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Teachers' Perceptions of Challenges and Support Needed to Teach Mathematics to Grade 6 Students

Asma Dahbour
Walden University

Walden University

College of Education and Human Sciences

This is to certify that the doctoral study by

Asma Dahbour

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Heather Caldwell, Committee Chairperson, Education Faculty
Dr. Michael Vinella, Committee Member, Education Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2024

Abstract

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Project Study Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Education

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Abstract

In response to a continued decline in Southern Ontario elementary students' Education Quality and Accountability Office scores, provincial leaders have implemented a new math curriculum to improve student math performance. The purpose of this qualitative study was to investigate teachers' perceptions of their success using the new curriculum to teach math to Grade 6 students in Southern Ontario primary schools and their perceptions of the challenges they faced and the support they needed. The study was grounded in Bandura's social cognitive theory, which posits that learning is in a social context, a reciprocal interaction between individuals. Key research questions highlighted Grade 6 teachers to address challenges faced with the updated curriculum and how they perceived teaching math with the new curriculum to prepare students for the Grade 6 exam. Individual semistructured interviews were conducted in one school with 13 Grade 6 math teachers using purposeful sampling. Open coding and thematic analysis were used to analyze the data gathered from the interviews. The findings suggest that all stakeholders— parents, teachers, and senior administrators—need to become involved to provide Grade 6 students with quality math education. Based on the findings, it is recommended that future researchers conduct mixed-methods studies with stakeholders. The findings were the basis for the development of a 3-day professional development training to increase teachers' knowledge of how to deliver math tuition. The training may lead to positive social change by helping Grade 6 teachers improve their mathematical instruction, which in turn may enhance student learning and test scores.

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Dedication

This doctoral study is dedicated wholeheartedly to my beloved family, friends, and, most significantly, to Allah, to whom I attribute all my blessings. My support system has been a consistent source of encouragement and inspiration, not only during the positive moments of navigating through this doctoral program but also during challenging times of self-doubt and despair. They have consistently offered their emotional, moral, and spiritual support. When I felt on the verge of giving up, my family and friends stood by me, keeping me motivated, and for that, I am profoundly grateful. I dedicate this doctoral study to all of you because your guidance, strength, protection, and spiritual enlightenment have illuminated this doctoral path with a radiant light.

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Finally, I want to appreciate The Honourable Stephen Lecce, Minister of Education in Canada, for his initiative to improve the new math curriculum and support the province with all the possible resources and needs

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Section 1: The Problem

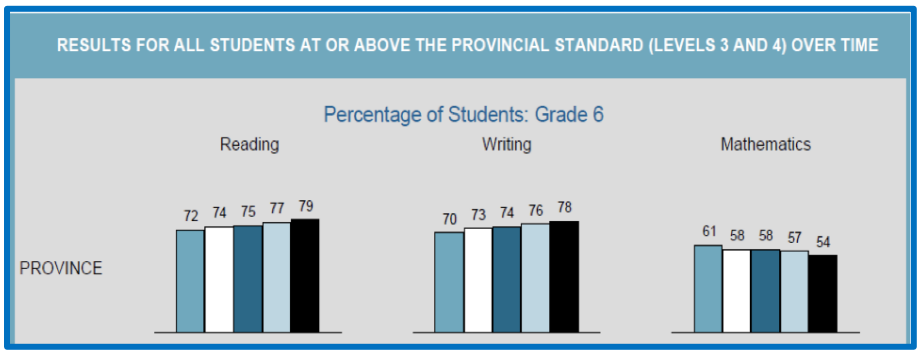
The Local Problem

In this qualitative study, I investigated the challenges faced by math teachers in using a new curriculum in primary schools in Southern Ontario, Canada. These challenges pertain in part to how math teachers interpret the curriculum and then deliver the lesson to their students. There is a clear trend of declining mathematics performances for Grade 6 students in Southern Ontario (Jones, 2019). Ontario is among the Canadian provinces whose leaders have allocated their general educational resources towards the study of mathematics from the elementary stage, continuing to higher levels of learning.

Highly advanced mathematical resources are not adequately utilized to solve the current underperformance problem among Grade 6 students in Ontario schools (Jones, 2019; Wickstrom et al., 2020). The Canadian government has attributed much of this failure to lax learning processes within the classroom environment (Jones, 2019). Research indicates that students in Southern Ontario have performed poorly in mathematics compared to other subjects, in the learning institutions in (Jones, 2019). This performance is worse among Grade 6 students in Southern Ontario, and math scores have consistently declined. Education Quality and Accountability Office (EQAO) assessment test results that illustrate this decline are shown in Figures 1 and 2.

Figure 1

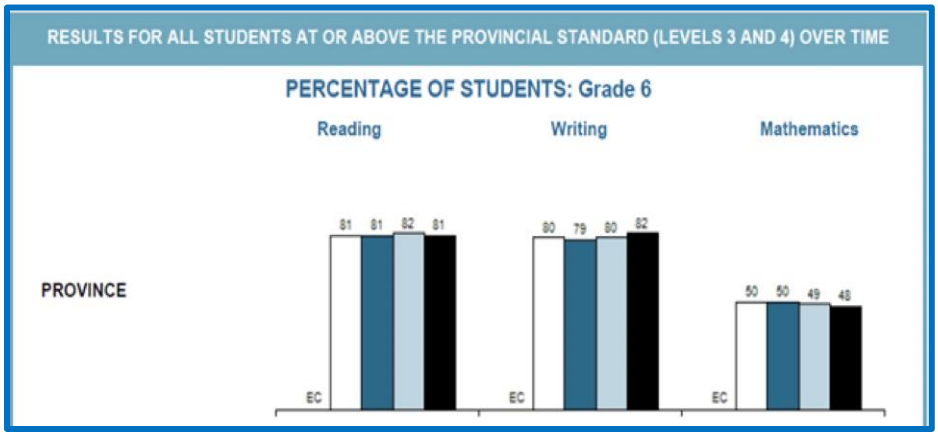
Comparison of Mathematics, Reading and Writing Scores in Ontario, 2009–2014



Note. From *Ontario Elementary Students' Math Scores Decline on EQAO Test*, by A. Jones, 2019, Global News (https://globalnews.ca/news/5824003/ontario-elementary-students-math-scores-eqao-test/). Copyright 2019 by The Canadian Press.

Figure 2

Comparison of Mathematics, Reading and Writing Scores in Ontario, 2015–2019



Note. From *Ontario Elementary Students' Math Scores Decline on EQAO Test*, by A. Jones, 2019, Global News (https://globalnews.ca/news/5824003/ontario-elementary-students-math-scores-eqao-test/). Copyright 2019 by The Canadian Press.

In response to this educational predicament, Canadian government officials have been working to improve the quality of mathematics education accorded to Grade 6 students by analyzing the learning process followed in educational institutions (Ganley et al., 2019). One of the significant considerations from the local and provincial educational authorities is that teachers may not effectively teach mathematics to Grade 6 students, culminating in suboptimal performances on students' EQAO mathematics assessment tests. Past literature on students' ability to learn and apply concepts taught in the classroom to the outside world has indicated that teachers play a vital role in students' learning (Ganley et al., 2019). The EQAO, established in 1996 as a succcessor to the Royal Commission on Learning, cited complications in the prevailing educational system in Ontario at the time (Parekh et al., 2021). Consequently, the EQAO also established a standardized system of grading students to observe, regulate, and improve the learning process and achieve higher standards across the country. This premise yielded an uncertain premise for the future of Grade 6 math scores because, at the time, school boards had no idea how this would impact scores (Ontario, 1997).

The primary issue presented by the new Ontario math curriculum reform is whether the curriculum can boost students' test performance, which has remained stagnant for years. On EQAO math assessments, student performance in Grades 3 and 6 in English language schools steadily declined from 2012 to 2018. In 2012, 68% of Grade 3 students met provincial standards; in 2018, the mean score dropped to 58%. Grade 6 mathematics was considered relatively worse, with scores plummeting from 58% to 48%,

meeting provincial standards (Parekh et al., 2021). On international tests, Ontario's Program of International Student Assessment (PISA) math scores peaked in 2003 at 530 and dropped in 2013 to 509, then recovered slightly in 2018 to 514, consistent with the provincial slide (Bennett, 2020).

The results of this study may highlight the factors that affect the performances of Grade 6 students on EQAO math assessments from the teachers' perspectives. Further, I offered various suggestions, based on the results, for administrators and mathematics teachers to improve primary students' overall mathematics performance. If implemented, these measures may make it possible to create a sustainable learning environment for further enhancing mathematics performances. Grade 6 students are still at their primordial stages in education, and any interference with their learning process might lead to unnecessary distractions, which can derail their learning progress (Daffern et al., 2020). The study's insights on how teachers perceive their successes, setbacks, and strategies in implementing the new curriculum may provide administrators with a path forward.

Rationale

In this qualitative study, I investigated teachers' perceptions of their successes, challenges, and the support needed to teach mathematics to Grade 6 students in Southern Ontario primary schools. The problem for the study matters because Grade 6 Ontario-based teachers have a stake in finding out how their students may succeed in improved math scores as a way to reverse lowering scores using a new curriculum. This is

supported by the researchers' findings that mathematics performance for Grade 6 students in Southern Ontario is relatively low compared to student performance in other subjects in the same grade, despite their scores increasing by 4% (Inglis & Miller, 2011).

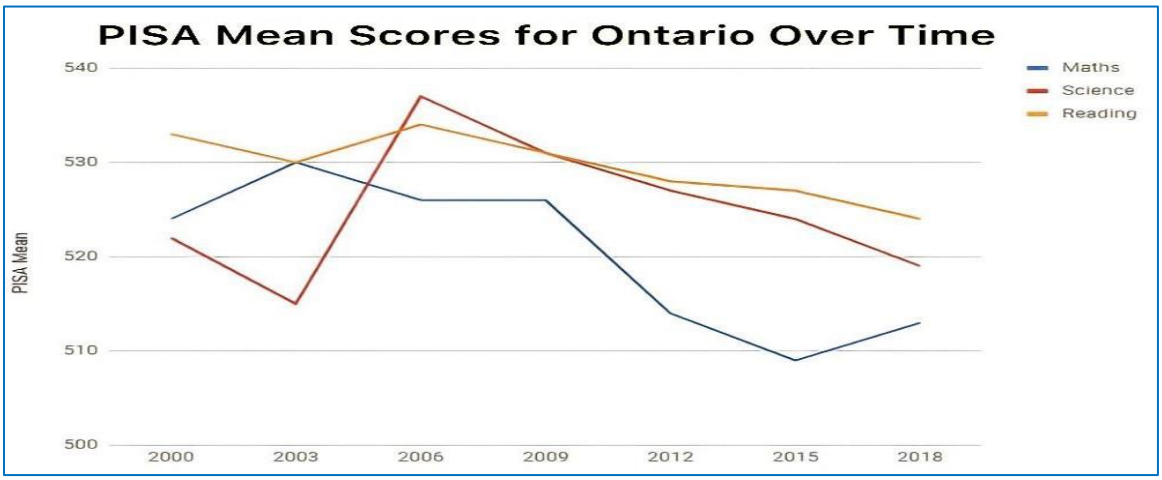
As a result, leaders of the Ontario provincial districts have tried different measures, such as the refinement of EQAO, to reform the math curriculum on a province-wide level (Daffern et al., 2020). The EQAO assessment tests, which standardize the learning curriculum for all elementary students in the province, provide information on the math performance of Grade 6 students (Ontario, 1997). Teachers in Ontario have criticized the province's new math curriculum, claiming that it had been implemented poorly and that they had received little instruction on the topics they were required to teach (Thompson, 2020). Teachers have also claimed that while the amendments to the current math curriculum would be challenging even in the best of circumstances, the COVID-19 pandemic has rendered these changes impossible (Thompson, 2020). However, as COVID-19 restrictions subside, teachers can focus on the new curriculum and strengthen their math instruction. I explored this topic by obtaining the views of Grade 6 math teachers.

