Towards an Understanding of Gender Differences in Literacy Achievement

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About the Education Quality and Accountability Office (EQAO)

The Education Quality and Accountability Office (EQAO) is an independent provincial agency funded by the Government of Ontario. EQAO’s mandate is to conduct province-wide tests at key points in every student’s primary, junior and secondary education and report the results to educators, parents and the public.

EQAO acts as a catalyst for increasing the success of Ontario students by measuring their achievement in reading, writing and mathematics in relation to Ontario Curriculum expectations. The resulting data provide a gauge of quality and accountability in the Ontario education system.

The objective and reliable assessment results are evidence that adds to current knowledge about student learning and serves as an important tool for improvement at all levels: for individual students, schools, boards and the province.

About EQAO Research

EQAO undertakes research for two main purposes:

• to maintain best-of-class practices and to ensure that the agency remains at the forefront of large-scale assessment and
• to promote the use of EQAO data for improved student achievement through the investigation of means to inform policy directions and decisions made by educators, parents and the government.

EQAO research projects delve into the factors that influence student achievement and education quality, and examine the statistical and psychometric processes that result in high-quality assessment data.
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INTRODUCTION

It is generally accepted that teachers and schools have significant influences on student achievement and growth. Increasingly, public education is being held accountable to demonstrate its efforts to ensure not only high levels of student achievement but also equality of outcomes for students. However, there remain significant differences in students’ success across schools and gaps between groups continue to exist. In response, education policies and practices are being developed around targets to address achievement levels and gaps therein. In order for efforts and expenditures to be worthwhile and informative, it is necessary to understand the nature and impact of these efforts and the contexts that may best support successful policies, initiatives, and practices.

Currently, educational achievement in Ontario is monitored through the provincial testing program administered by the Education and Quality Accountability Office (EQAO). Through EQAO, it is now possible to track student achievement in literacy at the student, school, and board levels. Researchers and, increasingly, practitioners are similarly interested in determining what teacher and school factors are related to student achievement and success. The student, teacher, and school data collected by EQAO and the Ministry of Education have made it possible for researchers to begin to identify those factors associated with student achievement. Further, advanced statistical techniques, most notably hierarchical linear modelling (HLM), have also made it possible to identify student and school factors associated with achievement and any gaps that exist. Such previous research acknowledges that the majority of differences in student success are attributable to differences among students (e.g., Klinger, Rogers, Anderson, Poth and Calman, 2006; Ma and Klinger, 2000). However, there remain significant differences in students’ success across schools, even when student factors are accounted for. While schools and teachers have significant influence on student achievement, the specific nature of the impact of teachers and schooling has been much more difficult to establish. Our work provides an initial exploration of such differences, focusing on the literacy achievement gaps that exist between girls and boys in elementary schools in Ontario. The work is a collaborative research effort by researchers at Queen’s University and the outreach team at the Education Quality and Accountability Office.

GENDER DIFFERENCES IN ACHIEVEMENT

Gender differences in achievement have been widely reported. For instance, in the most recent administration of the Programme for International Student Assessment (PISA), female students outperformed male students in literacy in every country (OECD, 2001, 2002). At the same time, the historical gender gap in mathematics and science in which boys previously outperformed girls continued to decline with no meaningful differences being found in mathematics achievement in several countries. Canadian research has served to further confirm these findings (e.g., Klinger, Rogers, Anderson, Poth and Calman, 2006; Ma and Klinger, 2000; Rogers, Ma, Klinger, Dawber, Hellsten, Nowicki and Tomkowicz, 2006). The reasons for these decreasing gaps in mathematics and science and ongoing gaps in literacy remain of interest to researchers and practitioners (e.g., Gray, Peng, Steward and Thomas, 2004; Halpern, Benbow, Geary, Gur, 2000; Rogers, Ma, Klinger, Dawber, Hellsten, Nowicki and Tomkowicz, 2006).
Hyde and Gernsbacher, 2007; Younger, Warrington and McLellan, 2002). At the same time, researchers and practitioners are interested in the persistent literacy gap favouring females. While gender gaps in literacy achievement favouring females are consistently found across jurisdictions, in some schools, male and female performance has been shown to be broadly similar. For example, a review of the British General Certificate of Secondary Education examinations revealed that although girls were performing better on average than boys, almost half the schools in the country had males and females progressing at almost equal rates—that is, with little to no gap between boys and girls (Gray, et al, 2004). However, these schools with little to no gap also tended to have lower overall student achievement. Such a finding highlights the complexity of achievement issues, and these interactions in academic performance across schools point to the need to better understand the different ways gender differences may occur in different school contexts (Gray et al, 2004). Researchers are only now beginning to examine the contextual factors and policy implications as they relate to the differences in male and female literacy achievement.

Prevalence of Gender Differences in Literacy Development

There are a number of points of comparison between males and females in terms of academic skills and cognitive processes. Certainly, there is no evidence that enables either gender to claim overall superiority in terms of academic achievement. However, reported findings do identify sets of skills and abilities for which the members of that gender typically excel. For instance, females have been described as more people oriented while males are often more object oriented in their interests (Lippa, 1998). The causes and reasons for these observed differences are less clear.

Girls and boys develop neither at the same biological rate nor at the same cognitive rate. Since girls generally develop earlier than boys, researchers often attribute their superior early-reading skills in part to this biological factor (Halpern, 2006). Females have an ability to learn and use language that starts as early as the first two years of life. Average vocabulary growth demonstrates this advantage: beginning with a mean 13-word difference favouring girls at 16 months, which grows to a 51-word difference at 20 months and a 115-word difference at 24 months. This gap in acquired vocabulary was even shown to occur, to some degree, above and beyond input, that is, how much mothers talked to their children (Huttenlocher, Height, Bryk, Seltzer and Lyons, 1991).

The prevalence of gender differences in reading performance is somewhat divided. Certainly, studies have commonly provided evidence for girls’ consistent superior performance in reading and writing (e.g., Arnot et al, 1999; Flynn and Rahbar, 1994; Scroggins, 1993; Younger, Warrington and McLellan, 2002). However, the size of the reading achievement gap varies and has been found to be non-existent in some cases (e.g. Davies and Brember, 1999; Hyde and Linn, 1988; Rowe, 1991; Willingham and Cole, 1997). Nonetheless, there are no reported studies in which boys performed better than girls in reading and writing. Nor is this higher academic performance by female students in literacy a new phenomenon. Girls’ superior performance in reading has been a widely observed, relatively static pattern for at least the last forty years (for a review, see Hedges and Nowell, 1995).

PISA is an international measure of achievement of 15-year-old students in literacy, mathematics and science, and is conducted every three years. Each time the test is administered, one of the
subject areas is emphasized, while the other two are given less emphasis. In 2000, the most recent administration of the literacy-focused PISA, girls performed significantly better than boys in reading in all 32 participating countries, as well as in all Canadian provinces (OECD, 2002). Canadian girls scored a mean of 551 and boys a mean of 519, achieving scores second only to Finland’s. In its most recent administration in 2006, science was emphasized and literacy less so, but results on the literacy component showed the same pattern: females were performing better on average than males in all 57 participating countries. According to the Canadian PISA 2006 results, girls had a mean score of 543 and boys a mean score of 511 on measures of reading. Similar patterns have been found on the Progress in International Reading Literacy Study (e.g., Martin, Mullis, Gonzalez and Kennedy, 2003; Ogle et al, 2003), designed to assess a wide range of reading skills and strategies in Grade 4 (average age of 10 years). Grade 4 girls performed significantly better than Grade 4 boys in all 35 participating countries.

Examining the Gender Gap in Reading Performance

One of the most comprehensive Canadian studies carried out in the last ten years on the subject of gender differences in reading development was published in 2002 by Phillips, Norris, Osmond and Maynard, who sought to track the relative reading performance of boys and girls from Grade 1 to Grade 6. They were seeking to determine the extent to which the gender differences in reading achievement were immutable, that is, “to what degree does the gap in early reading performance between boys’ and girls’ reading remain unchanged over years of schooling?” Using the comprehension test within the Gates-MacGinitie Reading Tests (MacGinitie, Kamons, Kowalski, MacGinitie and MacKay, 1978), which measures decoding ability as well as comprehension, students were categorized based on their performance at each grade level (“average,” less than one standard deviation (SD) from the mean; “above average,” one or more SD above the mean; and “below average,” one or more SD below the mean). Through Grades 1 to 3, there were greater proportions of boys than girls in the below-average category and a lower proportion of boys than girls in the average and above-average categories. By the end of Grade 4, there was no relationship between gender and reading category, and neither was there a difference in Grades 5 and 6. That is, the proportions of boys and girls in each of the three categories became more equal. Over time, the proportion of girls in the below-average category doubled, becoming approximately equal to the proportion of boys. Further, the difference in the proportion of boys and girls in the average category decreased, and the proportions of boys and girls in the above-average category remained the same (Phillips et al, 2002). Thus a reduced difference between boys and girls was achieved because of decreasing performance by girls in the junior grades (more girls in the below-average category) and an equalling of the proportion of boys and girls in the average category. These findings are contrary to the finding that reading performance is immutable between Grade 1 and Grade 4, that is, the probability that a poor reader in Grade 1 will be a poor reader in Grade 4 is 0.88. (Juel, 1988).

Phillips et al (2002) found that the middle of the distribution contained the least difference: for children who were in the average category in Grade 1, the probability that they would be average in Grade 6 was 0.76, and the proportions for boys and girls were nearly equal; the probability that average readers would become below-average was 0.13, and 0.11 that they would improve to above-average (Phillips et al, 2002). Students reading at an above-average level in Grade 1 had a zero percent probability of shifting to below-average, and about an equal probability that they would be reading at an average or above-average level in Grade 6. For below-average readers in Grade 1, there was a 0.53 probability that they would improve to average by Grade 6:
a 0.50 probability for boys and a 0.60 probability for girls. Although 70% of the students in the Phillips study remained in the same category in Grade 6 as they had been in Grade 1, category movement for 30% of the students gives support to the notion that reading skills are perhaps more mutable than previously assumed (Phillips et al, 2004).

Phillips et al (2004) pointed out the policy implications for the results of their study. Immediate identification and intervention for students who decrease by a category would greatly help to keep achievement on track. Further, their data challenges the widespread notion that reading achievement is immutable, allowing interventions to potentially have more of an effect for older struggling readers than previously thought possible (Phillips et al, 2004). However, the use of classification categories for comparison is not without its potential flaws. Measurement error, combined with regression towards the mean may result in changes in classification that are associated with very small changes in student performance. Certainly, the longitudinal nature of their study likely minimized this effect but it would not eliminate it. Further, classification categories may mask differences in reading achievement within a category. For example, girls that shifted from the average to the below-average category could have been in the lower portion of the average category and were now in the upper portion of the below-average category. Thus there may be gender differences in the location of boys and girls within each category that Phillips et al did not measure or identify.

In his review of 2,296 American students from kindergarten to Grade 1, Chatterji (2006) examined the magnitude of early reading gaps and the extent to which these gaps changed as students experienced their first full year of reading instruction. A gap between girls’ and boys’ reading performance became apparent as formal reading instruction began in Grade 1 (boys were -0.31 SD units below girls, \( p < .05 \), after controlling for socio-economic status [SES] and ethnic differences), whereas small differences in kindergarten “increased and appeared to consolidate” as children approached the end of Grade 1 (p. 502). However, the reading gaps in kindergarten were more associated with SES than with the student’s gender (low-SES children were between \(-0.61 \) and \(-1.0 \) SD below high-SES children). Chatterji noted that smaller class sizes and more time devoted to reading instruction appeared to produce positive effects on low-SES children’s reading performance.

**Performance at the Ends of the Distribution**

In their review of six studies (which together spanned the years 1960 to 1992) using national probability samples of students between the ages of 13 and 22 to provide an accurate sample of the total population, Hedges and Nowell (1995) examined gender differences in reading comprehension, writing, and other academic subjects (e.g., math, science). Overall, females performed slightly better in reading and substantially better in writing, and males performed better in math and science (Hedges and Nowell, 1995). Examining mean scores, the variance of these scores and the numbers of students with scores in the top or bottom 10% across these six data sets, they discovered that boys tended to be more variable in their cognitive performance (including reading comprehension and writing) and represented greater proportions at the low and high ends of skill distribution than females—in particular, boys were found in greater proportions near the bottom of the distribution (bottom 10%) for reading comprehension and writing than girls and lower proportions in the top of the distribution (top 10% and top 5%). In comparison, for those in the average (middle) portion of the distribution, the difference between
boys and girls was not as great as at the ends of the distribution (high and low ability) (Hedges and Nowell, 1995; McGillicuddy-De Lisi and De Lisi, 2002).

Examining the changes over time, Hedges and Nowell (1995) noted the gap narrowed somewhat over time in math and science, but not in reading and writing—for writing in particular, boys remained “at a rather profound disadvantage” compared to girls (p. 45). Despite the narrowing gap in math and science performance, the authors concluded that the variance of within-group scores changed very little over time: boys remained more variable in achievement throughout the time period between 1960 and 1992.

