SCHOOL CHANGE AND ABORIGINAL STUDENTS IN ELEMENTARY GRADE LEVELS IN BRITISH COLUMBIA

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ABSTRACT / RÉSUMÉ

This study utilizes British Columbia Ministry of Education administrative data associated with the school records of Aboriginal and non-Aboriginal students province-wide. Three cohorts of kindergarten students – 1996, 1997, 1998 – who attended elementary school in British Columbia[1] are examined. Comparisons include both on-reserve, or band-affiliated, students and non-band affiliated Aboriginal students as well as non-Aboriginal students. The study uses as its outcome variable the achievement of students in reading and mathematics on provincial standardized tests (Foundation Skills Assessments or FSAs) in Grades 4 and 7. School change (or mobility) is treated as a variable of particular interest. A logistic regression model extends the descriptive data with estimates of the odds of meeting FSA expectations while accounting for some individual-level characteristics as well as school mobility in each of the three student groups for the most recent (1998) cohort year.

Cette étude s'appuie sur les données administratives du ministère de l'Éducation de la Colombie-Britannique, ainsi que sur les dossiers scolaires des élèves autochtones et non autochtones à l'échelle de la province. Trois cohortes d'élèves de la maternelle – 1996, 1997, 1998 – ayant fréquenté une école primaire de la Colombie-Britannique[1] y sont examinées. Les comparaisons portent sur des élèves autochtones vivant dans les réserves, donc qui sont affiliés à une bande, des élèves autochtones non affiliés à une bande, de même que des élèves non autochtones. L'étude utilise comme variable de résultat le rendement en lecture et en mathématiques des élèves de 4e et de 7e années lors des tests standardisés provinciaux (Évaluation des habiletés de base). Le changement d'école (ou mobilité) y est traité comme une variable d'intérêt particulier. Un modèle de régression logistique utilise les données descriptives plus avant afin d'estimer la probabilité de répondre aux attentes de l'Évaluation des habiletés de base en tenant compte de certaines caractéristiques au niveau individuel et de la mobilité scolaire dans chacun des trois groupes d'élèves pour la plus récente (1998) année de la cohorte.

THE STUDY

Equity in the school performance of Canadian Aboriginal students compared to non-Aboriginal peers has long been a concern of educators and researchers. A base of research exploring differences in school experiences and pedagogies between Aboriginal and non-Aboriginal peoples has been established (see Aman 2006 for a fuller review). This study extends exploration of a demographic factor that may contribute to school success – that of school mobility or changing schools *not* due to grade promotion. The change of schools may involve a move across a school district, or across the province to another community. The underlying causes and prevalence of student mobility are not well documented in Canadian educational contexts, though several researchers have confirmed that migration on and off reserves occurs in Aboriginal populations (see Clatworthy 1995; Cooke 2002; Norris and Clatworthy 2003; Siggner and Costa 2005). Aboriginal mobility has been tied to pursuit of employment availability and higher education opportunities, cultural practices and responsibilities, housing issues, foster care and dynamics in extended families.

Previous research (Aman and Ungerleider 2008) provides evidence that, when Aboriginal secondary school students change schools, their likelihood of graduating is substantially decreased. This study asks the question *is school change for Aboriginal students at elementary school levels similarly associated with negative outcomes?* The study compares the prevalence and possible consequences of changing schools on standardized test results in reading and numeracy at an early grade level (Grade 4) and a later grade level (Grade 7). Approximately 3% of the province's student population in any given year are band-affiliated students, whereas Aboriginal students not affiliated with a band make up 7% of the student population. The student group of non-Aboriginal students comprise 90% of the BC student population.

THE PREVALENCE OF SCHOOL CHANGE

A greater proportion of Aboriginal students in British Columbia change schools than non-Aboriginal students, and Aboriginal students change schools more frequently than non-Aboriginal students. There is little difference in both the proportion and frequency of school change between band[2] students and non-band Aboriginal students. By Grade 4, approximately 50% of Aboriginal students have *not* changed schools, in contrast with 65% of non-Aboriginal students (see Figure 1). Conversely, by Grade 4 approximately 25% of Aboriginal students have changed schools two or more times, where only 11% of non-Aboriginal students have moved schools this frequently. By Grade 7 approximately 40% of Aboriginal students have changed schools two or more times, in comparison to 22% of non-Aboriginal students (see Figure 2). Students typically have higher rates of school change within districts; however band students frequently are more mobile across school districts than within school districts.