EQAO assessment tests are uniform for students within the same grade and subject (Ontario, 1997). The EQAO has standardized mathematics content to be taught at various levels of education so that all the students are subject to the same information on the topic. The EQAO has set forth standard practices that the teachers should observe in delivering mathematics content to Grade 6 students. The establishment of assessment

tests to standardize the learning process has put unnecessary pressure on both students and teachers to perform better and achieve the set targets in the curriculum, Ontario asserted. Due to the continued application of EQAO assessments, at every stage of learning at the elementary and secondary level, the minimal literature regarding the implications of these assessments on the students and teachers is unexpected. Manipulation of math outcomes and continuing to use ineffective mathematical procedures have not been enough to change that trajectory (Bennett, 2020). Figure 3 illustrates PISA mean scores for Ontario from 2000 to 2018.

Figure 3

Mean Scores for Program of International Student Assessment for Ontario, 2000–2018



Note. From *Ontario Mathematics Correction: Will the New Math Curriculum Reaffirm the Fundamentals?*, by P. W. Bennett, 2020, Educhatter (https://educhatter.wordpress.com/2020/07/02/ontario-mathematics-correction-will-the-new-math-curriculum-reaffirm-the-fundamentals/). Copyright 2019 by The Canadian Press.

Furthermore, numerous researchers have conducted studies regarding the success of EQAO tests in elementary schools and how they have helped determine students' abilities at different learning levels (Bennett, 2020). However, there is a research gap regarding the impacts of newer math curriculums on students' grades and the reactions and views of Grade 6 math teachers on these new curriculums (Harrell-Williams et al., 2019; Kang et al., 2021; Parekh et al., 2021). EQAO has formed the basis of all grading and determination of intelligence levels among learners (Kang et al., 2021). Moreover, the assessment tests have also been used to determine which areas of study are difficult to grasp. Subsequently, the EQAO establishes protocols that are meant to improve the delivery of these areas of study to the learners. Bandura's (1986) social cognitive theory (SCT) indicates that the learner will always learn what they wish to learn. They are subject to influences of the environment, the behaviors of other individuals, and the need to perform specific functions that require specific knowledge of the subject. Behavioral capability refers to a person's actual ability to perform actions through essential knowledge and skills Bandura (1989). A person needs to understand an activity's "what" and "how" to successfully conduct it. People learn lessons from the results of their actions, which also impact the social environment in which they live in. It follows that Grade 6 math teachers need to be in agreement with the new curriculums so that students' experiences are meaningful. I interviewed teachers to gain their input so that their concerns or negative opinions can potentially be addressed.

Definition of Terms

Academic achievement: Academic outcomes that show how well a student has met or exceeded grade-level learning goals. Academic achievement among Canadian students is frequently assessed via provincial exams or continuous evaluations, such as benchmarks (Mingo et al., 2020).

Abbreviated Math Anxiety Scale: A test that includes nine Likert-type items on a five-point scale ranging from *strongly agree* to *strongly disagree*. The scale is broken down into two subscales: Math Learning Anxiety with five items and Math Testing Anxiety with four items (Ramirez et al., 2018).

Curriculum-based measure: A strategy that teachers use to assess pupils' progress in fundamental academic disciplines such as math, reading, writing, and spelling (Mingo et al., 2020). Use of these measures can benefit parents by providing up-to-date, week-by-week information on their children's progress (Mingo et al., 2020).

Curriculum: Lessons and academic content including standards, objectives, skills, and content knowledge taught in a school or in a specific course or program (Poulou et al., 2019).

Education Quality and Accountability Office (EQAO): An arms-length agency of the provincial government in Ontario. Officials are responsible for testing Ontario students in Grades 3, 6, 9, and 10 (Jones, 2019).

Instructional practices: Content-related learning tactics instructors use to help students learn more effectively. Role-playing and peer coaching are two examples of

instructional practices that are meant to help students achieve higher academic success (Ganley et al., 2019).

Math anxiety: Students' sentiments of tension or anxiety when confronted with mathematics, which interferes with their ability to use arithmetic in an academic or everyday scenario (Cho, 2022)

Social cognitive theory (SCT): A theory developed by Bandura in 1986 to offer a more comprehensive outlook than the social learning theory (SLT) he proposed in the 1960s. The SCT proposes that learning takes place in a social context, with a dynamic and reciprocal interaction between the person, their environment, and their behavior. SCT is distinguished by its emphasis on social impact as well as external and internal social reinforcement (Bandura, 1986).

Self-efficacy: Belief in one's capability of achieving success in an activity, which ultimately determines the outcome of the activity (Bandura, 1977; Pervin et al., 2022). Perceived self-efficacy is a person's belief in their capacity, which affects their behavior, choices, and level of motivation toward activities (Bandura, 1977; Pervin et al., 2022).

Social learning theory (SLT): A theory that suggests that social behavior is learned by observing and imitating the behavior of others (Bandura, 1977). SLT is based on the idea that learning takes place through social observation and the imitation of modeled behavior; humans learn by observing the acts and consequences of others, according to SLT (Bandura, 1977).

Significance of the Study

Decisive measures can be taken to ensure the improvement of learners' education, both collectively and individually. There is minimal literature on the impacts of EQAO assessment tests on the performance of teachers and students during the learning process. The results of this project study may address this gap in the literature as well as serve as a mechanism to help teachers understand the new curriculum. Administration staff can potentially use the study findings to adopt alternative methods to inform the Grade 6 teachers about how they can improve their rubric in math courses and improve the scores of their students. Research conducted by Nelson and Powell (2018) suggests that the use of alternative methods may provide a standardized assessment of a student's education without adding unnecessary pressures that may interfere with the actual learning process.

The most important aspect of learning is for the learner to be actively engaged in the learning process and feel like a major and collaborative partner during the learning process (Daffern et al., 2020). Implementing the new math curriculum has not only been a challenge for Ontario teachers but has also been a major challenge and stress for principals and other educational leaders in the province. Schools are responsible for ensuring that the new math curriculum implementation progresses as efficiently as possible (Montgomery, 2022). It is pertinent that the Ministry of Education and subsequent departments at the local district and provincial levels adopt better learning procedures and processes so that all stakeholders in the education field attain the best levels of performance at all stages of the curriculum. The purpose of this qualitative study

was to investigate teachers' perceptions of their success, challenges, and support needed to teach mathematics to Grade 6 students in Southern Ontario primary schools using a new curriculum. This project study may support positive social change by highlighting how teachers can adapt their mathematical instruction to better teach the new curriculum..

Research Questions

I developed two research questions (RQs) to explore Grade 6 teachers' perceptions regarding teaching math after the new math curriculum had been implemented in Southern Ontario. The RQs may uncover the instructional practices they use and what is needed to assist teachers in teaching math more effectively to improve student outcomes and math grades. I conducted semistructured interviews to gather data to answer the RQs, which were as follows:

RQ1: What are the perceptions of Grade 6 teachers of teaching math with the new curriculum to prepare students for the Grade 6 exam in South Ontario elementary schools?

RQ2: What support and resources do Grade 6 math teachers need to teach math more effectively in their classrooms?

I used the findings for the RQs to design a 3-day training for teachers (see Appendix A).

Review of the Literature

Conceptual Framework

I based the conceptual framework for this study on the SCT. Albert Bandura (1960) developed the SLT, which later became known as SCT. The emphasis on social

impact and both external and internal social reinforcement is fundamental to SCT. SCT considers the many ways in which people learn and practice behaviors and the social context in which those behaviors are used (Dozier-Brown, 2019).

The SCT considers a person's prior experiences, which influence whether the behavioral activity will take place (Dozier-Brown, 2019). Reinforcements, expectations, and expectancies are all influenced by prior experiences and impact whether someone may participate in a certain activity as well as the motivations behind that conduct. Bandura (1960) suggested five necessary learning phases: observation, attention, retention, reproduction, and motivation. In his theory, Bandura posited that learning occurs within a social context and is a dynamic and reciprocal interaction between an individual, their immediate environment, and the behaviors of those around them (Dozier-Brown, 2019). One of the most unique features of the SCT is that it emphasizes the social influences and the impacts of both internal and external social reinforcement (Bandura, 1960). When considering Bandura's theory, an individual's past experiences must be considered an integral part of the individual's specific behavioral actions.

When conducting the study, I first considered that teachers, students, and administrators exist within the same space and are bound to interact with one another. Subsequently, a close look at their interaction was paramount to successfully establish the underlying relationships between the low performance of Grade 6 students in math and the teachers' perspectives on the challenges and support needed to teach math, including the new math curriculum. SCT reflects on the distinct ways in which individuals acquire

and retain knowledge. Further, Bandura's (1986) SCT provides a lens for analyzing the social environment in which an individual performs learned behavior.

According to Senturk (2022), learning is a direct result of an individual's interactions with the environment through association and reinforcement. However, Bandura also agreed that different types of learning cannot always be attributed to direct reinforcement. In hindsight, knowledge and skills determine a person's ability to pursue a specific behavior, a phenomenon known as behavioral capability (Senturk, 2022). A person needs to be aware of what to do and how to accomplish a task to engage in any behavior. People change their behavior because of the lessons they learn, which also affects the environment in which they live (Bandura, 1989).

Albert Bandura (1960) posited that individuals learn behaviors and knowledge from simply observing others, a situation that is prevalent in the classroom environment. Students can learn from observing teachers as well as their fellow students. Most theories of social learning have focused on the initiation of learned behavior instead of the maintenance of learned behavior (Senturk, 2022). Therefore, I concluded that Bandura's SCT was the ideal conceptual framework for explaining the teachers' perspectives on the challenges and support required to teach mathematics to Grade 6 students in Southern Ontario after the change in curriculum. Essentially, SCT's main aim is to explain how individuals adjust their behaviors through control and reinforcement to create goal-oriented behavior that can be sustained as the individual progresses into their successive

stages of growth (Listyani, 2018). When Albert Bandura first introduced the SLT in 1960, he considered two constructs: behavioral capability and self-efficacy.

Behavioral capability refers to an individual's ability to perform a set of behaviors based on essential acquired knowledge. Bandura (1960) discovered that there was yet another construct that deserved to be included as part of his SLT. According to the study's findings, the organization's working environment affected its members in terms of the responses. The study also showed that teachers' performance will increase if management addresses the issues found during the investigation. The issues are the lack of flexibility in the workplace, noise distraction at work, the interpersonal relationships between supervisors and subordinates, the use of performance evaluation, and the need for improved work incentives inside the company to encourage students to execute their studies. Self-efficacy is a unique construct that focuses on an individual's confidence in undertaking specific behaviors. A person with high self-efficacy experiences improvements in motivation, success, and overall well-being. On the other hand, those who lack self-efficacy frequently experiences stress and sadness, lack confidence in their talents, and frequently fail.

According to David et al. (2018), concerning SCT, every teacher in the classroom environment is partly responsible for the learning outcomes and the ability of students to not only initiate prudent behaviors but also maintain them. Therefore, the perspectives of Grade 6 mathematics teachers on the challenges and support needed to teach the subject were considered to establish the dynamic and reciprocal interactions of the students, their

environment, and their resultant behaviors. This approach could assist both teachers and students to raise math scores performance.

In the review of the literature, I consider the different models of behavioral capability: live models, symbolic models, and verbal instructional models (David et al., 2018). Either one of these models represents a different dynamic in understanding and having the skill to perform a behavior. According to Parekh et al. (2021), learning in elementary school impacts students' performance in secondary school in Ontario. This affirms Bandura's SCT that an individual does not have to exhibit behaviors about the things they have learned (Alcine, 2019). Other factors such as self-efficacy and behavioral capability may dictate the occurrence of a behavior in later stages of learning. Therefore, the teachers' perspectives in teaching math in Grade 6 in Southern Ontario should be taken seriously, as these teachers may influence the student's resultant behavior in later learning levels.