**Gender Differences in Learning and Reading Disabilities**

One of the most widely reported differences between males’ and females’ reading performance occurs with respect to reading disabilities. Gender differences in the frequency and severity of reading disabilities is an important, real issue in education (Halpern, 2006). For example, boys are twice as likely as girls to be identified with dyslexia, but boys are much more likely than girls to have milder forms of reading disabilities (Rutter, Caspi, Fergusson, Horwood, Goodman, Maughan et al, 2004). Similarly, twice as many boys than girls are identified for referral to educational psychologists (Vardill, 1996), and significantly more boys than girls are found in remedial reading classes (Alloway and Gilbert, 1997).

Ratios of boys to girls referred for additional assistance have been shown to differ depending on the identification method used. Consequently, the ratio of males to females identified with a reading difficulty can vary widely. Using clinical or referral methods, ratios range from 2:1 to 15:1 (boys to girls) (e.g., Vogel, 1990); however, research-identified samples have often shown a ratio as close as 1:1 (e.g., Harlaar, Spinath, Dale and Plomin, 2005; Hawke, Wadsworth and DeFries, 2006). Despite these differences due to method of identification, it remains typical to have more boys than girls identified with reading disabilities in the school system.

Shaywitz, Shaywitz, Fletcher and Escobar (1990) suggested that teachers tended to disproportionately diagnose boys with learning problems, while research-identified criteria identified a more even ratio of boys to girls. School personnel in the Shaywitz study had identified a higher percentage of males in both second (13.6% of boys, 3.0% of girls) and third (10.0% of boys, 4.2% of girls) grades. In contrast, when research-identified methods were used, Shaywitz et al found no significant differences in the prevalence of reading disability for boys compared with girls in the second (8.7% of boys, 6.9% of girls) and third (9.0% of boys, 6.0% of girls) grades. One of the strengths of this research project was that the research team was able to use a stratified random sampling procedure, ensuring statistically equivalent samples. Based on their research design and the findings, the authors concluded that school-identified samples may be subject to a selection bias based on patterns of behaviour as opposed to strictly academic difficulties (Shaywitz et al, 1990).

In her review of the research on gender differences in typically achieving students and children with a learning disability (LD), Vogel (1990) found a general female advantage for verbal and reading ability in typically achieving children, with gender differences varying according to age, measures used, magnitude of achievement between groups and variability within groups. Students with learning disabilities had a more varied pattern depending on the method used to identify LD status (that is, system-identified or research-identified). Vogel reported a 4:1 selection ratio (boys to girls) in learning disability programs and between a 6:1 and 3:1 selection...
ratio for reading disability diagnoses. Girls with inattention problems were less likely to be identified because their behaviour was not always differentiated from good behaviour, although achievement was low. Vogel suggested that girls would likely have to be more severely impaired or have a larger discrepancy between aptitude and achievement in order to be identified.

A subsequent study of 708 American children investigated the validity of referral programs examining those students who were either test-identified or school-identified for reading failure (Flynn and Rahbar, 1994). “Teacher-identified” was defined by enrolment in LD programs and Chapter One (a government-legislated program that provides financial assistance to support students from low-income families), as identification for student placement in these programs relied largely on teacher referral. Teacher-identified students for special assistance exhibited a large gender difference, 2.5 boys identified for every girl for LD programs, while similar percentages of boys and girls were identified for Chapter One (for which qualification depended much more on a selection protocol and standardized measures). “Test-identified” was defined as referral based on performance on nationally standardized tests. Using the scores from these group-administered standardized tests, between 1.1 and 1.4 boys failed in reading for every girl. This ratio applied both to groups below the 10th percentile and those between the 11th and 30th percentile—that is, the bottom 30% of students (Flynn and Rahbar, 1994).

Such results suggest a potential gender-selection bias for reading disabilities. Nonetheless, contrary evidence exists. In a review of four epidemiological studies carried out in Britain and New Zealand, Rutter and his colleagues sought to provide evidence regarding the “nature, extent, and significance of sex differences in reading disability” (Rutter, Caspi, Fergusson, Horwood, Goodman, Maughan, Moffitt, Meltzer and Carroll, 2004; p. 2,007). Each of the studies carried out word reading and IQ tests on the students in their samples, all of whom were between seven and 15 years of age. Rutter et al used two methods to calculate reading disability: non-IQ-referenced (lowest 15% of the distribution in reading) and IQ-referenced (participant’s reading ability more than one SD below what was predicted by IQ-test performance). Contrary to the findings above, in all four epidemiological studies boys had substantially more referrals for reading disabilities than did girls regardless of the method of identification for referral (that is, IQ-referenced or not).

It has been suggested that behavioural problems might be interfering with the identification of reading problems and the provision of support. As early as preschool, children exhibit different social behaviours associated with emergent literacy skills; problems with emergent literacy are associated with aggressive misbehavior, and fewer pro-social behaviours are noted for boys but not for girls (Doctoroff, Greer and Arnold, 2006). That is, boys who are experiencing difficulty with early reading act out, while girls experiencing the same difficulty do not. This pattern may contribute to the over-identification of boys as learning disabled because of increased negative attention from teachers (Keenan and Shaw, 1997), contributing to cycles of misbehaviour and learning problems that are more visible in boys than in girls (Stowe, Arnold and Ortiz, 2000).

In an effort to determine whether the origins of reading difficulties were different for boys and girls with severe reading impairments, Hawke, Wadsworth, Olson and Defries (2007) tested sets of twins (monozygotic or identical, same-sex dizygotic or fraternal and opposite-sex dizygotic or fraternal). No evidence was found for a different etiology of reading difficulties as a function of gender, suggesting that the same genetic and environmental factors contribute to reading difficulties in both boys and girls.
Addressing the Issue of Gender Differences in Literacy

There has been surprisingly little empirical research into the effectiveness of particular interventions to address the gap between girls’ and boys’ academic performance, or whether some strategies are more appropriate for certain school contexts than others (Gray et al, 2004). In order to evaluate strategies that aim to reduce the gap between male and female performance, Younger, Warrington and McLellan (2002) examined different approaches in place in the British school system at the secondary level. They grouped these approaches into four categories: organizational, individual, pedagogical and socio-cultural (2002). Organizational strategies were defined as whole-school approaches that attempted to change the culture of the school to one where achievement was the norm and was celebrated. Individual approaches were those that focused on certain children and involved some type of individual target-setting. Pedagogical strategies involved work at the classroom level and included interactions and dynamics within the classroom as well as teaching and learning styles. Socio-cultural approaches attempted to influence or change “images of laddish masculinity” (Younger et al, 2002; p. 393) held by peers, family and the community—making it cool and desirable for boys to learn and be intelligent.

The authors found that the four types of strategies were effective in generally improving achievement, but that the gender gap did not consistently narrow at any of the schools examined. Organizational strategies that established a culture of achievement were widely accepted by staff and policy makers. The most effective individual-based approaches gathered performance data to assist in target-setting (e.g., use of data, regular monitoring and feedback, mentoring). Schools that adopted a socio-cultural approach focused on students who were role models and social leaders, thereby influencing the majority of students indirectly. Unfortunately, the pedagogic approaches were not as well developed as other strategies in this study and it was unclear how these would be operationalized.

Challenges included building capacity in order to fully deliver and sustain these strategies so that they were delivered consistently by all staff and over a long period of time—“most successful innovations only succeed when they are given time to mature, to become established” (Younger et al, 2002; p. 401). Although the initiatives examined were aimed at secondary school students, their common characteristics, as highlighted by Younger et al, can be argued to hold true for elementary education as well: a sense of belonging to the school community; agency for students through responsibility and choice; safety and security within the school; and self-worth as learners.

The Contribution of Engagement and Motivation to Reading and Writing

The OECD (2002) noted that reading engagement was a stronger predictor of literacy achievement than socio-economic status. Further, there may be important gender differences in terms of reading engagement (Topping, Samuels and Paul, 2008). Topping et al conducted a secondary analysis of over three million books read by over 45,000 students. The range of the students was from Grades 1 to 12, although the majority of the students were in Grades 1 through 6. At the same time as accessing students’ quantity of reading, the researchers also had access to measures (book quizzes) of students’ quality of reading comprehension. Girls exhibited higher scores in both quantity and quality of reading as compared to boys, and this difference increased
in subsequent grades. More importantly, when boys and girls having similar levels of reading quantity and quality were compared, “boys and girls achieved similar gains, suggesting gender-specific patterns were not immutable” (p. 514).

Closely related to the topic of engagement is that of motivation. In their study of student motivation for reading and writing in Grades 3 to 5, Meece and Miller (1999) found few gender differences in students’ goal orientation for reading and writing. One participant group displayed a difference in work-avoidance scores, with boys scoring higher than girls, but overwhelmingly motivation was not mediated by a student’s gender. Interestingly, Grades 4 and 5 students displayed decreased levels of task-mastery and performance goals, while work-avoidance scores increased on average over the school year; Grade 3 students displayed a similar pattern of task-mastery and performance goals, although their work-avoidance patterns also decreased (Meece and Miller).

Oakhill and Petrides (2007) compared the reading comprehension of 10 and 11 year-old boys and girls. They reported that comprehension was significantly affected by the content of reading passages for boys and they performed significantly better on texts they were interested in reading. In contrast, girls’ performance was the same regardless of their interest in the text. The authors also investigated poor comprehenders’ performance, and determined that the relationship between text interest and reading performance remained significant for boys but not for girls, regardless of comprehension level. The finding that boys are often more influenced by the level of their interest in the text has also been previously shown (e.g., Ainley, Hidi and Berndorff, 2002), implying that “girls are more likely to persist with reading than boys, and do well, even on low-interest texts” (Oakhill and Petrides, 2007; pg 231). Oakhill and Petrides suggest that reading tests be made less homogeneous by offering choices of topics and genres and that they contain both fiction and non-fiction sections, as boys may be encouraged to persist when reading content they find interesting and motivating. In addition, they argued that students should be taught the necessary strategies for reading comprehension regardless of personal level of interest.

The Cognitive Process Taxonomy

Another method of addressing the gender gap in literacy performance is to step back from an examination of student ability as a function of academic performance and examine differences between males and females with respect to the cognitive, or thought, processes involved when answering questions. The cognitive process taxonomy developed by Halpern (2000, 2004) attempts to formulate an understanding of student performance via cognitive gender differences. Halpern argues that both boys and girls have differential strengths and weaknesses in problem solving. With respect to reading and writing, Halpern categorizes underlying cognitive skills as follows:

a. Boys perform better on tests of verbal analogies, which involve mapping verbal relationships in working memory, as well as tasks involving transformations in visuo-spatial working memory.

b. Girls are able to more rapidly access phonological, semantic and episodic information from long-term memory; they show the largest advantages in other memory tasks as well as a strong advantage in writing.

Halpern’s approach also addresses the differing levels of performance of boys and girls due to the type of test: girls tend to receive higher grades in school, especially when the teacher’s test
material closely resembles what was taught, while males obtain higher marks on standardized
tests, wherein test material tends not to be as similar to what was taught in class (Halpern, 2006).
Halpern dismisses the suggestion that this difference is simply due to girls’ learning being more
rote than boys’—as was suggested by Kimball (1989), for example—noting that girls’ superior
performance in writing constitutes a “highly creative act” that is above and beyond rote learning
(Halpern, 2006; p. 645).

Halpern argues that biological and environmental influences may be too closely intertwined to be
isolated, making the gender gap a difficult one to address. Nature and nurture do not simply
interact; they mutually influence each other in cyclical ways. She cites the psychobiosocial
model as a theory that best accounts for differences between boys and girls (Halpern, 1997). This
model is based on the notion that, as above, it is impossible to separate biological and
psychosocial (i.e. environmental) influences, and that all children can improve in every ability
area with appropriate instruction (Halpern, 1997, 2006).

What Previous Research Tells Us

With so many citing and attempting to illuminate the gender gap in education, it is certainly
likely that a difference between girls’ and boys’ performance in reading and writing exists. Girls
have been shown to have a significant and consistent advantage in literacy from an early age
over boys, and this advantage is found not only in North America and English-speaking
countries but internationally across cultures and languages. However, these gender differences
may not be consistent across the range of abilities. Of potential importance, boys are generally
more variable in their literacy performance, and constitute a greater proportion than girls in the
lower ends of the distribution in literacy achievement.

The modes of assessment have been linked to differences in achievement and identification
between males and females. Performance varies based on the types of measure used. For
example, Dwyer and Johnson (1997, cited in Halpern, 2006) noted a dichotomy between in-
school performance and achievement on standardized tests. Female students, on average, do
better in school assessments but often score lower than boys on standardized tests or aptitude-
type tests. However, such results are not consistently found in the research literature. Further, the
gender differences in literacy achievement are also found in standardized measures of literacy.
Thus, and to the extent that these assessment-mode differences truly exist, the gender differences
in literacy achievement may be under reported. Secondly, the methods used to identify students
as reading disabled result in differing gender proportions. IQ-referenced or non-IQ-referenced
selection methods and teacher-identified or test-identified selection criteria have differing impact
on the ratio of boys to girls diagnosed. Such findings suggest that diagnoses have been subjected
to a selection bias using problematic criteria, such as patterns of behaviour, as opposed to strictly
academic difficulties.