FIGURE 1: Average Number of School Changes by Grade 4 Over Three Cohorts

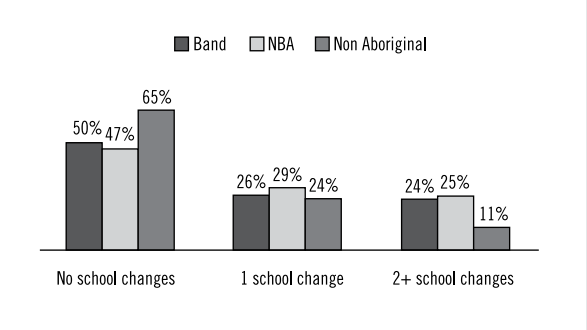
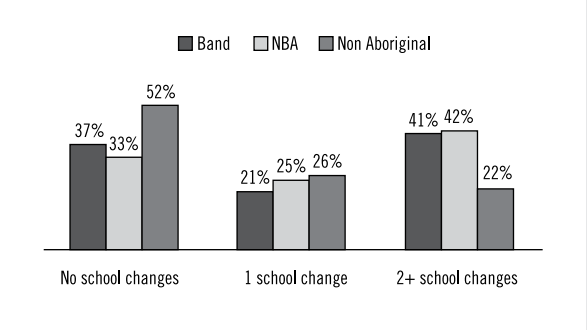
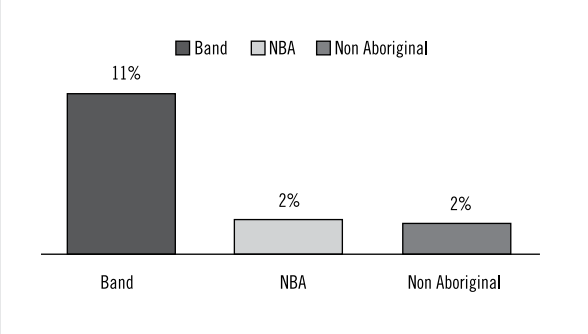


FIGURE 2: Average Number of School Changes by Grade 7 Over Three Cohorts



The school change rates presented here do not include the movement of new students to the province of British Columbia or the migration of students out of the province. In-migration rates are approximately 2% each year; equivalently, 2% of the cohort moves away from the province each year. However, there is a spike of new students to the school system enrolling after Kindergarten. These students include in-migrants as well as students who have deferred enrolment until Grade 1[3]. In other words, families of these young students are not registering their children in Kindergarten, legally an option, but waiting an additional year to enrol them in

FIGURE 3: Average Estimated Deferred Enrolment Rate



Grade 1[3]. Band students have substantially higher rates of deferred school enrolment than both non-band Aboriginal and non-Aboriginal students (see Figure 3). Deferred enrolment (though estimated) is one factor modelled in the second part of the study.

SCHOOL CHANGE AND FSA RESULTS

Foundation Skill Assessments (FSAs) are administered province-wide in British Columbia as a standardized measure of numeracy, reading and writing skills at Grade 4 and Grade 7. Students may be excused from test participation by prior arrangement of school administrators, or may be absent from school on test days. Non-participation rates are very low for non-Aboriginal students, higher for non-band Aboriginal students and highest for band students.[4] This is in part due to the higher rates of students who are not at grade level by Grade 4 or Grade 7 among Aboriginal groups, particularly band students.

When the rate of meeting grade level expectations is calculated for the entire cohort, school change is *typically associated* with lower success rates on Numeracy FSA Grade 4 (see Figure 4) and Numeracy FSA Grade 7[5] (see Figure 5). Yet for band students, school change is not negatively associated with meeting numeracy grade-level expectation rates. Rather, students who move a single time have nearly *equivalent or higher* numeracy success rates than those who never change schools.

Students typically have lower success rates on the Reading FSAs compared to Numeracy FSAs. When results of the Reading FSAs are examined, a similar pattern emerges regarding school change and the band student group. School change in the other student groups is generally associated with a decreased rate of students meeting grade-level expectations. As with the numeracy success rates of band students, school change is associated with *equivalent or marginally improved rates* of meeting expectations (see Figures 6 and 7)[6] in reading. Frequent school change (two or more changes) is associated with lower success rates for both non-band Aboriginal and non-Aboriginal groups on both exams at both grade levels. This pattern of decreased success rates associated with *increased* number of school changes is less evident in the band student group.

