

# We're...number 34!

## How the Education Establishment Embellishes International Results and Why It Matters

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### INTRODUCTION

Canada, as a nation, does fairly well on international student testing results. Provincial departments of education and school boards are quick to let everyone know about it too. In many cases, though, education departments (particularly those in Atlantic Canada and the Prairies) are patting themselves on the back for someone else's success

After all, Canada does not deliver education, the provinces do. And, as anyone who has moved between provinces can attest, school in one province often bears little resemblance to what is available in the next province over. If you look past the false bluster and consider the actual results on international tests, these differences become all too obvious. Unfortunately for Atlantic Canada, sometimes the truth hurts.

An excellent example of a high quality international testing program is the Organization for Economic Cooperation and Development's (OECD) *Programme for International Student Assessment* or PISA. Every three years since 2000,



performance results in reading, mathematics and science have been reported for 15-year-old students in an increasing number of countries. In the PISA 2006 assessment Canada was amongst the world's leaders in science (3<sup>rd</sup>), reading (4<sup>th</sup>), and math (7<sup>th</sup>) out of the 57 participating countries. According to the latest PISA 2009 results, however, Canada now ranks 6<sup>th</sup> in reading, 9<sup>th</sup> in science, and 11<sup>th</sup> in math, out of 65 countries included in the assessment. Slipping, but still very solid overall.

However, sub-national figures (for some countries) are also reported in the PISA documents. Given the relatively strong national results, it's not surprising that several Canadian provinces do very well on the international tests.

Alberta, for example, was ranked first in reading and science and second in mathematics in Canada according to the PISA 2003 results. While it still remains the leader among Canadian provinces, the PISA 2009 results show a significant decrease in Alberta's assessments such as going from a reading score of 543 in PISA 2003 to that of 535 in PISA 2009.

The Maritime Provinces, meanwhile, were found at the bottom of the list of Canadian results (see Tables 1, 2, and 3 for the PISA 2003, 2006, and 2009 reading scores and ranking of each Canadian province), with the exception of Nova Scotia that is ranked 5<sup>th</sup> according to the PISA 2009 assessments as compared to 7<sup>th</sup> (PISA 2006). Despite the small improvement in Nova Scotia, the Maritime Provinces remain below the overall Canadian average. For many in the education community this confirmed what most assumed on a ‘gut feeling’ basis. But instead of pointing to the poor ranking among Canadian peers, the provinces told a much brighter picture, choosing to point to the nations with poorer results and the advantages held by other provinces with higher scores – if acknowledging the other province’s results at all.

Table 1: PISA 2003 Reading Results and Provincial Rankings.

Rank	Province	PISA 2003 Reading Score
1	Alberta	543
2	British Columbia	535
3	Ontario	530
-	Canadian Average	528
4	Quebec	525
5	Newfoundland and Labrador	521
6	Manitoba	520
7	Nova Scotia	513
8	Saskatchewan	512
9	New Brunswick	503
10	Prince Edward Island	495

Table 2: PISA 2006 Reading Results and Provincial Rankings

Rank	Province	PISA 2006 Reading Score
1	Ontario	535
2	Alberta	534
3	British Columbia	528
-	Canadian Average	527
4	Quebec	522
5	Newfoundland and Labrador	521
6	Manitoba	516
7	Saskatchewan	507
8	Nova Scotia	505
9	New Brunswick	497
10	Prince Edward Island	497

Table 3: PISA 2009 Reading Results and Provincial Rankings

Rank	Province	PISA 2009 Reading Score
1	Alberta	533
2	Ontario	531
3	British Columbia	525
-	Canadian Average	524
4	Quebec	522
5	Nova Scotia	516
6	Newfoundland and Labrador	506
7	Saskatchewan	504
8	New Brunswick	499
9	Manitoba	495
10	Prince Edward Island	486

One might ask “so what?” Does the “spin” put on the results really matter? If it deflects criticism of the education system so it can focus on doing its job, is it really a bad thing? The answer is yes and yes. Further analysis done by the OECD shows that being genuine and honest and most importantly *open* about results indeed makes a difference.

