INTERVENING THROUGH SUPPLEMENTAL EDUCATION PROGRAMS: EVIDENCE FROM TORONTO'S JANE AND FINCH COMMUNITY.

Authors: Bryan Ekeh, Chinweizu Francis Okeke
Literature Review Contributed by: Humber College

ACKNOWLEDGEMENTS

Hanada Kardassopoulos
Educational Consultant

Devon Jones
YAAACE Founder and Organizer

Brendan Beckett
Humber College Research Team

Jennifer Fortune
Humber College Research Team

Jessonnica Chacin
Humber College Research Team

Tim Gao
Humber College Research Team

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ABSTRACT

Standardized testing scores show a two-tiered public education system exists in Canada. In Toronto, for example, schools in the Jane and Finch community consistently score lower on provincial literacy and math tests than the city's average by 11.3% in primary school, 14% in middle school, and 24% in secondary school. In response to achievement gaps in the two-tiered public school system, community groups operate Supplement Education Programs (SEPs) that aim to improve math and literacy levels by offering academic instruction after school hours, on weekends, and during summer breaks, often combined with unconventional activities like sports or arts.

During the summer of 2019, the research nonprofit, Road Home Research & Analysis, partnered with the Youth Association for Academics, Athletics and Character Education in Toronto's Jane and Finch community to study how SEPs can better close student achievement gaps. Following a 7-week small-group leveled learning intervention involving a sample size of 101 elementary and middle school students, this research documented a 13% improvement in their average literacy scores. In math, problem-solving and computational skills went up a grade level for 61% and 59% of the students, respectively. These improvements occurred despite challenges with student attendance, limited program resources, inadequate support from the Toronto District School Board, and limited teacher training opportunities due to teachers' union involvement. Our conclusions add to the body of research on the role SEPs could play in creating a public education system that offers equality of opportunity to all students. This study also makes the case for governments to consider that SEPs, when in line with best practices, are valuable actors for change in the current two-tiered education system.

INTRODUCTION

A supplemental education program (SEP) is a combination of academic training with unconventional methods (e.g. sports, games, arts, discussions) in an organized program to increase the number of positive academic outcomes among students relative to negative ones.[1] At the core of each SEP is the notion that low-performing students exposed to complementary academic training outside regular school hours will experience improved academic outcomes. The current state of academic literature on SEPs is largely informed by efforts in the United States. Due to the No Child Left Behind Act of 2001 mandating all American schools offer SEPs for low-achieving students, a market emerged for private SEP firms offering competing services. [2] However, studies of private SEP firms depict these efforts as ineffective at improving academic outcomes because of several factors, such as SEP curricula being inconsistent with what is taught during the day in traditional public schools, SEP staff lacking teacher training, and SEPs overly relying on independent worksheet-based academic activities.[2]

This case study is set in Canada, where our jurisdictional scan revealed a two-tiered educational system in which the needs of low-achieving students are also ineffectively addressed. In the particular Toronto community where our research takes place, the province of Ontario's Education Act of 2011 and Accepting Schools Act of 2012 is guiding legislation that prompts all school boards to proactively initiate strategies to increase academic outcomes among their student populations.[3] The existing policy infrastructure gives school boards the autonomy on what strategy to employ, with SEPs being one of several possible options. This local autonomy may explain why Canada doesn't have a private SEP market comparable to the U.S.

Our research finds that SEPs can have a positive impact on low-achieving students, with the right conditions and approach in place. By contrast to other empirical studies in the academic literature, we focus on the use of a small-group learning approach based on grade level for students. Instead of partnering with a private firm, we partnered with an established community organization that offers a SEP serving approximately five hundred elementary and middle school students per year for fourteen years. Youth Association for Academics Athletics and Character Education (YAAACE). YAAACE has offered basketball programming and academic instruction in Toronto's Jane and Finch community since 2005. The academic instructors employed by YAAACE are full-time teachers for the Toronto District School Board (TDSB). After years of limited academic improvement, YAAACE partnered with us to introduce a small-group learning approach based on grade level. The decision to transition to a small-group learning was based on literature demonstrating the positive effects of small-group learning on academic outcomes.[1]

[1] U.S. Department of Education, (2012). Description of Supplemental Educational Services. USA

[2] Sunderman, G. (2006). Do Supplemental Educational Services Increase Opportunities for Minority Students. Sage Publications.

[3] Heinrich. J, Meyer. R, Whitten. G. (2010).

[4] Government of Ontario. (2019). Accepting Schools Act, 2012. Retrieved from: https://www.ola.org/en/legislative-business/bills/parliament-40/session-1/bill-13

[5] Arias, J. & Walker, D. (2004). Additional Evidence on the Relationship between Class Size and Student Performance. The Journal of Economic Education

The following section is a Literature Review that summarizes the current and most notable narratives in the discourse surrounding SEPs. We used this literature review to give the reader a general understanding of the studies that informed our insights. Section 3 discusses the Program Details of the study. This section explains precise details documenting observations between teachers and students within the program. It also includes explanations of the instruments used to test for mathematics and literacy levels among the students, as well as the reasoning underlying the decision to use a small-group learning approach. Section 4, Research Methodology, documents the research design of small-group learning and the specific observational approach employed. Section 5 discusses the Data Collection and the Results of our study. It includes a jurisdictional scan that provides an analysis of the mathematics and literacy scores of elementary schools, middle schools, and high schools in the Jane and Finch community of Toronto. Section 6 is the Limitation portion of our study that describes the barriers and inconsistencies of the study. Finally, the 7th section focuses on our Discussion about the policy implications of our study and our final thoughts on the use of SEPs to address the needs of low-achieving students.

LITERATURE REVIEW

Supplemental Education Programs

Supplementary education programs, or SEPs, are programs that offer education services that supplement regular school education for student's in need of support. These commonly take the form of after school or weekend tutoring and summer school programs. Given a multitude of approaches to these programs, a lot of research has been done into what the most successful programs involve, as well as why others have failed.

Small Group Learning

In alignment with YAAACE's approach to their summer program, small-group learning has been shown to be an effective method for supplemental education with extensive research,[6] including for students of low socio-economic status[7] and specifically Black students with low SES.[8] One study, however, showed no effect of class size as a factor when evaluating supplemental education services as part of the United States' infamous No Child Left Behind (NCLB) act.[9]

Adjacent to small-group learning is tutoring. Most studies that refer to tutoring mean "small-group tutoring" which usually indicates smaller groups than "small-group learning" but is not one-on-one instruction. Per this definition, there is evidence supporting its effectiveness,[10] and evidence showing little effect.[11]

These small-group and tutoring styles can also involve cooperative learning, which was also found to be a beneficial factor when controlling for others.[12] What differentiates these programs goes beyond class size. These studies include other factors of what methods were used in the context of these learning environments.

[6] e.g. Denton et al., 2010; Webb & Brigman, 2007
[7] Dietrichson et al, 2017
[8] Harding et al., 2012
[9] Jones, 2015
[10] Dietrichson et al., 2017; Slavin & Lake, 2008
[11] Paeplow, 2011
[12] Dietrichson et al., 2017; Slavin & Lake, 2008

Feedback and Progress Monitoring

A common theme of successful programs is the use of feedback and progress monitoring.[13] This refers to more than the standard feedback and individualized attention that comes naturally from small-group learning and tutoring, but rather very specific data and feedback about student progress for both teachers and students.

Another example of how feedback improves student progress is the use of formative testing over summative testing.[14] This refers to frequent small tests and quizzes that emphasize understanding concepts and applying them over rote memorization. Formative testing allows teachers to stay on top of students' progress while also providing feedback to students on their understanding. Studies also show that this method leads to what is known as *transfer*, which allows improvement in one subject to boost performance in others.[15] This approach is called test-enhanced learning. This works by frequently engaging students in practice and recall in small chunks spaced over time while also 'interleaving' different skills and ideas in one sitting so that connections between them can form.[16]

Teacher Relationship and Mentoring

Another set of research focuses on the relationship between students and teachers. Studies show that forming a close relationship of trust fosters engagement and motivation in students.[17] This applies to the area of discipline as well, where evidence shows training teachers showing empathy to students reduces negative behavior from students.[18]

When it comes to middle-class and/or white teachers connecting to low-income Black and/or urban youth, there can be difficulties because of cultural disconnects.[19] One strategy suggested by Guerra[20] is to use urban fiction to engage students with literature they can see themselves in. By making school connect with their real lives they could benefit socially and academically. The idea of utilizing relative literature is bolstered by parallel evidence showing that while simply giving free books to students over the summer is not necessarily beneficial, giving them books that match not just their reading level but their personal interests does improve literacy.[21]

This can extend beyond the classroom to creating mentor-mentee relationships. These mentors may not even be teachers. While there is not a direct empirical link between providing low-income students with a mentor figure and academic success, it has been shown to confer a host of benefits and promote motivation and engagement with school.[22] Of particular relevance to YAAACE, sports coaches can also serve this mentor role, and often provide a source of social capital for urban youth.[23]

[13] Dietrichson, 2017; Denton et al., 2010
[14] Roediger et al., 2011
[15] McDaniel et al, 2013
[16] Agarwal & Roediger, 2018
[17] Davis et al., 2011
[18] Okonofua, 2016
[19] Brown & Rodriquez, 2017
[20] Guerra, 2012
[21] Kim & Blair, 2011
[22] Lindt & Blair, 2016; Reagan-Porras, 2013
[23] Richardson, 2012

What Does Not Work

Several studies have focused on the effectiveness of SEPs implemented under the *No Child Left Behind Act* of 2001 in the United States. Predictably, effectiveness varied across the country, and results were often mixed. For example, one study of a large urban school district found significant benefits for mathematics, but less so for boys – and little overall benefit for reading.[24] Another found no effect of supplemental education services in Milwaukee public schools.[25]

In areas where effectiveness proved to be minimal, the primary factors seem to be related to lack of participation and problems implementing the program.[25] Qualitative feedback in the Milwaukee study indicates that self-directed study was a particularly bad strategy, as it takes the form of "more school". YAAACE often emphasizes that this approach does not work for their students, because if regular school doesn't work, more regular school won't work either. One study that evaluated four separate programs with similar supplemental reading comprehension curricula, found all four to be ineffective.[26] What they had in common was teaching students to summarize what they read, and ask themselves questions about the text while reading.

Ontario Programs

Deller and Tomas at the Higher Education Quality Council of Ontario present six examples of early intervention programs in Ontario with common features.[28] These programs are (1) Jessie's – The June Callwood Centre for Young Women, (2) Native Youth Advancement with Eucation Hamilton, (3) YMCA – You Can Go, (4) University of Toronto – Saturday Program and Summer Mentorship Program in the Health Sciences, (5) Pathways to Education Canada, and (6) Wilfrid Laurier University – Building Bridges to Success.

These programs all offer a mix of services to target the web of potential barriers youth face. Built into each program is the 'one arm around one child' approach, which offers youth a tailored experience for their individual needs and circumstances. The importance of recognizing the particular culture of the community being served was also reinforced. Most of the programs incorporate some level of peer support with others of similar background and experiences, which has been shown to contribute to student success.

[24] Springer et al., 2014
[25] Heinrich et al., 2010
[26] Ascher, 2016; Heinrich et al; 2010
[27] James-Burdumy et al., 2012
[28] Deller & Tomas, 2013

Theoretical Perspectives on School Engagement and its Consequences

Engagement with the school experience is related to a number of important social and academic outcomes. These relationships are embedded in long-term patterns that can encompass the student's entire educational career. Engagement practices such as attendance in the elementary and middle school years can predict important future outcomes such as high school non-completion. Early engagement is fostered by parents who continue to act as an important source of motivation.

The Components of Engagement

Student engagement is best conceptualized as having three aspects: behavioural, cognitive, and affective engagement.[29] Affective engagement refers to the student's emotional attachment to teachers, classmates, and schoolwork. Cognitive engagement includes the student's willingness to think deeply and carefully about their schoolwork. Behavioural engagement is often compared to participation, and includes attendance at school and involvement in extra-curricular activities. Of the three, behavioural engagement has been most consistently linked with academic success.[30]

It should be noted that some theorists sub-divide the Behavioural category into academic engagement and social engagement.[31] Academic engagement includes observable behaviours directly related to the learning process, such as attentiveness, time on task and homework completion. Social engagement refers to the extent to which the student adheres to the rules of classroom behaviour and includes attendance, speaking out of turn and other disruptive actions. For the purposes of the present review, behavioural engagement will be treated as one category, as this is the more common approach. Indeed, even theorists who may use the subdivided system themselves acknowledge that the 3-part model is the standard approach.[32]

Student engagement has well-documented relationships with many variables, including risk factors which often cluster together, namely SES, gender, race, low academic performance, mental health and behaviour problems.[33] Top theorists in the study of school engagement suggest that life circumstance factors such as the student's beliefs about their own abilities, encouragement from family, home environment, peer support and teacher expectations should be viewed as antecedents of engagement, whereas academic performance should be viewed as a consequence.[34]

The accepted antecedent-consequence relationship is often viewed as a cycle, as positive academic outcomes will also bolster engagement which then further increases performance. This cycle is known as the participation-identification model and has three main stages: participation in school activities (which maps most closely to behavioural engagement), academic successes and so-called "identification" with the school experience.[35] This identification component refers to the student's subjective sense of belonging at school, and the extent to which they value the educational experience.