FACTORS AFFECTING STUDENT GROUPS

While school mobility does not appear to have the same negative association with success rates on FSAs across student groups, it cannot be overlooked that band success rates on FSAs are profoundly lower than their non-band peers and non-Aboriginal peers. What demographic factors related to the available student administrative data may account for this finding?

As noted above, a large proportion of band students (estimated at 11%) do not attend kindergarten, deferring entry to school until grade one. Band students subsequently have one less year in the system and have substantially lower success rates on both Reading and Numeracy FSA Grade 4 and 7 exams.

FIGURE 4: Average Cohort Rate of Meeting Expectations on Numeracy FSA Grade 4

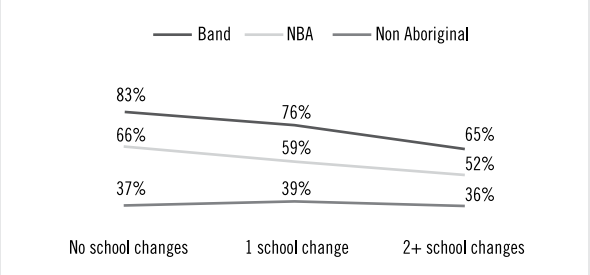


FIGURE 5: Average Cohort Rate of Meeting Expectations on Numeracy FSA Grade 7

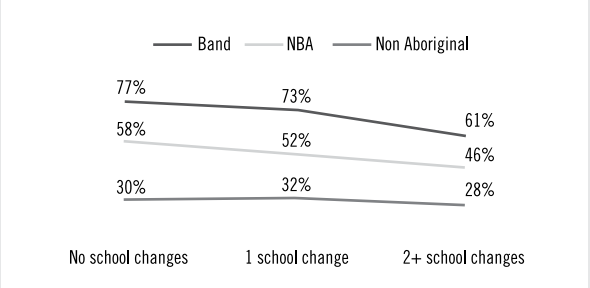


FIGURE 6: Average Cohort Rate of Meeting Expectations on Reading FSA Grade 4

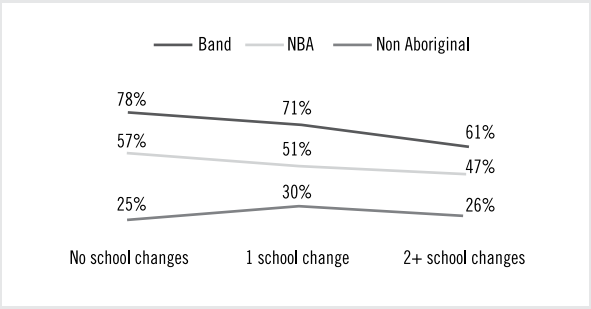
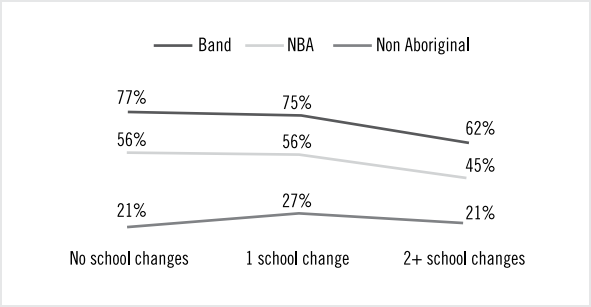


FIGURE 7: Average Cohort Rate of Meeting Expectations on Reading FSA Grade 7

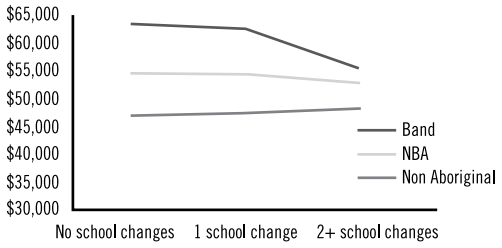


Band students are also unique in that a substantial percentage (approximately 23%) of them has enrolled in band-operated schools at some time in their elementary school trajectory.[7] Comparing band students who have ever enrolled in band schools to band students who have never enrolled in band schools yields mixed findings. Students who have enrolled in a band-operated school have decreased success rates in reading skills on both the Grade 4 and 7 FSAs. Students who have enrolled in band schools at any time have lower success rates on Numeracy Grade 4. However, by Grade 7, when these band students *participate*[8] in the exam, the students have equivalent success rates in Numeracy. Band students who exit band schools (33%) for the public school system have increased success rates on both numeracy and reading compared to peers who remain in band schools. Enrolment in band-operated schools is modeled in the calculation of odds below.