Moreover, what one cannot but note is the decreasing trend in the overall score of Canada. Take reading for instance, which is one important basis for a good educational foundation, and see that Canada’s overall score has dropped from 528 in 2003 to 527 in 2006 and now to 524 in 2009. But the real concern lies not with the nation’s aggregate score, but with the scores for individual provinces and the “spin” being put on them by system advocates.

### A PROVINCE IS NOT A COUNTRY

One issue that needs to be addressed from the reporting of past results is the selection of poor comparators when provinces analyse their PISA scores. Following the release of the 2003 PISA results several provinces reported their ranking internationally – and omitted the other ten Canadian provinces in the process. Nova Scotia, for example claimed a tie for 9<sup>th</sup> in the world while New Brunswick claimed that it ranked 11<sup>th</sup> in the world, despite the fact that Nova Scotia’s average score of 513 put them behind 7 countries and 6 other Canadian provinces and New Brunswick’s



503 placed them behind 10 countries and 8 provinces (See Table 4).

There are two basic problems with making such claims. First, the PISA assessments do not include every country in the world, and therefore no included country or sub-national jurisdiction can claim to be the best in the world, even if it finds itself right at the very top of the PISA rankings. Indeed, PISA 2009 included a total of only 65 countries (34 OECD member-states plus 31 partner countries), which represent about one-third of all nations of the world. Second, comparing a province to a country while ignoring other provinces and avoiding comparison to any sub-national regions/jurisdictions of other countries skews the results in favour of the province in question.

**PISA 2003 Results:**  
 Nova Scotia claims it ranks 9<sup>th</sup> in the world. Proper analysis shows it ranks 34<sup>th</sup> among assessed countries and sub-regions.

Excluding sub-regions both within and outside of Canada wrongly assumes that all regions from the same country had identical scores which, of course, would be equal to the country score. Although this can happen, it is highly unlikely. In Canada, for example, the PISA 2003 provincial scores in reading ranged from 543 to 495 (the equivalent of almost one full year of schooling) while the Canadian average was 528.

**Table 4: PISA 2003 Reading Results and Provincial and Country Rankings**

Rank	Provinces/Countries	PISA 2003 Reading Score
1	Alberta	543
1	Finland	543
3	British Columbia	535
4	South Korea	534
5	Ontario	530
-	Canadian Average	528
6	Australia	525
6	Liechtenstein	525
6	Quebec	525
9	New Zealand	522
10	Newfoundland and Labrador	521
11	Manitoba	520
12	Ireland	515
13	Sweden	514
14	Netherlands	513
14	Nova Scotia	513
16	Saskatchewan	512
17	Hong Kong-China	510
18	Belgium	507
19	New Brunswick	503
20	Norway	500
21	Switzerland	499
22	Japan	498
22	Macao-China	498
24	Poland	497
25	France	496
26	Prince Edward Island	495
26	United States	495
	15 other countries	< 495

So where did they really stack up? The OECD report *Learning for Tomorrow's World: First Results from PISA 2003* included data on the geographic sub-regions of Italy, Spain, and the United Kingdom, as well as results for sub-groups of Belgium and Finland based on language. Several countries produce reports on their own results compared to the rest of the world, as well as looking at sub-regional comparisons, much like Canada does with its own national report. Among those examining sub-regional PISA 2003 results, other than those countries listed in the OECD report, are Australia, Switzerland, and Germany. Australia reports on its six states and two mainland territories, Germany on its 16 federal states, and Switzerland on 13 of its 26 cantons, including two cantons reporting results further divided by language.

Once sub-regions are included in the 2003 PISA results for reading, along with those countries not reporting sub-regional results, Alberta drops to 5<sup>th</sup> place, Nova Scotia to 34<sup>th</sup> and New Brunswick to 40<sup>th</sup>. Prince Edward Island, the lowest ranking province in Canada ends up in 51<sup>st</sup> place (see Table 5). And as bad as this seems the provincial rankings could be even lower if other countries such as the United States, South Korea, Sweden,



New Zealand, and Japan for example had reported PISA 2003 results at the state, provincial, county, or prefecture level.