[29] Fredricks, Blumenfeld & Paris, 2004; Skinner, Kindermann & Furrer, 2009

[30] Finn & Zimmer, 2012

[31] Finn, 1989; Finn, 2006; Finn & Zimmer, 2012

[32] Finn & Zimmer, 2012

[33] Alexander, Entwisel & Horsey, 1997; Archambault et al., 2009; Astone & Mclanahan, 1994; Duchesne et al., 2008; Estell & Perdue, 2013; Fredricks, Blumenfeld & Paris, 2004; Skinner et al., 2008; Wentzel, 1998

[34] Finn & Zimmer, 2012; Fredricks, Blumenfeld & Paris, 2004

[35] Finn, 1989; Voelkl, 1997

The concept of identification is most similar to affective engagement.

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Put together, the participation-identification model holds that students with higher levels of behavioural engagement – namely, participation – will experience more academic successes, which then increase affective engagement with the school experience. This increasing affective engagement will then increase behavioural engagement, thereby completing a sort of feedback loop.[36] The cycle is thought to start early in a student's educational career, with the initial participation and encouragement likely stemming in large part from the home environment. [37] Conversely, students who receive little parental encouragement for education may enter the school environment predisposed to low behavioural engagement, and without the propensity to develop a sense of belonging and value towards the school.[38]

The most serious academic outcomes later in high-school – namely dropping out – are conceptualized by researchers as the culmination of a whole host of difficult life circumstances and challenging events which, compounded together, can lead to complete disengagement from formal education.[39] In this case the participation-identification cycle is operating in the same way with negative outcomes: students with low behavioural engagement will experience challenges and failures in the classroom which then reduce their affective engagement with the school environment. This perpetuates negative pattern in that this low affective engagement with the school will further decrease levels of behavioural engagement, which for many low-performing students will eventually lead to dropping out of school entirely.

American youth from low-income families showed that while most students experienced a notable drop in GPA between grades 5 and 6, students with high engagement did not experience this effect. This is one of several investigations that suggest a protective effect of school engagement.

[36] Finn, 1989; Voelkl, 1997
[37] Fredericks, Blumenfeld & Paris, 1994
[38] Finn, 1989
[39] Alexander, Entwisle & Horsey, 1997

The Protective Effects of Engagement

Most importantly, longitudinal research on engagement and academic achievement indicates that all varieties of engagement can serve as protective mediators against the influence of a student's co-existing risk factors.[40] For example, one long-term investigation of the Seattle Social Development Process followed students from schools assigned to one of three intervention conditions: early years intervention from grades 1-6, late intervention in grades 5-6 or a no-intervention control condition.[41] During the middle- and high-school years teachers rated the students' engagement. At age 13 – and every subsequent time point – students who had received more intervention time showed higher levels of engagement than those who had less or none. Disparities between the groups grew with time, to the extent that by age 18, those with the highest levels of engagement showed substantially better academic performance, higher rates of high school completion, and fewer incidents of criminal behaviour, smoking, alcohol and drug use.[42]

This protective effect of engagement has also been observed in relation to decreases in academic performance that are sometimes observed towards the later elementary years. One study of African American youth from low-income families showed that while most students experienced a notable drop in GPA between grades 5 and 6, students with high engagement did not experience this effect.[43] This is one of several investigations that suggest a protective effect of school engagement.[44]

Extracurricular Activities, Academic Achievement and Engagement

Participation in extracurricular activities represents a form of behavioural engagement with the school environment. However, relationships between extracurricular activities and academic results are mixed. Some investigations indicate strong positive relationships between participation in extracurricular activities and higher academic achievement, whereas others find small relationships or even negative results. This confusing range of findings may depend on the nature of the activities students engage in. Consensus in the research suggests that academic extracurricular activities, such as spelling bees or science fairs are positively related to academic performance, whereas non-academic activities (such as athletics) often have almost no relationship to grades.[45] Despite these discouraging findings, some researchers nevertheless recommend participation in sports as a means of preventing complete disengagement in students most at risk.[46]

Long Term Consequences of Elementary School Engagement

Attendance serves as a crucial measure of engagement because it is an early indicator of the pattern of disengagement from school that can eventually culminate in dropping out at the high school level. Although dropping out is considered a problem in the secondary school environment, years of attendance data show that the patterns of low attendance that predict dropping out can start as early as grade 1 and develop through a habit of increasing absenteeism. [47]

[40] Finn & Zimmer, 2012
[41] Hawkins et al, 2001
[42] Hawkins et al, 2001
[43] Gutman & Midgley, 2000
[44] de Bruyn, 2005; Finn & Rock, 1997
[45] Booker, 2004; Chambers & Schreiber, 2004; Eccles & Barber, 1999; Melnick & Sabo, 1992
[46] Yin & Moore, 2004
[47] Alexander, Entwisle & Horsey, 1997; Epstein & Sheldon, 2002; Kaplan, Peck & Kaplan, 1995; Rumberger, 1995

Engagement in the early school years is associated with benefits at the secondary school level, including an increased likelihood of high school completion. For example, Alexander, Entwisle and Horsey[48] evaluated students' personal qualities, Grade 1 experiences, children's personal resources, and family circumstances as predictors of high school attrition, using a logistic regression model. These were found to predict dropping out of school independently of sociodemographic factors, and account for much of the attrition risk associated with common risk factors like socioeconomic status and family type. The authors emphasize that dropping out of school represents the long-term additive effects of life-long circumstances. These key factors include stressful family changes, parental attitudes and socialization experiences, along with academic data and the child's engagement measures, such as attitudes and behaviour.[49] A broad body of research confirms that engagement – particularly behavioural engagement practices, such as attendance – is related to long-term academic success and completion.[50] One factor-analytic study of longitudinal results from a sample of French-Canadian High School Students. Results of the factor analysis indicate that behavioural engagement practices were the best predictors of high school completion. Specifically, students who skipped class or reported rude or disruptive activities in the classroom were most at risk of dropping out.[51]

Further evidence suggests that the engagement practices established in childhood can act as predictors of secondary-level academic success. One study of 303, 845 students between grades 4 and 8 in New York City found that attendance in middle school served as a robust predictor of high school completion.[52] Elementary-age academic skills, including working memory also predict high school level engagement and attrition behaviours.[53]

Taken together, these studies suggest that engagement practices in the elementary and middle school years are related to long-term academic success. Furthermore, the importance of these early years indicates that interventions should target children in the earlier grades in order to reduce the impact of risk factors later on.

[48] Alexander, Entwisle & Horsey, 1997

[49] Ibid.

[50] Alexander, Entwisle & Kabbani, 2001; Epstein & Sheldon, 2002; Jimerson, Anderson & Whipple, 2002; Montague et al., 2011; Orginas et al., 2015; Rumberger & Lim, 2008

[51] Archambault et al., 2009

[52] Kieffer, Marinell & Neugebauer, 2014

[53] Fitzpatrick et al., 2015

Parents Facilitate Engagement

Parents contribute to children's school engagement in a number of ways, starting with practices that begin well before formal schooling.[54] Within the literature on student engagement, consensus suggests that parental support is best conceptualized as a key antecedent.[55] Indeed, according to the participation-identification model discussed earlier, parents are the primary source of any engagement practices students might bring as they first embark on their schooling. One oft-cited study of 6th graders notes that parental support was the most important predictor of the children's interest in school.[56] Supporting this conclusion, data from the first wave of the American National Longitudinal Study of Adolescent Health examined three metrics of parental involvement for 7th and 8th graders: the parent-child relationship, the parent's involvement at the school and parents' educational aspirations for their children. Students whose parents were most involved also exhibited the highest levels of academic achievement and school engagement.[57]

One of the ways in which parents might facilitate engagement for students in the primary grades is through attendance. An influential study of student school absences from grades 2-4 showed that students who had many absences for which no reason was given were the ones with the lowest reading test scores.[58] The author suggested that these unexcused absences might act as an indicator of a low-functioning home environment. Unstable home environments such as these represent a well-known risk factor for poor academic performance.[59]

Engagement in schooling is an important factor for academic success, in part because it can protect vulnerable students from the effects of risk factors in their lives. The behavioural component of engagement – those participatory activities, such as extracurricular pursuits and attendance – are especially powerful. Part of this power stems from the fact that behavioural engagement practices, including attendance at the elementary and middle school level can predict long-term outcomes including high school success. Parents are a crucial part of the puzzle because they imbue students with the motivation they have at the very beginning of the educational process and can encourage ongoing engagement behaviour.

[54] Fan & Williams, 2010; Melhuish et al., 2008
[55] Fredericks, Blumenfeld & Paris, 2004
[56] Wentzel, 1999
[57] Mo & Singh, 2008
[58] Gottfried, 2009
[59] Alexander, Entwisle & Horsey, 1997; Astone & Mclanahan, 1994

PROGRAM DETAILS

Overview

The aim of this program was to use a levelled literacy intervention, delivered in the form of small-group learning, to improve educational outcomes for students in at-risk areas. We used CASI (Comprehension Attitudes Strategies Interests) assessment scores, which uses material aligned with the Revised Ontario Language Arts Curriculum and is one of various assessments used by teachers in the public school system.[60] These scores were then rendered on the Ontario public school rubric, as shown below.[61] Previous YAAACE cohorts had received the standard one-to-many instruction both in their day schooling and at YAAACE's Saturday programming during the school year and YAAACE's annual summer program. These cohorts had not shown the intended improvement in their reading, comprehension and math scores as they progressed in school.

Table 1: Ontario Public School Rubric[62]

Calculation Table of Overall Level				
Level	1	2	3	4
Range	4-11	12-19	20-27	28-32

Small-group learning was the approach taken because it has been shown to be an effective method in improving elementary-middle school students' reading levels.[63] By changing the pedagogical approach, the expectation was that the students would get more individualized and tailored instruction giving them less of an opportunity to fall behind.

Student Selection

The students, ranging from 2nd to 8th grades, came from all the school boards that operate in Ontario and were already enrolled in YAAACE's basketball program.

Teacher Selection

There were 6 teachers that participated in and administered the intervention, 5 of whom had worked with YAAACE in previous summers. The teachers were selected by the Toronto District School Board with limited input from YAAACE. A major motivation for having returning teachers is that the students were already familiar with them, and that this would allow for a smoother and less disruptive environment than if new teachers were used. While the plan was to train the teachers for 10 hours across 2 sessions, they only ended up receiving 4 hours of training because of union and school board-enforced restrictions.

[60] Reading Assessment Guide Framework. (2014). CASI Comprehension Attitudes Strategies Interests (Grade 4 to 8). Retrieved from: https://ontarioteachers.files.wordpress.com/2014/09/casi_overview.pdf

[61] Scores go from 4 to 32, corresponding with levels 1 to 4 for a given range of scores, with level 3 meaning a student is at grade level.

[62] Ministry of Education. Growing Success: Assessment, Evaluation and reporting in Ontario's schools covering grades 1 to 12. pp 18, 40. edu.gov.on.ca/eng/policyfunding/growsuccess.pdf

[63] Denton, C. A., Nimon, K., Mathes, P. G., Swanson, E. A., Kethley, C., & al, e. (2010). Effectiveness of a supplemental early reading intervention scaled up in multiple schools. Exceptional Children, 76(4), 394-416.

Moderated marking was the method used by the teachers to ensure that the marking standard was uniform for the diagnostics and independent assessment. This entailed the teachers reviewing papers in a roundtable manner to set a consistent standard ('level 3'), and then use that standard to mark the remaining papers. On Fridays when YAAACE students went on field trips, researchers and teachers had weekly meetings wherein they voiced concerns and sought clarification. This was important as it made for smoother implementation, easier data collection and helped get the teachers to understand the program.

Program Design

A levelled literacy intervention (LLI) is "a supplemental literacy intervention designed to help struggling readers achieve grade-level competency... through explicit, direct instruction in a small-group format".[64] This levelled literacy intervention was chosen because with some tweaks, it is relevant and applicable to dealing with the problems faced by YAAACE and schools in the Jane and Finch area, with students performing below grade-level. Drawing from studies that highlighted and sought to improve the shortcomings of reading groups that were not based on and catered to students' levels, it also represented a methodical approach to changing YAAACE's previous model of academic instruction.[65] Given the failures of the standard one-to-many teaching approaches in serving low-performing students, this levelled literacy intervention delivered through explicit and guided instruction in a small-group format presents a systematic approach, especially as applied within the literature.[66]

Although the levelled literacy intervention as developed by Fountas and Pinnell focuses on reading and literacy, we adjust this by applying this structure and principles to math instruction too, expanding beyond just literacy (reading & comprehension). We followed the application of the small-group format as described by Fountas and Pinnell, selecting grade appropriate texts from Nelson Literacy Storybooks, and with the math giving teachers the autonomy to create lesson plans based on what students in that grade would be covering in their regular day schooling as per their curriculum.

