

³ It is important to subtract the provincial average pass rate from the school's pass rate in each year on each assessment. The average pass rate varies across reading, writing and mathematics both within and across the grades, the years and the language of assessment.

⁴ The variables and regressions used to predict the school's adjusted pass rate are presented in the Appendix. More methodological details, including the process for tying census data from small geographical areas to schools, can be found in Johnson (2005).

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Copper Cliff, Derby, and Britannia are all equivalent schools, because they all have adjusted actual pass rates equal to the adjusted pass rate predicted for schools with their socio-economic characteristics. Despite its much higher adjusted and actual pass rate, Britannia is no better than Derby or Copper Cliff – Britannia simply draws its students from more advantaged backgrounds. The difference between the predicted and actual scores for every Ontario school creates a better measure of a school's quality than the school's actual pass rate.

Finding Ontario's Top Schools

The vertical line with schools labelled Brookdale Public School (Halton DSB), Sacred Heart Separate School (Dufferin-Peel Catholic DSB) and Smith Public School (DSB of Niagara) are all schools where the mix of social and economic characteristics predict an adjusted pass rate 5 percentage points higher than the provincial average. Sacred Heart's actual pass rate is also 5 percentage points higher than the provincial average; that is, Sacred Heart's primary students do exactly as predicted by their social and economic background. However the pass rate at Brookdale is 3 percentage points below the provincial average and the pass rate at Smith is 19 percentage points above the provincial average. Given that both schools have students with similar characteristics, Smith is a much better school than Brookdale.

The school ratings are re-expressed as a percentile, found in the parentheses in Figure 1. A percentile score of 50 indicates that, compared to schools with similar students, that school is average: half of similar schools are better and half are worse. On the other hand, the percentile score of 91 at Smith says Smith is better than

91 percent of schools similar to Smith. The Grade 3 outcomes at Smith are very good. The percentile score of 11 at Brookdale indicates that among schools similar to Brookdale, 89 percent of schools do better in Grade 3: there is room for improvement at Brookdale. We emphasize that a rating of 91 is not different in any interesting way from a rating of 89, but a rating of 91 is different from a rating of 11. Percentile scores for all Ontario schools where sufficient data are available can be found by region in tables published with this *e-brief* and available at http://www.cdhowe.org/ontario best public schools 2009-2011/17939.

Table 1 lists 29 schools in the province where the percentile rating in both the Primary assessment and the Junior assessment is 97 or higher, an exceptional achievement. We strongly encourage other researchers to investigate the reasons for such an outstanding performance.⁵

Conclusion

Why do these performance indicators matter? Arguably, these ratings are most useful to education officials who wish to see which schools need improvement, and identify schools whose practices deserve imitation. Parents can also use them to evaluate whether their children's schools are doing a commendable job when compared to other schools in the province in similar socio-economic environments. If their school is in a high percentile, say 80 or over, as is Smith, then there is evidence that the principal, teachers and other staff at this school should be praised. On the other hand, if their school is in the 20th percentile or less, there is likely to be considerable room for improvement.

⁵ There are many other schools with high percentile ratings; all these schools should be investigated and celebrated. The choice to list schools with both percentiles above 97 was arbitrary. Schools with both percentiles at 95 are equally interesting. One-unit differences in a percentile rating are not of any interest. It is the large gaps between the 90th percentile schools and the 10th percentile schools that are of the most interest.

Table 1: Top Performing Schools, Both Primary and Junior (97th Percentile and Up) 2008/09-2010/11, Alphabetical Order