SCT can be applied two-fold when analyzing teachers' ability to deliver the appropriate learning content in the classroom context. Vasileiou et al. (2018) argued a strong connection exists between the beliefs, grammatical awareness among the instructors, and the student's ability to grasp the knowledge taught in the classroom environment. Nelson and Powell (2018) echoed the sentiments of Parekh et al. (2021) that students can pick up the prevalent traits in approaching mathematical problems by observing their teachers. Therefore, understanding the teachers' perspectives on the support needed to exercise their self-efficacy was important to the study.

Yet, another important factor to consider is the ability of the teachers to effectively relay information to students based on their affinity to confidently deliver the educational content in class (Smith et al., 2020). According to Smith et al. (2020), teachers' perceptions of assessment feedback and instructional practice can potentially inspire better professional development methods during teaching. Teachers can therefore assess the value of their work compared to the output as represented in the assessment feedback, which would help teachers describe how to best deliver valuable content to the low achievers in Grade 6.

Moreover, teacher rankings have been more intricately linked to end-of-year grades than group-administered curriculum-based measures (Mingo et al., 2020). The general behaviors of students can be assessed based on the teacher rankings. Rolison et al. (2020) argued that teachers' perceptions of the value of their work affect their delivery and, consequently, that of their students. It is therefore important to establish a solid foundation for teacher assessment and rankings to help teachers improve their self-efficacy skills and those of their students through behavioral capability.

Math anxiety levels are inextricably linked to other teacher characteristics in more predictable ways (Ganley et al., 2019). In their research, Ganley et al. (2019) found that a lack of specific math teaching skills is directly linked to high levels of math anxiety. As the student is an active observer of the teacher, they might pick up these traits, derailing their confidence in handling mathematical problems. It is then important to understand the teachers' perspectives on the challenges they face when teaching mathematics to

Grade 6 students, as these challenges will affect their subsequent performance in the future.

Ganley et al. (2019) argued that changing the teacher practice or even encouraging reflective thinking among teachers results in a highly active link to academic performance. Establishing advanced teaching protocols and development will help the teachers improve their skills and perspectives. Subsequently, these changes will improve the academic performance of Grade 6 mathematics students (Smith et al., 2020).

Behavioral capability among teachers is another important construct in terms of how it affects Grade 6 students' academic achievements. Behavioral capability relates to teachers' ability to perform a specific set of behaviors based on the knowledge already acquired. Although Ganley et al. (2019) separated self-efficacy and behavioral capability as two distinct concepts, the two are deeply interconnected. Behavioral capability is a consequence of behavioral capability, self-efficacy, and reciprocal determinism.

Scharp and Sanders (2019) studied whether various profiles would yield different mathematics achievements based on the self-determination theory. The authors revealed that high-quality profile students had the highest levels of math achievement. Their research reinforces that confidence in teaching yields better results in the learners' academic achievements.

Poulou et al. (2019) also supported this theory and argued that students with arithmetic difficulties tend to improve on their math tests. Nevertheless, the authors also offered a contradictory sentiment when reckoning that the same students who improve on

their math tests have unsatisfactory performances and that they are more likely to struggle in their future classes. In this premise, self-determination is inextricably tied to math difficulties. It is assumed that difficulty in handling mathematical problems inspires self-determination, which sparks the factors of behavioral capability in an individual.

In another study conducted by Cho (2022), a lack of self-confidence in mathematics was tied to poor academic achievement in the subject. The author established that the Abbreviated Math Anxiety Scale was valid, especially with a sample group of underrepresented minority undergraduates. Cho affirmed that the scale was reliable in predicting individuals' objective and subjective performance on an arithmetic scale.

In contrast, Mingo et al. (2020) studied the role of math anxiety as well as subjective and objective numeracy and identified that a direct relationship between arithmetic anxiety, objective numeracy, subjective numeracy, and a general numerical aptitude existed through different routes. Teachers play a critical role in ensuring that students have an abject numerical aptitude and that they can relate mathematical concepts learned in class to mathematical applications in the real world.

The most important aspect to consider is the value of self-efficacy among teachers as part of behavioral capabilities. Instead of focusing on the capability of learners to be confident in their learning and delivery, Poulou et al. (2019) argued that teachers influence learners’ ability to obtain and maintain behaviors that they acquire within the learning environment. Confident teachers inspire confident students, resulting in better

academic performance. In addition, the Ontario Ministry of Education proposed that the identification of key designs, constructs, and measurement difficulties could also lead to improved performance among teachers (Jones, 2019). It may be that increased teacher knowledge and understanding of the learning environment help inspire improved academic performances in the EQAO assessment tests.

To support this hypothesis, Scharp and Sanders (2019) conducted a test to find the link between math anxiety among teachers as well as the prevailing math achievement among students. The authors found that a higher level of math anxiety among teachers translated to a lower math achievement among students, an inverse proportionality (Ramirez et al., 2018). When analyzing the problem of challenges and support needed to teach mathematics to Grade 6 students, the conceptual framework shone the light on self-efficacy as a major factor in the resultant academic performance of the students.

Self-efficacy is integral to social learning and is included as a construct, updating SLT to SCT (Bandura, 1960). All these concepts are essential in understanding the underlying relationships between teachers' performance in schools and the students' academic achievements on the EQAO assessments in mathematics. Essentially, SCT can be broken down into three major concepts: (a) people learn through observing other people, (b) the internal mental states of an individual are essential to the learning process, and (c) not all learned concepts result in a change in behavior (Bandura, 1960). This study specifically focused on behavioral capability and self-efficacy as the main

constructs used in the conceptual framework researching teachers' perspectives on the challenges and support needed to teach mathematics to Grade 6 students.

In addition, the self-efficacy theory was instrumental in considering its impact towards how it relates to the study and the selected RQs. Self-efficacy theory assumes that external and internal reinforcement are the most pivotal aspects to social interaction. The RQs focused on perceptions of Grade 6 teachers in Ontario teaching math with a new curriculum and what resources they needed to effectively teach math with a new curriculum. The behavioral capacity of teachers teaching a new curriculum of mathematics in Grade 6 schools is important to consider especially with internal and external factors.

The self-efficacy theory is an integral part of the proposed study because behavioral capacity and self-efficacy are aspects that apply to both students and teachers. Furthermore, self-efficacy and behavioral capacity play a role in the RQs regarding the challenges of teachers in dealing with the new curriculum and their perceptions of their students' performance. Bandura's (1960) theory has the potential to provide greater, in-depth analysis of both the objectives of the RQ and the literature review by providing a behavioral approach to the study.

Review of the Broader Problem

The literature review aimed to provide the most current review of peer-reviewed research on curriculum and instructional practices that contributed to Grade 6 students' low academic performance on the EQAO assessment and solutions to increase student

academic achievement. This qualitative study aimed to explore Grade 6 mathematics teachers' experiences with instructional practices they perceived are necessary to prepare students for the province's EQAO assessment.

The purpose of this review of the literature was to clarify the problem identified in Southern Ontario. In doing so, I sought research articles that included discussions of the effects of instruction and curriculum on academic achievement within the classroom setting. The literature review was an integral component of this research study and was focused on instructional practices and other factors perceived to be the causes of the low EQAO assessment scores.

The following key terms were used to search the literature: *academic achievement*, *achievement success*, *secondary teachers*, *instructional strategies*, *writing instruction*, *teachers' perceptions of low student academic achievement*, *teachers' experiences*, *standardized assessments*, and *academic performance on standardized assessments*. Further, the following scholarly resources and databases were used to conduct research: Google Scholar, Academic Search Premier, ERIC, Sage, and JSTOR. Additional searches were carried out on the local school district website, the Ontario Ministry of Education website, and the EQAO. The articles chosen for the literature include themes of teaching mathematics, such as the challenges teachers face when teaching the math curriculum, standardized testing, instructional strategies, practices, and preparing students for provincial assessments.

Standardized Testing and Teaching Mathematics in Elementary School

The Canadian-based school system in Ontario is divided between primary and elementary divisions, with Grade 6 placed in the latter. Students are taught various subjects across the standardized Ontario curriculum within elementary schools. Some of the fundamental principles that are contained within Grades 1–8 in Ontario district mathematics include the following: knowledge and understanding, thinking, and communication, as well as the fundamental principles of mathematics (Yeager, 2020). Program planning with Ontario district reforms regarding what is taught in elementary school includes the following principles: instructional approaches, human rights, equity, inclusive education in mathematics, the role of information and communication within mathematics, and a more accessible mathematical curriculum for students with special needs (Yeager, 2020). The modes of teaching outlined in this instance greatly focused on the Ontario Curriculum as it appeared in 2020.

The specifics of the Ontario math curriculum are divided by different skills and techniques from an arithmetic standpoint. For example, Grade 3 students within the Ontario school district are expected to apply problem-solving, reasoning, proving, reflecting, connecting, and communicating while working through math problems to understand the extent of their resourcefulness as well as view themselves as capable math learners with their peers (Ontario Mathematics Curriculum Expectations, 2020). Grade 6 students are expected to learn more advanced concepts while surpassing the basics (e.g., skills with rational numbers that include comparing and ordering integers, decimals, and

fractions within the scope of different contexts; Ontario Mathematics Curriculum Expectations, 2020). In earlier grades, teachers introduced basic building blocks for Ontario elementary schoolers. In contrast, Grade 6 teachers augmented overall difficulty and expected the latter to fully understand and implement what they had learned throughout their course. Standardized testing in Ontario began in May and proceeded until June.

Students learning and attitudes toward learning are affected by teachers' effectiveness. Educators and other relevant stakeholders have a chance while teaching basic math to establish a love of math in students from an early age, in addition to teaching them the fundamental ideas they will utilize throughout their academic careers. The literature review includes a discussion of the mathematical curriculum in Ontario-based elementary schools. Topics that are covered included what is covered in Grade 6 elementary math curriculum and when students are tested.

Variable Performance Levels and Outcomes

There are different patterns and achievements among Ontario-based Grade 6 students concerning mathematics courses. Fesseha et al. (2020) indicated that there is a higher likelihood for an English Language Learner to decline in math achievement from Grades 3 to 6, which suggests a greater need to support these students with mathematics. Ontario-based government educational agencies, such as EQAO, are allocated to help support student learning (McNelles et al., 2020). In a recent study, McNelles et al. (2020) highlighted the chances of academic success within an Ontario-based context.

Knowledge and understanding, thinking, and application were among the qualities observed in the study (McNelles et al., 2020). There is a great emphasis on introducing elementary students to the fundamentals of mathematics from Grades 3 to 6 (McNelles et al., 2020). From a pedagogical perspective, the arts and digital media also played a role in how the Ontario mathematics curriculum was shaped (Silva, 2015). These are only a few ways in which the Ontario mathematics curriculum had raised its versatility in adapting to new challenges while catering to the needs of students to boost their overall performance in math.

Different mathematic skills are taught in different grades within the elementary divisions of Ontario elementary schools. Some of these different math skills were reflected by different forms of reform that have taken place within an educational context. Ashraf (2019) outlined the teachers' role in both mathematical reform and what is taught in elementary classes. Three core themes were presented among math teachers in Ontario elementary courses: (a) confidence in math impacted reform success, (b) teachers do not play an active role in how mathematics is reformed in the main curriculum, and (c) the impact between math reform and teachers is bidirectional (Ashraf, 2019). The implications were that teachers were not being treated as agents of change, which signifies the Ontario school board’s emphasis on the use of examinations, such as EQAO, to enact mathematic reforms (Pinto, 2018).

The mathematic skills that were taught to students in the context of this study varied from grade to grade, as well as the situation of current test scores. Between 2003

and 2012, every Canadian province except two witnessed declines in international math exam scores, which were administered by the Organization for Economic Cooperation and Development (Mendaglio, 2015; Stokke, 2015). Stokke stated that among discussions in the context of Canada's declining math scores, the teaching strategies of North American mathematics were central in mathematics discourse with strategies that promoted concepts like fraction arithmetic in early and middle years, which may have acted as predictors for success.