In regards to literacy instruction, the focus is on teaching and improving students' reading comprehension, defined as "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language."[67] In giving the students a range of contexts and topics in the stories they read on their worksheets daily, we were trying to ensure we captured a benefit of guided reading as described by Fountas and Pinnell, as well as research in the literature that points to wider reading as a predictor of gains in reading achievement in elementary school.[68] In regards to the math instruction,, we tried to capture this by letting teachers use relatable examples in their lesson plans and worksheets e.g. basketball point/scoring contexts, which would make concepts easier to grasp and clearer for students, while also sticking to the concepts of explicit and intentional instruction.

[64] Institute of Education Sciences. (2017) WWC Intervention Report: Leveled Literacy Intervention. What Works Clearinghouse- Institute of Education Sciences. pp 2 https://ies.ed.gov/ncee/wwc/Docs/InterventionReports/wwc_leveledliteracy_091917.pdf

[65] Ransford-Kaldon, C., Flynt, E. S., Ross, C. L., Franceschini, L., Zoblotsky, T., Huang, Y., & Gallagher, B. (2010). Implementation of effective intervention: An empirical study to evaluate the efficacy of Fountas & Pinnell's Leveled Literacy Intervention system (LLI). Memphis, TN: Center for Research in Educational Policy, University of Memphis; Ransford-Kaldon, C., Ross, C., Lee, C., Sutton Flynt, E., Franceschini, L., & Zoblotsky, T. (2013). Efficacy of the Leveled Literacy Intervention System for K–2 urban students: An empirical evaluation of LLI in Denver Public Schools.

[66] Ibid.

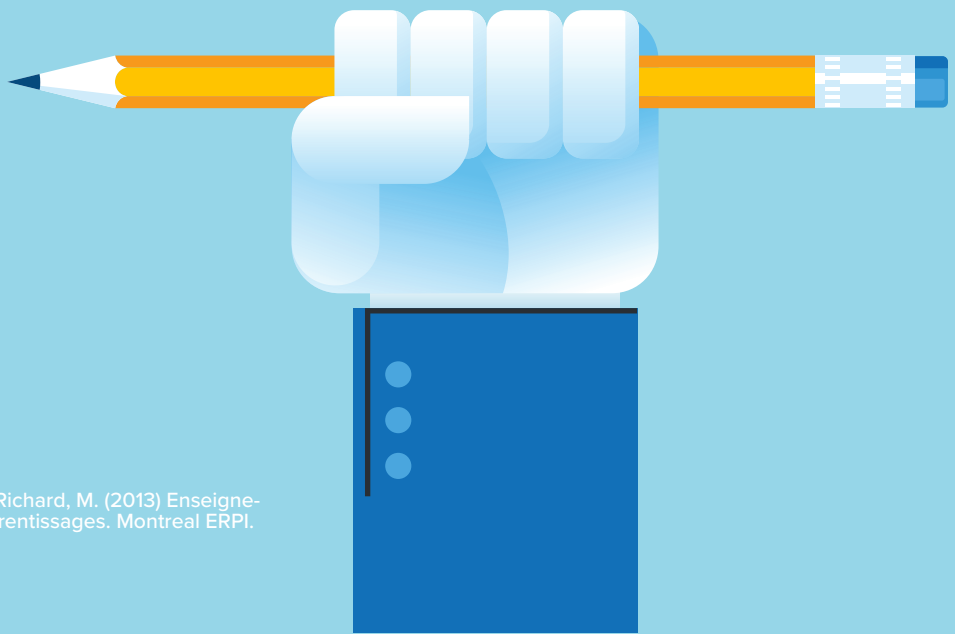
[67] RAND Reading Study Group. (2002). Reading for understanding: Toward an R&D program in reading comprehension. Santa Monica, CA: RAND, pp. 11.

[68] Anderson, R. C., Wilson, P. T., & Fielding, L. C. (1988). Growth in reading and how children spend their time outside of school. Reading Research Quarterly, XXIII, Summer, 285–303.

Fountas and Pinnell emphasize ‘explicit instruction’, which entails teaching to students in simple and straightforward language to communicate lessons and expectations as clearly as possible to students. In practice, explicit instruction can be divided into 3 methods: modelling, guided practice and independent practice. Modelling entails the teacher demonstrating and clearly describing what is done while it is being done, as well as how and why it is being done and giving examples. Guided practice occurs with help from the teacher; students are given space to work and the teacher provides feedback and reassurance throughout. This allows students to “verify, adjust, consolidate and...deepen their understanding of the learning taking place, by connecting their new learning with that which is already present in their long-term memories”.[69] Independent practice gives students the autonomy to apply the lessons and test their understanding without help from a teacher, usually in the form of filling out worksheets among others.

In the small-group format, the explicit instruction delivered through guided learning means students are less likely to lose concentration as they would in a standard one-to-many format. It also provides a conducive environment for students to request and receive feedback because instead of having to ask for help in a class of 22, they can now do it within a smaller group of no more than 7. While Fountas and Pinnell use explicit instruction only in the context of guided reading, we also apply it to the math, as the students in the groupings got to watch the teachers work through problems, before going on to work on some problems themselves under some guided supervision and finally getting independent practice time to themselves to fill in worksheets and come back with any further questions.

The guided instruction that comes with the small-group format allows the students to write extensively through the worksheets and written responses they had to give in class, thereby improving their writing skills, and by extension their oral skills. This is necessary because in the process of writing, thinking and asking the teacher questions, they sound out words and see them used in different contexts. This was done in this program with the varied selection of texts from the Nelson resources, as well as giving the freedom to incorporate other teaching aids into their lessons, including videos, cartoons, and manipulatives for math.



[69] Gauthier et al 2004, in Gauthier, C., Bissonnette S., & Richard, M. (2013) Enseignement explicite et réusitte des élèves. La gestion des apprentissages. Montreal ERPI.

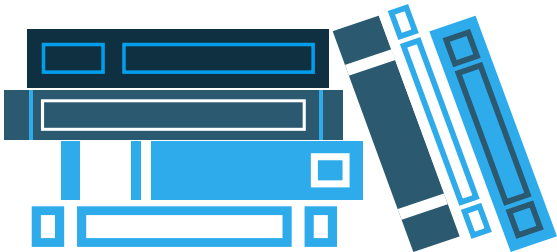
Program Implementation

The students were sorted into their groupings based on their scores on CASI diagnostic tests administered in July at the grade level they would be resuming in September. These test results had a majority of the students below grade level, with an average raw score of 12.8 (level 2-) and based on their scores, students were then put into guided groupings based on their test scores and placement level on the rubric, with instructional material, lesson plans and syllabi catered to their placement levels. The levels were low, medium and high, which were determined based on the student's raw scores within a given level. For example, a low level 2(2-) would range from 12-14, medium level 2(2) 15-17 and a high level 2(2+) 18-19, with the same intervals holding for other levels. Following the intervention, the students received post-intervention diagnostic tests at the same levels as they had received in July, to see what progress had been made through the instruction.

Each grade got an hour with the teachers, given the idea behind small-group learning is instruction more focused and catered on the individual needs of students. Within each grade, the students were divided according to their levels determined from the July diagnostic, into groupings of no more than 7, with each grouping receiving 15-18 minutes of instruction. Whilst one group was getting instruction from one teacher, the other groups carried out independent work, completed worksheets and followed up on previous lessons if there were questions, all under the supervision of another teacher. Given the different numbers of students in each grade, some groups were larger than others, and as such required an extra teacher and/or YAAACE counsellor. Below are sample rotations for literacy (reading & writing) and math respectively, with the math table showing how the rotations worked for larger grades.

Table 2: Sample Small group Rotations for Reading & Writing[70]

Blocks	Instruction	
	Model/Shared/Guided Group Instruction	Independent
	Teacher 1: Mr. Hassan **1 teacher : 6 students**	**Teacher 2: Ms. Burgess** **1 teacher: 10 students**
Block 1 18 mins	Group 1: Grade 2	Group 2 Group 3
Movement Break (2 min)		
Block 2 18 mins	Group 2: Grade 3	Group 1 Group 3
Movement Break (2 min)		
Block 3 18 mins	Group 3: Grade 4	Group 1 Group 2



[70] Full rotations for literacy and math in the Appendix

Table 3: Sample Group Rotations for Math

Blocks	Instruction		
	Model/Shared/Guided Group Instruction	Model/Shared/Guided Group Instruction	Independent
	Teacher 1: Mr. Salick 1 teacher : 4 students	**Teacher 2: Mr. Jordan 1 teacher: 4 students**	**Mr. Jordan and Counsellor 1 staff: 10 students**
Block 1 18 mins	Group 1	Group 4: Grade 4	Group 2 Group 3 Group 5 Group 6
Movement Break (2 min)			
Block 2 18 mins	Group 2	Group 5	Group 1 Group 3 Group 4 Group 6
Movement Break (2 min)			
Block 3 18 mins	Group 3	Group 6	Group 1 Group 2 Group 4 Group 5

Prior to this intervention, YAAACE balanced the basketball and academic components by offering 2 hours of each (four hours total). This intervention increased each component to 3 hours (six hours total) every day from Monday to Thursday. Fridays were designated by YAAACE for field trips to help broaden the students' horizons beyond the confines of their neighbourhood, with grades 6-8 receiving instruction in the morning then going off for basketball in the afternoon after lunch, and grades 2-5 doing the reverse. While giving the teachers a structure and outline on how to organize lessons, the design also allowed for them to exercise professional discretion, for example in reshuffling students at the same level across groups to deal with rowdiness or concentration. It is worth noting that teachers were given slightly more freedom in how they taught math compared to the material for reading and comprehension, largely because the reading and comprehension passages came from Nelson Literacy books.

In addition to the basketball component, the program mandated movement breaks at regular intervals during and in-between sessions, in accordance with provincial requirements and observations in the literature that show incorporating physical activity and reducing sedentary time in class are associated with improvements in student time-on-task.[71]

[71] Allison, K. R., Vu-Nguyen, K., Ng, B., Nour Schoueri-Mychasiw, Dwyer, J. J. M., Manson, H., Robertson, J. (2016). Evaluation of daily physical activity (DPA) policy implementation in Ontario: Surveys of elementary school administrators and teachers. BMC Public Health, 16.; Barker, B. & Forneris, T. (2011). Youth fitness programming:A pilot youth fitness and life skill program implementation for at-risk youth. Children, Youth, and Environments, 21(2), 195-203.; Grieco, L. A., Jowers, E. M., Errisuriz, V. L., & Bartholomew, J. B. (2016). Physically active vs. sedentary academic lessons: A dose response study for elementary student time on task. Preventive Medicine, 89, 98–103.

For more accuracy, the teachers were to make anecdotal notes during their instruction, detailing any changes they made to the plans during instruction, challenges faced, students' progress and generally anything pertaining to the instruction they thought noteworthy. This practice mirrors what teachers do in regular schooling on elementary progress report cards and provincial report cards, wherein they leave anecdotal comments describing and identifying what the student learned, highlight the student's progress, strengths and any further room for improvement.[72] The rationale for this increased frequency is that it encourages teachers to pay more attention to the student's progress qualitatively over time, and it also makes the teaching more intentional and student-specific, as the teacher can make teaching adjustments informed by their observations and observable patterns. Teachers were supposed to make those notes as soon as possible after observation to reduce the chance of distortion or forgetting. However, teachers complained there was not enough time to make the anecdotal notes because of the rotation schedule and watching students after program hours because of late parents. Teachers continued to express these concerns until the end of the program, although the format of the notes was changed from independent notes filed per student to attaching a sheet at the back of each student's worksheet, which the teachers could fill at the end of the day. It was suggested by some teachers in exit interviews conducted at the end of the program that having more student counsellors on hand would help make it easier on the teachers and free up some more time for taking the notes. YAAACE's funding only allowed for two paid counsellors over the summer but having additional counsellors to take over some of the administrative and logistical tasks that fell to YAAACE teachers would have been beneficial.

It is worth noting that while the plan was to assess students every two weeks to keep track of their levels and shuffle the groupings accordingly, we were only able to complete one assessment due to challenges that are further explained in the limitations section. This assessment was administered in the last week of July, over a period of 3 days, to accommodate for the problems we encountered with student attendance and ensure we had enough completed assessments to gauge progress thus far and finalize the adjustments we would be making to the rest of the program.