School		Percentage of adults in school neighbourhoods who:	
	School Board	Did not complete high school	Attended some university
Average of All Ontario Schools		14.7	26.8
Admiral Collingwood Elementary	Simcoe County DSB	14.0	22.1
Alexandra Public	Trillium Lakelands DSB	18.6	22.8
Bobcaygeon Public	Trillium Lakelands DSB	17.3	13.9
Cathedral Catholic	Renfrew County Catholic DSB	20.4	12.1
Coronation Public	Durham DSB	18.0	15.8
D.A. Gordon	Lambton Kent DSB	28.5	5.0
Discovery Public	York Region DSB	15.1	27.6
Gregory Drive	Lambton Kent DSB	16.1	21.0
Holy Name	Niagara Catholic DSB	12.2	18.9
Immaculate Conception Separate	Bruce-Grey Catholic DSB	22.3	12.5
John XXIII Separate	Renfrew County Catholic DSB	15.2	14.4
King George VI	Lambton Kent DSB	20.1	13.7
Monsignor O'Donoghue Catholic Elementary	Peterborough Victoria Northumberland and Clarington Catholic DSB	12.7	20.9
Our Lady of Fatima Separate	Renfrew County Catholic DSB	18.9	9.5
Ridgewood Public	Trillium Lakelands DSB	21.5	10.3
Rogers Public	York Region DSB	10.5	25.2
Ross Public	DSB of Niagara	13.8	19.6
St Charles Separate	Simcoe Muskoka Catholic DSB	17.0	18.8
St Elizabeth	St. Clair Catholic DSB	19.9	8.2
St James Separate	Niagara Catholic DSB	10.4	23.3
St John Vianney Catholic	Simcoe Muskoka Catholic DSB	13.8	17.3
St Joseph Separate	Renfrew County Catholic DSB	14.2	17.1
St Joseph's Separate	Catholic DSB of Eastern Ontario	14.9	14.5
St Martin of Tours Separate	Hamilton-Wentworth Catholic DSB	14.6	18.7
St Michael's Choir School	Toronto Catholic DSB	10.0	47.5
St Paul's Separate	Simcoe Muskoka Catholic DSB	16.9	14.9
St Teresa Separate	Toronto Catholic DSB	13.2	33.8
St. Francis Xavier Separate	Catholic DSB of Eastern Ontario	16.9	14.6
Westminster Public	Upper Canada DSB	20.7	12.1
Note: Education variables are include	led as the largest determinants of predicted ac	liusted pass rates	

Sources: Authors' calculations from EQAO; Statistics Canada; Ontario Ministry of Education.

Appendix: How to Remove Socio-Economic Factors from the Performance Results

Many factors may contribute to a school having success. This appendix explains how to remove, in a statistical sense, the association of observable socio-economic and student characteristic factors from the measures of the school pass rate. Once we have identified schools where students from similar backgrounds have more success, we can begin to look for the factors that lead to that success. Encouraging further research on what makes schools successful is part of the purpose of presenting the analysis in this *e-brief*.

The study estimates the two regressions reported in Table A1. The output of these regressions is a predicted adjusted pass rate for each school, the fitted values from regressions of the actual adjusted pass rates on a set of social, economic and a school structure variable in the case of the Junior assessment (Grade 6). The dependent variable in these regressions is, as described in the text, the average of the school's pass rate minus the provincial pass rate, over three years and up to nine assessments. An adjusted pass rate of zero indicates that school has the average pass rate in the province. The units are percentage points of all students at the school.

The EQAO suppresses results for schools with fewer than 15 students eligible to write the test in a given year. As such, test results from very small schools are not included in the analysis. To minimize the effect of random year-to-year variation, schools are only included if at least 45 students, including exempt or absent students, were enrolled over the three years. The number of assessments for which data is available is noted next to each school in the accompanying document of full results. If only math or reading and writing assessments are available, this is also noted as M or RW, respectively.⁶

Student Variables from EQAO Data

The uppermost panel of Table A1 shows the association between the adjusted pass rate and variables using the EQAO-provided administrative data for students at the school in the relevant grade writing the assessment. The first row presents coefficients on the percentage of girls in the group of students writing that assessment. In the Primary assessment (Grade 3), holding all other factors constant, a 10 percentage point increase in the proportion of girls is predicted to increase the adjusted pass rate by 1.5 percentage points. In the Junior assessments, the same increase is associated with a 2.6 percentage point increase in the percent of students meetings or exceeding expectations. Both of these effects are statistically significant at the 1 percent level.

There is a large negative association between the percentage of students who immigrated to Canada in the last three years and the adjusted pass rate. Recently arriving students to the Ontario system have a more difficult time in school and that effect is slightly stronger in the Junior assessment.

The use of the percentage of students in a grade who are designated special education students requires further explanation. In Grade 3, 14.6 percent of students are designated as such by their schools and, in Grade 6, 18.2 percent. We cannot be sure entirely why a student is designated as a special education student. We can be

⁶ A number of schools offering French immersion programs do not require their immersion students to take the reading and writing portions of the Primary assessment.

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Variable	Coefficient in Primary Regression (standard error)	Coefficient in Junior Regression (standard error)
Student Variable	es from EQAO Data	
Percentage of girls	0.15** (0.03)	0.26** (0.03)
Percentage of students who immigrated within the last 3 years	-0.29** (0.06)	-0.35** (0.06)
Percentage of special education students	-0.05* (0.02)	-0.30** (0.02)
School Characteristics Co	onstructed from Census Data	
Percentage of lone parents	-0.24** (0.04)	-0.24** (0.03)
Percentage of aboriginals	-0.11 (0.06)	-0.07 (0.05)
Percentage of dwellings which are detached houses	0.06** (0.02)	0.04* (0.02)
Percentage of those who moved in the last year	-0.32** (0.04)	-0.27** (0.04)
Percentage of those over 20 years of age who: Have not completed high school	-0.31** (0.05) 0.32**	-0.22** (0.04) 0.34**
Have at least some university education	(0.03)	(0.02)
Percentage of students speaking English or French at home	-0.03* (0.02)	-0.04* (0.02)
School Stri	ucture Variable	
Middle school beginning in Grade 6		-4.98** (0.98)
Regres	sion Statistics	
Number of schools in regression	3005	2922
Explanatory power of regression	0.41	0.52