In Ontario, privatization and public investment are some contributing factors to up-and-coming education trends in elementary schools (Fullan & Rincon-Gallardo, 2016). On a district level, Ontario has undergone reforms aimed at increasing the academic capability of Grade 3–6 students through the Whole System Reform Strategy. Because of this strategy, 180,000 more elementary students reached higher proficiencies in mathematics, reading, and writing than if those same implementations were not applied (Fullan & Rincon-Gallardo, 2016). The key implications are that most of the strategies discussed in existing Ontario education literature place less emphasis on the teacher as an actor of change and more on the results of standardized reforms (Sitch, 2005). The EQAO is one of the many reforms that may make a difference in how children are taught from an elementary perspective (Eizadirad, 2019; Wickstrom et al., 2020).

Numerous aspects define most of the newer Ontario school curriculum. Some of the key learning elements in the updated curriculum as of 2020 include algebra, number facts, and geometry (Math Project, 2021). The implementation of these newer elements

into the current provided an added emphasis on basic skill-building sets that acted as building blocks following the Grade 6 level of mathematics. Further, an emphasis was placed on cultivating math skills for real-life applications, such as calculating discounts or changes at times of purchase (Math Project, 2021). The new provincial math curriculum also focused on the social-emotional learning elements that were aimed at benefiting Grade 6 students' prospective academic, social, and career endeavors in the years to come (Math Project, 2021). Other skills in the new curriculum that were given broad focus included data management skills, which could stimulate students' thinking processes; coding, a skill that could assist with strengthening problem-solving skills; and financial literacy, which the Ontario provincial curriculum aimed to use as a tool to improve students' financial skills in the future (Math Project, 2021). The current curriculum was built and based on improving the life skills of Grade 6 students through the application of mathematics.

The current changes brought about by the Ontario provincial math curriculum were connected to mathematics performance in Canada as a whole (Allison & Geloso, 2021). Canadian provinces had unique circumstances, under which they implement their mathematic and curriculum reforms on elementary grade students, namely those in Grade 6 (Allison & Geloso, 2021). Changes were made to reinforce the principles that the 2020 Ontario math curriculum aimed to promote to its students. Correa (2020) observed that the memorization of timetables and a thematic change in curriculum organization were aspects put into place so provincial education initiatives could promote improved social-

emotional learning, coding, and financial literacy among students. The measures that were brought about by the Ontario school board in Grades 1–8 students were reflective of the provincial objectives that focused not only on mathematics but on knowledge building and creative thinking (Costa, 2019). Costa noted that the Ontario province placed importance on the learning skills of mathematics among Grades 1–8 students not only because of its real-life applications but also because of the key objectives of indoctrinating young students with a math-like mind from an early age.

Irvine and Telford (2015) outlined the strengths of previous provincial math coaching programs held by Ontario, such as the GAINS program. The authors concluded by stating that continuous sustainment of math caching problems is necessary to maintain any semblance of effectiveness (Irvine & Telford, 2015). This was supported by Handford and Leithwood (2019) who, in a British Columbia-based study, determined that the actions of school district leaders within a provincial perspective had the power to diminish or augment the learning of students in the math fields.

Other observations have been made in the context of ongoing math reforms within Canadian provinces. Researchers have observed the role of teacher and educator training in either a Canadian or American context to improve the performances of Grades 1–8 students (Kajander, 2010; Kramer, 1997). These measures may have included changes in instruction strategy or a shift in scheduling (Kajander, 2010; Kramer, 1997). Student self-efficacy also played a role in how math performances are either augmented or diminished on an infrastructural level (Kilpatrick, 2014; Larsen & Jang, 2021). Researchers have also

highlighted the effect of the environment within a school curriculum and provincial context vis a vis the newly implemented math reforms within Ontario for Grades 1–8 students (Litner, 2016; O'Shea, 2003).

In addition to the standardization of new math curriculums within the Ontario province, the roles played by teachers and standardized testing within a Canadian context are important to note. Pinto (2016) highlighted that political accountability on a provincial level played a sizable role in how effective standardized math testing in the provinces had become. Reid and Reid (2017) noted that the development of teacher candidates within Canada was critical not only for students but also for policy makers, school districts of provinces, and universities. The standards and indicators of achievement on a provincial level have long changed in the past 3 decades; thus, it was instrumental for math teachers in all connected fields to properly adapt to newer policies and curriculums to augment Grade 6 students' achievement levels and improved test scores. In the following section, I discuss the challenges of teaching math using the newer curriculums.

Challenges of Teaching Mathematics Including the New Math Curriculum

Present-day mathematics education comes with its share of circumstances and difficulties. Examples include anxiety, racial equity, and how technology has affected most mathematical dynamics within the classroom (Finlayson, 2014; Smith et al., 2020). These difficulties apply not only to those looking to comprehend in-depth news and information or pursue a degree in finance, business, or economics but also to people

looking to have basic arithmetic abilities and data literacy. The three most common difficulties are as follows:

- Dealing with anxiety. Students may feel nervous if they are required to complete a math problem on a whiteboard in front of their peers (Finlayson, 2014).
- Racial equity in mathematics instruction. Mathematics instruction differs among racial, ethnic, linguistic, gender, and socioeconomic categories. In general, pupils of color cannot access the best math instruction (Smith et al., 2020).
- How to make the most of technology. Technology offers a variety of opportunities for innovative and engaging mathematics education, but it may also prove to be complicated. Technology such as tablets, smartphones, and mobile applications are often used in the classroom (Smith et al., 2020).

There are multiple dimensions and aspects to consider in terms of math anxiety on an academic level. Math anxiety may occur in both teachers and students (Harper & Daane, 1998; Wigfield & Meece, 1988). Math anxiety is characterized as worries or concerns centered on achieving right or wrong answers, the extent of confidence in one's math abilities, timed examinations, and worries that arise from completing word problems in mathematics (Harper & Daane, 1998). Math anxiety was also found to be prevalent between Grades 6 and 12 students because of the more advanced elements of the curriculum that students must face following those years (Wigfield & Meece, 1988). If left unchecked, math anxiety can cause a series of long-term consequences, including a loss of confidence or stagnation in overall math performance and implementation for

real-life scenarios (Ashcraft & Ridley, 2005). Math anxiety left unchecked can affect children's mathematical achievement from an early age (Ramirez et al., 2013). Foley et al. (2017) observed that it is important for researchers to understand better the underlying causes of math anxiety due to the growing demand for employees in math-related jobs such as science, technology, engineering, and mathematics. Therefore, a greater understanding of math anxiety was necessary to address the issue.

Another contextual challenge within the mathematics classroom is how race, stereotypes, and, by extension, gender played a role in current mathematics discourse on an elementary to secondary level. Cvencek et al. (2015) characterized race and math as stereotypes formed from preconceived notions or beliefs that may prove to be problematic (e.g., Chinese or persons of Asian descent are the most skilled at math). Reardon and Galindo (2009) added that there was a preexisting achievement gap between White, non-Hispanic, and Hispanic students in elementary grades. The findings of the study illustrated that upon entering preschool and elementary school, Hispanic students were reported to have lower mathematics and reading skills compared to non-Hispanic students (Reardon & Galindo, 2009). Riegle-Crumb and Grodsky (2010) also observed a difference in racial intersections regarding the field of math. The representation of inequality in math focused on both Hispanic and Black students (Riegle-Crumb & Grodsky, 2010). Even though the study utilized an American sample, the findings can help researchers better understand how achievement gaps based on race can also affect Canadian provinces, such as Ontario. Sonnenschein and Sun (2017) and Sciarra and

Seirup (2008) illustrated the importance of understanding the multidimensionality of race in mathematics and how young it can be traced back to.

Finally, another tool that teachers and school districts have utilized in recent years is technologically assisted learning tools. Examples of technologically assisted learning tools were computer programs that helped low-achieving students improve their mathematics and academic scores (Ahmad & Abdul Mutalib, 2015). Demir and Önal (2021) added that the use of technology can be implemented not only to improve students' math scores but also to alter their overall attitudes and sentiments towards math and their prospects of potential academic achievement. Technologically assisted learning tools have numerous uses in an evolving school environment where technology is being normalized more and more (Sari & Aydoğdu, 2020). Technology can be absorbed not only through a math context, but also in an overall classroom environment that normalizes most aspects of technology into curriculum, activities, learning, working tasks, and views for student achievement (Liang & Zhou, 2009; Ozel et al., 2008). The role of technology in the classroom in addition to addressing math and race as well as math anxiety was essential in the plans of the EQAO.

The EQAO was established in 1996 as a precedent to the Royal Commission on Learning (Jones, 2019). The main purpose of the EQAO was to establish a standardized system of testing students' aptitudes and knowledge. The first full assessment of the performance of students in Ontario was achieved in 1997 (Cho, 2022). A sample assessment of Grade 6 mathematics was achieved during the same year. The institution

has since worked tirelessly to ensure that all assessment and grading among students is standardized in all elementary schools and secondary schools in Ontario (Boyd, 2021).

While the premise of the establishment of the EQAO was meant to create equal opportunities for all learners and improve the educational standards in Ontario, this new curriculum has also yielded unprecedented results. Standardized testing has created a lot of pressure for both the teachers and the students to perform their best (Parekh et al., 2021). The situation has further escalated over the past couple of years, owing to the increasing magnitude of the stakes of the assessments. Teachers faced growing pressure to meet specified student growth measures as set forth by the province of Ontario and the Ministry of Education (Daffern & Thompson, 2020). Teachers also feared failing to meet the stipulated learning curves among all students. Teachers faced the pressures of teaching the specific province-stipulated education standards at different learning levels (Scott et al., 2018).

Ontario oversaw the decline in the quality of delivery because they were more focused than other schools on rating the educational performance at the local, district, provincial, and national levels of participation (Jones, 2019). As a result, more focus had been directed toward students passing the standardized assessment tests than the actual learning process. In Ontario, this approach had indicated that mathematics performance was in a critical situation compared to other learning subjects. Researchers had indicated that mathematics performance levels had continued to decline over recent years at the local, district, and provincial levels (Mingo et al., 2020).

Owing to these developments and recent research into the effects of standardized assessments on students' academic achievements, Ontario believed that the solution-based approach to learning had grounded the applications of mathematics in other areas. Therefore, Ontario tried to alleviate the situation by changing the mathematics curriculum, especially for Grade 6 students (Parekh et al., 2021). The new curriculum and new assessment protocols were scheduled to take effect in 2020 (Rolison et al., 2020). However, due to the outbreak of the COVID-19 pandemic, the implementation process of the new math curriculum in 2020 and 2021 was delayed (Döringer, 2021). Even so, the policies that had been set forth before the pandemic were scheduled to take effect in 2022 to improve the quality of education and the student's ability to relate mathematics to real-life applications throughout the elementary and secondary schools in the provinces.

Implications

The study has various implications for academic improvement at the local, district, and provincial levels. The proposed study has the potential to affect how the students, teachers, and administrators teach math more effectively in classrooms. Ontario school districts may benefit from the research by redefining the protocols used in delivering quality academic provisions for students in Southern Ontario and other parts of the province. Academic institutions have the opportunity to focus on their relative strengths while annihilating the weaknesses in the delivery of quality education. Educational operators at a district level have the potential to make professional learning plans for the teachers to create a strict protocol that ensures that both the teachers and

learners may have better experiences in the learning environment. This premise may effectively boost self-efficacy levels among both teachers and students carefully. In effect, this may lead to improvements in Ontario schools and their math curriculums.

Finally, defining the factors of Grade 6 mathematics performances and their decline may help the province plan and improve the curriculum across all elementary and secondary education levels. Consequently, prevention measures may also be established to prevent better-performing classes from practicing the same set of instructional practices, which could lead to a decline in the academic achievements of mathematical studies throughout learning institutions in Ontario and other parts of the province. A possible project direction may serve to enhance performance levels in Grade 6 students studying mathematics.

Summary

Over the past 2 decades, EQAO has taken an active role in standardizing student assessment tests in learning institutions. Although the EQAO was created to coordinate and equalize every student in the province, unforeseen and detrimental circumstances were also yielded. Teachers felt pressure to deliver the province's standard education to the respective students, while the students felt pressure to reach their potential. The result was a focus on attaining the set standards instead of learning concepts that would be applicable in their lives.