**Table 5: PISA 2003 Reading Results and Rankings – Sub-Regional Ranking with All Available Sub-Regional Results including Countries without Sub-Regional Results**

Rank	Country	PISA 2003 Reading Score
1	ACT (Australia)	549
2	WA (Australia)	546
T3	Finnish speaking (Finland)	544
T3	Provincia Autonoma di Bolzano (Italy)	544
5	Alberta	543
6	Provincia Autonoma di Trento (Italy)	542
7	British Columbia	535
8	South Korea	534
9	SA (Australia)	532
T10	NSW (Australia)	530
T10	Flemish Community (Belgium)	530
T10	Swedish speaking (Finland)	530
T10	Ontario	530
-	Canadian Average	528
14	Liechtenstein	526
T15	Quebec	525
T15	Liechtenstein	525
17	New Zealand	522
18	Newfoundland and Labrador	521
19	Manitoba	520
T120	Fribourg French Speaking (Switzerland)	519
T20	Thurgovie (Switzerland)	519
T22	Bayern (Germany)	518
T22	Valais German Speaking (Switzerland)	518
T24	QLD (Australia)	517
T24	Valais French Speaking (Switzerland)	517
T24	Northern Ireland (United Kingdom)	517
27	Scotland (United Kingdom)	516
T28	Ireland	515
T28	Regione Lombardia (Italy)	515
T28	St-Gall (Switzerland)	515
T31	Sweden	514
T31	VIC (Australia)	514
T31	Regione Veneto (Italy)	514
T34	Nova Scotia	513
T34	Argovie (Switzerland)	513
36	Saskatchewan	512
37	TAS (Australia)	508
38	Baden-Württemberg (Germany)	507
39	Sachsen (Germany)	504
40	New Brunswick	503
T41	Jura (Switzerland)	502
T41	Zurich (Switzerland)	502
T43	Regione Piemonte (Italy)	501
T43	Berne German Speaking (Switzerland)	501
T45	German-speaking Community (Belgium)	499
T45	Castile and Leon (Spain)	499
47	Vaud (Switzerland)	498
48	Basque Country (Spain)	497
T49	NT (Australia)	496
T49	Wales (United Kingdom)	496
T51	Prince Edward Island	495
T51	Neuchâtel (Switzerland)	495
T51	United States	495
	39 other countries/sub-regions	<495

Fortunately, Nova Scotia’s reporting improved in 2006 compared to its outrageous claims in 2003 (after, that is, AIMS and others publicly noted the odd way we ignored everyone else in Canada in trumpeting our 2003 “success”).

Referring to the PISA 2006 results, released in December 2007, Nova Scotia’s Department of Education issued a release boasting a best showing of 18th place in the world out of the 67 jurisdictions assessed in the 2006 assessment. While more honest than in 2003, once again the 67 jurisdictions they refer to only include the 57 countries writing the assessment along with the 10 Canadian provinces, ignoring all the provinces, territories, states, cantons, and other sub-regional results released by other countries.

While sub-regional reporting was included in the main PISA 2006 document for countries such as Italy, Spain, Belgium, Finland, Australia, and the United Kingdom, other countries such as Switzerland and Germany also produced national reports with PISA 2006 results for their sub-national jurisdictions.<sup>1</sup> Adding those sub-regions moves Nova Scotia down the list from 18<sup>th</sup> to 37<sup>th</sup> in the science score rankings, as shown in Table 6.

**PISA 2006 Results:**  
 Nova Scotia claims it ranks 18<sup>th</sup> in the world. Proper analysis shows it ranks 37<sup>th</sup> among assessed countries and sub-regions.

<sup>1</sup> Sub-regional scores were available for 10 out of 26 Cantons of Switzerland and all of the 16 federal states of Germany.



**Table 6: PISA 2006 Science Results and Rankings – Sub-Regional Ranking with All Available Sub-Regional Results including Countries without Sub-Regional Results**