Attempts at altering the school environment in order to better support academic achievement and
literacy for boys (as well as for all students) include approaches that target the organizational
structure of the school, the individual student, the pedagogical outlook of the classroom, the
socio-cultural relationships of students and their beliefs about learning have all been shown to
have relative levels of success. This success is most commonly found in an overall increase in
student achievement rather than a differential increase for boys or girls. Hence such approaches
may increase overall achievement but not reduce the gender difference in literacy achievement.
It also appears that the least information is known about the impact of differing pedagogical approaches to literacy achievement for boys and girls. Certainly, anecdotal evidence exists about the value of specific pedagogical approaches for addressing boys’ literacy. As an example, the use of non-fiction reading materials has been promoted as a technique to better engage boys in literacy activities. While there is evidence that boys may choose non-fiction more so than girls, both boys and girls seem to prefer fiction to non-fiction materials (Harkader and Moore, 1997; Moss, 1999; Topping, Samuels and Paul, 2008). Moss noted that when boys do choose non-fiction materials, the materials tended to be visually based and may have been chosen to help hide their poor reading skills. Similarly, Topping et al noted that while boys did read proportionately more non-fiction than girls, they read it less carefully and tended to read less overall, especially in the higher grades. Although the non-fiction materials children chose tended to be more challenging than fiction materials, Topping et al actually identified a negative correlation between the amount of non-fiction reading and overall reading achievement. Mirroring the conclusions of Halpern (1997, 2006), Topping et al were able to identify differences between classrooms in promoting successful comprehension, suggesting that specific interventions can improve literacy achievement. As Moss concluded, “tackling boys’ underachievement is closely linked to overall school improvement” (see also Younger et al, 2002).

Given the complex nature of education, in addition to the intricacies of group and individual differences in academic achievement, more research is needed to illuminate the gender differences in literacy achievement. While gender differences in literacy are consistently reported, the reasons for these differences and the interventions and strategies to address these differences are largely unknown. Certainly there is a real need to systematically examine ongoing attempts occurring in classrooms or schools to reduce this gap. It is important to challenge boys to improve their literacy performance and to find ways to better engage boys in the reading process, but we need to better understand the processes that will help boys to meet these challenges. Fortunately for researchers and practitioners, the variation in the gender gap in literacy achievement found across schools and jurisdictions (see, for example, OECD, 2001), suggest these differences are not absolute and can be addressed through teaching.
OUR METHODOLOGY

Previous research has not only identified the need for continuing research of gender differences but also has provided an overview of the methods and directions for future research. Comprehensive and systematic programs of research and inquiry are required to measure and understand those aspects of teacher and school effectiveness that differently impact student achievement. In response, we conducted a multi-faceted program of research designed to begin to understand and determine those aspects of students, teaching, and schooling that are associated with improved student learning over time. The research focused on both gender differences and non-differences in literacy achievement. Our work was guided by the following research question: What are the educational policies and resulting teacher and school initiatives and practices that are associated with gender variability in literacy achievement?

Given the complex nature of education, the project was implemented across several sequential phases. The initial phase was a literature review, focusing on what is currently known and believed about gender differences in educational achievement. The results from this review were provided to EQAO as a separate document and have also been summarized above. The review also served as a framework for subsequent quantitative analyses and school-based case studies. We then conducted a series of quantitative statistical analyses and qualitative case studies.

We conducted three sets of quantitative analyses. The first set of quantitative analyses used the EQAO data to identify schools for inclusion in the case studies (“Initial Analysis of EQAO Results”). The second set of quantitative analyses used HLM and EQAO data to examine the student and school factors associated with literacy achievement to determine if there were different factors associated with the literacy achievement of boys (“Statistical Modelling of EQAO Results”). These models used the student and school-level survey data and the student results from the 2007 EQAO assessments. The third set of quantitative analyses (“The Students’ Surveys”) used the data from the student surveys we distributed in the case-study schools. These analyses compared the responses of boys and girls across the low- and high-gap schools. The survey consisted of four pages and the items were drawn from previous work we have competed, although modifications were made to the survey based on our review of the literature regarding gender differences, the initial case studies and based on recommendations by the EQAO Outreach Team. The surveys (see Appendix 1) focused on students’ attitudes towards school and literacy-related activities and on their in-school and out-of-school activities. Descriptive and statistical analyses provided an opportunity to identify variables and factors (principal axis factoring using all the data) associated with both gender and school differences in literacy achievement.

Qualitative analyses (“The Case Studies”) were completed as follows. The Queen’s University research team completed the first set of pilot case studies. Two pilot schools were selected from the pool of selected low- and high-gap schools. The first school was chosen because of the relatively low gender gap in literacy achievement. The second school was matched on achievement for girls and demographic information but was from the pool of schools having a high gender gap in literacy achievement. Our data for the two pilot schools included interviews with the school principal, a selection of four teachers, other relevant staff (e.g., the lead literacy teacher and the school librarian) and a survey of 100 students from four classes. We also attempted to obtain relevant school documents and make observations of the school and to
document the teaching practices of the four teachers. The initial case studies served two purposes. First, these case studies are part of the final report. Second, they helped to develop, field test and refine the research protocols and instruments used in the main study. With the completion of the initial two case studies, the Queen’s University research team worked with members of the EQAO Outreach Team to help train and prepare them to complete the second set of qualitative analyses. The EQAO Outreach Team then collected data from these case studies, including principal and staff interviews and school observations.

The focus of the data collection in the case studies was to ascertain potential factors that could account for the presence or the lack of gender differences in literacy achievement. We asked about purposeful literacy programs or interventions that had been implemented, the assumed priority of literacy within the school and community and students’ literacy practices. We wanted the participants to talk to us about the school, its resources, the teachers, the students, the community and their beliefs. All of these data were used to identify features of classrooms and schools that could be important to understanding gender differences in literacy achievement. Another important aspect of this qualitative research was to help EQAO staff develop their own research capacity while becoming collaborators in making sense of the data collected during this and subsequent research projects. Hence we encouraged the Outreach Team to explore its own questions and biases, its thoughts and ideas and its own experiences. With these goals in mind, the Queen’s University research team worked with the EQAO Outreach Team to analyze the data collected from the case studies. These analyses were iterative, involving discussion and reflection and revisiting and challenging our ideas, thoughts and conclusions.
Our Results

The results that follow are divided into four sections based on the separate analyses described above, “Initial Analysis of the EQAO Results,” “Statistical Modelling of the EQAO Results,” “The Students’ Surveys” and “The Case Studies.” Combined, these quantitative and qualitative results enabled us to begin to understand the complex issue of gender differences in literacy achievement. These analyses identified systematic predictors of literacy achievement, along with unique and common themes related to literacy achievement for both boys and girls. We believe these results provide a foundation not only for increasing our understanding of this issue, but also for subsequent exploration.

Initial Analysis of EQAO Results

Selection of low-gap schools
The initial analyses of the EQAO data were used to determine the prevalence of gender differences on the EQAO provincial assessments in Grades 3 and 6. We used the provincial school results for the school years 2004–2005, 2005–2006 and 2006–2007. Schools were ranked based on the differences in the proportion of boys and girls obtaining at least Level 3 on both the reading and writing portions of the EQAO assessment across the three years. The 400 schools having the smallest overall gender gaps in literacy were reviewed to select possible schools for inclusion in the case studies. The schools were also expected to have generated expected and consistent literacy achievement for the girls—approximately 75% of the girls obtaining scores at Level 3 or 4. This helped to eliminate the problems in previous research findings in which the absence of gender gaps was associated with low literacy achievement overall for both boys and girls. Schools with small annual sample sizes of students (<30 students per year) and highly variable results or with low levels of achievement for both girls and boys were removed from consideration. Schools with small numbers or having fluctuating results across years between boys and girls were removed from the potential pool of case-study schools.

This resulted in a reduced pool of 36 English schools that appeared to have consistent EQAO literacy results with little or no differences between boys and girls. Overall, these schools showed gender differences that had proportions of boys at Level 3 being between 8% above or below the girls in the school. Nonetheless, these 36 schools also varied in literacy results. In some schools, the gender results were relatively stable across years, grades and reading and writing. More commonly, one of the grades would exhibit few gender differences while greater differences would exist at the other grade. Similarly, the reading and writing results were inconsistent. Schools were coded based on the achievement patterns. Selection of the case-study schools were made from this sample, with preference being given to schools in which the Grade 6 writing results exhibited the lowest gender gaps. This choice was made because it was believed that Grade 6 students’ writing would be the most affected by teaching. Seven elementary schools were selected and agreed to participate as being representative of low-gap schools.

Selection of high-gap schools
Selection of the high-gap schools occurred after the low-gap schools were selected and agreed to participate in the study. The selection of high-gap schools was far less problematic because several schools could be found with average gender achievement gaps that were above 25%. These high-gap schools were selected based on their relative demographic similarity to one of
the participating low-gap schools. Six schools were selected and agreed to participate as being representative of high-gap schools.

**Statistical Modeling of the EQAO Results**

The second set of analyses was intended to determine which student and school-level factors were associated with literacy achievement. From the EQAO data, we studied a sample of the 200 schools that had the lowest gender gaps in literacy achievement and the 200 schools that had the highest reported gender gaps in literacy achievement (schools had to have at least 15 boys to be included). The outcome measures we used for these analyses included the raw reported literacy scores, the overall literacy score (on the four-point scale) and if the student obtained at least a Level 3 on the literacy assessment. Schools were divided into two sub-groups. One group consisted of schools with a low gender gap in literacy achievement on the EQAO assessments, and the second group consisted of schools with a high gender gap on these assessments. HLM was used to produce the models.

The production and examination of these models has been a daunting task and the results have not been encouraging. Few of the Level 2 factors have been found to have a significant association with literacy achievement, and the choice of outcome variables has resulted in different and, at times, difficult-to-interpret findings. Hence we are also including descriptive findings in this section (see Table 1). Much of the focus of our analyses has been on the Grade 6 results as these appeared to produce the most consistent models. Further, we have largely focused on the results for boys. We used the raw EQAO scores in order to maximize variability.

The higher boys’ reading scores are not surprising for the low-gap schools because these schools were selected to maximize the boys’ reading scores relative to the girls’ scores. This selection procedure also resulted in girls’ reading and writing scores and literacy attitudes within the high-gap schools also being higher. This provides some evidence that low achievement gaps are more commonly associated with poorer overall performance for all students. Interestingly, boys in the high-gap schools were the most likely to have an IEP. However, boys in both the low- and high-gap schools had relatively similar reading and writing attitudes, with the reading attitudes being only slightly more positive for those boys in the low-gap schools. We did not find evidence of the often-reported increased variability of boys’ responses as compared to girls.
Table 1: Comparison of EQAO Student Survey Results across Low- and High-Gap Schools

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low-Gap (M, SD)</td>
<td>High-Gap (M, SD)</td>
</tr>
<tr>
<td>EQAO Raw Reading Score</td>
<td>3.22 (.25)</td>
<td>2.75 (.27)</td>
</tr>
<tr>
<td>EQAO Raw Writing Score</td>
<td>3.13 (.23)</td>
<td>2.83 (.25)</td>
</tr>
<tr>
<td>IEP status</td>
<td>0.19 (.12)</td>
<td>0.28 (.14)</td>
</tr>
<tr>
<td>I am a good reader</td>
<td>1.62 (.15)</td>
<td>1.49 (.14)</td>
</tr>
<tr>
<td>I Like to Read</td>
<td>1.30 (.21)</td>
<td>1.20 (.19)</td>
</tr>
<tr>
<td>I read by myself</td>
<td>1.54 (.21)</td>
<td>1.45 (.20)</td>
</tr>
<tr>
<td>I am a good writer</td>
<td>1.32 (.17)</td>
<td>1.25 (.16)</td>
</tr>
<tr>
<td>I like to write</td>
<td>1.13 (.22)</td>
<td>1.11 (.19)</td>
</tr>
<tr>
<td>I write by myself</td>
<td>1.23 (.25)</td>
<td>1.25 (.26)</td>
</tr>
</tbody>
</table>

The school selection procedure enabled us to have a sufficient sample while also maximizing the between-school variance. This resulted in a between-school variance of 16% for reading and 18% for writing (see the intraclass correlation [ICC] in Table 2). Independent variables and factors were standardized for the analyses (Mean = 0, SD = 1). Table 3 contains the results for the reading and writing models for boys across these 400 schools. We only included individual level variables that were significant predictors and had a coefficient of at least 0.05. As found in previous studies (e.g., Klinger et al, 2006, Ma and Klinger, 2000), the largest predictors of reading and writing achievement were student factors, with IEP and ESL/ELD being the largest negative predictors and gifted status being the most positive predictor. Reading variables were also relatively strong predictors, with both students’ perceptions of themselves as readers and their enjoyment of reading positively predicting reading achievement. As with our previous studies (Klinger et al), these reading variables were also strong predictors of writing achievement. The negativity associated with reading at home with someone is not surprising. This result may actually suggest that parents of struggling readers continue to read to their children even in Grade 6, in an effort to help their children succeed. The presence of a home computer has also been identified in some of our previous research as a significant predictor of achievement. It remains unclear if this association is actually due to computer use or if it is a proxy measure for socio-economic status.