Following the independent assessment, we were unable to reshuffle the students' group assignments due to time constraints, as we had one week-which was really three instructional days as the Monday was a civic holiday- until the last week of camp, when we were supposed to administer the diagnostics. As such, we used those days for light instruction and reinforcing concepts taught earlier, as there was not enough time to introduce new material or teaching based on new group arrangements due to constraints beyond our control.

[72] Ontario Ministry of Education. (2010). Growing Success: Assessment, Evaluation and reporting in Ontario's schools covering grades 1 to 12. pp 64. Toronto. edu.gov.on.ca/eng/policyfunding/growsuccess.pdf .

METHODOLOGY

The students in this study are the elite group of YAAACE student-athletes number 101, all of whom were also involved in the Saturday programming during the school year and travel around the province to play in tournaments. The 'elite' designation here refers to their basketball skills and membership of the travelling teams. This study uses a quasi-experimental case design to observe the effects of a levelled literacy intervention (LLI) on a cohort of 110 student-athletes that participated in YAAACE's Summer Institute.

Guided reading is described as "small-group reading instruction designed to provide differentiated teaching that supports students in developing reading proficiency", wherein the teacher uses a "tightly structured framework that allows for the incorporation of...research-based approaches into a coordinated whole."[73] From a teaching standpoint, guided reading entails "careful text selection and intentional and intensive teaching".[74] With this pedagogical approach, students are grouped for efficient reading instruction, with the texts being selected "along a gradient of difficulty" (i.e. on a predetermined scale or rubric).[75] Designed by Irene Fountas and Pinnell, it provides instruction to students in "fluency, vocabulary, reading comprehension, oral language skills, and writing" and is designed to be "delivered through explicit, direct instruction in a small group format".[76] The small-group format allows for the teaching to be more attuned to students' current capabilities, intentional and conducive for students to request and receive feedback.

In a 2010 paper, Fountas and Pinnell outline characteristics and components of modern guided reading, many of which are incorporated into this study's design and expanded to apply to math instruction as well.[77] In a guided reading setup, teachers select books for student groups based on their pre-sorted reading levels instead of the more orthodox and rigid reading groups, groups are fluid and dynamic because their memberships change based on student needs and assessment. From a teaching standpoint, teachers "teach for a full range of strategic actions: summarizing information, maintaining fluency, predicting, making connections, synthesizing, inferring, analyzing and critiquing", and an emphasis is placed on improving students' critical thinking and deep comprehension.[78]

They also outline several important components of a guided reading program. The first is that the focus should always be teaching and improving students' reading comprehension, with reading comprehension here defined as "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language". [79]

[73] Pinnell, G.S, and Fountas, I.C. (2010) Research Base for Guided Reading as an Instructional Approach. Scholastic Guided Reading Program. http://teacher.scholastic.com/products/guidedreading/pdf/2.0_InYourClassroom/GR_Research_Paper_2010.pdf. pp 2.

[74] Ibid.

[75] Ibid.

[76] Pinnell, G.S, and Fountas, I.C. (2010) pp. 2

[77] Ibid. pp 5.

[78] Pinnell, G. S., & Fountas, I. C. (2008). The continuum of literacy learning, K–8: Behaviors and understandings to notice, teach, and support. Portsmouth, NH: Heinemann. (2008) in Pinnell and Fountas, (2010).

[79] RAND Reading Study Group. (2002). Reading for understanding: Toward an R&D program in reading comprehension. Santa Monica, CA: RAND, pp. 11.

Secondly, after establishing a scale which is used to group the students accordingly, the teacher provides texts that support individual progress along the scale. The teacher is also to establish a timeframe for consistent assessments to determine how the students are doing and better cater instruction and texts to their changing levels. The potential adjustments and exposure to different texts that comes with this program also has the benefit of increasing the quantity of reading students do. Work by Anderson et al. showed that "over a period of 26 weeks, among all the ways children spent their time, reading books was the best predictor of several measures of reading achievement, including gains in reading achievement between second and fifth grade."[80] In addition to improving students' reading comprehension by increasing the volume of reading they do, through assignments and support from teachers guided reading is also expected to help cultivate an interest in casual reading outside classroom thereby helping the students build positive habits and hobbies.

Yet another component of guided reading is explicit instruction, through which students will expand their vocabulary as guided reading "provides a setting within which teachers can help children derive the meaning of words from context and also help them understand how passages work".[81] Explicit instruction is based on an "explicit pedagogy for inclusion and access", which has as one of its main goals, preparing students for life in a world of cultural diversity through education.[82] It is meant to be applied to students in communities and at-risk areas that traditionally have been underserved by their school systems, comparable to the Jane & Finch area. It has been applied in Australia, where it has also been called 'explicit genre instruction',[83] and in the U.S as well as a way of improving educational outcomes for African American students.[84] Proponents of explicit instruction have argued that because educational outcomes are not often contextualized for socio-economic realities (e.g. single-parent or low income backgrounds), explicit instruction is instrumental as a way of exposing students to realities norms and expectations-which author and educator Lisa Delpit calls "access to the culture of power" - they otherwise may not encounter regularly.[85] So, in addition to improving educational outcomes like literacy and reading comprehension, the guided learning program also has an eye on improving other qualitative aspects of students' lives and by extension, their communities.

[80] Anderson, R. C., Wilson, P. T., & Fielding, L. C. (1988). Growth in reading and how children spend their time outside of school. Reading Research Quarterly, XXIII, Summer, 285–303.

[81] Pinnell and Fountas. (2010). pp 8

[82] Frankel, K. (2013). Revisiting the Role of Explicit Genre Instruction in the Classroom. The Journal of Education, 193(1). pp 20.

[83] Cope,B & Kalantzis, M. (1993) "The power of literacy and literacy of power" In Cope B and Kalantzis M(Eds), The powers of literacy: A genre approach to teaching writing, 63-89. Pittsburgh, PA: University of Pittsburgh Press.

[84] Delpit, L. (2006). Other People's Children: Cultural Conflict in the Classroom. New York: New Press

[85] Ibid.

Evidence in cognitive literature indicates that guided learning through small-group instruction is more effective and efficient than an unguided/independent approach.[86] By instructing students explicitly, their young brains are better able to deal with the information (over)load that comes with learning and keeps their "working memory load" light, because giving them examples to follow helps them sort through the noise and focus more on what is needed to complete the task. Sweller and Cooper describe a 'worked example effect' from their experiments, which occurs "...when learners required to solve problems (unguided approach) perform worse on subsequent test problems than learners who study the equivalent worked examples."[87]

Another component of the guided reading approach is providing students with the opportunity to write extensively, thereby improving their writing skills while reinforcing their oral skills as "...it presents the opportunity to hear sounds in words and closely examine aspects of print."[88] Lastly, guided reading creates and improve students' engagement with the teacher and with each other as they work and learn in groups.

[86] Paul A. Kirschner , John Sweller & Richard E. Clark (2006) Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching, Educational Psychologist, 41:2, 75-86; Paas, F. (1992). Training strategies for attaining transfer of problem-solving skill in statistics: A cognitive-load approach. Journal of Educational Psychology,84, 429–434; Paas, F., & van Merriënboer, J. (1994). Variability of worked examples and transfer of geometrical problem solving skills: A cognitive-load approach. Journal of Educational Psychology, 86, 122–133.

[87] Sweller, J.,&Cooper, G. A. (1985). The use of worked examples as a substitute for problem solving in learning algebra. Cognition and Instruction, 2, 59–89. in Kirschner et al. pp 80.

[88] Pinnell and Fountas. (2010). pp 10.

DATA INSTRUMENTS AND COLLECTION

Throughout the 7-week study, the two sources of data used to inform our results were: student-level pre-academic intervention data and post-academic intervention data from a pool of 101 elementary and middle school students in the YAAACE Summer Institute. They were administered a small-group learning pedagogical approach at the Summer Institute on weekdays from July 3rd to August 16th, 2019. The student level data involved information on aggregate literacy levels, aggregate mathematics levels, student attendance, relative grade level functioning, current grade, total number of students, raw literacy scores, raw mathematics scores, problem solving, computation, knowledge and understanding, thinking, communication, and application.

The intended outcome of the study was to determine if the academic intervention had an effect on the student's final academic outcome. The instruments used to collect indicators of the intended effect of the research design were separate mathematics and literacy pre-academic intervention and post-academic intervention diagnostic tests. The pre-academic intervention mathematics and literacy diagnostic tests provided an indication of each student's academic functioning relative to their respective grade level. Within the seventh and final week of the study the students were administered the post-academic intervention tests as instruments to indicate the effect of the academic intervention.

CASI literacy assessments aligned with the small-group learning research design employed in the study. CASI is an instrument that compares individual student-level literacy scores to standards and targets for literacy rates across Ontario.[89] We used CASI to measure the students' level of knowledge and understanding, creative and critical thinking, ability to make inferences, ability to make connections within texts, and their capability of application. We captured each literacy measurement in descriptive variables that used CASI's distributed measurement scheme to assign numerical values. Each descriptive variable's numerical value is an indication of academic functioning compared to Ontario's student literacy targets. We accounted for null values by replacing them with the numerical value of zero. The raw score variable is our most influential indicator of overall academic progress because it contains the summed numerical value of all descriptive variables. The CASI score calculator is applied to each raw score and classified as level 1, 2, 3 or 4. All 101 students have unique pre and post raw scores. Pre-academic intervention raw scores were collected through the initial literacy diagnostic test that used CASI's standards as its marking criteria. Post-academic intervention raw scores were collected using a final test that applied a CASI's measurement scheme to the marking criteria.

[89] Reading Assessment Guide Framework. (2014). CASI Comprehension Attitudes Strategies Interests (Grade 4 to 8). Retrieved from: https://ontarioteachers.files.wordpress.com/2014/09/casi_overview.pdf

The Brigance Comprehensive Inventory of Basic Skills (Brigance) is a summative instrument intended to measure the academic progress of students in elementary and middle schools.[90] It contains a range of mathematic assessments to determine grade level functioning and the most appropriate grade placement for each student. Brigance's emphasis on grouping students based on their grade level functioning aligned with the small-group learning aspect of the study's research design. The Brigance assessment tool was used to develop the pre-academic intervention and post-academic intervention diagnostic tests for the students in the study. The small groups were designed to correspond to grade level and students were grouped based on their Brigance mathematic scores. We captured mathematic level functioning in two descriptive variables: computation and problem solving. Each student's record displays a pre-academic intervention and post-academic intervention computation and problem solving grade level variable. Grade levels were recorded as numerical values and ranged from 1-8. Null values were represented with the numerical value zero. Comparisons that contained null values for pre-academic intervention or post-academic intervention computation and problem solving variables were omitted. The reasoning for this is that a binary comparison needs 2 values. In this case, even though a null value is represented by the numerical value of zero it is not a sufficient indicator of the effect of the educational intervention.

We conducted a jurisdictional scan of the Toronto District School Board (TDSB) elementary, middle, and high schools currently operating within the boundaries of the Jane and Finch community. Specifically, it consists of 11 elementary schools, 3 middle schools, and 2 high schools. We used data from the Education Quality and Accountability Office (EQAO) public database to develop insights on the students within the area of interest. Our scan contains data from 2015-2019, specifically scores from EQAO elementary and middle school students, and the scores of the Ontario Secondary School Literacy Test (OSSLT) for students in grade 10. EQAO is an annual assessment instrument administered to all students in grade 3 and 6 in publicly funded Ontario-based schools.[91] It measures the percentage of students that meet provincial standards for Reading, Writing and Mathematics.[92] Ontario uses a scale of 1-4 to determine academic achievement for elementary and middle school level students.[93] Level 1 represents students that are far below the provincial standard. Level 2 indicates that a student is approaching the provincial standard. Achieving a Level 3 signifies that a student meets the provincial standard, and Level 4 is an indication of a level of academic achievement that surpasses the provincial standard. Ontario's provincial standard for academic achievement for Reading, Writing and Mathematics is level 3. We recorded each score for Reading, Writing, and Mathematics according to school and year of assessment. We used the following formula:

$$\mu = \frac{\sum (x_i)}{n}$$

[90] Brigance. (2019). Curriculum Associates. Retrieved from: https://www.curriculumassociates.com/products/brigance

[91] Education Quality Accountability Office. (2017). About EQAO. Retrieved from: http://www.eqao.com/en/about-eqao

[92] Education Quality Accountability Office. (2017). About EQAO. Retrieved from: http://www.eqao.com/en/about-eqao

[93] Ministry of Education. (2010). Growing Success: Assessment, Evaluation, and Reporting in Ontario Schools. (1)

to find the average for each descriptive variable spanning across the four years of interest. The average we sought to decipher was the percentage of students that either met or surpassed Ontario's provincial standard for Reading, Writing, and Mathematics in the TDSB. After determining each school's aggregate average for each descriptive variable in their respective year, we created three comprehensive variables to represent the Reading, Writing, and Mathematics levels for all TDSB elementary and middle schools in the Jane and Finch community. The comprehensive Reading variable compiled each of the school's reading scores from 2015-2019. The comprehensive Writing variable compiled each of the school's writing scores from 2015-2019, and the comprehensive Mathematics variable compiled each of the school's mathematics scores from 2015-2019. We developed separate comprehensive variables for the middle school and elementary schools included. Similarly, we collected the average of TDSB middle and elementary schools that either met or surpassed the provincial standard for Reading, Writing, and Mathematics from 2015-2019. To conduct our analysis, we compared each comprehensive variable to the TDSB averages for Reading, Writing, and Mathematics.