Science Rank	Region	Science Mean Score
1	Finland (Finnish Speaking)	565
2	Alberta	550
3	Australia (ACT)	549
4	Australia (WA)	543
5	Hong Kong-China	542
6	Germany (Sachsen)	541
6	Switzerland (Schaffhausen)	541
8	British Columbia	539
9	Ontario	537
10	Australia (NSW)	535
11	Italy (Provincia Friuli Venezia Giulia)	534
-	Canadian Average	534
12	Germany (Bayern)	533
12	Switzerland (Aargau)	533
14	Chinese Taipei	532
14	Australia (SA)	532
16	Estonia	531
16	Japan	531
16	Quebec	531
16	Finland (Swedish Speaking)	531
16	Switzerland (St. Gallen)	531
21	Germany (Thüringen)	530
21	New Zealand	530
23	Belgium (Flemish Community)	529
24	Italy (Provincia Autonoma of Bolzano)	526
24	Newfoundland and Labrador	526
26	Netherlands	525
26	Switzerland (Bern – German speaking)	525
28	Italy (Provincia Veneto)	524
29	Germany (Baden-Württemberg)	523
29	Manitoba	523
29	Switzerland (Basel-Land)	523
32	South Korea	522
32	Liechtenstein	522
32	Australia (QLD)	522
35	Italy (Provincia Trento)	521
35	Switzerland (Thurgau)	521
37	Nova Scotia	520
37	Spain (Castile and Leon)	520
37	Spain (La Rioja)	520
40	Slovenia	519
41	Germany (Sachsen-Anhalt)	518
42	Saskatchewan	517
43	Belgium (German-Speaking Community)	516
43	Germany (Rheinland-Pfalz)	516
43	United Kingdom (England)	516
46	Germany (Mecklenburg-Vorpommern)	515
46	United Kingdom (Scotland)	515

46	Switzerland (Valais – German speaking)	515
49	Germany (Brandenburg)	514
50	Spain (Aragon)	513
50	Czech Republic	513
50	Australia (VIC)	513
53	Germany (Saarland)	512
54	Spain (Navarre)	511
54	Austria	511
54	Macao-China	511
57	Italy (Provincia Emilia Romagna)	510
57	Germany (Schleswig-Holstein)	510
57	Switzerland (Zurich)	510
60	Spain (Cantabria)	509
60	Prince Edward Island	509
62	Germany (Berlin)	508
62	Spain (Asturias)	508
62	Italy (Provincia Piemonte)	508
62	United Kingdom (Northern Ireland)	508
62	Ireland	508
67	Australia (TAS)	507
67	Germany (Hessen)	507
69	New Brunswick	506
69	Germany (Niedersachsen)	506
71	United Kingdom (Wales)	505
71	Spain (Galicia)	505
72	Hungary	504
74	Germany (Nordrhein-Westfalen)	503
74	Sweden	503
76	OECD average	500
	48 countries/sub-regions	<500

Despite the obviously misguided comparisons that led to inaccurate claims about the ranking of Nova Scotia among the PISA assessed countries and economies in the previous two rounds of results, the same logic seems to have prevailed in the province’s report of the latest PISA 2009 results and rankings. According to statement issued by the Nova Scotia Department of Education, “in the PISA 2009 rankings of readings, Nova Scotia is surpassed by only 9 of the 65 participating countries/economies.”<sup>2</sup> This places Nova Scotia 10<sup>th</sup> in the reading rankings.

As was the case with the PISA 2006 report, the PISA 2009 report includes scores for sub-national units of the United Kingdom, Italy, Belgium,

<sup>2</sup> Source: <http://plans.ednet.ns.ca/files/Nat-Int-Results/PISA%202009%20Results%20Information%20Item.pdf>





Spain, and Finland, with the exception of Australia for which no sub-national scores are reported this time. While Australia has made available its sub-national scores on its own, however, sub-national data is not yet available for Germany and Switzerland. Nova Scotia makes no reference or allowance for these readily available comparators.

Adding the available sub-national unit reading scores for the United Kingdom, Italy, Belgium, Spain, Finland, and Australia, Nova Scotia moves from 10<sup>th</sup> to 17<sup>th</sup> in the rankings. When sub-national scores become available for Germany and Switzerland, Nova Scotia's ranking may even go lower on the list.

Rankings aside, Nova Scotia has improved its reading score from 505 in 2006 to 516 in 2009, which is only slightly better than its score of 513 in 2003. Its science score of 523 in 2009, however, has not changed much since 2006 when it was 520.