Few of the school-level variables (from the teachers’ questionnaires) were significantly associated with boys’ literacy achievement. Surprisingly, teachers’ use of language-related software positively predicted reading achievement but negatively predicted writing achievement. Further, the use of external instructional materials was a negative predictor of achievement. It is possible these materials are of limited value; however, a more likely interpretation is that these associations likely identify the work of teachers to find external resources and materials to better
support their current instruction. Teachers in these schools have large populations of struggling readers and are looking for resources to guide their instruction. The final reading model accounted for 32% of the within-school variance (Level 1) and 48% of the between-school (Level 2) variance in boys’ reading scores. The final writing model accounted for 30% of the within-school variance (Level 1) and 44% of the between-school (Level 2) in boys’ writing scores.

Table 2: Unconditional Models for Boy’s Grade 6 Reading and Writing

<table>
<thead>
<tr>
<th></th>
<th>Reading</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \gamma_{00} )</td>
<td>( \gamma_{00} )</td>
</tr>
<tr>
<td>Intercept</td>
<td>2.99</td>
<td>3.00</td>
</tr>
<tr>
<td>( \sigma^2 )</td>
<td>0.098</td>
<td>0.076</td>
</tr>
<tr>
<td>( \sigma^2 )</td>
<td>0.524</td>
<td>0.350</td>
</tr>
<tr>
<td>ICC</td>
<td>0.16</td>
<td>0.18</td>
</tr>
<tr>
<td>( \chi^2 )</td>
<td>2367.34***</td>
<td>2619.91***</td>
</tr>
</tbody>
</table>
Table 3: Final HLM Model for Boys in Low- and High-Gap Schools

<table>
<thead>
<tr>
<th>Variable</th>
<th>Reading</th>
<th></th>
<th>Writing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b (SE)</td>
<td>t</td>
<td>b (SE)</td>
<td>t</td>
</tr>
<tr>
<td><strong>Student-level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French immersion</td>
<td>0.10 (0.03)</td>
<td>3.44**</td>
<td>0.16 (0.04)</td>
<td>4.94***</td>
</tr>
<tr>
<td>Immigrant Status</td>
<td>-0.11 (0.04)</td>
<td>-2.22*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESL/ELD</td>
<td>-0.37 (0.05)</td>
<td>-7.17***</td>
<td>-0.21 (0.04)</td>
<td>-5.59***</td>
</tr>
<tr>
<td>IEP</td>
<td>-0.62 (0.04)</td>
<td>-25.54***</td>
<td>-0.49 (0.02)</td>
<td>-27.03***</td>
</tr>
<tr>
<td>Gifted</td>
<td>0.39 (0.04)</td>
<td>8.56***</td>
<td>0.38 (0.04)</td>
<td>9.91***</td>
</tr>
<tr>
<td>Home computer</td>
<td>0.16 (0.01)</td>
<td>11.56***</td>
<td>0.12 (0.01)</td>
<td>10.89***</td>
</tr>
<tr>
<td>I am good reader</td>
<td>0.24 (0.01)</td>
<td>18.36***</td>
<td>0.14 (0.01)</td>
<td>13.36***</td>
</tr>
<tr>
<td>I like to read</td>
<td>0.13 (0.01)</td>
<td>10.29***</td>
<td>0.06 (0.01)</td>
<td>5.55***</td>
</tr>
<tr>
<td>I read by myself at home</td>
<td>0.07 (0.01)</td>
<td>6.37***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I read with someone</td>
<td>-0.07 (0.01)</td>
<td>-6.25***</td>
<td>-0.06 (0.01)</td>
<td>-6.01***</td>
</tr>
<tr>
<td>I am a good writer</td>
<td>0.06 (0.01)</td>
<td>4.81***</td>
<td>0.11 (0.01)</td>
<td>10.93***</td>
</tr>
<tr>
<td><strong>School-level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to language-related</td>
<td>0.08 (0.03)</td>
<td>2.06*</td>
<td>-0.09 (0.03)</td>
<td>-2.86**</td>
</tr>
<tr>
<td>computer software</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usefulness of board-developed</td>
<td>-0.15 (0.03)</td>
<td>-2.23*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>language-instruction materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of students absent</td>
<td>-0.06 (0.01)</td>
<td>-4.07***</td>
<td>-0.06 (0.01)</td>
<td>-4.72***</td>
</tr>
<tr>
<td>during the school year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EQAO assessment activity</td>
<td>-0.05 (0.02)</td>
<td>-2.33*</td>
<td>-0.04 (0.01)</td>
<td>-2.46*</td>
</tr>
<tr>
<td>EQAO Guide to</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvement Planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge in primary reading</td>
<td>0.12 (0.05)</td>
<td>2.42*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>instruction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge in data management</td>
<td>0.06 (0.03)</td>
<td>2.07*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>and analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unexplained Variance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between schools ($\tau_{00}$)</td>
<td>0.053</td>
<td>1583.93***</td>
<td>0.042</td>
<td>1775.86***</td>
</tr>
<tr>
<td>Within schools ($\sigma^2$)</td>
<td>0.351</td>
<td></td>
<td>0.245</td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, ** p < .01, *** p < .001
The Students’ Surveys

A total of 1,019 students from the case-study schools completed a student survey, with the number of completed surveys varying from 38 to 158 across the 13 schools and with 95% of the students being in Grades 4 to 7. One survey could not be used because it could not be linked to any of the schools. One school presented a unique challenge. While the school had been identified statistically as a high-gap school, the principal indicated that recent efforts at the school had changed the culture of the school, primarily at the lower grade levels. The principal believed that the school was now becoming a low-gap school. However, the majority of the data from this school was collected from students in Grades 4 to 7. The inclusion of this school tended to reduce the observed differences between the low- and high-gap schools. Hence we removed the student data from this school for the purposes of analysis. The resulting sample consisted of 931 usable student surveys with a relatively equal distribution across gender and low- or high-gap status (see Table 4). Pairwise deletion was used during the analysis.

Table 4: Distribution of Students’ Survey based on Gender and Literacy Achievement-Gap Status

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-Gap</td>
<td>255</td>
<td>226</td>
<td>481</td>
</tr>
<tr>
<td>High-Gap</td>
<td>222</td>
<td>228</td>
<td>450</td>
</tr>
<tr>
<td>Total</td>
<td>477</td>
<td>454</td>
<td>931</td>
</tr>
</tbody>
</table>

There were slightly more students who responded from the low-gap schools, and this difference was due to an increased number of boys who completed the surveys in these schools. With an average age of 10.32 years, the students in the low-gap schools were slightly younger than the students in the high-gap schools (average age of 10.69; \( p < 0.001 \)). Similarly, the students in the low-gap schools reported having fewer siblings (\( p < 0.001 \)) and were slightly more likely to have English as their first language (80% vs. 70%; \( p < 0.001 \)). Children in the low-gap schools were also more likely to take music, dance or art classes (37% vs. 30%; \( p = 0.038 \)), travel (by plane or to a summer cottage or summer camp) or play on a sports team (50% vs. 40%; \( p = 0.001 \)).

Combined, these results do suggest that the children in the low-gap schools have a slightly higher socio-economic status. The same patterns were found if boys were considered individually. Based on Cohen’s \( d \), the effect sizes for these differences were small.

Survey Results

We completed descriptive and inferential statistical analyses of the students’ surveys, with special attention focused on the boys. For the purposes of analysis, we recoded the data so that higher scores represented more positive outcomes, attitudes or activities, with a score of 6 representing “every day,” “strongly agree” or “true.” The one exception was the item “Usually the number of days I read for fun is.” This item was recoded so that a score of 8 represented “every day.” Our factor analyses identified six (based on scree-plots) separate factors (see Table 5 and Appendix 2): homework, electronic entertainment writing attitudes, reading attitudes, attitudes towards school, and school library use. Correlations amongst the factors were relatively
low. Hence we used an orthogonal rotation to separate the factors. Items that did not load on any of the factors were retained for analysis at the variable level.

Table 5: Student Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Number of Items</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>2</td>
<td>0.77</td>
</tr>
<tr>
<td>Electronic Entertainment</td>
<td>4</td>
<td>0.60</td>
</tr>
<tr>
<td>Writing Attitudes</td>
<td>8</td>
<td>0.87</td>
</tr>
<tr>
<td>Reading Attitudes</td>
<td>9</td>
<td>0.89</td>
</tr>
<tr>
<td>Attitudes Towards School</td>
<td>4</td>
<td>0.78</td>
</tr>
<tr>
<td>School Library Use</td>
<td>4</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Table 6 contains the descriptive results for the survey items and factors we included in the analyses. These results are separated by both gender and between low- and high-gap schools. The results highlight some of the consistent trends we found throughout the data. First, these students did not differ on their self-conception respecting the difficulty of their school work, regardless of their gender or the school status. For the most part, students believed that school work was relatively easy some or most of the time. Similarly, the students seemed to share the same general attitude that working hard would result in higher achievement (the observed difference for boys in the high-gap schools was not significant). Boys in the low-gap schools were the most likely to use a computer at home to look things up. Boys reported less reading at home, were less likely to be involved in artistic endeavours and were more likely to be involved with sports as compared to girls in both sets of schools. Interestingly, although the qualitative data suggested that boys in the high-gap schools were overly involved in sports, our findings did not find a difference in sports participation. It may be possible that boys in the high-gap schools were more likely to play competitive sports than boys in low-gap schools, but this would need to be examined in future studies. At school, boys were slightly more likely to use a computer and were also more likely to play sports than girls. One potentially interesting finding is that the boys in the low-gap schools were more likely to play a musical instrument than any of the other groups of students, including girls. In terms of the factors, boys reported lower levels of literacy-related activities and less-positive attitudes towards literacy than girls, regardless of school status. Boys also reported higher use of electronic entertainment than girls. Overall, the largest differences were between boys and girls rather than between the low- and high-gap schools (see also Figures 1, 2, and 3).

We did find potentially interesting differences between the boys in the low- and high-gap schools—asterisks in Table 6 represent significant differences (α < .05) between boys in these schools. The boys in the low-gap schools reported doing more homework than the boys in the high-gap schools. These boys were also more likely to read fiction books or play a musical instrument at school and reported higher levels of reading at home. Two other observed differences, although not significant in this sample, are worth subsequent investigation. Specifically, the boys in the low-gap schools may use electronic entertainment less and may have slightly more positive attitudes towards reading (p < 0.10). As with the EQAO data, we did not
seem to find evidence of boys’ increased variability on most of these survey items and factors. Again, all of the effect sizes were small.