SCT was utilized to establish the underlying relationships between teachers and students at various levels of education. Although Bandura’s SLT comprises six

constructs, the most widely used constructs are those of behavioral capability and self-efficacy (Bandura, 1999). In the first part of this subsection, I highlighted the problem and aim of this literature review. In this study, I have sought to ascertain teachers' perceptions of the challenges and support needed to teach mathematics, including the new math curriculum, to Grade 6 students. In the second part of the literature review, I described the conceptual framework that formed the basis of this study and highlighted the use of SCT to alleviate the prevailing situation of the low performance of mathematics in elementary schools. Section 2 focuses on the study's methodology.

Section 2: The Methodology

I chose the qualitative research design for the study because of its ability to examine the phenomenon of the study topic (see Döringer, 2021). The researcher can derive an evaluation and research design through the research and problem questions (Creswell & Creswell, 2017). The two guiding RQs that I sought to answer were as follows:

RQ1: What are the perceptions of Grade 6 teachers of teaching math with the new curriculum to prepare students for the Grade 6 exam in Southern Ontario elementary schools?

RQ2: What support and resources do Grade 6 math teachers need to teach math more effectively in their classrooms?

Qualitative Research Design and Approach

I used a qualitative design to investigate teachers' perceptions of the challenges and support needed to teach mathematics to Grade 6 students. The qualitative design aligned with the problem and research methodology because a qualitative study centers on the experiences of people as opposed to empirical numbers (Creswell & Creswell, 2017). A basic qualitative design was used to explore the perceptions and experiences of Grade 6 math teachers related to their implemention of instructional practices to support the new curriculum. Within qualitative research, researchers explore the "how" or "why" behind a phenomenon (Ontario, 1997). Additionally, the aim of a qualitative research study is to explore how individuals interpret their experiences. For this study,

interpretations offered insight into the application of the new curriculum in classroom settings in Southern Ontario elementary schools.

Description of the Research Design

Qualitative researchers seek to describe and discover the daily actions of people using a narrative basis (Creswell & Creswell, 2017). I chose this methodology because I planned to collect data solely through individual semistructured interviews to understand Grade 6 mathematics teachers' perceptions and experiences, and the support they require to improve their teaching skills and, subsequently, student's performance on standardized exams. Qualitative researchers contend that research inquiries are subjective and that multiple realities are created by individuals (Yin, 2015). A qualitative approach was appropriate to capture participants' perceptions about the perceived challenges that teachers experiences and the support they require. I used a basic qualitative approach with a phenomenological design to investigate actual lived experiences (see Creswell & Creswell, 2017). Thus, teachers were interviewed to gain insight into their perceptions of the challenges and support that teachers experiences and require while teaching to improve their instruction. Qualitative methodology enables the study of phenomena that are both implicit as well as explicit.

Using a basic qualitative design allowed for an in-depth focus on the research problem, which generated a rich description of the phenomenon under study (see Creswell & Creswell, 2017; Yin, 2015). Researchers employ qualitative research methodologies to explore, describe, and interpret meanings or generate new hypotheses

and or theories. I used qualitative methodology to answer the two RQs. The study's main data collection instrument consisted on semistructured interviews. The interview questions were open-ended and involved probing to gather in-depth personal experiences, opinions, and insight regarding a specific context that was relevant to this study.

I considered a quantitative research design for this study because of its ability to draw from a larger sample and population (Döringer, 2021). However, an empirical or numerical approach to data would not be enough to answer the two RQs, which focused on the perceptions of teachers and how they use materials to teach math in Ontario using a new curriculum. In the subsections that follow, I further expound on this justification and why the qualitative methodology was chosen over the quantitative methodology.

Justification for Research Design

Because there are significant differences between qualitative and quantitative research and support, it is important to explain why a qualitative research design was more appropriate for this study. First, the use of a qualitative research design allowed me to understand the local district (classroom) problem with greater insight, thereby allowing for valuable narrative data to be obtained (see Döringer, 2021). Second, using a qualitative design allowed me to view the perceptions of the participants (Döringer, 2021). Third, a qualitative study created an opportunity to elicit teachers' responses and experiences so that feedback information was analyzed and translated into the emergence of meanings, which, in turn, allowed for a unique insight into the problem derived from the elicited data (Scharp & Sanders, 2019). Understanding the local problem and the

perceptions of participants, and having the ability to analyze qualitative data accurately and efficiently aligned with the objectives and RQs of the study. The qualitative approach also aligned with the chosen theoretical framework, in particular the concept of self-efficacy as it pertained to the behavioral efficacy of teachers both from an internal and external perspective.

Also, I concluded that the quantitative design was not appropriate because it would not provide the opportunity to capture the in-depth experiences of participating teachers. Numerical data would not provide rich enough data to gain an understanding of how teachers interpret their experiences of implementing instructional strategies to increase student achievement in mathematics. A quantitatively structured research design with closed questions would not allow the participants the autonomy to respond, in their own words, to the type of RQs asked (see Alexander et al., 2018). By asking open-ended interview questions, I allowed the participants the opportunity to reflect on their own personal experiences and perceptions as a mechanism to enable a subjective response. This way, I fully understood the participants' experiences regarding how they implemented curriculum-based instructional strategies and why they believed that the students in the local district were not performing well. Thus, I determined that a basic qualitative research design approach was best suited for this study.

Participants

Criteria for Selecting Participants

At the time of the study, there were 180 Grade 6 mathematics teachers located within Southern Ontario with teaching experiences of at least 3–5 years. To select the participants, I used purposeful sampling, a research tool that allowed me to use a series of nonrandomized sampling maneuvers to find participants who were considered suitable for the study (Campbell et al., 2020). Purposeful sampling was chosen because the nature of the study required a specific sample from the target population for me to understand what affected mathematics performance among Grade 6 students. A minimum of 12 Grade 6 teachers were originally recruited to provide rich, detailed descriptive meanings as well as an in-depth overall picture of the central phenomenon. A local school board had given permission to interview their teachers and employees in this study (see Appendix F). However, additional participants were recruited until saturation was reached using online resources such as LinkedIn, social media, and public websites. Data saturation is the point at which no new information can be garnered by enlisting new participants (Fusch & Ness, 2015).

In using purposive sampling techniques to recruit participants, I focused on certain inclusion criteria. Purposive sampling is a nonrandom sampling technique that is used to understand a central phenomenon. The participants selected for this study were Grade 6 mathematics teachers within Southern Ontario. The screening instrument criteria required that the participants (a) know about and/or teach Grade 6 mathematics within the

Southern Ontario area, (b) have 3+ years of teaching experiences, and (c) know about EQAO requirements.

Based on the study screening instrument, I sought participants with at least 3 years of professional experiences in the field of study. Teachers within Southern Ontario with at least 3 years of experiences would know the mathematics content for Grade 6 students and EQAO requirements. I sought participants based on the research problem, population, and sample characteristics, and the planned procedures for analyzing and interpreting as findings. For this study, I examined teachers' perceptions of the challenges and support needed to teach mathematics with the new curriculum to Grade 6 students and prepare them for EQAO assessments. Participants were selected who met the eligiblity criteria, and they were interviewed until data saturation was reached. Data saturation was reached when no new information was elicited from the participants and emerging themes became increasingly redundant as they offered no new insight of understanding pertaining to the RQs used to inform this study.

Justification for the Number of Participants

From the population of Southern Ontario's 180 mathematics teachers, a minimum sample 12-15 mathematics teachers were identified to gain insight into mathematics teachers' perceptions of the challenges and support required to teach mathematics to Grade 6 students. Qualitative studies generally require fewer participants than quantitative research (Creswell & Creswell, 2017). Qualitative sample sizes should be large enough to obtain enough data to describe the phenomenon of interest sufficiently

and to reach data saturation. For basic qualitative studies, which rely on personal experiences, a minimum of five participants were recommended to achieve the overall goal of saturation (Döringer, 2021). However, due to the number of mathematics teachers in Southern Ontario, a minimum of eight participants were recruited to offer a thorough understanding of the participants' experiences and to address the RQs sufficiently. Once data saturation was reached, I stopped interviewing new participants.

Procedure for Gaining Access to the Participants

I used purposeful sampling to recruit the appropriate participants. I provided full disclosure of the purpose of the study via email and was available to answer additional questions upon request. In addition, I sought permission from the relevant boards within Southern Ontario and gained Walden University Institutional Review Board (IRB) approval (no. 04-25-23-0157637) prior to beginning data collection. Immediately upon receiving approval from the boards, I asked the school principal to send invitations to the teachers via email. Emails were sent to Grade 6 mathematics teachers within Southern Ontario; they were only sent to teachers who had been employed for at least 3 years, this for participation in the study when they gained permission from school principals. Participants were asked to sign an informed consent form before they participated in the study. An informed consent translates to the ability of the participant to consent to participate in the research based on the full understanding of both their assigned roles and their rights to terminate their participation at any time. An interview protocol was followed, and participants were asked to participate in semistructured interviews.

I planned to reassure the participants that the study was a personal matter and, therefore, they were not required by the Southern Ontario government to participate as participation was entirely voluntary. Participants were made aware that they were free to withdraw their participation at any time throughout the study. Participants were assured that their decision to participate would not interfere with any other of their assigned duties and jurisdiction in the local district.

Establishment of a Researcher–Participant Relationship

As a current teacher in Southern Ontario for the past couple of years, I have established a few affiliations within Southern Ontario. Although participants worked at various schools within Southern Ontario, my employment with the school was the foundation of rapport with the participants. Additionally, I have taught mathematics to Grade 6 students; therefore, my previous experiences established a common ground with the participants. However, to help establish a positive researcher–participant relationship, I started the interview by introducing myself and explaining the purpose of the study, their role as a participant, and my role as the researcher. A positive researcher–participant relationship developed through open communication and full disclosure of both parties' roles and responsibilities in the study. I reviewed the informed consent form with participants and allowed the participants to ask any clarifying questions they had before the interview began. I elaborated as needed to provide further context for the interview. I planned to end each interview by thanking the interviewee for their time and willingness to participate. This fostered trust between me and the interviewee.

Protection of Participants' Rights

I followed the set guidelines to ensure that the participants were protected. After receiving permission to conduct the research study, the potential participants were emailed an invitation to participate in the study. The invitation informed them of both the nature of the study and its purpose. Teachers interested in participating in the study completed an informed consent by responding with "I consent" to be included in the study. The informed consent form detailed the study's purpose, my role as the researcher and participant, and how I preserved their confidentiality. I also included vocabulary that specified that their participation was strictly voluntary and that they could choose to opt out of participation at any time without disclosing any reason. Moreover, to ensure confidentiality, participants were assured that their identities would be kept confidential. Their answers to the interview questions were not linked directly to their names or school locations. Pseudonyms such as Teacher A and Teacher B were used to protect the identity of each participant and ensure protection from any harmful invasion of confidentiality and privacy.

Additionally, virtual interviews were scheduled during a convenient time for each participant to avoid conflict with the duties and responsibilities of their job. All correspondence remained confidential. Documents such as interview responses, journal notes, informed consent forms, invitation to participate responses, as well as any other identifying documentation containing the individuals' names or school locations were secured in a locked filing cabinet in my home office.

Data Collection

Identifying how data is collected and how the data will be used before conducting the study is key in qualitative studies. Data collection for this study consisted solely of semistructured interviews to examine Grade 6 mathematics teachers' perceptions about the challenges and support needed to teach mathematics to Grade 6 students. In addition, the interviews allowed me to gain insight into teachers' perspectives regarding the success and support needed to prepare Grade 6 students to perform well on the Grade 6 EQAO testing. Interviews have unique data collection features that make them valuable tools for qualitative data collection. Unlike other methods, commitment from both the researcher and the participant is essential to completing a qualitative study. The interview questions (see Appendix B) were developed from the following two RQs for the study:

RQ1: What are the perceptions of Grade 6 teachers of teaching math with the new curriculum to prepare students for the Grade 6 exam in Southern Ontario elementary schools?