**Table 7: PISA 2009 Reading Results and Rankings – Sub-Regional Ranking with All Available Sub-Regional Results including Countries without Sub-Regional Results**

Science Ranking	Region	Reading Mean Score
1	Shanghai-China	556
2	Korea	539
3	Finland (Finnish speaking)	538
4	Hong Kong-China	533
4	Alberta	533
6	Australia (ACT)	531
6	Ontario	531
8	Singapore	526
9	British Columbia	525
-	Canada	524
10	Australia (WA)	522
10	Italy (Provincia Lombardia)	522
10	Quebec	522
13	New Zealand	521
14	Japan	520
15	Australia (QLD)	519
15	Belgium (Flemish Community)	519
17	Australia (NSW)	516
17	Nova Scotia	516
19	Italy (Provincia Valle D'Aosta)	514
20	Australia (VIC)	513
20	Italy (Provincia Friuli Venezia Giulia)	513

22	Finland (Swedish speaking)	511
23	Italy (Provincia Trento)	508
23	Netherlands	508
25	Australia (SA)	506
25	Newfoundland and Labrador	506
27	Italy (Provincia Veneto)	505
28	Saskatchewan	504
29	Norway	503
29	Spain (Madrid)	503
29	Spain (Castile and Leon)	503
32	Italy (Provincia Emilia Romagna)	502
33	Switzerland	501
33	Estonia	501
35	Iceland	500
35	Poland	500
35	UK (Scotland)	500
35	United States	500
39	Belgium (German speaking community)	499
39	UK (Northern Ireland)	499
39	Italy (Provincia Marche)	499
39	Liechtenstein	499
39	New Brunswick	499
44	France	498
44	Spain (La Rioja)	498
46	Spain (Navarre)	497
46	Germany	497
46	Sweden	497
49	Ireland	496
49	France	496
49	Iceland	496
49	Italy (Provincia Piemonte)	496
53	Sweden	495
53	Spain (Aragon)	495
53	Prince Edward Island	495
53	Denmark	495
53	Chinese Taipei	495
53	Manitoba	495
53	UK (England)	495
60	Hungary	494
60	Spain (Basque Country)	494
60	Latvia	494
60	Austria	494
64	Portugal	493
64	Italy (Provincia Toscana)	493
64	OECD average	493
	65 countries/sub-regions	<493



***PISA 2009 Results:***  
Nova Scotia claims it ranks 10<sup>th</sup> in the world. Proper analysis shows it ranks 17<sup>th</sup> among assessed countries and sub-regions.

This very same logic used by provinces to make comparisons of their PISA scores to others has been used by school districts as well. In New Brunswick, for instance, School District 18 publicly released the results for their own district based on PISA 2006, proudly trumpeting that the average score of 545 in science was head and shoulders above the New Brunswick average of 506, better than the national average of 534, and also added that the district was doing as well as some of the top performing provinces in the country. Of course, they were right, given the District 18 score of 545 rivalled Alberta's 550 average. And this is certainly commendable. What it fails to consider, however, is that the variance between the high and low performing school districts in Alberta is unlikely to be negligible. To put a point on it, the odds are that someone in Alberta is doing much better than 545 but that also means someone is likely doing worse as well – a reason why not even Alberta should be resting on its provincial laurels.

## **THE DIFFERENCE: WHAT THESE SCORES TELL US**

PISA results are reported using a scale where the average of all OECD countries is 500 points with a standard deviation of plus or minus 100. Further analysis on international results for the 2006 science assessment shows that a difference of 41 points from country to country represents about a one year difference in schooling. In other words, 15-year-olds enrolled in grade nine should score,

on average about 41 points lower than 15-year-olds enrolled in grade ten. It also means that if you take two countries which have their students at the same grade level at the same age, and one scores 41 points higher than the other, the lower scoring country's 15-year-olds are essentially a year behind the 15-year-olds in the higher scoring country. International analysis for the PISA 2003 math results put the difference at 36 points, while results for Canada in 2003 suggested a difference of 53 points between provinces represented a year of schooling.<sup>3</sup>

As for the latest PISA results, OECD suggests that a difference of 39 points in PISA 2009 scores is equivalent to one full year of schooling in international (country to country) comparisons. For Canada, however, a difference of 49 points in PISA 2009 science scores is equivalent to a full year of schooling.