Band students also differ from the other student groups in that school change is associated with change to neighbourhoods with *higher* (on average) income levels[9] (see Figure 8). This differs for non-band and non-Aboriginal students whose school change is associated *with lower* (on average) neighbourhood income levels whether they move a single time or more frequently.[10] This socioeconomic indicator was used in the modelling, though is not explicitly presented in the table below.

School choice is another factor that disproportionately applies to student groups. In British Columbia French immersion programs and independent schools[11] are available options, but do not enrol equivalent shares of the student population. Very few band students have ever enrolled in French immersion programs, for example. The proportion of Aboriginal students to ever enrol in an independent school is half to a quarter that of non-Aboriginal students. Students ever enrolled in independent schools (approximately 16% of the student population) and in French immersion programs (approximately 9% of the student population) have higher success rates on both FSA exams. Students who change schools specifically to enter a French immersion program (approximately 6%) *or* to attend an independent school (approximately 4%) invariably have higher success rates than peers who change schools within the public school system, no matter which student group they belong to. Enrolment in band-operated schools, French immersion programs and independent schools is featured in the model below.

FIGURE 8: Average Neighbourhood Family Income and Number of School Changes by Grade 7



STUDENT GROUPS AND ODDS OF MEETING FSA EXPECTATIONS

In order to quantify and compare the odds of meeting expectations on FSAs, logistic regression was computed for each student group. The most recent cohort, 1998, was used in the modelling procedure.[12] While the ability of the models to account for individual variance in meeting expectations results is weak,[13] the calculation of

FIGURE 9: Odds of Meeting Expectations on Grade 4 and Grade 7 FSAs

	NUMERACY FSA 4			READING FSA 4			NUMERACY FSA 7			READING FSA 7		
BAND												
		CI LOWER	CI UPPER		CI LOWER	CI UPPER		CI LOWER	CI UPPER		CI LOWER	CI UPPER
Constant	0.45***			0.28***			0.37***			.14***		
Ever changed schools	1.00ns	0.89	1.12	0.91ns	0.80	1.03	1.00ns	0.92	1.08	1.03ns	0.95	1.13
Gender	1.08ns	0.86	1.35	1.45**	1.13	1.86	1.19ns	0.94	1.50	1.61**	1.23	2.12
Possible deferred Kindergarten	0.81ns	0.58	1.12	0.68**	0.47	0.99	0.81ns	0.57	1.15	0.70*	0.45	1.06
Ever enrolled at an independent school	1.35ns	0.93	1.95	1.17ns	0.79	1.73	1.47**	1.00	2.13	2.00**	1.35	2.98
Ever enrolled at a band-operated school	0.56***	0.41	0.75	0.43***	0.30	0.62	0.83ns	0.62	1.11	0.55**	0.38	0.80
NON-BAND ABORIGINAL												
		CI LOWER	CI UPPER		CI LOWER	CI UPPER		CI LOWER	CI UPPER		CI LOWER	CI UPPER
Constant	1.34*			0.47***			0.88ns			0.32***		
Ever changed schools	0.77***	0.72	0.82	0.83***	0.78	0.88	0.82**	0.79	0.62	0.85***	0.81	0.89
Gender	0.97ns	0.84	1.11	1.29***	1.13	1.47	1.16ns	1.02	1.33	1.66***	1.45	1.91
Possible deferred Kindergarten	0.68**	0.48	0.96	0.86ns	0.60	1.21	0.78ns	0.54	1.11	0.99ns	0.69	1.42
Ever enrolled in French immersion	1.80***	1.31	2.48	1.61**	1.19	2.15	1.63***	1.26	2.11	2.11**	1.62	2.72
Ever enrolled at an independent school	0.82ns	0.62	1.09	0.91ns	0.69	1.20	1.01ns	0.77	1.33	1.13ns	0.85	1.50
NON-ABORIGINAL												
		CI LOWER	CI UPPER		CI LOWER	CI UPPER		CI LOWER	CI UPPER		CI LOWER	CI UPPER
Constant	2.42***			1.07ns			1.27***			1.02ns		
Ever changed schools	0.68***	0.66	0.70	0.72***	0.70	0.74	0.75***	0.74	0.77	0.78***	0.77	0.80
Gender	1.00ns	0.94	1.05	1.45***	1.38	1.53	1.10***	1.05	1.16	1.48***	1.41	1.55
Possible deferred Kindergarten	0.67***	0.59	0.77	0.77***	0.68	0.88	0.83**	0.72	0.94	0.89*	0.79	1.01
Ever enrolled in French immersion	1.30***	1.17	1.44	1.21***	1.09	1.32	1.58***	1.46	1.72	1.57***	1.47	1.70
Ever enrolled at an independent school	0.80***	0.75	0.86	0.99ns	0.93	1.06	1.30***	1.23	1.38	1.35***	1.27	1.43