Table 6: Descriptive Results of the Students’ Surveys

<table>
<thead>
<tr>
<th></th>
<th>Low-Gap Schools</th>
<th></th>
<th></th>
<th>High-Gap Schools</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
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<td>For me, school work is</td>
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<td>0.78</td>
<td>4.61</td>
<td>0.75</td>
<td>4.63</td>
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<td>easy</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>If I work hard, I can</td>
<td>5.69</td>
<td>0.68</td>
<td>5.72</td>
<td>0.59</td>
<td>5.60</td>
<td>0.80</td>
</tr>
<tr>
<td>get good marks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Home</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I play with friends</td>
<td>4.72</td>
<td>1.33</td>
<td>4.43</td>
<td>1.35</td>
<td>4.71</td>
<td>1.46</td>
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<td>I look up things on the</td>
<td>4.68</td>
<td>1.28</td>
<td>4.29</td>
<td>1.31</td>
<td>4.51</td>
<td>1.38</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I read with a family</td>
<td>2.47</td>
<td>1.86</td>
<td>2.93</td>
<td>1.92</td>
<td>2.27</td>
<td>1.74</td>
</tr>
<tr>
<td>member</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I play sports</td>
<td>5.13</td>
<td>1.33</td>
<td>4.42</td>
<td>1.53</td>
<td>5.05</td>
<td>1.41</td>
</tr>
<tr>
<td>I draw, paint, or play a</td>
<td>4.00</td>
<td>1.82</td>
<td>4.74</td>
<td>1.48</td>
<td>3.75</td>
<td>1.99</td>
</tr>
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<td>musical instrument</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The number of days I</td>
<td>5.15</td>
<td>2.27</td>
<td>6.15</td>
<td>2.03</td>
<td>4.55</td>
<td>2.39</td>
</tr>
<tr>
<td>read each week for fun</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>is* (8 = every day)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>At School</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I use the computer or</td>
<td>4.12</td>
<td>1.32</td>
<td>3.92</td>
<td>1.30</td>
<td>4.30</td>
<td>1.14</td>
</tr>
<tr>
<td>the internet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I read fiction books*</td>
<td>4.82</td>
<td>1.00</td>
<td>4.97</td>
<td>1.00</td>
<td>4.60</td>
<td>1.27</td>
</tr>
<tr>
<td>I read non-fiction books</td>
<td>3.98</td>
<td>1.43</td>
<td>3.93</td>
<td>1.52</td>
<td>4.03</td>
<td>1.53</td>
</tr>
<tr>
<td>I write non-fictional</td>
<td>3.25</td>
<td>1.72</td>
<td>3.17</td>
<td>1.58</td>
<td>3.17</td>
<td>1.70</td>
</tr>
<tr>
<td>paragraphs</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I play sports, or do</td>
<td>4.98</td>
<td>1.55</td>
<td>4.43</td>
<td>1.60</td>
<td>5.06</td>
<td>1.40</td>
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<tr>
<td>I play a musical</td>
<td>3.43</td>
<td>1.90</td>
<td>3.19</td>
<td>1.85</td>
<td>2.99</td>
<td>1.97</td>
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<td>instrument*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I volunteer at the</td>
<td>3.00</td>
<td>1.80</td>
<td>3.51</td>
<td>1.79</td>
<td>2.92</td>
<td>1.81</td>
</tr>
<tr>
<td>school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homework*</td>
<td>5.48</td>
<td>0.84</td>
<td>5.62</td>
<td>0.66</td>
<td>5.24</td>
<td>1.00</td>
</tr>
<tr>
<td>Electronic Entertainment</td>
<td>4.81</td>
<td>0.79</td>
<td>4.51</td>
<td>0.80</td>
<td>4.94</td>
<td>0.82</td>
</tr>
<tr>
<td>Writing Attitudes</td>
<td>3.78</td>
<td>0.88</td>
<td>4.37</td>
<td>0.87</td>
<td>3.74</td>
<td>0.93</td>
</tr>
<tr>
<td>Reading Attitudes</td>
<td>4.64</td>
<td>0.81</td>
<td>4.94</td>
<td>0.74</td>
<td>4.49</td>
<td>1.01</td>
</tr>
<tr>
<td>Attitudes Toward School</td>
<td>4.68</td>
<td>0.87</td>
<td>5.12</td>
<td>0.67</td>
<td>4.69</td>
<td>0.91</td>
</tr>
<tr>
<td>School Library Use</td>
<td>4.21</td>
<td>0.80</td>
<td>4.40</td>
<td>0.74</td>
<td>4.30</td>
<td>0.81</td>
</tr>
</tbody>
</table>

* Significant differences exist (α < .05) between boys in low- and high-gap schools.
Figure 1: Students’ Activities at Home

- I play with friends
- I look up things on the computer
- I read with a family member
- I play sports
- I draw, paint, or play a musical instrument

Boys Low-Gap
Girls Low-Gap
Boys High-Gap
Girls High-Gap

Every day
Rarely or Never

Figure 2: Students’ Activities at School

- I use the computer or the internet
- I read fiction books
- I read non-fiction books
- I write non-fictional paragraphs
- I play sports, games or do a club activity
- I play a musical instrument
- I volunteer at the school

Boys Low-Gap
Girls Low-Gap
Boys High-Gap
Girls High-Gap

Every day
Rarely or Never
We also completed a second set of analyses comparing the average results for both boys and girls across the low- and high-gap schools (see Figure 4a and Figure 4b). These figures illustrate the range of average scores across the low- and high-gap schools, separated by gender. In terms of homework completion by boys, the highest reported level of homework completion in the low-gap schools was approximately 5.9 (6 = every day) and the lowest was 4.45 (4 = once a week), with the average being just above 1.5. In contrast, these values ranged from 5.75 to 4.55 for boys in the high-gap schools, the average being 5.24. Generally, these results describe the variability across these factors in both the low- and high-gap schools. The variability was relatively similar across genders. Of potential interest, there was much more between-school variability in the amount of electronic entertainment by boys in the low-gap schools and less variability in reading attitudes. Similarly, there did seem to be lower variability in the girls’ results at the school level. The small number of schools in the sample makes it difficult to determine if these differences in variability were significant. Nonetheless, these results provide further evidence of the need to further explore these student factors in both low- and high-gap schools and for boys and girls.
Figure 4a: Low- and High-Gap School Variability in Boys’ Attitudes and Practices

Figure 4b: Low-Gap School Variability in Girls’ Attitudes and Practices
The Case Studies

The case studies were completed by the Queen’s University research team and the EQAO Outreach team. The groups worked both independently and together to try to identify common and unique themes within these data. The results that follow represent a summary of the work that we completed together. While the findings do not provide definitive evidence for those factors that reduce or exacerbate gender gaps in literacy achievement, they do provide a foundation for further discussion and research.

The case studies are reported as two distinct groups, the low literacy achievement gap schools and the high literacy achievement gap schools. Together, these narrative summaries highlight some of our findings about teachers’ beliefs and practices related to literacy achievement for boys and girls. We have endeavoured to represent the schools included in the analyses; however, the results here are reported at a more global level, ensuring the confidentiality of the schools involved in the research.

The Low-Gap Schools

The low-gap schools were drawn from a sample of elementary schools, located primarily in Southern and Eastern Ontario. All of the schools had kindergarten to Grade 6 and the majority also had Grades 7 and 8. The cases included public and Catholic schools, varying in size from 120 students to close to 400 students. The selected schools were drawn from both rural and relatively dense suburban populations. Qualitative data from the interviews with teachers and principals at the seven low-gap schools revealed a number of themes that recurred in response to the interview questions. These themes were classified as follows: “Boys and Girls are Different,” “Impact of Home and Community,” “School Culture,” “Collaboration and Shared Support” and “Good Instruction for all Students.” Frequently, the relevance of the comments and observations regarding these themes was linked to potential causal factors in gender differences or gender parity in achievement. Not surprisingly, we did not find any specific belief, practice or policy that was found universally across this set of schools, but we did find themes and practices that should be considered further.

Boys and Girls are Different

[Our boys need] pushing and prompting. They just need a little more guidance in how to express themselves more coherently and concisely.

Teachers and principals at the seven low-gap schools reported strong beliefs about substantive differences between boys and girls. Some of these beliefs centred around perceived cognitive and maturational gender differences. For example, boys are believed to be more tactile and kinesthetic learners, to be slower to develop motor skills, to have difficulty transferring ideas to paper and to have a higher need for structure. Girls, on the other hand, have more organized thought processes, are better listeners, are able to sit and sustain attention for a longer period of time and capitalize on earlier language development. The attribution of different learning styles to boys and girls was a common theme among the teachers and administrators.
Differences were also reported with respect to motivation, choice, and behaviour. Although noting that some boys do, in fact, enjoy reading, teachers and principals largely believed that girls enjoyed reading more than boys. As well, they believed that boys in the upper-junior and intermediate grades are less likely than younger boys to be motivated to read. Although there were no statements that girls are not also motivated by materials that link to their personal interests, boys were considered to require activities or initiatives that are current and relevant to their lives and interests to spark engagement with literacy. There was an ongoing sense that it is more difficult to motivate boys to read fiction and that success lies in recruiting active participation of boys in the selection of reading materials. For example, magazines and comic books or books on popular subjects such as video games were considered more appealing to boys than novels. Boys were also perceived to look elsewhere than academic achievement to feel successful; music and, more commonly, sports were cited as sources of self-esteem for boys.

Notably, boys and girls are also believed to differ in their values related to reading and school achievement. While girls were seen to work hard with the intention to please, boys are, as one teacher stated, “clock watchers” and will often fail to give their best effort to the task at hand. Boys appear to lack the individual motivation to improve their work. One teacher summarized this belief with the following example.

Girls ask “Am I done?” while boys report “I am done.”

One solution to this problem was to not accept poor quality work from either boys or girls, insisting the work be done to the expected standard. Being a boy was not considered a reasonable excuse for poor-quality work. The teachers at one school in particular thought that this policy had helped all of the students to be more successful.

Both teachers and administrators believed that girls are able to organize their thoughts and transfer them to paper, asking questions when they hit a roadblock. Boys, on the other hand, often have difficulty “getting the task off the ground,” lose interest quickly and do not know what to ask when they encounter difficulty. At the same time, boys are typically product oriented, tending to give shorter answers and focusing on speedy task completion, while girls are much more willing to provide more elaborate responses. Girls also seem to attribute greater importance to their performance on EQAO assessment than boys.

Only a few teachers and principals referred directly to the sources of these perceived gender differences. One principal stated his belief that gender differences are socially constructed. The assumption that boys’ relative lack of interest in reading is at least partly a result of social factors was echoed in responses that communicated the notion that traditional models of schooling are better suited to girls. Specifically, these features include the acquisition of resources, the instructional approaches of the female-dominant primary division and the lack of male role models in the classroom (although one school had male teachers in each division who were active in both athletics and the arts). While the majority of these educators believed that differentiated instruction and resources were necessary for engaging boys, one respondent reported that boys and girls should be welcomed into participating in all valued activities, including sports, arts and reading and that gender-specific activities would likely exacerbate existing divisions between boys and girls. For example, staff at one school believed that boys’ refusal to buy into stereotypes of typical masculine behaviour was responsible for the low gender
gaps. The boys in this school were allowed to socialize around literacy activities, which seemed to make those activities acceptable.

**Impact of Home and Community**

It’s really important that you have parents supporting the child and saying “Yes, I’m going to push you to do your best.” Educators at the low-gap schools believed that home and community factors played a crucial role in the development of boys’ attitudes towards reading. Approximately half of the teachers and principals reported that parents in their community have high expectations of achievement and are active participants in volunteer roles. Teachers and principals in some of these schools cited low levels of transience, a high percentage of at-home mothers, an active school council, parent attendance at educational sessions after school, support for education at home and parents’ willingness to engage with staff and “ask hard questions.” The involvement of fathers, in particular, as volunteers was cited as a positive factor in supporting student achievement. Others, however, noted that parent involvement in school activities did not always transfer to specific support for and value of literacy achievement for boys. Success in sports, in particular, was frequently mentioned as a goal that parents valued more highly than academic success, especially for boys. While staff at one school reported that parents set academic success as a condition for sports participation, others pointed to parents pushing boys to excel in sports and withdrawing them from school for sports events, often to the detriment to these boys’ academic success. In another school, teachers spoke of parents’ concerns that they did not know how to help their children with homework and that reading was considered a school activity rather than a home activity. Related to this, home factors were reported as potential causes for gender differences. For example, parents are more likely to encourage preschool girls than boys to play with books, and traditional gender roles were embraced by some families.

Given the potentially important role of parents, staff at three schools mentioned specific parent communication initiatives they believed were successful in improving parent involvement and literacy activities in the home. The home-school connection was seen as an ongoing priority, designed to not only improve school-parent communication but also to support parent engagement with the school. Initiatives included Web sites, provision of literacy software to parents, curriculum nights, grade-level nights and guest speakers. One school achieved 90% attendance at evening sessions through personal phone calls made by the principal. In particular, there was a perceived need in the area of promoting communication with diverse parent and language groups and maintaining parent involvement into the intermediate grades. Principals commonly spoke of their efforts to find the optimal way for parents and teachers to work together and be active partners.

**School Culture**

[We have an experienced staff] and they are so very willing to learn, and grow, and try new things.

Teachers and administrators throughout these schools often spoke about the importance of the school culture. This culture extended from the dedication and collaboration of the staff to holding common and high expectations for all students in the school. Staff at three low-gap schools referred specifically to elements of their schools that they believed were effective at
creating an environment for educational success while decreasing the number of behavioural issues. Springing from the shared values promoted by the schools, one school promoted social justice through fundraising for an international project; another school discussed how “Tribes” training for staff created a non-threatening environment and literacy-focused classrooms. Lastly, a focused learning culture for students, staff and parents at one school was believed to have a big impact on student achievement.

Two schools reported a belief that relative gender parity was due to a school culture that emphasized the arts. Frequent arts opportunities, arts-oriented trips, school concerts, and drama productions were highly prized initiatives in these schools. An added ingredient in one of these schools was that the principal and the Grade 7 teacher, both male, were active in the arts and stood as role models for boys to participate in activities that are perhaps not traditionally seen as masculine. In the words of the principal, “Nobody is made fun of.”

Some aspects of the schools themselves seemed to play a role in helping to create a positive educational culture. In one smaller school, its size appeared to contribute to the sense that boys “don’t get lost” and allowed the principal to “know every child and his or her story.” However, this same school also reported large class sizes and combined grades, which created challenges to teaching and learning, especially in providing differentiated instruction.

Certainly, school leadership plays an important role in creating a school culture that supports students. Teachers in these schools commonly spoke of the valuable support and leadership of the school principal, especially when the principal had a deep understanding of student achievement and a realistic framework for a plan of action. Specific examples of such leadership included assigning the right personnel to supporting roles (e.g., consultants, coaches), pressure and support for achieving high EQAO results, providing adequate time and opportunities for staff to learn new things and make changes and promoting a positive culture of accountability. These initiatives helped to create and foster a learning culture in the school that supported students’ success.