RQ2: What are the perceptions of Grade 6 math teachers regarding the challenges they face with improving their students' math scores?

Semistructured interviews were conducted immediately after receiving IRB approval for conducting the research as well as gaining participants' consent. The semistructured interviews were used to answer the study's two RQs. These semistructured interviews were conducted by me via an online platform such as Zoom and consist of approximately 12 open-ended questions that led the discussion to elicit and

understand teachers' perceptions regarding the issue of preparing students for the EQAO. Three types of interview protocols in qualitative data collection are generally used: unstructured, semistructured, and structured (Creswell & Creswell, 2017).

The semistructured interview protocol is the most used interview protocol of the three because it allows the participants to respond freely with flexibility while still allowing the researcher to guide the interview by following a semistructured outline that may be enhanced with follow-up questions as various themes arise (Lauterbach, 2018). As data and information emerges, both the researcher and participants can elect to pursue and investigate emerging themes, especially if such themes become expressed by multiple participants. 13 teachers were interviewed. In qualitative studies, having a small sample size is common and allowed me to gain an in-depth look into the experiences of the participants. The semistructured data collection method allowed the participants to answer the RQs based on their known knowledge (open source) and via their tacit knowledge gained from experiences and intuition (Levinthal & March, 1993).

Further justification for the qualitatively constructed semistructured interviews pertained to the two different types of knowledge that emerged from these interviews. General (open source) knowledge is data and information that is expressed by the participants that is freely available, is known, and is transferable. It is knowledge that can be learned from textbooks or from traditional teaching. This form of general widely available knowledge can be explored as a way to gather new knowledge, and then that same newly acquired (explored) knowledge can be exploited and researched so as to

maximize its usefulness (Levinthal & March, 1993). However, in the attempt to find out what these participant teachers really believed and felt about the research problem, only the qualitative approach could be used to examine tacit knowledge as it is more difficult to access and transfer.

The exploitation of general knowledge may be considered as finite in design thereby possessing only a limited lifespan. Exploring tacit knowledge is more long term in design and can be stored as experiences, intuition, and even insight. Tacit knowledge is knowledge gained via experiences and is often expressed intuitively and instinctively. Such tacit knowledge can never be subjected to thematical analysis using the quantitative approach as it is almost impossible to statistically quantify instinct, sixth sense, insight, and intuition (Gonzalez & de Melo, 2018). Such tacit knowledge was elicited from the teacher participants and used to inform this study, as I was a research tool, and could penetrate deeper into the participant's instinctive and/or intuitive awareness of issues pertaining to the delivery of the curriculum; such served to translate theories into real-life interventions within the classroom domain (Levinthal & March, 1993).

Data Collection Instrument and Source

With emerging technology, data collection through online semistructured interviews is becoming increasingly flexible, which allows the researcher more options than the traditional physical (offline) face-to-face model. I began by contacting potential participants who fitted the sampling criteria by sending an invitation to participate via email (see Appendix C). Once participants agreed to participate and completed the

consent form, semistructured interviews were conducted using a virtual platform, such as Zoom, to adhere to and practice safe social distancing. The semistructured interviews occurred face-to-face within a virtual format, each recorded for later review and were transcribed by myself. The semistructured interview format was chosen as the main instrument of data collection because of its ability to extract information related to the experiences and contextual scenarios of the teachers recruited for the study. The sample for the proposed study were Grade 6 teachers based in a Southern Ontario school district. Purposive sampling was used for the recruitment strategy because of the proposed study's requirement for a non-randomized sample.

Sufficiency of Data Collection

Participants were selected based on the purposeful sampling criteria and interviewed until data saturation was reached. The sampling criteria for the purposive sampling strategy consisted of Grade 6 math teachers based in Southern Ontario, Canada with at least 3 to 5 years of experience. The semistructured interviews focused on exploring participants' lived experiences through their descriptions and stories. I developed the interview questions using concepts from the conceptual framework (Daffern et al., 2020). Elements of explicit instructions were incorporated to guide the interview questions to explore mathematics teachers' perceptions of the challenges and support needed to teach mathematics to Grade 6 students in preparation for the EQAO. Each interview question was developed to gain a deeper understanding of their experiences with implementing instructional strategies that teachers were using to prepare

students for the EQAO as well as the resources needed to support the students' needs as best they could to help improve student performance in these standardized exams. As the interview progressed, I probed the interviewees for deeper and more tacit answers and explanations as and when further clarification was needed. Data was deemed sufficient when saturation was reached, which occurred when no new information was gleaned from the semistructured interviews. Interview questions were used to process and answer both RQs.

Process for Collecting and Recording Data

The semistructured interviews were conducted soon after the IRB was granted. Participants were allowed to schedule their interviews at a convenient time using Sign-Up Genius which is an online tool that allows individuals to choose a time slot based on their availability. Each participant was able to choose a convenient date and time outside of their contractual work hours by clicking on a link sent through email with both virtual and face-to-face options available. I recorded the semistructured interviews face to face for the purposes of a later review. Semistructured interviews lasted approximately 30–45 min. I reflected on the responses by listening to the audio-recorded interview sessions; such were recorded using the facility offered by the online platform Zoom. The recording will be kept on my computer and will be password protected for a period of 5 years upon which the recording will be deleted permanently. I took notes using a research journal following each interview to gain an in-depth understanding of the teachers' experiences. Afterward, I analyzed the field notes for data on codes and emerging themes.

System for Keeping Track of Data

Research logs and reflective journals were used throughout the data collection process to keep track of the data. I took detailed field notes during semistructured interviews with each participant to aid in understanding the emerging themes. Detailed notes and summaries of the participant's responses were taken in a research journal. These notes and digital recordings will be locked in a filing cabinet in my home office. Next, I used the three-step data analysis process to code the interview. The data was analyzed to find significant patterns in the responses that linked to the RQs. Categories were then created for the codes as a way to narrow down and identify the patterns. Once patterns were identified, themes that explain similarities or differences across codes were created to develop the meaning of the patterns found in the data.

Procedures for Gaining Access to Participants

To gain access to the participants, I first gained permission from the relevant school Board. I contacted the school boards in the Ontario area. Next, the Southern Ontario authority requested information on the study's purpose, participants, RQs, research design, and the study's benefit to Southern Ontario (Lauterbach, 2018). Upon approval from the responsible boards, I sent an email invitation to potential participants who met the criteria to participate, and this was followed by a consent form. This documentation explained in detail the nature of the study and as noted earlier, reminded participants that their participation was voluntary, could be terminated at any time, and without any stated reason. Interviews began once consent was given.

My Role as the Researcher

The role of the researcher in qualitative studies is crucial, as the researcher collects and analyzes data. Therefore, my role in this study was to collect and analyze data. For the study, I collected, coded, and analyzed the data from interviews to reveal emerging themes. The interview questions were formulated to examine teachers' perceptions of the challenges and support needed to teach mathematics to Grade 6 students in preparation for the EQAO. In my current role as an educational consultant, I do not hold a supervisory position over anyone employed by the schools within Southern Ontario; therefore, the participants were assured that nothing said in the interviews would be punitive to harm them or their position with the school district, and that all disclosure was anonymous and absent of any personal identification.

I have been in the field of education since 1997 and has served as a mathematics teacher in Southern Ontario from 2008-2013. Having served as a mathematics teacher, I have gained valuable knowledge of the curriculum, instruction, and assessments. Over the past 13 years, I have taught students in Grades Kindergarten to 9, including advanced and gifted classes. Additionally, I have served with various committees to improve the school, such as the Teacher Support and Mentor team, Climate and Culture committee, and the Literacy Initiative Committee. I have experiences teaching and preparing students for success on provincial standardized assessments.

The study has a degree of possible bias because both the participants and myself work for the same schools within Southern Ontario, and within the same or similar roles.

I may have some opinions and insight regarding the topic and RQs; however, to maintain the integrity of the study, I remained unbiased by avoiding the use of leading questions. Such questions are designed to influence and guide the response thereby creating bias, therefore the interview questions did not contain any rhetoric or words designed to influence thereby enabling participants to offer any feedback of their choosing regardless of any of my bias or preferences. While conducting interviews, I reassured the participants that their responses would be used solely for this study and that all responses were confidential. Additionally, I was careful to respect the time and well-being of the participants.

Data Analysis

After the semistructured interviews were completed, the data was analyzed to understand the teachers' perceptions of the challenges and support needed to teach mathematics to Grade 6 students for the EQAO. I carefully read through the semistructured interview transcripts and took detailed notes and summaries of the participants' responses in a research journal. Next, I used the three-step data analysis process to code the interviews. Basic coding is the act of identifying meaning within the data and labeling the segments of meaning with a word or short phrase, this is known as code (Daffern et al., 2020). These codes were derived from the frequent responses of the participants to identify patterns and make connections. Inductive coding allows the researcher to explore related ideas and possibly lead to a solution to the problem (Daffern et al., 2020). Codes were then categorized. To remain unbiased and avoid inadvertently

integrating my ideas and prior knowledge of the issue, the codes would mirror the data to ensure accuracy and credibility. This approach is called inductive coding. This type of data coding allows the inductive researcher to remain open-minded to offer credible interpretations of the raw data. According to Daffern et al. (2020), researchers and scientists suggested that five to seven themes are sufficient to avoid duplication. Therefore, similar words and phrases were combined and analyzed for in-depth meaning. Thus, themes were created from the coded data and used to better understand teachers' experiences of the reasons for the challenges and support needed to teach mathematics to Grade 6 students.

Evidence of Quality and Procedures

To ensure credibility, I asked the participants to complete member checking. During member checking, participants read the transcripts of their interviews and reviewed the codes that emerged from the interviews to determine the accuracy of my interpretations (Lauterbach, 2018). Member checking is known to be the most important way to strengthen a study's credibility (Lauterbach, 2018). During member checking after the interviews, participants were offered the opportunity to determine whether their original words during the interview aligned with what they intended to convey. Participants were given the preliminary findings to eliminate the likelihood of data misinterpretation. I provided the participants with a two-page summary of the findings to check for accuracy. In addition, I allowed the research participants to review and examine findings to ensure accuracy and credibility.

Procedures for Dealing With Discrepant Cases

Discrepant data is data that varies from most findings in a study. Discrepancies that emerged during data analysis that contradicted the perceptions and experiences of most participants, were carefully reviewed and analyzed to gain a deeper understanding of the data. The dynamics around varying positions or discrepancies were regarded as healthy. In this study, a discrepancy can be a differing viewpoint or an isolated theme (Creswell & Creswell, 2017). I carefully noted the area of difference and analyzed the context and situation to determine why the discrepancy emerged.

Owing to these developments and recent research into the effects of standardized assessments on students' academic achievements, the solution-based approach in learning has grounded the applications of mathematics in other areas. Therefore, Ontario has tried to alleviate the situation by changing the mathematics curriculum, especially for Grade 6 students (Parekh et al., 2021). The new curriculum and new assessment protocols were scheduled to take effect in 2020. However, the outbreak of the Coronavirus pandemic ultimately delayed the implementation process of the new math curriculum in 2020 and 2021 (Carver-Thomas et al., 2022). Even so, the policies that had been set forth before the pandemic were scheduled to take effect in 2022, to improve the quality of education and the ability of students to relate mathematics to real-life applications throughout the elementary and secondary schools in the province.

In summary, the qualitative methodology allowed me to perform as a part of the primary research process and conduct the semistructured interviews with 13 Grade 6

math teachers for the purpose of eliciting and using more efficiently their tacit knowledge that was derived from their own personalized opinions and experiences. The research tools and data processing were in the form of interview transcripts, open coding, and thematic analysis; such facilitated my ability to subjectively analyze the interview data. It was anticipated that the results of the interviews with the Grade 6 math teachers would create the academic environment that may serve to lead positive social change. Such a change can be manifest via an improvement in how Grade 6 math teachers delivered their mathematical instructions in this post-pandemic period that in turn can positively impact the student learning process.