Note: *** Significant at < 0.001; ** significant at < 0.05; * significant at < 0.10; ns is non-significant.

odds associated with individual factors and meeting expectations on different FSAs is of great interest. Odds higher than 1.00 indicate a student has a higher than even chance of meeting expectations. Odds lower than 1.00 indicate the reverse – a student has a lower than even chance of meeting expectations. Odds should be interpreted keeping in mind that the success rates differ among the three groups.

There are stark differences between the student groups regarding the odds of meeting expectations on both FSAs at both grade levels (see Figure 9). As evident in the descriptive data, band students have substantially lower success rates than both non-band Aboriginal peers and non-Aboriginal peers. When other student characteristics are considered this does not change. However, there are some variables that have a significant effect on the odds of meeting expectations within student groups.[14] These differ slightly over exams and over grade levels.

School change – the variable of greatest interest in this study – operates differently across the student groups across the elementary grade trajectory. For band students school change is not significant and odds of meeting the expectations on FSAs remain even. This differs from school change within the other two student groups. For non-band Aboriginal students, odds of meeting expectations when school change has occurred are substantially lower at both grade levels and on both exams (more so on Numeracy Grade 4). The odds ratios regarding school change are in accord with the descriptive data.

Gender is another variable represented in the model.[15] For band students, gender is not significant in Numeracy Grade 4 and Grade 7 odds. In other words, being female does not convey a statistically significant advantage in the odds of meeting expectations for that exam, though the trend is in favour of females. Gender is significant for band students on Reading FSAs however. At Grade 4, band-affiliated females have a greater chance of success than band males (odds are 1.45); at Grade 7, an even higher chance than band males (odds are 1.61). Similarly, in numeracy, non-band Aboriginal females do not have *significantly* higher odds than males at either grade level (though there is a trend for female higher odds on the Grade and Numeracy exam). Yet the odds of success are always significantly higher for females in reading. Again gender is not significant in non-Aboriginal females on the Numeracy Grade 4 FSA. It achieves significance by the Grade 7 exam. Gender is significant on both grade level Reading FSAs. Being female is an advantage again in non-Aboriginal groups.

Descriptive data suggests that students who began at Grade 1 in the British Columbia school system (whether due to migration to the province or to deferred entry to school) have lower success rates. This is especially of interest in the band student population, where over 10% of students fall into this category. A clear negative association exists with deferred enrolment, though the lower odds are not statistically significant across all exams. Band students who have possibly deferred school entry have lower odds of meeting expectation on the Grade 7 Reading FSA (odds are .70) than band peers who have enrolled at Kindergarten. The same holds true in the non-band Aboriginal population. In the non-Aboriginal population, deferred entry to school is statistically significant and lowers odds of meeting expectations at both

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grade levels and on both exams. For all groups, deferred school entry appears to be associated with odds lower in numeracy compared to reading.

There are two school contexts where students generally exhibit higher odds of success. These are French immersion schools[16] and independent schools. The model confirms that for both non-Aboriginal band students (a very small number) and for non-Aboriginal students ever enrolled in French Immersion schools odds are indeed significantly higher at both grade levels and both exams. Enrolment in independent schools always confers higher odds for band students compared to those band students never enrolled in independent schools and achieves significance at the Grade 7 level. Conversely, for non-band Aboriginal students, enrolment in independent schools does not appear to confer a positive effect with the exception of the Grade 7 Reading exam. The association of students and enrolment in independent schools is more ambiguous on Grade 4 exams. At the earlier grade level, results are insignificant for some groups and negative for non-band and non-Aboriginal students.[17]

Finally, for band students there is an additional student context where students exhibit lower odds of meeting expectations. Band students enrolled in band-operated schools have lower odds of meeting expectations on both numeracy and reading exams in both grade levels (though not significantly on Numeracy Grade 7) than band students who have never enrolled in band-operated schools. For example, odds of meeting expectations on Grade 7 Reading FSAs (0.55) are lower than Numeracy FSAs (0.83).