The Ontario Secondary School Literacy Test (OSSLT) is used to determine if students are meeting the minimum requirements for literacy for all academic disciplines until the end of grade 9.[94] Additionally, receiving a passing grade on the OSSLT is a requirement to receive an Ontario Secondary School Diploma. We collected OSSLT data on two high schools in the Jane and Finch community from 2015-2019. The data was captured in the variable, "Percentage of students who passed the OSSLT".[95] We applied the same formula used above to the two high schools of interest and found their aggregated average. We collected the combined average of all TDSB students that wrote the OSSLT from years 2015-2019 in the variable, "Percentage of students who passed the OSSLT". To conduct our analysis, we compared the aggregate TDSB "Percentage of students who passed the OSSLT" with the aggregate average of the two high schools of interest.

[94] Education Quality Accountability Office. (2017). Ontario Secondary School Literacy Test. Retrieved from: http://www.eqao.com/en/assessments/OSSLT/Pages/OSSLT.aspx

[95] Appendix A: Figure 17

RESULTS

CASI

To determine the impact of RHRA's educational intervention using the CASI assessment tool both pre-academic intervention raw scores and post-academic intervention raw scores for all students were subject to the following formula:

Pre- academic intervention raw score mean equation	Post-academic intervention raw score mean equation
$\mu = \frac{\sum \square (x_i)}{n}$	$\mu = \frac{\sum \square (x_v)}{n}$

The μ symbol represents the mean value of the CASI pre-academic intervention and post-academic intervention raw scores for all students. The x_i symbol is used to represent all pre-academic intervention raw scores and post-academic intervention raw scores recorded during two assessments throughout the study. The figure "n" represents the total number of participants in the study. To achieve the mean value, we divided the total sum of raw scores for all students by the total number of participants. The mean value of pre-academic intervention raw score was 13 points out of 32 possible points. Applying the CASI conversion would indicate that the average student in the study functioned academically at level 2. The mean value of the post-academic intervention raw score was 17 points out of 32 possible points. Applying the CASI conversion would indicate that the average student in the study continued to function at a level 2. To determine if the educational intervention we proposed had an effect on the academic performance of the students we compared the mean value of the pre-academic intervention raw score to the mean value of the post-academic intervention raw score. We converted both mean values of the pre-intervention and post-intervention raw scores into percentages. Resulting in a pre-academic intervention mean value of 40 percent and post-academic intervention mean value of 53 percent. Therefore, at the end of the 7-week study the literacy preparedness of the average student in the program increased by 13 percentage points.

Brigance

To determine the impact of the academic intervention using the Brigance assessment we determined the percentage of students who either experienced an increase, decrease or neither with respect to their mathematics grade level functioning for each descriptive variable. The percentage of students that experienced an increase, decrease or neither by collecting pre-academic intervention diagnostic test scores that acted as indicators of grade-level functioning. We compared the pre-academic intervention scores to the post-academic intervention scores and counted how many students experienced grade levels that increased by one full grade, decreased by one full grade or remained the same. Students that had null values representing either one of their pre-academic intervention or post-academic intervention variables were omitted. As a result, we omitted 28 percent of the data when comparing the pre-academic intervention and post-academic intervention problem solving variable.

Additionally, we also omitted 27 percent of the data when comparing the pre-academic intervention and post-academic intervention computation variable. The problem-solving variable demonstrated that 61 percent of students experienced an increase in grade level by one full grade, 23 percent remained at the same grade level, and 15 percent of students experienced a decrease in grade level by one full grade. The computation variable demonstrated that 59 percent of students experienced an increase in grade level by one full grade, 35 percent of students remained at the same grade level, and 4 percent of students experienced a decrease in grade level by one full grade.

JURISDICTIONAL SCAN

EQAO

We recorded each score for Reading, Writing, and Mathematics according to school and year of assessment. We used the following formulas:

TDSB EQAO mean equation	Jane and Finch school mean equation
$\mu = \frac{\sum \square (x_i)}{n}$	$\mu = \frac{\sum \square (x_v)}{n}$

to find the average for each descriptive variable spanning across the four years of interest. The μ symbol represents the mean value of the EQAO scores for elementary and middle school students contributing to the TDSB average. The μ symbol for the Jane and Finch public school mean equation represents our own collection of mean values of the EQAO scores for schools in the Jane and Finch community. The x_v symbol is used to represent the values of writing, reading, and mathematics for each variable of analysis. The figure “n” represents the total number of elementary and middle schools who produced the writing, reading and mathematical values. To achieve the mean value, we calculated the total sum of each value for writing, reading or mathematics, separately. Then we divided each value for all schools by the total number of elementary or middle schools in question. This process took three iterations, each iteration represented one of the three testable disciplines. From our analysis we determined that 65 percent of students attending elementary schools in the Jane and Finch community had Reading levels either at or above the provincial standard. We determined that 70 percent of students attending elementary schools in the Jane and Finch community have writing levels at or above the provincial standard.[96] The data also demonstrates that 54 percent of students attending elementary school in the Jane and Finch community have Mathematics levels at or above the provincial standard. We applied the same analysis to the middle schools within the Jane and Finch community. We determined that from 2015-2019, 62 percent of students attending middle school within the Jane and Finch community had reading levels at or above the provincial standard. From the data we concluded that 64 percent of middle school students were at or above the provincial standard. Only 30 percent of middle school students were at or above the provincial standard for mathematics.

[96] Appendix A: Figure 18 & 19

From 2015-2019 the elementary school TDSB average for students at or above provincial standards for Reading, Writing, and Mathematics were: 75, 75, and 68 percent, respectively. Similarly, the middle school TDSB averages for students at or above provincial standards for Reading, Writing, and Mathematics were: 81, 81, and 54 percent, respectively. Using EQAO scores as our guide, we determined that over the past 4 years elementary students attending schools in the Jane and Finch community scored 11 percent lower than the TDSB averages. Similarly, we determined that over the past 4 years middle school students in the Jane and Finch score 14 percent lower than the TDSB averages.

OSSLT

OSSLT mean equation
$\mu = \frac{\sum \square \, (x_i)}{n}$

The μ symbol represents the mean value of the OSSLT for the two high schools in the Jane and Finch Community. The x_i symbol is used to represent the percentage of students who received a passing grade on the OSSLT. The figure 'n' represents the number of high schools used in the study. From 2015-2019, 57 percent of high school students within the Jane and Finch community have received a passing grade on the OSSLT. Within the specified time frame, the TDSB average for students who received a passing grade on the OSSLT is 81 percent. From our analysis we determined that students attending high school in the Jane and Finch community scored 24 percent lower than the TDSB average.[97]

[97] Appendix A: Figure 18 & 19

LIMITATIONS AND AREAS FOR FUTURE IMPROVEMENT

The study is not without its limitations, which include validity, reliability and logistical issues. Firstly, the student sample consisted overwhelmingly of male student-athletes, which is largely due to the selection pool being a neighbourhood basketball camp that is catered mostly towards young boys, as against a whole grade in a school. In future iterations and to improve external validity there should be more female students. To strengthen reliability, a controlled comparison trial between a group that gets the intervention and another that gets the pre-summer 2019 Summer Institute program could also be done. This would, however, require more resources, as well as dealing with the logistical, ethical and other issues that come with running trials, especially one involving elementary and middle school children.

Attendance is another factor that affected implementation fidelity and by extension our data analysis, with students missing several days and even assessments. This is partially attributable to YAAACE's main draw being a basketball camp and with student's teams being eliminated, students see less of a reason to show up. Solutions for this may include something like "...a hall monitor, but for absent students...", or YAAACE employing more counsellors, who can help keep track of, or track down students with spotty attendance records.[98] It is worth noting that the 2013 Ransford-Kaldon et al study, selected students out for absenteeism, thereby ensuring those enrolled would see it out, and such a step would have also made our findings more robust because there would have been more complete data to draw from.[99]

There were also various administration and logistics issues that affected our implementation fidelity. Firstly, there was an unforeseen location change from the district school board the weekend before the program began, which resulted in the summer institute being moved from the planned location at C.W Jefferys Collegiate to Monsignor Fraser College Norfinch Campus. This change cost us a little more than a week to adjust to because YAAACE supplies also had to be moved from the base, which was closer to CW Jefferys, to the Monsignor Fraser campus, as well as having to change all the plans that had been made with the C.W Jefferys location in mind. Monsignor Fraser had also not been cleaned or prepared to hold any programs so YAAACE teachers had to do some of that to save time before caretakers and janitors were arranged for, which took more time and focus away from the teaching, training and lesson prep.

Monsignor Fraser did not have the same kind of facilities as C.W Jefferys and to the extent it did, we did not always have access. For example, we did not have access to the computer lab at Monsignor Fraser, which resulted in teachers using their access to their home schools to get Chromebooks, which were incorporated as aids in their lessons as they saw fit. With a significant portion of the program running during a very hot July that included a heatwave and various heat warnings from Environment Canada, Monsignor Fraser, unlike CW Jefferys, did not have air conditioning or powerful enough fans, which made the environment less conducive for teaching and learning.[100] While we tried to adjust to this by extending movement breaks and propping doors open, it could have been avoided with better planning and communication from the district school board before the location change.

[98] Quote from exit interviews conducted with teachers

[99] Ransford-Kaldon, C., Ross, C., Lee, C., Sutton Flynt, E., Franceschini, L., & Zoblotsky, T. (2013). Efficacy of the Leveled Literacy Intervention System for K–2 urban students: An empirical evaluation of LLI in Denver Public Schools in Institute of Education Sciences. (2017) WWC Intervention Report: Leveled Literacy Intervention. pp 3.

[100] Nielsen, K. (2019, July 16). Heatwave in the forecast for southern Ontario this weekend. Retrieved from https://globalnews.ca/news/5501151/heatwave-in-the-forecast-for-southern-ontario-this-weekend/.

Furthermore, union and school board meant teachers got only about 4 hours of training on one day instead of the planned 10 hours across 2 days, although the teachers themselves had signed up to the program knowing the requirements. This insufficient training also cost us time and affected implementation fidelity, as it took longer to get the teachers to fully understand all that was expected of them in the program e.g. how frequently they needed to make anecdotal notes and the amount of freedom they had within the program structure. The teachers also attested to this in exit interviews we conducted with them at the end of the program, noting that more training would have given them more clarity and made for a more efficient and better instruction for the students.

With YAAACE being a modestly funded local community organization, we also had financial limits, and these especially mattered for access to a wider range of learning materials, workbooks, manipulatives and other tech aids for learning, which was compounded by the short notice change of location. For comparison, the tools and resources used in a similar intervention for 2nd and 3rd graders alone cost $7000.[101] To the extent we had materials, it had to be sourced by teachers from their home schools e.g. Chromebooks and our on-site education consultant's access to various literacy tools, workbooks, storybooks and past tests, as she is a former elementary and middle school principal.

[101] Ransford-Kaldon et al in Institute of Education Sciences. (2017) WWC Intervention Report: Leveled Literacy Intervention. pp 3.

DISCUSSION

Our analysis of EQAO and OSSLT scores demonstrated that elementary, middle and high schools in the Jane and Finch Community have been consistently lower than the TDSB averages in reading, writing, and mathematics for the past 4 years.[102] This pattern is indicative of a disconnect between educational policy development at the TDSB and educational policy implementation within TDSB public schools of the Jane and Finch community. An observation that reinforces the two-tiered education system in Ontario. The Education Act empowers the TDSB to make use of its own policies to find strategies to increase the academic outcomes of low-achieving students.[103] TDSB policies such as: Policy P.038 CUR: Achieving Excellence in Reading, Writing, and Mathematics and Policy P.040 CUR: Accountability for Student Achievement demonstrate the policy infrastructure currently exists to encourage a consistent cycle of feedback and academic improvement within the TDSB.[104] The TDSB can use the evidence of the effectiveness of SEPs to adjust the methods to address the academic achievement gap among low-achieving schools. Perhaps using the positive evidence from this study to initiate dialogue about alternative methods of academic and pedagogical strategies for low-achieving students can lead to innovation in the current method of delivering education. Additionally, the TDSB may consider drafting new policies that define "low-achieving schools" and require a method of appropriate actions, such as implementing an SEP, for schools that meet the definition.