Sources: Authors' calculations from EQAO; Statistics Canada; Ontario Ministry of Education.

sure that a student classified as a special education student is substantially less likely to pass either assessment and that the strength of that effect is six times stronger in Grade 6 than in Grade $3.^{7}$

School Characteristics Constructed from Census Data

The second panel of Table A1 shows the association of results and school profile variables constructed from the long-form Census data. These variables are constructed from the postal codes of the school's enrolment and the Census to describe the characteristics of the school's student populations (details are available in *Signposts of Success* 2005). Since the enrolment data for 2010/2011 are not yet available from the Ministry of Education, these characteristics use school enrolments from 2009/10 and 2008/09. There are no data and no results for schools that opened in 2010/2011.

The Census-based variables predict that schools with a higher proportion of lone-parent families, aboriginals, households who live in non-detached homes, households who speak English or French at home, and households who move more frequently all have lower assessment results. These variables have similar coefficients in the Primary and Junior prediction regressions. The Census data provide the only available measures of parental education. The two measures used are the percentage of adults over 20 with less than high-school education and the percentage of adults over 20 with some university education. There is good news and bad news. The bad news is that the association between adults' education and their children's success on the assessments is significant; a 10 percentage point decrease in the share of adults with some university reduces the predicted pass rate on the Primary assessment by 3.2 percentage points; a 10 percentage point increase in the share of adults who have not completed high school reduces the predicted pass rate by 3.1 percentage points. The good news is that the negative association of the less-than-high-school-education variable with adjusted pass rates is smaller in the Junior than in the Primary assessment: a 10 percentage point larger share of less-educated adults predicts only a 2.2 percentage point decrease in the pass rate on the Junior assessment. As time passes in the child's life, the school system partly compensates for a disadvantaged background along this important dimension.

The School Structure Variable

There are 86 middle schools where students begin at that school in Grade 6, the year of the Junior assessment. As seen in the third panel of Table A1, on average, these schools have an adjusted pass rate that is 5 percentage points lower than similar schools with a Junior assessment. The presence and large size of this effect strongly suggests a need for a better understanding of how the transition from elementary to secondary school is managed in Ontario.

The Importance of Controlling for Student Background

The last panel of Table A1 gives basic information on the regressions, the number of schools, and the explanatory power of the regression. The latter is a value that falls between zero and one, and is an indicator of the strength of the relationship between the variables that describe the schools and the adjusted pass rate. If that value

⁷ Various other regression specifications, including a specification without the special education variable were estimated. The percentiles are virtually identical. This makes sense because the use of special education is related to the proportion of students who arrive at school with other disadvantages and the coefficient on other social and economic variables would absorb the effects of the special education variables. Other specifications of the prediction equations and percentile are available on request from interested boards or researchers.

were 1.0, then all of the schools in Figure 1 would fall exactly on the upward sloping line. There would be no schools on the vertical line of dots. All of the variation in school results would be associated with variation in the background and educational classifications of students attending schools. The values in the table which lie between 0.41 and 0.52 indicate that between 41 and 52 percent of the variation in adjusted pass rates is associated with variation in observable characteristics of students as measured in the EQAO administrative data or in the Census. Thus, schools where students come from similar backgrounds get very different assessment results. We interpret these differences as identifying where results are much better than at similar schools or much worse.

It is important that the prediction regressions are estimated separately for Primary and Junior because, as discussed, the weights placed on the different prediction variables clearly differ by grade. It is also important to incorporate the grade structure variable in the Junior assessment prediction regression in order to make a fair comparison between teachers and principals who operate in a middle-school environment in Grade 6 and staff in schools where students do not face that transition the year they write the Junior assessment.

References

- Dhuey, Elizabeth. 2012. "Middle School or Junior High? How Grade Level Configurations Affect Academic Achievement." University of Toronto Working Paper.
- Johnson, David R. 2005. Signposts of Success Interpreting Ontario's Elementary School Test Scores. Policy Study 40. Toronto: C.D. Howe Institute.
- Johnson, David R. 2010. "British Columbia Schools: Where Teachers Make the Difference." C.D. Howe Institute *e-brief* 100. June.

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