**Collaboration and Shared Support**

Teachers and administrators commonly linked student success to a school staff who worked together, making it a focus to work as a team and engage in dialogue about their instructional practices. In these instances, common language, assessments and teaching practices were identified as useful in demonstrating positive attitudes about teaching and learning. The challenge of finding time to make collaboration happen is everpresent, but educators at nearly all of the low-gap schools confirmed the importance of sharing strategies across divisions, trying new things and working towards achieving consistency in language and communication. Particular mention was made of teacher moderation of assessments and collaborative planning. In one school, collaboration resulted in some teachers changing teaching assignments, further supporting professional growth. A collaborative environment encourages teachers to want to learn more and to be willing to ask questions. Certainly, these educators recognized that more work in this area needed to be done, but the increased student achievement across classrooms and divisions was encouraging.

**Good Instruction for all Students**

Teachers and principals provided a number of what they considered to be key instructional and assessment approaches as well as professional development for teachers, which they believed
were responsible for students’ literacy achievement. In addition to substantial instructional time for literacy, some schools used exemplars, illustrating strong and weak work to help students aim for maximum performance. These exemplars also helped teachers to provide more effective feedback. In addition, participation in the Ontario Library Association Blue Spruce, Red Maple and Silver Birch reading clubs, use of technology and after-school tutoring were other initiatives used in different schools.

A number of instructional approaches and orientations, although not targeted specifically at boys, were mentioned by the respondents, with the notion that effective classroom management, reflective planning, collaborative learning, formative and responsive assessment and early intervention would improve the learning of all students. One school used board resources and opportunities for professional development and the involvement of senior administration in discussions around data and achievement. A second school described the implementation of a “reading buddies” program, where younger students are matched with older students to read together. During this time, teachers meet as a professional learning community. Educators from several schools mentioned the importance of being knowledgeable about teaching reading and the fact that teachers’ understanding of and practices around literacy had changed in recent years. Examples include an increase in the variety of reading materials given to boys and girls, with an emphasis on interest and personal choice. Reading likes and dislikes are ascertained through surveys and interest inventories, and reading logs are employed to ensure a variety of genres are sampled. Physical space for reading was also considered to make reading a more comfortable activity. Yet another school emphasized non-fiction books, magnetic letters, the use of high yield strategies, the use of anchor charts, models and activities involving sentence starters, persuasive writing, quick writes and community circles. A common sentiment emerged when these initiatives were used by teachers.

Good teaching does not cater to one gender or the other; it’s good teaching practice that matters.

At the same time, when asked about boys educational needs, several of these educators felt that certain strategies or approaches were especially helpful for increasing boys’ literacy outcomes and engagement. Hence it was common to hear descriptions of activities and initiatives that were being used. Again these varied across schools. Examples included the use of writing topics that covered a wide range of subject matter, structuring activities that facilitated cross gender conversations and increasing the method, structure and organization in instruction. The staff at one school described technology and different types of media as being particularly attractive to boys. One educator reported that boys especially benefited from the school-wide focus on reading responses and better answers. In several schools, resources had been deployed to acquire reading materials that were believed to be especially attractive to boys. These boy-friendly resources included high-interest, often low-vocabulary books, non-fiction books, graphic novels and magazines.

Three schools reported active involvement of the teacher-librarian or library technician in the pursuit of students’ literacy development. These educators promoted the importance of the library as a vital space, or “playground,” to which students come for assistance finding books and materials that matched their interests. Some programs included visiting authors, a “Battle of the Books” in partnership with the local library and “Cover to Cover,” where students are publicly recognized for the reading they do. One participant emphasized the importance of open
lines of communication between teachers and the teacher-librarian, to keep the library well-organized and for everyone to know what is in the library in order to connect students with appropriate books.

A number of responses illustrated effective, cohesive practices that benefited all students, regardless of ability. In one school, a literacy-partners, peer-coaching model allowed teams of teachers to design lessons for at-risk learners and to discuss the efficacy of the lesson in case management meetings with peers. A predominant sense among these educators was that they were responsible for the variety of learners in their classrooms, including students who are English language learners and those with special education needs. In at least one school, these students were integrated into and supported in the classroom. A Junior Learning Disabilities program for the board was housed in one of the schools, and students from across the district attend the program for support with reading and writing. The provision of assistive technology had been particularly effective in increasing achievement among these students.

**The High-Gap Schools**

Since the high-gap schools were selected to match the sample of low-gap schools, these selected elementary schools were also located primarily in southern and eastern Ontario. All of the schools had kindergarten to Grade 6 and the majority also had Grades 7 and 8. The cases included public and Catholic schools, although these schools tended to be larger than the low-gap schools, with one school reporting a student population over 800 students. As with the low-gap schools, we identified a number of themes based on our data. These themes were generally similar to those identified for the low-gap schools, although the contents within each of the themes did vary in places. Beliefs about learning, home and school connection, and instructional strategies were the strongest themes, appearing in most or all of the comments from the staffs in the high-gap schools.

**Boys and Girls are Different**

Boys will answer the question but are reluctant to elaborate on their responses.

When asked about differences between boys and girls, teachers and administrators in the high-gap schools focused largely on differences in how boys and girls learn and function at school. Staff members from all six high-gap schools talked at length about these differences. Overall, they believed that boys learn differently from girls and as a result have different needs in the classroom. They most often mentioned that boys need to move around and engage (hands-on) with objects and activity, respond to structured lessons, are less engaged and motivated (especially with respect to reading materials), focus on finishing a project, regardless of quality, are less likely to write or elaborate on answers, have differences in working memory, planning, attention and information processing and need visuals to support their learning. It was also mentioned that boys seem to struggle with school expectations because they mature later than girls and that the school system “privileges” girls by valuing neatness and requiring students to spend long periods of time sitting and listening. Girls were also described as “school smart,” with the ability and desire to please their teachers, while boys have many characteristics that hinder their learning (e.g., boys “want to succeed, but not necessarily academically” unless it is through a hands-on lesson, boys are “more self-centred and do not think of results or
Similarly, teachers and principals raised differing societal expectations of boys and girls as playing a role in the gender differences in literacy achievement. For example, some schools cited social and cultural differences in expectations for boys’ and girls’ areas and degrees of achievement as a result of their comparative value (boys get their self-esteem through sports, girls are better prepared for school, and boys have lower fine-motor skills). Some administrators also mentioned a perceived need for more male teachers and role models in the elementary grades, particularly those who showed an interest in subjects such as reading and poetry.

**Impact of Home and Community**

Teachers and administrators in each of the high-gap schools acknowledged the role of the home and the community, most commonly as a barrier to achieving gender equity in both literacy and academic achievement. The most common topics focused on differing family and societal expectations of boys and girls and how these expectations played out at home and in children’s relationships with caregivers. For instance, one principal described the “high [parental or caregiver] expectations for girls to do well in school” and explained that there are “not the same expectations from parents placed on boys…[the] mentality of ‘boys will be boys’ dominates in some homes.”

Many of the teachers and principals interviewed suggested that there was a disconnect between school and home, with differing priorities and degrees of follow-through. These educators commonly attributed responsibility to parents, describing them as “too busy to help with homework,” not seeing academics or reading as a priority and unsupportive of after school academic programs. In some schools, staff members saw the home-school connection differently; for instance, one school had a teacher who felt that parents were “keen [and] quick to volunteer,” while other staff members felt the opposite. At another school, parents were said to participate in “fun nights” but not in “curriculum nights.” In schools where parents did not have time to work with their children at home, the staff felt that, as a result, the “school need[ed] to teach the children skills that one would assume they should have learned at home.” Overall, there was a sense that although most parents valued the work that happened at school, they were reluctant or unable to follow through by working with their children at home (e.g., through homework completion or home-reading programs).

**School Culture**

Comments from educators in the high-gap schools typically focused on the need to create a strong learning culture within their schools. Teachers and principals from two of the high-gap schools specifically cited the importance of a positive, caring school culture as a contributor to student achievement. A sense of community, whereby staff members are supportive of each other and of their students and focus on community-based classroom management, was encouraged at one of the schools to respond to behavioural problems and lack of student engagement. A focus on involvement in extracurricular activities was also mentioned by another school. These comments reflected a growing awareness of the need to address ongoing issues in these schools, in this case the learning culture within the school. The current school culture was typically, by the majority of the educators we spoke to in the high-gap schools, considered a challenge to be overcome. When teachers noted that the culture was changing, they also would
talk about the role of the principal in helping to lead this change, providing instructional support and expertise.

Collaboration and Shared Support

[We need to] learn and do our best for the students.

Expanding on the school culture theme, half of the high-gap schools’ teachers and administrators noted that support and a sense of community among staff members was a particularly important factor for closing the achievement gap between boys and girls. Teacher collaboration was mentioned at several schools, with one teacher mentioning the need to think of more than the current grade being taught, saying “teachers need to be aware of expectations at the next level. For example, kindergarten teachers need to know what students are learning in Grade 1.” Teacher motivation and encouragement were seen as necessary in order for teachers to work together and continue to acquire knowledge and expertise. These teachers often described some of their challenges but believed that staff collaboration and efforts were helping to overcome these challenges.

One principal described how teachers shared “common practices, assessments, language, and attitudes about learning” and were “knowledgeable and articulate” about the school’s initiatives and their own potential impact on student performance. Another teacher noted how good professional development can often be a challenge, stressing its importance and impact on teaching.

Good Instruction for All Students

Teachers and principals from all of the six high-gap schools believed it was important to use a wide variety of strategies to address literacy learning and instruction. The individual strategies themselves were extremely varied and too numerous to list but were aimed at creating a more literate environment for students. Some strategies were aimed at addressing teaching practices (e.g., “stand and deliver does not work,” teacher training on Reading Recovery), while other strategies addressed more global school- and classroom-based approaches (e.g., additional library time, changing [word identification], SAILS, manipulatives, Battle of the Books). Some schools described early-intervention programs and strategies, implemented both in kindergarten and the primary grades, to support subsequent literacy learning. Typically, these programs did not focus on boys but on addressing the literacy needs of all children in the school. Nonetheless, there was a general sense that boys tended to be more commonly identified for intervention and support. For example, Reading Recovery was most often being provided to boys.

Staff at two of the high-gap schools said they worked hard to ensure a commitment to all students’ learning, explaining that they did not focus on either gender specifically in their school’s literacy plan, but rather on each student’s achievement. Staff at one school described their use of differentiated instruction, literacy coaches, literacy blocks, and staff support services (e.g., PLPs, weekly meetings with the literacy coach, ongoing resource allocation). Participation in the Turnaround program was identified by one school staff as helping to provide a more cohesive, comprehensive literacy program. The assigned literacy coach and funds “allowed [the] staff to come together to learn new strategies [and] also fund a book room, book bins” and other literacy-related items.
In keeping with the common sentiments expressed in all the high-gap schools, the principal of one school felt that because of the “differentiated curriculum and implementation of a balanced literacy program [in his or her school]… more boys are successful.” Hence there was an underlying belief that good-quality instruction is necessary for all students, but perhaps especially for boys to do well in reading and writing.

Many schools had implemented strategies that targeted boys specifically, like book clubs for boys, after-school homework clubs, peer tutoring, use of computer software, and co-curricular clubs. A conscious effort was made to include non-fiction literature and graphic novels in the school library at most schools in addition to the use of non-fiction books in classrooms for reading and writing activities. The role of the school library, specifically making “more effective use of the library” was described in more than one interview. One teacher described bringing in male speakers, authors, and sports heroes as guest speakers to the school and affirmed what powerful teaching resources they can be. A principal echoed this in a separate interview, noting that her staff was making a “conscious effort… to provide male role models who like to read.”

Many of the high-gap schools mentioned the use of assessments and data related to other themes (e.g., commitment to all students, using a variety of strategies), and two schools made comments that were directly related to the use of data to support the achievement gap in literacy. The use of formative assessments to provide accurate pictures of student learning and progress, as well as to flag those students needing assistance in order to provide early intervention, were the most common examples. Hence these schools increasingly recognized that, while not universal, there were literacy achievement gaps across groups of students in their schools and were making efforts to begin addressing these gaps.