Data Analysis Results

This qualitative study sought to investigate the local problem in Southern Ontario primary schools in which there had been a significant decline in math scores and challenged how math teachers have utilized the new math curriculum. The study investigated teachers' experiences of their successes, challenges, and the support needed to teach mathematics to Grade 6 students in Southern Ontario primary schools. This study is important because Grade 6 Ontario certified teachers have a stake in finding out how their students may succeed in math in the face of lowering scores using a new curriculum. This was supported by the fact that researchers have established that mathematics performance for Grade 6 students in Southern Ontario was relatively low compared to student performance in other subjects in the same grade, despite their scores increasing by 4% (Inglis & Miller, 2011). To stem this, Ontario had tried different measures, like the

refinement of EQAO, in reforming the math curriculum on a province-wide level (Daffern et al., 2020). The perceptions of teachers towards success, measures, and setbacks regarding math were crucial to this study and will provide administrators with a path forward. Grade 6 students are still at their primordial stages in education, and any interference with their learning process might lead to unnecessary distractions, which can derail their learning progress (Daffern et al., 2020). Two RQs were explored in this study:

RQ1. What are the perceptions of Grade 6 teachers of teaching math with the new curriculum to prepare students for the Grade 6 exam in South Ontario elementary schools?

RQ2. What support and resources do Grade 6 math teachers need to teach math more effectively in their classrooms?

This section details the purpose of this study, the RQs, study setting, procedures of data collection, data analysis, results, evidence of trustworthiness, and summary. Coding inductively is a preferred method of creating original codes from raw data the first time the researcher reviews the data (Saldaña, 2021). Inductive coding as a ground up approach process was used in this study to develop codes from data without any preconceive notions about the emergence of codes that may lead to forcing the data into some kind of pre-existing codes (Miles et.al, 2020). After all semistructured interviews were completed and transcribed verbatim, transcripts were read and thoroughly reviewed repeatedly for full understanding of participants' narratives.

The first phase of data analyses comprised attaching labels to words, phrases, sentences, and short sequence of texts based on responses to each of the interview questions. In Vivo codes were used to preserve the data in participants' original language (Saldaña, 2021), while process codes were used to convey some actions in the data as explored in this initial coding phase of data analysis. At the completion of the first phase, numerous and specific codes were generated.

The second phase of data analyses involved grouping the portions of coded segments into categories. Coded data that appeared related or similar through engaging closely with primary data (Locke et al., 2022) were codified to form categories as a result of their relationship in generating related ideas and concepts. The outcome in this phase produced a reduction of the many pieces of coded data from the initial coding phase.

The third phase involved a synthesis of codes and categories into comprehensive themes by integrating words or phrases between categories that logically established their connection (Saldana, 2021). The categories gave rise to carefully constructed themes that were repeatedly revised based on the whole data. Thematic analysis was discussed based on all the themes derived from the overall data to complete the process.

The initial coding generated many codes, which I grouped into categories (see Appendices D and E). All the categories were meticulously and repeatedly reviewed based on the two RQs and the conceptual framework for this study. At the completion of this review and recategorization of the coded data, a total of five themes emerged from the different categories (see Table 1). The similarities and dissimilarities with other codes

were examined, and finally in the third level of analysis, the second order codes were aggregated into conceptual codes (Mishra & Dey, 2022) necessary for the themes to emerge. The five themes are related to the two following RQs:

RQ1: What are the perceptions of Grade 6 teachers of teaching math with the new curriculum to prepare students for the Grade 6 exam in South Ontario elementary schools?

RQ2: What support and resources do Grade 6 math teachers need to teach math more effectively in their classrooms?

Table 1

Five Themes Derived From Categories Connected to Research Questions 1 and 2

Code extracted from excerpts	Category	Theme
There are challenges that teachers encounter with students that cannot solve certain questions because they do not have a good understanding of the basics.	Challenges of new curriculum	Teacher training in the new curriculum help meet new curriculum challenges relating to basic learning strategies.
Mathematics is considered a foundational subject that provides essential skills and knowledge for various aspects of life. It helps students develop critical thinking, problem-solving, and logical reasoning abilities that are valuable in everyday situations and future careers.	Teaching confidence and teaching essential skills	Teacher training in the new curriculum to develop confidence teaching essential skills and to help students develop critical thinking, problem-solving, and logical reasoning abilities.
Many teachers are not fully confident to answer EQAO math questions because math is not their major subject and help from additional resources are needed even to answer questions in EQAO math exam questions.	EQAO math exam preparation	Teacher training in new curriculum EQAO math exam preparation help students improve EQAO scores.
To play the role of a good elementary school teacher, participants must be professionally certified. An elementary certified teacher must have good prior teaching experiences.	Professional development of teachers	Teacher training and professional certification of teachers coupled to more experiences help them to better educate students.
A good teacher should be able to educate and nurture young learners from kindergarten to Grade 8.		
Self-efficacy is vital for the development of students' cognitive skills because a teacher is expected to provide a supportive, safe and encouraging learning environment, where students feel comfortable and respected. This affords the students the opportunities to ask questions, seek help, and take risks in their learning.	Teacher-Student relationship	Teacher training in developing relationships and teaching self-efficacy will help students develop math skills.

Discrepant Cases

Outliers or data that were not in conformity with other data were minimal but included those from teachers who were not confident in their ability to teach mathematics, yet enough to be appropriately placed in the proper settings within the research objective. These were not expected to cut across the entire data set but were determined through carefully seeking for contradictory themes. The qualities of these discrepant cases were factored into the analysis by categorizing them with those related to pedagogical differences in subjects of teachers' specialization. During member checking, the participants confirmed the accuracy of the narratives to reflect the analysis of their original inputs.

Results

The 13 Grade 6 school math teachers' perceptions of differentiating instruction for students of trauma were explored through 12 interview questions. Through a thematic data analysis, five themes emerged. These themes were identified through merging of related categories developed from codes using the three-step data analysis process. The following two RQs informed the identification of the five emergent themes:

RQ1: What are the perceptions of Grade 6 teachers of teaching math with the new curriculum to prepare students for the Grade 6 exam in South Ontario elementary schools?

RQ2: What support and resources do Grade 6 math teachers need to teach math more effectively in their classrooms? The first research question was addressed by the

participants' answers to Interview Questions 1–11 (see Appendix B). The second RQ was addressed by the participants' answering Interview Questions 1, 3, 4, 6, 7, 9, 10, 11, and 12 (see Appendix B). Data analysis yielded five themes, which revealed that resources, knowledge, and confidence are essential for teaching math using the new curriculum to prepare students for the Grade 6 exam in South Ontario elementary schools. The themes were as follows:

- Teacher training in the new curriculum helps meet new curriculum challenges relating to basic learning strategies.
- Teacher training in the new curriculum to provide resources and develop confidence in themselves and students.
- Teacher training in the new curriculum EQAO math exam preparation helps students improve EQAO scores.
- Teacher training and professional certification of teachers coupled to more experiences helps them to better educate students.
- Teacher training in developing relationships and teaching self-efficacy helps students develop math skills.

Theme 1: Benefits of Teacher Training Meeting Challenges in the New Curriculum Related to Basic Learning Strategies

Feedback from all 13 participants indicated that teacher training is required to understand the new curriculum so that they can learn basic teaching and learning strategies, and transfer their knowledge to students. This is especially true teaching math

from the new curriculum. They also believed that if the new curriculum content was strategically taught to the students and more weighted towards math, EQAO math exams scores would improve, as TA1 said, “the new curriculum places a strong focus on math which I feel is very important. I think the new curriculum will positively affect students’ performance.” TA13 went even further by claiming that, “in Ontario, the curriculum for junior schools (Grades 4 to 6) is designed to provide a framework for teaching and learning in various subjects, including mathematics”, thereby inferring that teacher training can help teachers use newly acquired basic teaching skills and strategies to help students not only with math but also other subjects.

TA2 and TA8 agreed that teaching the new curriculum correctly would help teachers to teach their students how to focus “on more than one idea/expectation (TA2), math/science together or literacy and math together (TA8)”. TA3 supported the idea of the curriculum’s multi-functionality, “the new curriculum is putting more emphasis on the two most important areas: writing and math”. This participant later went on to add, “yes, I think the implementation of financial literacy, coding, budgeting, savings, debt, and price comparisons are so important for students to be successful in their daily lives”, inferring that the acquisition of math-related curriculum content was not only academically beneficial and also socially beneficial in terms of lifestyle.

Training in the new curriculum should include computer science with a view to enhance later vocational prospects, as according to TA4, “I like how they are emphasizing computer studies more [as] this helps students these days because everything seems to be

done on the web and computer skills are very important in many jobs of the present and future". TA5 took a slightly different view of purpose of the new curriculum and was therefore more aligned with TA3's view believing that training on the new curriculum was helpful as it focused more on "real life situations such as financial literacy as well as 21st-century skills, especially when teaching coding". TA6 and TA9 did not seemed to have any specific critique of the new Canadian Grade 6 curriculum claiming ignorance, TA6 claiming, "I am not very familiar with the new curriculum as I have taught mainly overseas," and (TA6) noted "I am not especially familiar with the new curriculum," albeit positively conceding that "I do know that coding and financial/emotional literacy are a new component that will be beneficial to student learning and future success". TA11 viewed the new curriculum in terms of social and emotional benefits noting, "the new curriculum focuses on the social emotional aspect of children as well as the integration of students' traditions and backgrounds to form a solid foundation of math through the lens of different cultures and backgrounds."

However, the participant (TA11) did not view the new curriculum as totally beneficial by including the caveat, "I think the new curriculum will influence the students' performance in ways that can be positive and negative". The teacher went on to claim that post training, while the teachers could then teach the new curriculum so that students would "be able to relate math to real life based on the fact that it would be introduced to them in ways relatable to themselves and their identity", there may be issues if there is less focus on repetitive-based practice as a learning mechanism. TA11 claimed that students can have a

careless attitude towards solving math problems using mental math and algebraic concepts given the less emphasis on repeated practice and more emphasize on SEL [social and emotional learning] and literacy through math". TA7 argued, "I think the new curriculum is going back to the basics. Rote memorization "recall" of multiplication for example is something that was considered old times and now it's being brought back with this new curriculum", inferring that revisiting traditional learning strategies was a positive aspect of the new curriculum, then adding, "I think students will benefit and student performance will increase with the new curriculum. I think feelings of confusion and frustration with math will transform to feelings of perseverance and confidence." TA10 optimistically added, "I like how we connect math more to real-life experiences rather than just formulas".

Overall, despite a little hesitancy or misgivings from three of the participants, it would appear that all of the 13 participants viewed teacher training of the new curriculum as potentially beneficial to both teachers and students and that it at least was a step in the right direction. Evidence suggests that the participants not only viewed the new curriculum in terms of how well they understood it and could teach it, but also from the students' point of view in terms of how they would have experiences learning from this new curriculum. It would appear that despite three negative personal preferences, 10 of the participants recognized that the students could not do without the new curriculum as they would benefit from better basic learning strategies relating to both academic studies and real-life experiences.

Theme 2: Teacher Training as a Means of Developing Confidence and Resources in Teachers and Students

There was significant evidence from the teacher participant responses indicating that teacher training pertaining to the new curriculum would serve to increase levels of confidence and develop more resources in both provider and recipient stakeholders. It appeared that while each of the 13 participants had some form of reservations about their preparedness to teach the new curriculum due to the challenges of meeting all the curriculum requirements and their perceived lack of expertise, the participants offered some suggestions as follows. According to TA5, "the new curriculum definitely is more engaging and teaches 21st-century skills which speaks the language of nowadays students [most recent generation]". However, this claim was countered, "but there are some challenges in implementing this curriculum which is the availability of technology in classrooms and therefore a major obstacle toward teaching these skills" (TA5).