We conducted exit interviews with more than half of the teachers that taught throughout the 7 weeks.[105] A common piece of feedback we received from the teachers was that their orientation was too short. As a result, there were plenty requirements of the teachers by the research and program design that were met with confusion. For instance, teachers were required to take anecdotal notes on the academic progress of students in between literacy or mathematics rotations. Teachers found this requirement combined with learning and administering the small group learning tedious. To account for this concern, the teachers were advised to write their notes on their spare time after work. This request was blocked by the policies of the teachers' union they belonged to. We experienced a similar union related issue when investigating the reason for the relatively short teacher orientation. Officially recognizing SEPs as a complement to the provincially distributed curriculum could provide a new source of skill development and teaching experience for the pool of unemployed teachers at the moment. We also acknowledge that reskilling a pool of unemployed teachers will be easier before they enter the teachers' union. As a result, they will be able to surpass union restrictions while gaining skills that will benefit them in the long run as teachers. Conclusively, contributing to the overall functioning of Ontario's education sector's well-being.

102

103 Toronto District School Board. (1998). Policy P.040 CUR: Accountability for Student Achievement

104 Toronto District School Board. (1999). Policy P.038 CUR: Achieving Excellence in Reading, Writing and Mathematics

Ontario's teacher surplus is currently projected to end by 2025.[106] As the number of retirees outweigh new teachers, Ontario district school boards will begin increasing their recruitment efforts. In the upcoming years, Ontario district school boards will have the opportunity to introduce new teaching methods alongside the introduction of a new cohort of younger teachers. The Ministry of Education can potentially usher in SEPs as an optional strategy for low-achieving public schools without the added pressure from legacy academic and teaching methods held by heavily experienced teachers.

Ultimately, the study we conducted demonstrated that SEPs can improve the academic preparedness of low-achieving students. An evidence-based shift of the pedagogical approach from one to many to small group learning gave the students the necessary time needed with teachers to improve their understanding of the curriculum. Widespread use of SEPs throughout educational sectors will require policy makers to determine the definition of a "low-achieving school" and enact policies that call on school boards to use alternative strategies to alleviate the definition of "low-achieving". A potential criterion for the definition of low-achieving schools can be underperforming on standardized tests such as EQAO and the OSSLT. The evidence demonstrates that SEPs can be a viable solution for various schools that have reported scoring below provincial academic standards. However, further research needs to be conducted on academic incentives for students to consistently be present throughout the duration of the SEP. A common theme among the literature was that students were not consistently attending the SEP. Attendance is a consistent limiting factor in collecting the data and conducting analyses. The research that suffices on academic incentives for students to attend SEPs needs to focus on factors within SEPs that outweigh the various variables that influence students to consistently attend the program.

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Appendix A: EQAO and OSSLT Test Scores