Transiency of Students and Teachers

One theme identified in the high-gap schools that we did not find among the low-gap schools was that of transiency. Staff members from three of the high-gap schools mentioned issues related to the transiency of staff and students, with the belief that it had intensified the achievement gap between girls and boys in their schools. One principal described the school as having a “lack of stability due to a high mobility rate” resulting in a “constant state of flux.” In addition, a young staff with many teachers on maternity leave added to high teacher mobility. In another school, a number of students transferred to a newly opened French Immersion program, presenting challenges for the students who remained in the English-language stream. In another school, literacy leads were recently lost to promotions and staff turnover. While transiency would equally affect boys and girls, the comments from these educators indicate that they believe this mobility has a more negative impact on boys’ learning. Interestingly, a principal in one high-gap school described a stable staff with only one staff change in the last four years. Hence it would appear that factors associated with stability, if related to supporting students’ literacy achievement, are complex and multi-dimensional.
Highlights from the Case Study Schools

We have tried to provide some sense of the commonality of our findings, noting aspects of each theme that were either unique to a school or more commonly found in the schools. Our descriptions of these findings are not evaluative. Hence the reported themes are reflections of statements and beliefs of the teachers and administrators we met. Certainly, there is a need to examine the validity and generalizability of these often very diverse beliefs. For example, while male role models were described as important supports for boys in one low-gap school, teachers in other low-gap schools did not identify this as an important factor. Currently, the research literature contains little evidence for many of the gender differences and strategies described by educators in the case study schools. Together the findings from our interviews and observations in these low-and high-gap schools highlight a set of findings that are worth further examination and exploration.

- Teachers and administrators believe there are differences in how boys and girls learn (e.g., differences in working memory and processing, boys being more tactile, kinesthetic learners, boys needing more structure) and function (e.g., literacy preferences, motivation, educational values, interests) in school. As a result boys and girls have different needs in the classroom (e.g., boys need to move around and engage and require structured lessons).
- Educators commonly speak about different societal expectations for boys and girls and how these play a role in increasing the gender differences in literacy achievement.
- Teachers and administrators point to the crucial role of home and community factors in the development of boys’ attitudes towards literacy and schooling in general.
- Educators in the low-gap schools described the importance of ongoing communication with parents and the active engagement of parents in the school.
- Educators in the high-gap schools believed that most of their parents valued the work that happened at the school but were reluctant or unable to follow through for a variety of reasons (e.g., homework completion, home reading programs, language barriers, enforcing academic expectations). This resulted in a disconnect between the school’s expectations and the expectations from home, especially for boys.
- Efforts were being made in both the low-and high-gap schools to either maintain the positive relationships and communication models that had been established with parents or build such positive models to increase parental engagement and support.
- A positive school culture that focuses on learning for all students was consistently described as an important factor in enabling student success. Such a climate is obtained through high academic, social and behavioural expectations, positive role models and a positive, caring school community.
- Educators in the high-gap schools often spoke of overcoming current challenges by focusing on the current school culture, behavioural issues, or the lack of student engagement, in an effort to build positive, caring school communities which increase student achievement.
- Similarly, teachers highlighted the importance of their collaborative efforts and dialogues about instructional practices in developing a stronger educational culture in the school. In these instances, common language, assessments and teaching practices were identified as useful in demonstrating positive attitudes about teaching and learning and developing a collaborative environment and a sense of community that enabled the staff to challenge
each other and support learning and teaching. Strong and directed leadership from the principal or other key individuals was considered essential in order to begin and maintain the initiatives described throughout the case studies.

- Educators in the high-gap schools spoke of their efforts to address achievement concerns. Assessment data and other data sources were being used to provide information to identify the literacy achievement gaps across groups of students.
- Teachers and administrators believed it was important to use a wide variety of instructional strategies and early-intervention programs to address literacy learning and instruction.
- Educators in both the low- and high-gap schools described a variety of approaches used to meet students’ needs, regardless of gender. A number of instructional approaches and orientations, although not targeted specifically at boys, were identified and included the notion that effective classroom management, reflective planning, collaborative learning, formative and responsive assessment and early intervention improve the learning of all students.
- Teachers in some of the case-study schools focused on good teaching strategies for all students, believing that quality instruction was more important than broad gender- or group-specific strategies. In contrast, other staff members described their strategies that specifically targeted boys (e.g., book clubs for boys, non-fiction resources).
- In some schools and neighbourhoods, the transiency of staff and students was considered a challenge that served to intensify the achievement gaps between boys and girls.
SUMMARY

Increasingly, educational research in schools is becoming difficult to accomplish. Teachers and administrators feel pressure to meet both internal and external accountability targets. Within this climate, it is difficult for these professionals to find either short- or long-term benefits to incorporating ongoing research within their already full set of professional expectations. Collaborative research projects between the professional and academic communities have the potential to build these connections, highlighting the valuable role of both professional practice and research. Ultimately, these partnerships can better support our practice and understanding, supporting the educational outcomes of students. These collaborative projects are not without their challenges. Researchers and practitioners conceive of evidence in different ways. The protocols for research are often different from the practices used by professional organizations to explore educational issues. Research findings are typically communicated through the slow and cautious release of information that has been vetted by academic review and debate; there is a continuous level of doubt and a cautious interpretation of findings. By contrast, the imperative to support the needs of current students means that the professional educational community must address issues and problems within a much shorter timeline. Thus the evidence for new ideas and understanding, and the adoption of new practices and initiatives, rarely has the opportunity for systematic review. It is within these potentially opposing demands that we must build our research and professional partnerships.

Our collaborative research project begins the process of building such partnerships while systematically examining an important issue within the context of Ontario’s education system. The research project had two primary goals. First, the research collaboration provided an opportunity to develop models of research that combined the skills and expertise of both practitioners and researchers, building capacity for subsequent research and partnerships. Secondly, and more importantly, we wanted to begin to understand some of the student, teacher and school factors associated with gender differences in literacy achievement. The research used both quantitative analytic procedures and qualitative case studies to help build this understanding.

To the extent the current project was able to build such a partnership, we have also been able to begin to understand the gender differences in literacy achievement in Ontario. The combined quantitative analyses of EQAO results and the student surveys, and the qualitative analyses of the case studies provide a wealth of data highlighting many of the attitudes, beliefs, and literacy-related practices of students, teachers, and administrators. Perhaps not surprisingly, the data from both the low- and high-gap schools were often quite similar, especially with respect to teachers’ beliefs about gender differences in academic and literacy achievement, instructional practices, and students’ attitudes towards schooling. Our quantitative analyses identified relatively minor differences between the boys’ attitudes and their at-home and at-school activities between the low- and high-gap schools. Students, and boys in particular, in the low-gap schools reported higher levels of reading and literacy related practices at home than students in the high-gap schools. Boys in the low-gap schools were more likely to engage in academically related activities and may be less likely to engage in some non-academic activities (e.g., electronic entertainment). However, the biggest differences were typically between boys and girls regardless of the school they attended. Overall, our quantitative analyses found that the majority...
of the variability in boys’ literacy achievement could be attributed to student-level factors, although there were a few significant school factors that bear further study, specifically, student absenteeism, literacy-resource use and principals’ knowledge about literacy instruction. The case studies identified other possible factors that may contribute to our understanding of systematic differences in boys’ literacy achievement.

Throughout the case studies, there were three recurring themes. First, teachers and administrators in both the low- and high-gap had a diverse set of beliefs to account for the observed differences between boys’ and girls’ literacy achievement and educational outcomes in general. These beliefs included motivation, maturational differences, social expectations, interests and role models. Genetic and social factors were also described as important causes of these differences.

Second, good teaching benefits all students. Teachers and administrators described a wide variety of policies, strategies and practices that they considered to represent good teaching and education. Often these practices echoed initiatives currently and commonly described throughout Ontario. As an example, teachers in both the low- and high-gap schools talked about non-fiction, differentiated instruction and teacher moderation to support literacy achievement. Nevertheless, it is not clear from our data if there is a well-defined set of practices and initiatives that could be considered representative of good teaching or that differed across the low- and high-gap schools. In the most apparent difference, teachers in the low-gap schools more commonly discussed their ongoing efforts to ensure that the boys produced high-quality work. They did not accept poor-quality work from any students. The teachers in these schools still found it a struggle at times, especially with the boys, but believed their expectations were having long-term benefits for individual students and the school as a whole. In contrast, teachers in the high-gap schools were more likely to talk about the challenges to get boys to focus on schooling, let alone to meet high expectations. Such comments are consistent with previous research about the importance of setting and demanding high standards.

Third, and perhaps most important, school culture was cited as an important factor in supporting teaching and learning, demonstrated through a commitment to students, and the presence of a caring and compassionate learning climate. Teachers and administrators in both the low- and high-gap schools commented on their ongoing efforts to improve their own skills and their dedication to helping their students. Yet there were observed cultural differences observed between the low- and high-gap schools. The low-gap schools seemed to be more able to set high expectations for their students and insisted that these expectations be met by all students, regardless of gender or background. Teachers in these schools often spoke of a culture that valued all aspects of learning and of a degree of peer acceptance among students. There was often a school culture that allowed both boys and girls to move beyond gender stereotypes. Boys actively participated in the arts and girls in athletics. For example, there was an interesting interaction in terms of the amount of time spent playing musical instruments at school. The highest reported frequencies were by boys in the low-gap schools followed by girls in the high-gap schools. In contrast, teachers in the high-gap schools were more likely to talk about the struggles they were having with a community attitude that boys need to be boys. These teachers would talk about competing demands on boys’ time between sports and school, with sports often winning. Interestingly, our student survey results did not find any differences in sport participation, although we did not look at the amount of participation. Hence it is possible that boys in the high-gap schools may be devoting more of their leisure time to sports than boys in the low-gap schools.
The creation of this school culture, if it is a key factor for supporting the achievement of both boys and girls, requires a sustained collaborative effort. In cases having the most coherent and collaborative culture or in cases where efforts were being made to create a stronger learning culture, the principal was identified as one of the key instructional leaders. Parents were also identified as important in supporting the culture in the school and their children’s learning. We found differences between the low- and high-gap schools, not so much in terms of expectations but more in terms of parents’ abilities to support their children’s education. It was certainly more common for teachers in the high-gap schools to comment on parents’ inability to fully support their children’s education.

Our observations of the low-gap schools certainly suggested that they often had a permeating school culture that focused on education. The hallways, students, and teachers collectively created an overall impression that students and staff shared a common set of expectations for the operation of the schools. While we often had difficulty articulating specific aspects that highlight the features of school cuture, we could recognize its presence early in our observations. Whatever the challenges facing these teachers and students, a school culture had been created to largely meet these challenges.
CONCLUSIONS AND RECOMMENDATIONS

Girls have been shown to have a significant and consistent advantage in literacy from an early age over boys, and this advantage is found not only in North America and English-speaking countries but internationally across cultures and languages. However, these gender differences may not be consistent across groups of students. Further, the reasons for these differences and the interventions and strategies that might successfully address them are, as yet, largely unknown. Certainly, it is important to challenge boys to improve their literacy performance and find ways to better engage boys in the reading process, but we need to better understand the processes that will help boys to meet these challenges. The observed variability of gender gaps in literacy achievement across schools and jurisdictions as well as the research literature on literacy achievement suggest that these differences are not absolute and can be addressed through instruction and family support. Research has the potential to increase our understanding of these differences and then identify ways to minimize these differences.

Our findings largely support the general framework identified by Younger et al (2002). We found evidence of organizational (structural) approaches that addressed students’ educational needs. Our observations, supported by principals’ and teachers’ comments, found evidence of a school culture in the low-gap schools that valued academic achievement for all students while also promoting the importance of broader educational goals and individual acceptance. Consistent expectations for literacy achievement and achievement as a whole were reported, along with school practices that may have lessened gender stereotypes (e.g., increased arts participation for boys). In contrast, principals and teachers in the high-gap schools spoke of their work to build such a culture. There was also evidence of a socio-cultural factor and increasing attempts to address it. There were certainly reports of parent and student attitudes that illustrated a belief that boys need to be boys and that literacy is not generally as important for boys. While this attitude was equally prevalent in both the low- and high-gap schools, teachers in the high-gap schools reported it to be much more of a challenge. Similarly, school staff in both the low- and high-gap schools reported the use of practices to help increase boys’ literacy achievement, for example, using male role models to promote literacy and school related outcomes. Once again, these practices seemed to be more embedded in the low-gap schools and in development in the high-gap schools.

We found less definitive evidence of either individual or pedagogic approaches to literacy instruction. Certainly, there were examples of efforts to build boy-friendly literacy resources such as gender-specific book clubs. Teachers spoke of their increased awareness of the need to use materials that better met boys’ interests and experiences. These teachers also talked about new initiatives, often linked to current provincial initiatives such as differentiated instruction and data tracking. There were also examples of ongoing interventions (e.g., Reading Recovery) to meet the needs of struggling readers. However, these interventions were commonly limited to a small proportion of the students. There were few instances of teachers describing how these individual approaches actually resulted in different classroom and teacher practices. This wide variety of beliefs about gender differences and the methods to address them may pose a problem for subsequent efforts to address the gender gaps in literacy. Specifically, many of the widely held perceptions described by teachers are not found in the research literature, or the evidence is either inconclusive or non-existent. Other perceptions (e.g., boys prefer non-fiction, boys need boys-only classrooms) are contrary to what the research has generally concluded (see, for
example, Topping et al, 2008). Nor is it conclusive that some of the described practices will have any lasting benefits. As described previously, the focus on non-fiction does not seem to have any support as a method to better assure boys’ literacy achievement. Similarly, it is not at all clear that boys need to have more relevant texts or male role models in order to be successful academically. It will be important to continue to track these practices and the others described above to determine if they do have any systemic benefits for students’ literacy achievement. If true, these beliefs will help us to better understand the needs of individual and groups of students. If false, these beliefs will likely result in practices that are, at best, of little or no value or, at worst, detrimental to students’ learning. Hence there is a need for organizations and researchers to publish up-to-date and accurate summaries of the evidence supporting or refuting these beliefs and the benefits of these practices.