CONCLUSION

This research provides some data-driven information on an issue rarely formally examined in Aboriginal education research. School change – the variable of greatest interest in this study – operates differently across demographic groups across the elementary grade trajectory when provincial student populations are analyzed. Aboriginal student groups more frequently change schools than non-Aboriginal students. Calculation of

odds ratios supports descriptive information regarding school change and meeting FSA expectations while shedding light on the influence of additional demographic/schooling choice factors. The influence of factors that cannot be represented in administrative data such as pedagogy and cultural fit of schooling practices or community history is unknown.

For band students the mobility factor lowered odds on one exam – Reading Grade 4. For all other FSAs, school change is not significant for band students and odds of meeting the expectations on FSAs remain even. For the other Aboriginal group, non-band Aboriginal students, school change – even a single school change—is associated with decreased success rates. This pattern is similar to that evident in non-Aboriginal peers, where mobility appears to be even more sharply associated with lower success rates. The anomalous band student results must be considered within the context of substantially lower success rates exhibited within this student group. Additionally, the possibility that the context of lowered socioeconomic neighbourhoods (on average) for band students and more common deferred enrolment could be important factors in understanding the phenomenon of little effect associated with school change. The association of enrolment in band-operated schools and decreased odds of success of these band students is also of critical concern for band students. This data cannot address the causes of school mobility or directly assess the causes of different school outcome results associated with mobility. Despite this limitation, understanding the extent of student mobility and locations where student mobility rates are high may assist educators and advocates of Aboriginal students in working toward consistently higher graduation rates and achievement in school.

FOOTNOTES

[1] Those students joining the cohort from beyond BC at later grade levels are also included. However, English as Second Language students are not included.

[2] School change rates vary widely across individual bands. Across bands where there are 20 or more students in the cohort, rates of two or more school changes range from 14 to 64% depending on the cohort year.

[3] The impact of deferred enrolment has not been addressed in the school attainment research.

[4] Non-participation rates vary by group. Approximately 27% of band students do not participate in Grade 7 FSAs, compared to 18% of non-band Aboriginal students and 9% of non-Aboriginal students. Band students have three times the excused status, three times the absent on test day rate, and five times the not-at-grade-level rate compared to non-Aboriginal students.

[5] The same holds true when success rates are calculated including only exam participants. In this report, cohort rates are presented. An interesting phenomenon occurs within the band student group.

[6] This is also true when only exam participants are used in the calculation of the success rate.

[7] Negligible numbers of non-band students or non-Aboriginal students are ever enrolled in band schools.

[8] This does not hold true in the examination of the cohort rate.

[9] Average family income at the residential postal code level is used as a proxy indicator of socioeconomic conditions. This data is provided by the Statistics Canada Census 2001 Survey. In this study, average family income is unavailable for a large percentage of band students (10%) in contrast to 1% in non-band Aboriginal students and non-Aboriginal groups.

[10] Though studies in education typically rely on proxy measures of individual student SES, the connection between lower SES is widely suggested to be comorbid with decreased education attainment.

[11] In British Columbia, independent schools may be either denominational or traditional, university-preparation styled institutions.

[12] The 1998 Kindergarten cohort is the smallest cohort (n=39,709). The results of band students on Grade 4 FSAs are similar to preceding cohort years. Results of band students on Numeracy Grade 7 show a modest increase from preceding cohorts; and results in Reading Grade 7 a modest decline.

[13] The percentage correct prediction values improve from the empty model to fuller models by 1 to 3% across student groups.

[14] Female advantage is evident in most measures of academic success in elementary grade levels in reported British Columbia results. See for example British Columbia Ministry of Education (2008).

[15] The socioeconomic indicator was positive and highly significant in all groups for both exams and grade levels. However, because of the small incremental differences in family income levels, the increased odds associated with students residing in higher average family income postal codes appears as nearly 1.00. The confidence interval is 1.000-1.000.

[16] Less than thirty band students were enrolled in French immersion schools, so results are not represented here.

[17] In preceding cohort years the pattern of lower success rates on the Numeracy Grade 4 FSA for non-Aboriginal students ever enrolled in independent schools compared to peers in public schools holds true. For non-band Aboriginal students success rates are slightly higher for students ever enrolled in independent schools in preceding cohort years.

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