Looking at the provincial results of the PISA 2009 science assessment, as shown in Table 7, the difference between the top (Alberta) and bottom (Prince Edward Island) scores is 50 points or a full year of schooling. Four other provinces (New Brunswick, Manitoba, Saskatchewan, and Newfoundland and Labrador) are between 44 and 27 points behind Alberta, meaning those provinces' 15-year-olds were basically more than a half year of schooling behind the top province in the country. Nova Scotia and Quebec are 22 and 21 points behind Alberta, meaning that their 15-year-olds are slightly less than half year of schooling behind Albertan 15-year-olds.

<sup>3</sup> Given the PISA 2003 results for Canada, a difference of 53 points math scores is estimated to equal one year of schooling. In practical terms this means that the 15-year-old 9<sup>th</sup> graders of the province with the higher score (higher by about 53 points) are as good (if not better) than the 15-year-old 10<sup>th</sup> graders of the province with the lower score. Vice-versa, this also means that the 15-year-old 10<sup>th</sup> graders of the lower score province are only as good as the 15-year-old 9<sup>th</sup> graders of the higher score province

Table 7: PISA 2009 Math Results and Provincial Rankings

Rank	Province	PISA 2009 Science Score
1	Alberta	545
2	British Columbia	535
3	Ontario	531
-	Canadian Average	529
4	Quebec	524
5	Nova Scotia	523
6	Newfoundland and Labrador	518
7	Saskatchewan	513
8	Manitoba	506
9	New Brunswick	501
10	Prince Edward Island	495

While the PISA 2009 results put Nova Scotia at a better place than in 2006, the improvement is not all that much to celebrate. Let's recall that the difference in math scores, for instance, between Alberta (549) and Nova Scotia (515) according to PISA 2003 was 34 points or about two-thirds of a year of schooling behind Alberta. The difference now (PISA 2009) is 22 points or slightly less than half a schooling year behind Alberta. In practical terms, a difference of a half year of school is significant.

To put things in perspective and to give practical meaning to the difference of a half year of schooling between 15-year-old Nova Scotians and 15-year-old Albertans, consider the following:

A typical school year in Canada consists of 194 school days (teaching days). Assume that the math curriculum for the 9<sup>th</sup> graders foresees teaching students how to solve both one-variable and two-variable equations during the entire school year. In the first half of the year, students will be taught about one-variable equations and in the second half about the two-variable equations. So, what the PISA score difference between Alberta and Nova Scotia is showing is that, on average, 9<sup>th</sup> graders in Alberta will be able to solve both one- and two-variable equations, while the Nova Scotia 9<sup>th</sup> graders will only know how to solve one-variable equations, on average.

## SO WHAT?

Let's not forget that Canada, as such, or the federal government to be more specific, does not deliver education to Canadians. Indeed, Canada's Constitution Act of 1867 stipulates that "In and for each province, the legislature may exclusively make Laws in relation to Education." Education, therefore, is one of the primary responsibilities of Canadian provinces and territories.

So for any province to boast about Canada's good scores in international assessments is to really appropriate credit from the good showings of provinces like Alberta, Ontario, and British Columbia. If one were to take out the scores of these provinces, the scores for "Canada" would be very close to the average OECD scores if not actually slightly below them.

One education official in New Brunswick compared the overall PISA results to an athletics event where Alberta is winning the race but the lowest ranked Canadian provinces are still making the finals. No problem there, right? Not quite.

The lowest ranked Canadian provinces, according to the PISA 2009 results, fall at OECD average level of scores and some even fall significantly below the OECD averages. It is hard to imagine a truly competitive athletic event where the average athletes all make it to the finals. Usually only the best prepared and fit make it to the finals, not the average ones.

It is this complacency that is most worrisome. By painting a picture that appears brighter than it actually is, the education system diminishes the urgency to make the necessary changes to improve.

Additionally, the OECD provided another insight to the importance of being open and transparent about assessment data in its analysis of the 2006 PISA results. It found that schools releasing performance data publicly at the school level, so not combined with other schools in a board or



provincial average which can hide the poor performers as well as the good, did significantly better on the PISA science assessment than those schools which did not release results at the school level. Perhaps more importantly, this was one the few variables analyzed by the OECD where the effect remained significant when socio-economic and demographic variables were considered. In short, putting results out in the open for people to see them creates the incentive to strive for better results.



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