Subsequent research requires the collection of information about the policies and practices of teachers and schools, a more thorough picture of students, and the use of outcome measures that are sensitive to effective interventions. Our subsequent research needs to be supported by an increased understanding of what teachers are actually doing in their classrooms. This can be gained by the increased use of teacher and student surveys that examine classroom and school practices, and research projects that observe teachers in the act of teaching over an extended period of time. Indeed, the information gleaned from the case studies provides a base from which to develop more relevant questions to include in future survey instruments. It is unlikely that new educational initiatives will have immediate measurable effects on student achievement. Hence our future research efforts and partnerships need to better understand school practices and shifts therein, observe them and measure the impact of school practices over an extended period of time.

It will be important for both the researchers and professionals involved in future efforts to continue to consider our reported findings. Are there other examples that either support or refute our initial findings? Do we have examples of both a changing school culture and a subsequent reduction in the literacy achievement gaps of groups of students? These efforts will be needed if we want to build causal models that link changing practices to both increased literacy achievement and lower achievement gaps. Based on the results of this collaborative project, the following recommendations are most likely to further our understanding of the root causes of these persistently observed gender differences and guide our subsequent efforts to reduce these achievement gaps. We finish with a set of recommendations for subsequent practice and research.

For Practitioners

1) We found few differences between boys’ attitudes towards schooling and writing across the low- and high-gap schools. Boys in the low-gap schools reported higher levels of fiction reading and reading frequency and increased amounts of homework completion. Further, the boys in the low-gap schools may have slightly more positive attitudes towards reading. Similar results were also found for most leisure activities, with the exception that boys in the low-gap schools may play video games less frequently. Hence these factors are not likely to be relevant for the differences we observed.

2) Our results highlight the important role of good teaching and positive learning environments. Good teaching encompasses a broad range of skills, although the most important may be the ability to adapt teaching and the learning situation to the needs of
individual students or groups of students, as needed.

3) Work to develop and maintain a strong, positive learning culture in the school. This includes creating mechanisms to increase parental engagement and students’ sense of belonging while maintaining high academic and behavioural expectations for boys and girls.

4) School leadership and sustained collaborative efforts by teachers and administrators are likely to be important factors in supporting students and creating the conditions described above.

5) Continue to explore, examine and consider teaching practices and initiatives that are believed to support learning. Develop a solid understanding of literacy instruction, informed both by practice and research. However, be cautious of initiatives that promise to provide solutions to complex educational issues, for example, increasing boys’ literacy achievement. Education is complex and the likely solutions will require sustained work and effort.

6) Become more aware of the educational research literature, recognizing that research is rarely definitive. Further, gender-specific literacy strategies are largely untested and certainly lack definitive evidence.

For Researchers

1) Our research identified several initiatives and practices being used to address boys’ literacy achievement. The challenge is to document and understand the common practices and policies that underlie these teaching and learning practices.

2) Continue to track schools with high-gaps over time and those schools in which the gender gaps are decreasing over time. For example, the Ministry of Education has provided funding to various schools that have targeted boys’ literacy. However, there has not been a systematic effort to track the effects of these interventions in terms of literacy achievement. EQAO could play an important role in examining the impacts of these efforts.

3) Develop survey instruments that include measures of school and teacher practice and student activities.
   - Potentially important teacher variables include
     - literacy-instruction strategies and knowledge, practices, background and ongoing professional development.
   - Potentially important administrator variables include
     - leadership experience and skills, curriculum and instructional expertise.
   - Potentially important student variables include
     - homework, electronic entertainment, literacy practices at school and at home and other activities.

4) This information needs to be supported by an increased understanding of what teachers are actually doing in their classrooms. Hence we need to continue to combine quantitative research that identifies schools worth examining and qualitative research that explores
what occurs in these schools. We need to talk to and observe administrators, teachers, and students. It is unlikely that new educational initiatives will have immediate measurable effects on student achievement. Future research efforts and partnerships need to better understand school practices and shifts by observing and measuring the impact of these practices over an extended period of time.

5) Continue to consider the following questions during subsequent EQAO outreach activities. Are there other examples that either support or refute our initial findings? Do we have examples of both a changing school culture and a subsequent reduction in the literacy achievement gaps of groups of students? What practices and policies are consistently found in low-gap schools but not in high-gap schools? This will require outreach activities in both successful and less successful schools.

Our understanding of the factors associated with gender differences in literacy achievement is still in a very early stage. These differences have been widely and consistently reported. It is likely that the reasons for these differences are multi-dimensional and complex. Certainly, there appear to be school and teacher practices that may serve to ameliorate these differences, and our initial work has identified some avenues for future observation and research (e.g., school culture). However, the solution to reducing gender gaps in literacy achievement may not be obtained through directed efforts towards boys’ learning. Rather, it may be more beneficial to begin to focus on the educational needs of specific sub-groups of the student population. For example, what are the characteristics of students who are not meeting the provincial standard (those at Level 1 or Level 2)? What are the classroom-based practices that support these children, and do different groups of children need different forms of support? What is the variability in the implementation of educational interventions such as differentiated instruction?

We believe our research model provides a foundation for EQAO, teachers and administrators to examine and interpret their own theories, beliefs and practices. There is an opportunity to continue the work that began in this research collaboration. The research team at Queen’s University will continue to examine many aspects of the quantitative data. We have recently created an HLM group, and it will continue to conduct analyses of the data, examining Grade 3 data, exploring random slope models and building alternative models (e.g., multi-level logistic regression). It is our hope to present our current and future results at academic conferences and publish these results in academic and professional journals. Throughout, we hope to work with in partnership with EQAO in these research and dissemination activities. Subsequent research and work by EQAO and its other partners will also further our understanding of students’ literacy achievement and learning.
REFERENCES


# APPENDIX 1
## STUDENT SURVEY

### About Me

1. I am a [ ] girl. [ ] boy.
2. I am [ ] years old and am in Grade [Blank].
3. I was born in [ ] (country).
4. I have lived in Canada for [ ] years.
5. I have lived in Ontario for [ ] years.
6. I have [ ] sisters and [ ] brothers.
7. The first language I learned to speak was [ ].
8. The language I speak most often at home is [ ].
9. Since the last summer, I did the following activities? (fill in the circle for those activities done)
   - a) I went to the community centre or park.
   - b) I took music, dance, or art classes.
   - c) I went on a plane or train.
   - d) I went on a holiday outside Ontario.
   - e) I played on a community sports team.
   - f) I went to summer camp.
   - g) I went to our family cottage.
   - h) I was part of a school club or team.
   - i) Other activities.

### True | Mostly True | Sometimes | Mostly False | False
---|---|---|---|---
10. For me, schoolwork is easy. | [ ] | [ ] | [ ] | [ ] | [ ]
11. Getting good marks is important to me. | [ ] | [ ] | [ ] | [ ] | [ ]
12. I think school is boring. | [ ] | [ ] | [ ] | [ ] | [ ]
13. I enjoy learning new things at school. | [ ] | [ ] | [ ] | [ ] | [ ]
14. I like school very much. | [ ] | [ ] | [ ] | [ ] | [ ]
15. If I work hard, I can get good marks. | [ ] | [ ] | [ ] | [ ] | [ ]
### At Home

<table>
<thead>
<tr>
<th>16. When I am at home:</th>
<th>Every day</th>
<th>A couple of times a week</th>
<th>Once a week</th>
<th>Several times a month</th>
<th>At least once this month</th>
<th>Rarely or Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) I play with my friends.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>b) I look up things on the computer.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>c) I play games on the computer.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>d) I chat with friends using the computer (MSN, Facebook).</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>e) I read books.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>f) I read with a family member.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>g) I write stories or poems.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>h) I play sports.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>i) I play video games.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>j) I watch television or movies.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>k) I draw, paint, or play a musical instrument.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>l) I work on school homework.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

17. My 3 favourite activities above are:

(Place a check mark beside the 3 favourite activities above)

18. Others things I like to do when I am at home are:

<table>
<thead>
<tr>
<th>True</th>
<th>Mostly True</th>
<th>Sometimes</th>
<th>Mostly False</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
## At School

### 20. When I am at school:

<table>
<thead>
<tr>
<th></th>
<th>Every day</th>
<th>A couple of times a week</th>
<th>Once a week</th>
<th>Several times a month</th>
<th>At least once this month</th>
<th>Rarely or Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) I use the computer or the internet.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b) I read fiction books.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c) I read non-fiction books.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>d) I write fictional paragraphs (stories, poems, plays).</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>e) I write non-fictional paragraphs (science, social studies).</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>f) I play sports, games, or do club activities.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>g) I play a musical instrument.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>h) I work on school homework.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>i) I volunteer at the school.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>j) I go to the school library.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### 21. Tell us about the school library.

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree or disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) I like going to the school library.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b) The school library is a busy place in the school.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c) The school library has a good selection of books I like to read.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
About Me and Reading/Writing

Lastly, we want to know more about your thoughts on reading and writing. For each question below, please fill in the circle for the answer that **Best** describes your thoughts on reading and writing.

<table>
<thead>
<tr>
<th></th>
<th>True</th>
<th>Mostly True</th>
<th>Sometimes</th>
<th>Mostly False</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.</td>
<td>I am a great reader.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>23.</td>
<td>I read more than my friends.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>24.</td>
<td>I enjoy reading in school.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>25.</td>
<td>I enjoy reading at home.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>26.</td>
<td>For me, reading is interesting.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>27.</td>
<td>For me, reading is difficult.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>28.</td>
<td>I like to receive books as presents.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>29.</td>
<td>I am a great writer.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>30.</td>
<td>I write more than my friends.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>31.</td>
<td>I enjoy writing at school.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>32.</td>
<td>I enjoy writing at home.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>33.</td>
<td>For me, writing is interesting.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>34.</td>
<td>For me, writing is difficult.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>35.</td>
<td>I like to write in a journal.</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>36.</td>
<td>Yesterday, I read a book for my own enjoyment.</td>
<td>〇 Yes</td>
<td>〇 No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37.</td>
<td>Usually, the number of days I read each week for fun is:</td>
<td>Everyday</td>
<td>6 days</td>
<td>5 days</td>
<td>4 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
<td>〇</td>
</tr>
<tr>
<td>38.</td>
<td>My favourite book is:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39.</td>
<td>The kinds of things I like to read include:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thank you very much for completing this survey. You have helped us understand the activities that children do. Please return the completed survey to your teacher.
## APPENDIX 2
### SURVEY ITEMS IN THE SIX FACTORS

<table>
<thead>
<tr>
<th>Factor</th>
<th>Number of Items</th>
<th>Survey Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>2</td>
<td>16l) I work on school homework at home&lt;br&gt;20h) I work on school homework at school.</td>
</tr>
<tr>
<td>Electronic Entertainment</td>
<td>4</td>
<td>16c) I play games on the computer.&lt;br&gt;16d) I chat with friends using the computer (MSN, Facebook).&lt;br&gt;16i) I play video games.&lt;br&gt;16j) I watch television or movies.</td>
</tr>
<tr>
<td>Writing Attitudes</td>
<td>8</td>
<td>16g) I write stories or poems.&lt;br&gt;20d) I write fictional paragraphs (stories, poems, plays).&lt;br&gt;29) I am a great writer.&lt;br&gt;30) I write more than my friends.&lt;br&gt;31) I enjoy writing at school.&lt;br&gt;32) I enjoy writing at home.&lt;br&gt;33) For me, writing is interesting.&lt;br&gt;35) I like to write in a journal.</td>
</tr>
<tr>
<td>Reading Attitudes</td>
<td>9</td>
<td>16e) I read books at home.&lt;br&gt;19) My family likes to read.&lt;br&gt;20b) I read fiction books at school.&lt;br&gt;22) I am a great reader.&lt;br&gt;23) I read more than my friends.&lt;br&gt;24) I enjoy reading in school.&lt;br&gt;25) I enjoy reading at home.&lt;br&gt;26) For me, reading is interesting.&lt;br&gt;28) I like to receive books as presents.</td>
</tr>
<tr>
<td>Attitudes Toward School</td>
<td>4</td>
<td>11) Getting good marks is important to me.&lt;br&gt;12) I think school is boring.&lt;br&gt;13) I enjoy learning new things at school.&lt;br&gt;14) I like school very much.</td>
</tr>
<tr>
<td>School Library Use</td>
<td>4</td>
<td>20j) I go to the school library.&lt;br&gt;21a) I like going to the school library.&lt;br&gt;21b) The school library is a busy place in the school.&lt;br&gt;21c) The school library has a good selection of books I like to read.</td>
</tr>
</tbody>
</table>