Figure 1:
Blacksmith Public School

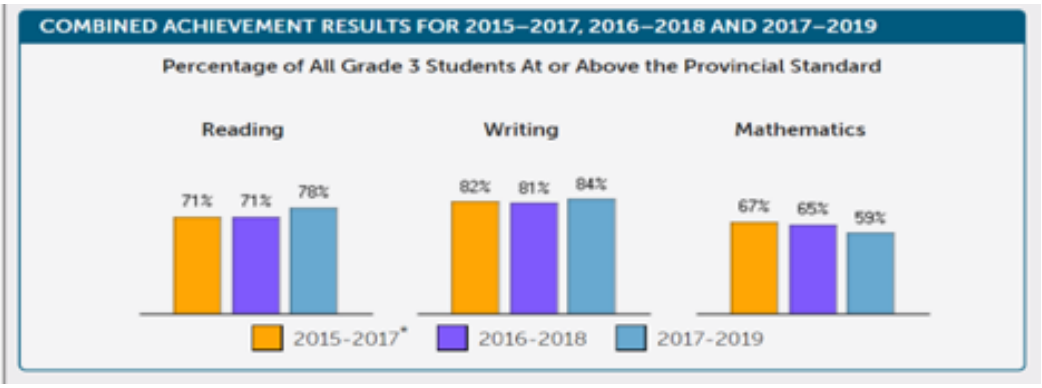


Figure 2:
Brookview Middle School

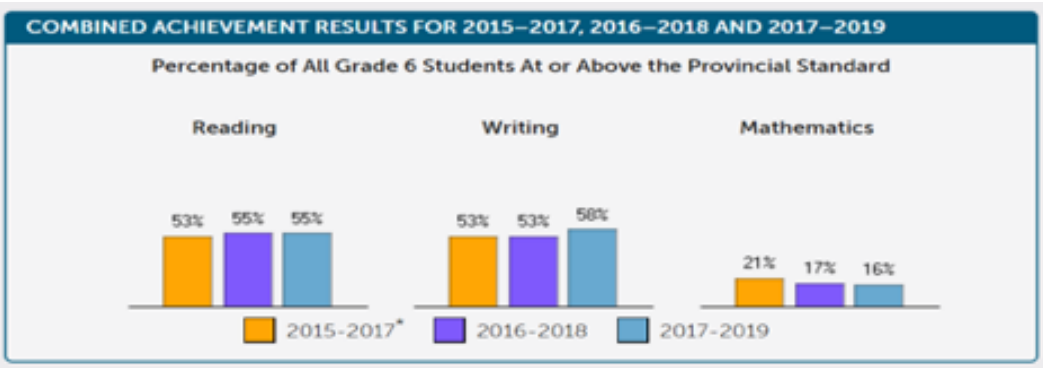


Figure 3:
CW Jefferys High School

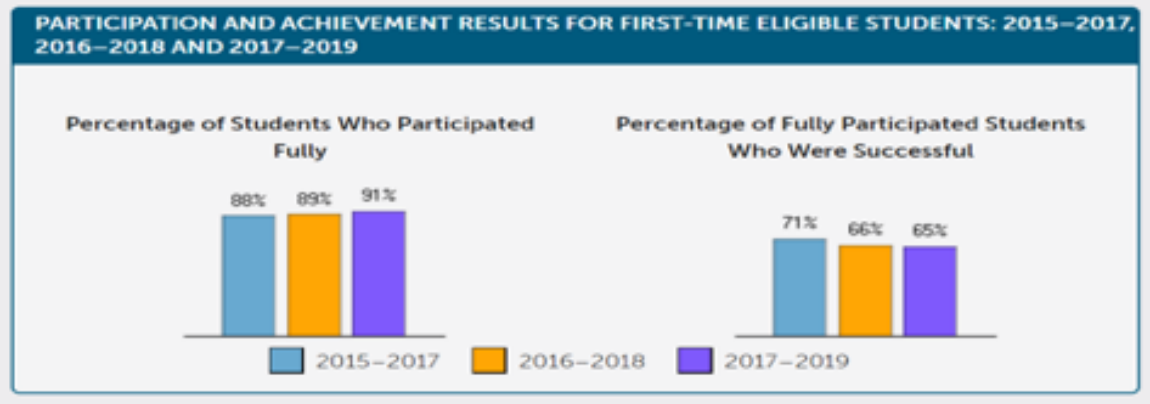


Figure 4:
Derrydown Middle School

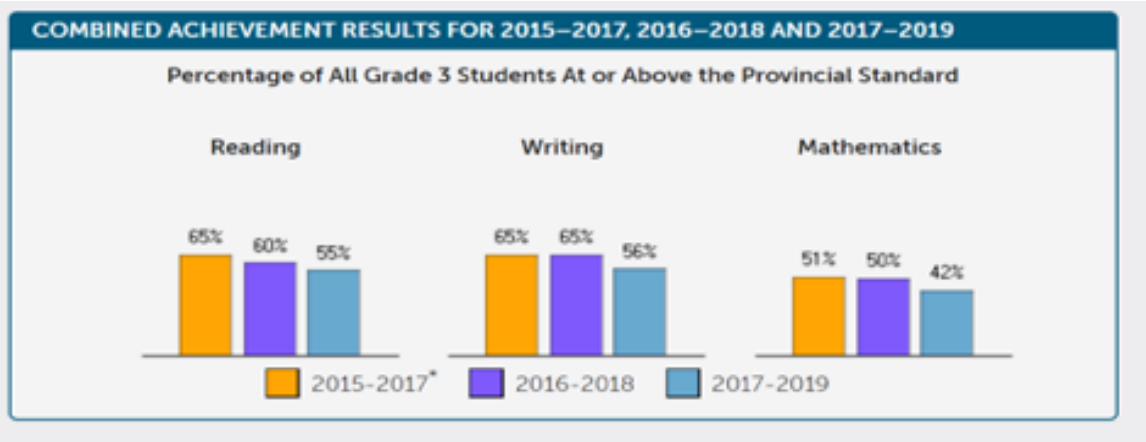


Figure 5:
Driftwood Public School

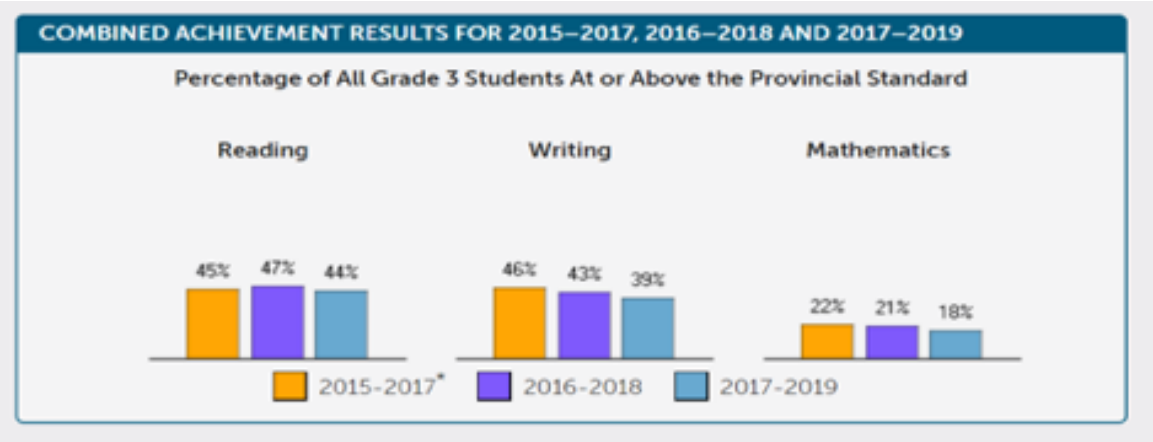


Figure 6:
Elia Middle School

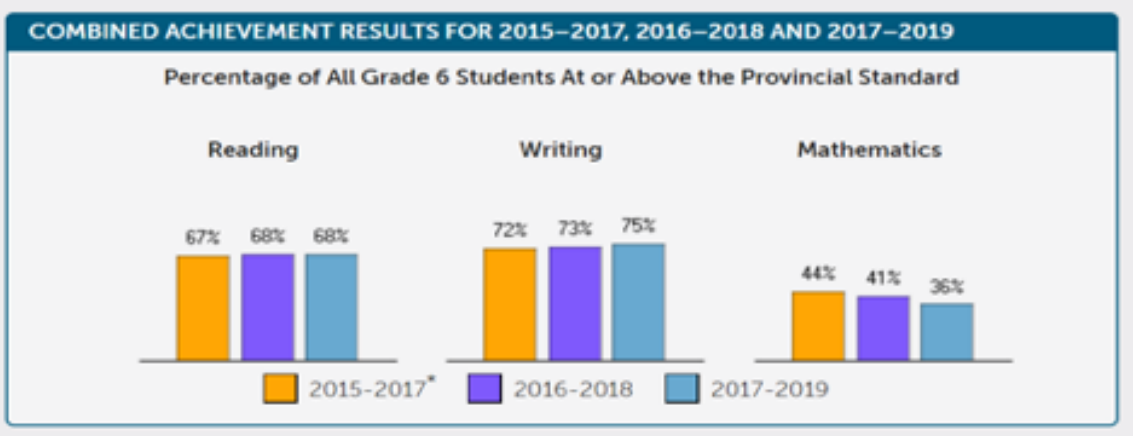


Figure 7:
Firgrove Public School

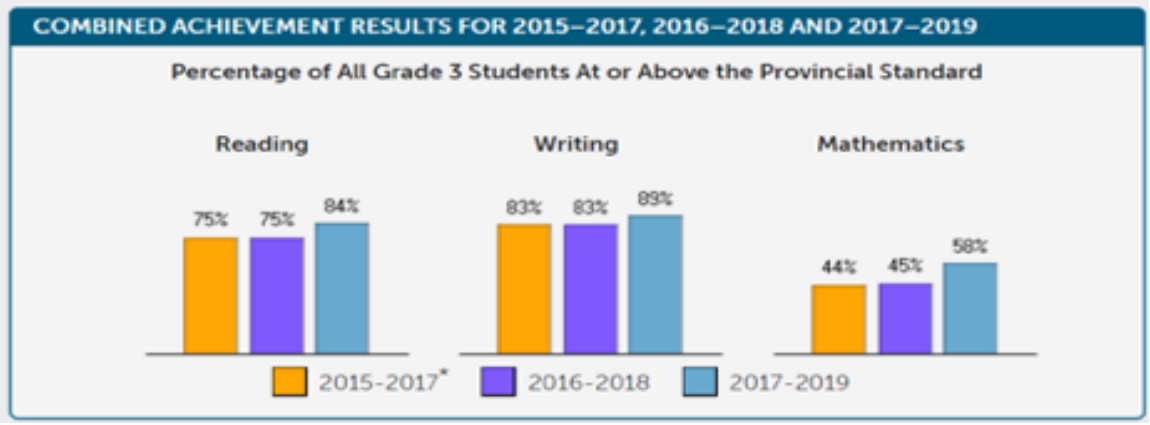


Figure 8:
Gosford Public School

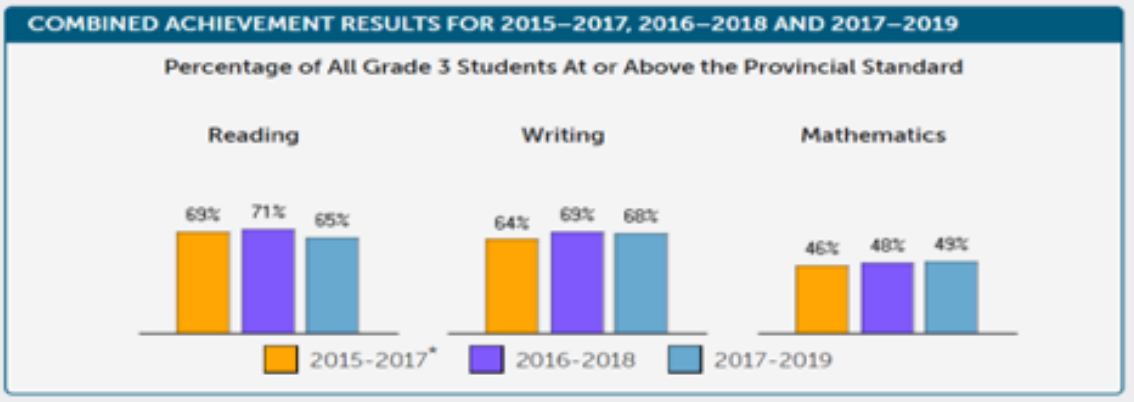


Figure 9:
Lamberton Public School

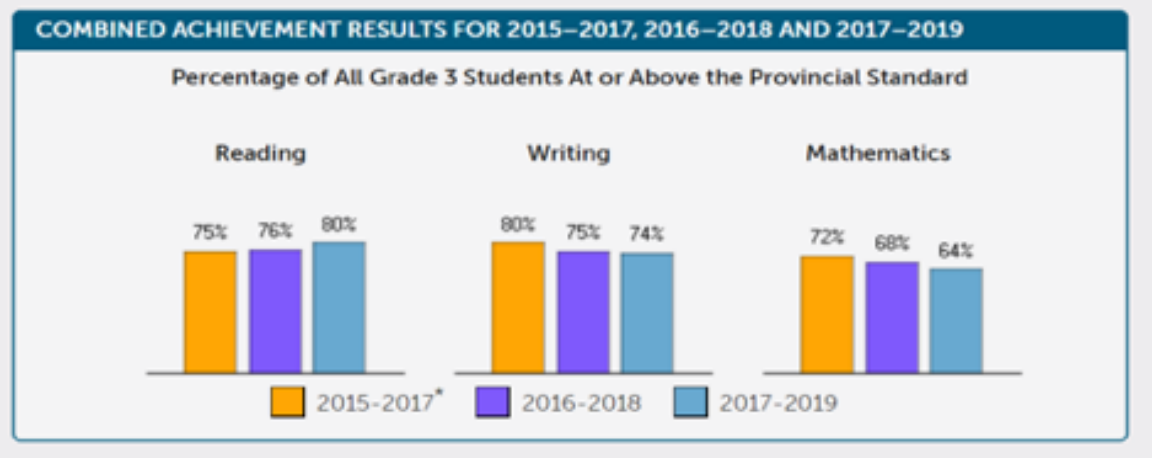


Figure 10:
Oakdale Park Middle School

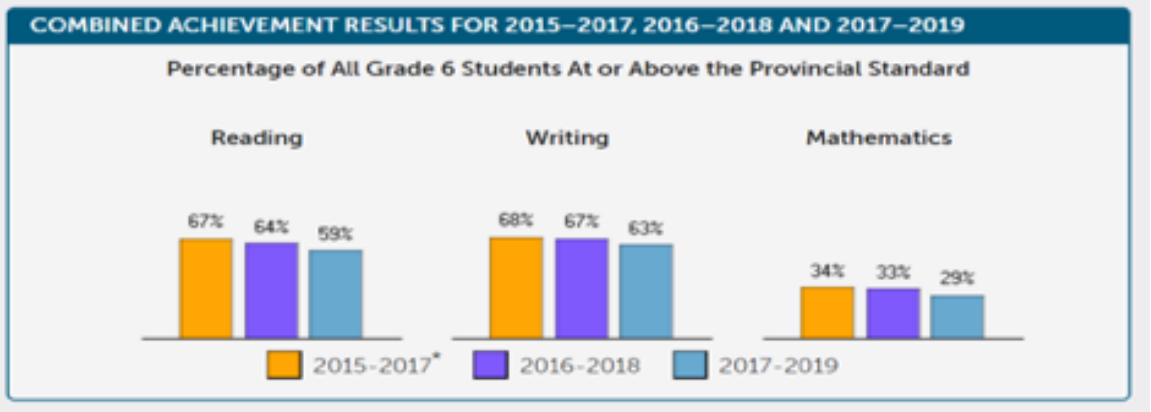


Figure 11:
Sheppard Public School

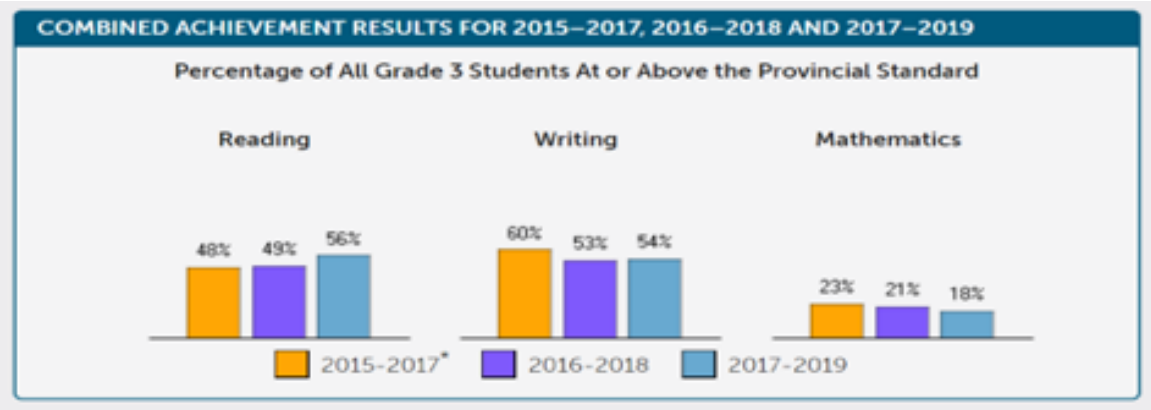


Figure 12:
Shoreham Public School

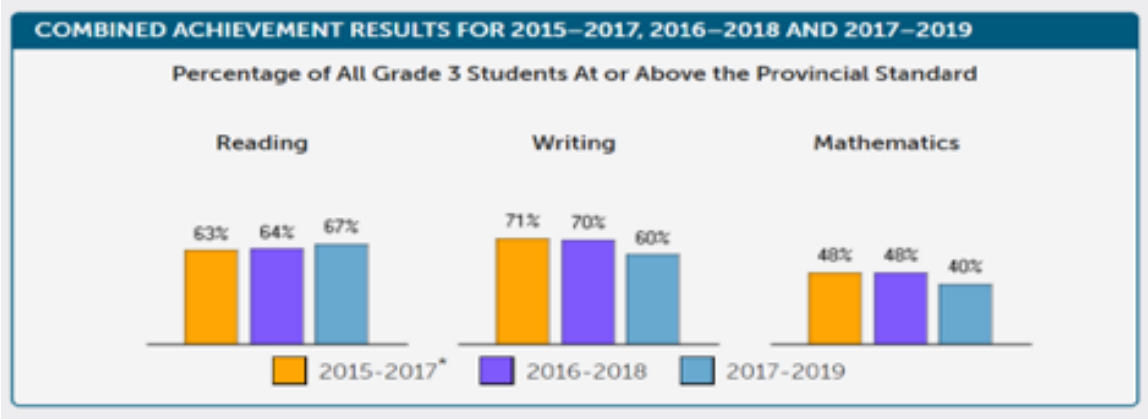


Figure 13:
Stanley Public School

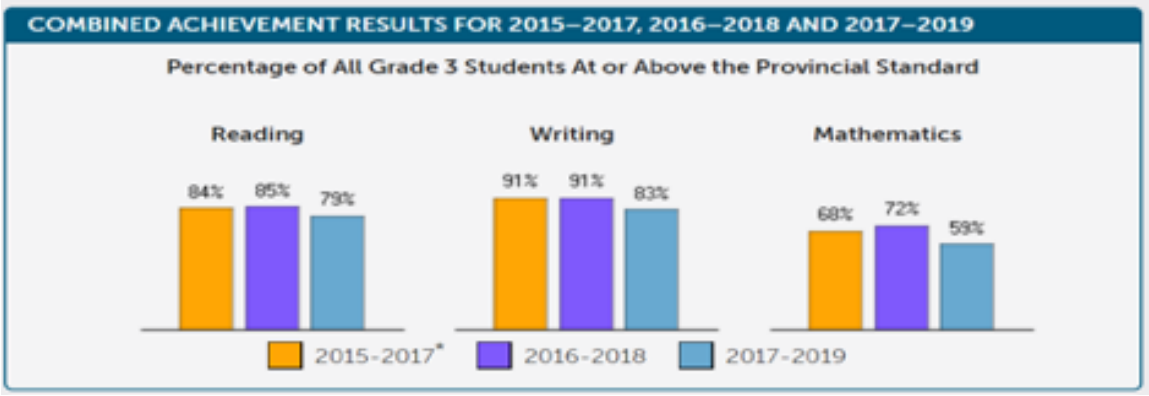


Figure 14:
Stilecroft Public School

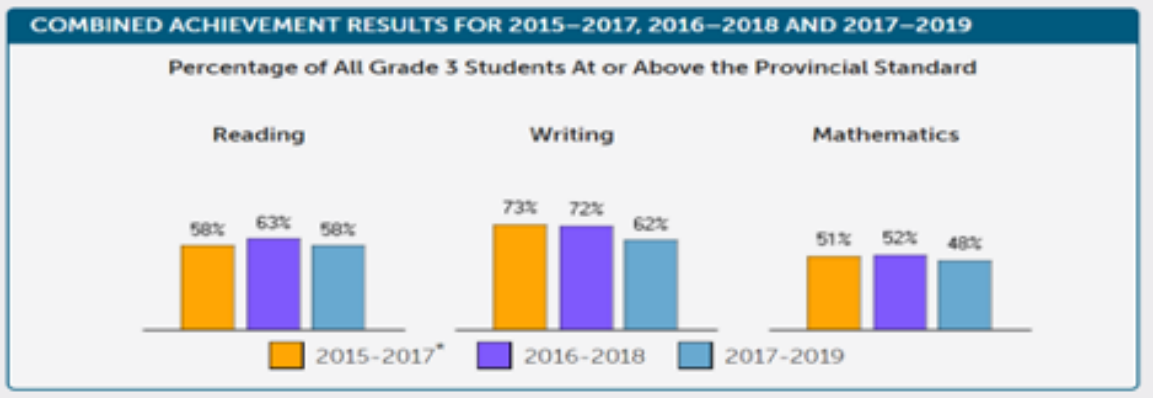


Figure 15:
Topcliffe Public School

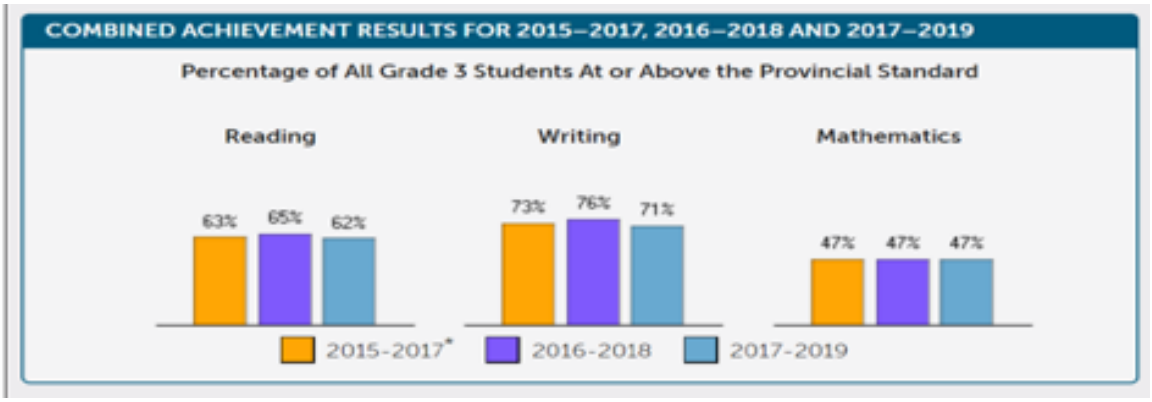


Figure 16:
Westview Collegiate High School

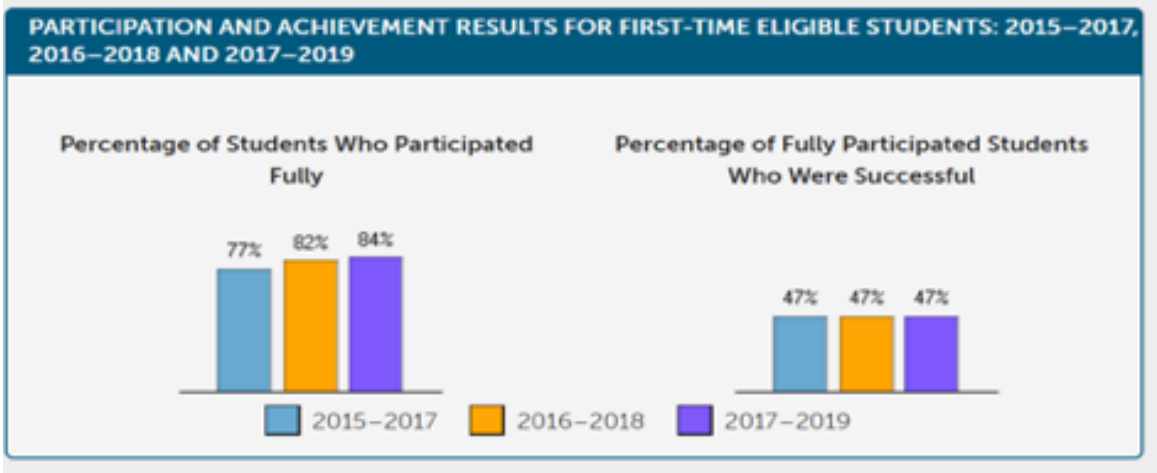


Figure 17:
Yorkwoods Public School

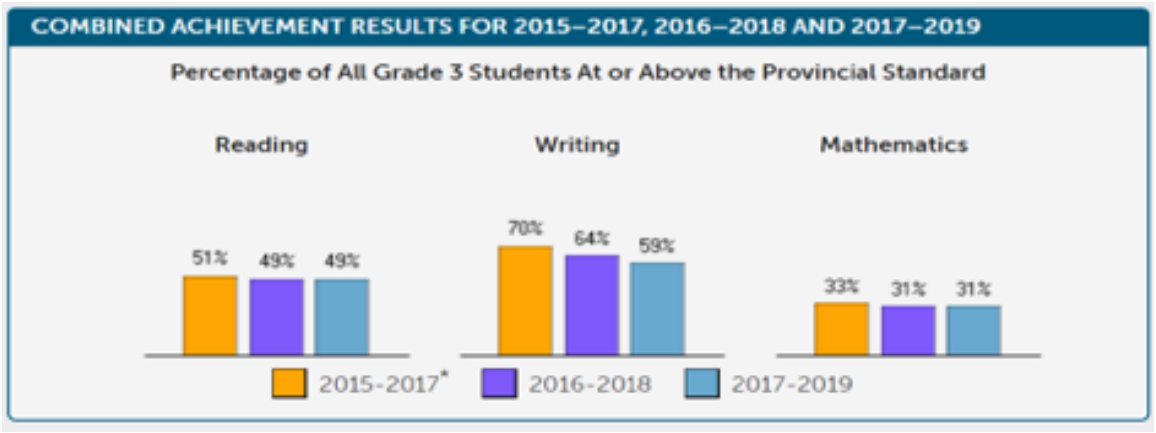


Figure 18:
Toronto District School Board Grade 3 EQAO Averages

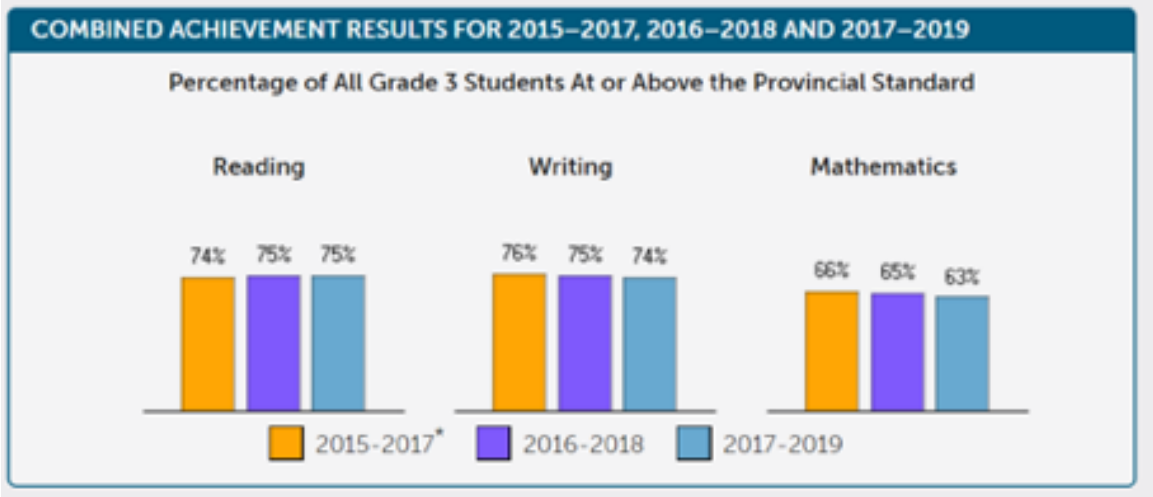


Figure 19:
Toronto District School Board Grade 6 EQAO Averages

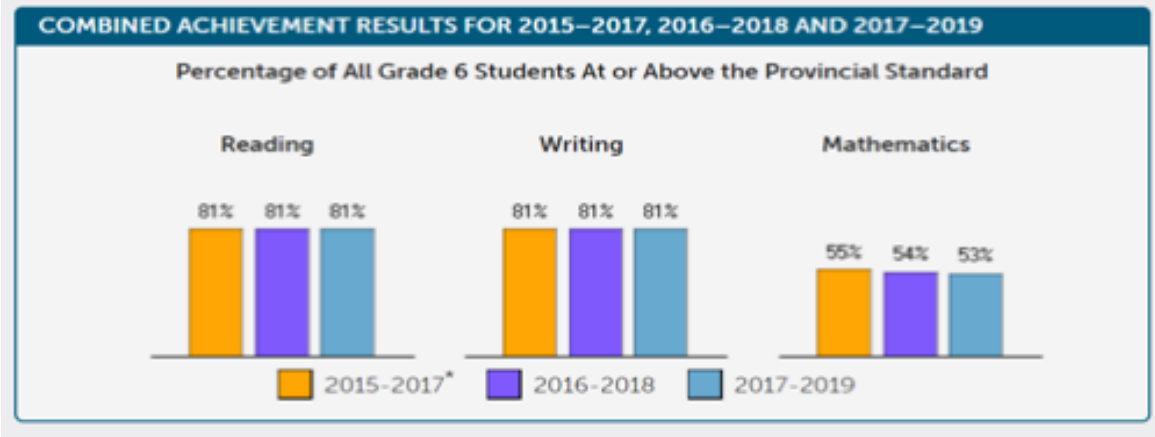
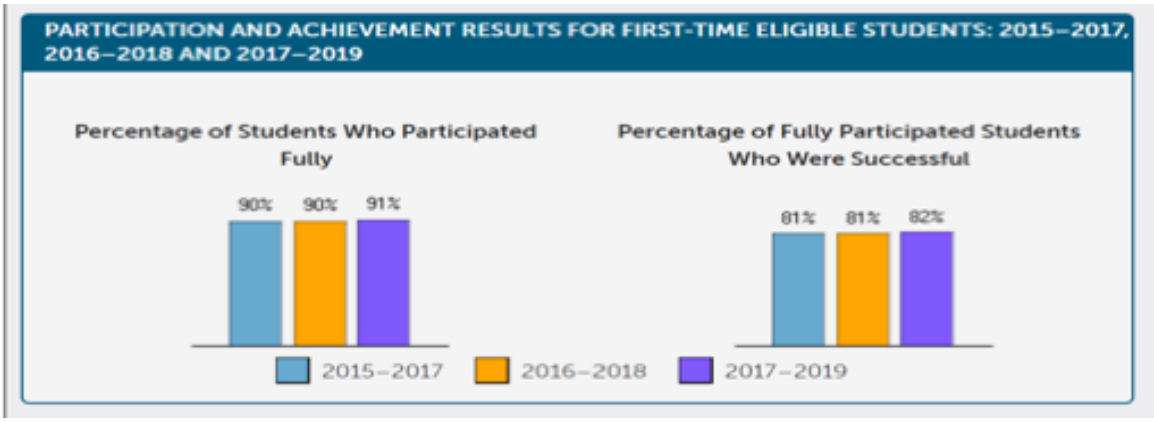
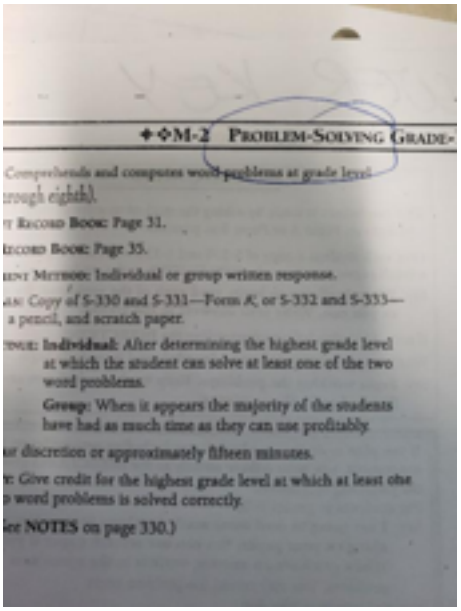
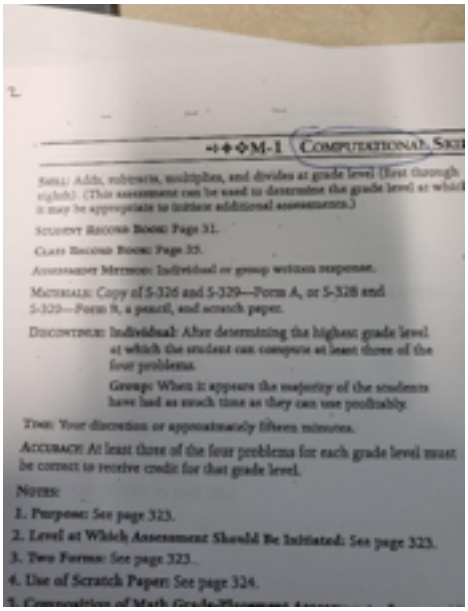


Figure 20:
Toronto District School Board OSSLT Averages







Word Problem Rubric Computational Rubric

- Pre-CASI Assessments let you know where the kids are not, it doesn't tell you exactly where they are. So independent testing could have been more precise because instead of testing them only at the grade level they should've been at, it could've tested them at their actual trash level.
  - Especially since it's only for tracking purposes, and not the actual pre/post analysis. SO would be a better and more accurate way of gauging changes in future cases.

Day IX – 14th Aug 2019

- Data collection/marking today, getting first looks at CASI Scores
- In determining how we'll calculate 'instructional days' for attendance, after checking with Devon and some of the teachers, we settled at 20 instructional days. We did not count Fridays because those were trip days, and we also excluded testing days and the week lost moving across schools.
- Gr 2s tests were 'teacher assisted' because at that level there's no CASI for 2nd grade, so they decided to use grade 3 CASI but allowed for scribing and some prompting because it was a level above them anyway.

Appendix D: Brigance Diagnostic test