This lack of technology in classrooms poses limitation on teacher training if there are insufficient resources for teachers and students to exploit the training. While TA13 was mostly optimistic about the new curriculum, the teacher viewed the need for resources and confidence differently by noting, "the impact of the new curriculum on student performance can vary depending on several factors, including the quality of implementation, teacher proficiency, and student engagement", inferring that the deficiencies or limitations lay in the lack of efficiency in practices and applications rather than a lack of material resources. TA12 conceded, "I do not have the confidence to teach a

math class to Grade 6. I would have to study the material and I still would feel as though I am not equipped with the right skills to teach it." When talking about the benefits of training, TA12 inferred that confidence derived from teacher training would translate into better tuition by suggesting that "the explaining of the lesson in itself would be better as a result of the confidence the teacher has".

TA10 also lacked confidence teaching math from the new curriculum, conceding, "my level of confidence teaching mathematics to Grade 6 students is not strong". Moreover, TA9 also admitted the lack of confidence, claiming that due to "the lack of experiences teaching in the intermediate division, I feel that I would need some time to review and reflect on the Grade 6 math curriculum and the ways to engage students in meaningful math learning". However, this concession was tempered by a more positive and optimistic view that, "I think I might enjoy teaching at this grade level, but I don't necessarily feel confident because I am not completely aware of the expectations", thereby suggesting that training and curriculum expectations need to be made available to these Grade 6 teachers. Surprisingly, TA11 was very positive about teaching math from the new curriculum mentioning, "I believe that I would be very confident teaching mathematics to Grade 6 students given that I scored very well on my math proficiency test".

Based on the participants' responses, it would appear that while the new curriculum was relatively positively received by some participants as it is more constructed to meet the demand for Grade 6 students to learn 21st-century skills, there was a shortfall in appropriate technological resources, and an even greater shortfall in teacher confidence.

Teacher training should address this lack of resources and self-confidence so that these Grade 6 teachers can teach new technology-based skills to their students especially those skills associated with learning math. It would also seem that teachers need tuition and training in how to proficiently deliver the math component of the curriculum content.

Theme 3: Teacher Training as a Means of Helping Students to Improve EQAO Scores

All the 13 participants agreed that there had been declining math performance in the EQAO exams amongst elementary school students in Southern Ontario education district over the past 5 years. While some teacher participants claimed direct experiences on the issue, a few of the participants revealed that they were not told of this negative development because they were not directly involved in teaching the subject, and others maintained that they got to know only during staff meetings. For example, TA1 claimed, “in the past 5 years, I have noticed that math scores for the EQAO have been declining”, thereby indicating a downward trajectory of Grade 6 EQAO scores in math.

TA10 offered an example pertaining to ignorance about these declining scores by admitting, “No, I am not aware of the Grade 6 EQAO scores in math” yet contradicted this statement in part by mentioning that, “I know that they [EQAO math scores] have been mentioned at staff meetings as a general discussion”. TA12 claimed, “I have noticed that over the years of the pandemic, results relatively stayed the same for reading and writing however they have decreased for math”, and TA13 viewed declining EQAO math scores as a “menace”, caused by either the students’ lack of interest or understanding.

The participant went on to state, “most of the students find Mathematics tricky as compared to other subjects, and their results clearly show that they find issue in this certain subject only,” thereby inferring that the primary issue with the new curriculum pertained to teaching and learning math.

TA2 corroborated the decline in math scores noting, “I know that there has been a decline in student performance in math for the past 5 years. TA2 further offered a measure of causation claiming “students cannot complete basic math skills and that there is a lot of anxiety and negative thoughts around learning math”; such implying that there was a negative mindset towards math within the body of students. TA3 believed that teacher training should include the element of specialization and validating this belief by stating, “I feel that in Grade 6 students should have specialized teachers. Instead of one homeroom teacher teaching English, math and science, they should have one teacher teaching math with a math degree”. The need for teacher training in new curriculum EQAO math exam preparation by existing lack of confidence was obvious as TA 11 conceded, “I unfortunately do not have time to complete a test for this interview”, implying a lack of confidence in teaching math.

The need for teacher training to help teachers become acquainted with the new curriculum EQAO math exam preparation becomes clear due to the obvious lack of confidence and even admitted incompetency. For example, TA6 conceded, “No, I think I would need to review elementary school math before even trying it”. Similarly, TA8 admitted, “as I have been teaching kindergarten for most of my teaching career, I question

my ability to remember how to properly answer a Grade 6 math question. I learned math by memorization when I was in elementary school". Again, TA9 said "I'd prefer not to…I do not teach at this level at the moment, so I feel like this task would be out of my comfort zone".

These admissions clearly indicate a serious lack of confidence or competence to teach Grade 6 math by these participants. However, this shortfall of confidence and competency teaching Grade 6 math was not characteristic of all participants as TA7 stated, "Yes, I am comfortable to answer sample questions from the Grade 6 EQAO test because I have a good background in math". It would seem that TA7 was the exception albeit TA1 claimed, "I taught math for 3 years since I started working at the school. I also taught other subjects including math for Grades 3–5 students". However, this does not validate any real competency at math at Grade 6 level. Other participants indicated issues with their capacity to competently teach new curriculum EQAO math exam preparation. For example, TA4 admitted, "I am not as confident because times have changes and the methods of teaching math have also changed. I avoid teaching math, because it is difficult, and it is not a subject that I am strong in". TA5 conceded, "I only had the opportunity to teach Grade 6 during one of my teaching practicums for a month". Similarly, TA8 pointed out, "I have not taught Grade 6. My last experience teaching Grade 6 was when I was in teacher's college almost 20 years ago".

These examples serve to indicate that one of the main reasons for the decline in EQAO math exam performance was brought to the fore by this theme. Of the 13

participants included in this study, only two (TA5 and TA7) stated that they were capable of teaching math to students between Grades 3 and 8. Yet, none of these has consistently taught math in Grade 6 over a reasonable period of time (5+ years). This raises the question concerning why are Grade 6 students expected to achieve good exams scores in math when math tuition is clearly substandard and teacher competency teaching math is questionable. Overall, there seemed to be a general consensus between all 13 participants that there had been an ongoing attenuation in the math scores in the EQAO exams amongst Grade 6 elementary school students over a significant number of years, and it was either stated or implied that such a downward trajectory was unsustainable.

Theme 4: Positive Implications of Teacher Training, Professional Certification, and Experiences for Educational Practice

The fourth theme that emerged was the foundation of education pedagogy in which the student is the central focus. The teacher's role includes their responsibility to create an excellent classroom climate to facilitate trust and relationship building. Cui (2022) found that the presence of positive relationships between teachers and their students can help avoid emotional fatigue and serve as a source of well-being for both teachers and learners. To be able to create an appropriate learning environment, a teacher must be professionally qualified and certified. The teacher must also have the requisite experiences to teach. This theme was used to test the qualification and suitability of the participants in this study. While not directly referring to teaching math to Grade 6

students, many participants offered the following examples pertaining to teacher training, the professional certification of teachers, and adequate relevant experiences.

TA1 claimed, “I am certified to teach all subjects from K [kindergarten] to 6 with years of experiences. I taught Grades 3, 4, and 5 during my time working at this elementary school”, suggesting a reasonable level of competency in the curriculum. TA2 also laid claim to some form of professional certification by stating, “I have an undergraduate degree in psychology, with interest in child psychology. I have spent most of my career teaching kindergarten. I have also taught Grade 2”. However, is teaching kindergarten and a bachelor degree in psychology sufficient certification to teach new curriculum math to Grade 6 students? TA3 commented that, “I am a certified teacher in Ontario. I am a primary junior level teacher. I teach from kindergarten to Grade 6. I took a focus on urban education during my teachers’ college”. Again, there is no clear indication what TA3 is professionally certified to teach.

TA4 sounds more promising by revealing, “I have taught all grades, and I was the English teacher for Grades 1–8 at a private school”, yet there is no indication in this example of the qualification to teach math to Grade 6 students. TA5 indicated a significant level of experiences by pointing out, “I have been a teacher with the Greater Essex County District Board since 2016 which is a total of 7 years teaching experiences”, inferring some measure of competency albeit no mention of certification. TA6 was very promising by commenting, “I am an Ontario certified teacher. I am qualified to teach Primary and Junior which is from kindergarten to Grade 6. I have 7 years teaching experiences. I taught Grades

kindergarten and 1". While the certification of TA6 seems valid and relevant, there is the absence of experiences teaching at Grade 6 level.

As observed in Themes 1–3, TA7 alone seems to possess both appropriate certification and experiences to teach at Grade 6 level including math. Although the teacher does have 11 years of experiences teaching at elementary level, TA7 does possess some notable certification as stated, "I am an OCT (Ontario Certified Teacher) teacher for P/J/I divisions. I am certified to teach Grades K–10. I have an ABQ (Additional Basic Qualification) course in family studies and am a specialist in kindergarten." Despite the relatively relevant certification and experiences, TA7 admitted, "I had taught mostly in kindergarten and Grade 2 classes. I have experiences teaching prep coverage, library, SK/1 combined, and literacy intervention", suggesting that teacher training would be a useful instrument to ensure that this teacher leverages and enhances existing levels of certification, experiences, and competency.

Another participant TA8 claimed "I have been teaching with the private-school board for 15 years", implying a significant level of teaching experiences. TA8 further articulated, "I am a certified Ontario teacher qualified to teach primary/junior [Grades Kindergarten through 6]. I have an undergraduate degree in psychology, with an interest in child psychology". While this certification sounds possibly adequate, as noted in Theme 3, TA8 also conceded, "my last experience teaching Grade 6 was when I was in teacher's college almost 20 years ago", indicating that experiences did not match certification to teach at Grade 6 level. TA9 claimed, "I have been teaching for 13 years, 9 of those [years]

have been as a full-time contract teacher. I have taught kindergarten, Grade 1, and Grade 3", such with no mention of teaching higher than Grade 3 or teaching math at Grade 6 level. TA10 noted, "I have been teaching with the private board for 7 years", primarily as a supply or contract teacher, stating, "as a supply teacher, I taught from kindergarten to Grade 8", this while not mentioning specific contract work although TA10 noted teaching "Grade 6 for 5 months".

TA11 claimed, "I am a PJ OCT certified teacher. I have 3 years of experiences teaching the Ontario curriculum so far…I taught Grade 2 for 2 years and have been in various grade levels as an OT", indicating some certification and experiences, yet no evidence of direct certification or experiences teaching math or at Grade 6 level. TA12 was more promising, "I have been teaching since 2006. I taught abroad for 9 years…I also taught Grade 9 for 1 year. During the years of substituting, I taught all grades from Grade 1 to 8", thereby indicating substantial teaching experiences including Grade 6, albeit no mention of competency in Grade 6 new curriculum-based math. TA13 noted, "As an elementary certified teacher, I have experiences of 8 years…[As] an elementary certified teacher in Ontario I was responsible for educating and nurturing young learners typically ranging from kindergarten to Grade 8, depending on the school structure".

From these narratives of the 13 teacher participants included in the study, it was evident that all the participants involved in this study to a lesser or greater extent were qualified, experienced, and certified to be elementary school teachers in the Southern Ontario education district of Canada. However, there is little evidence to support their

competency to teach new curriculum math to Grade 6 students, thereby highlighting the need for further training to help them deliver relevant EQAO-based math tuition to these Grade 6 students to reverse declining EQAO scores.

Theme 5: Relationship of Teacher Training on Developing Relationships and Teaching Self-Efficacy to Improved Math Skills Among Students

The fifth theme that emerged was attributed to the Grade 6 declining EQAO scores pertains to the likelihood of the attenuation of self-efficacy in Grade 6 students. Self-efficacy is vital for the development of students' cognitive skills because a teacher is expected to provide a supportive, safe, and encouraging learning environment, in which students feel comfortable and respected. This affords the students the opportunities to ask questions, seek help, and take experimental risks in their learning to test new ideas and research. A good teacher-students relationship guarantees self-efficacy. This theme was developed to test the effect of self-efficacy on students' understanding especially as it relates to the new curriculum-based math. There were numerous examples of the value teachers attributed to self-efficacy in Grade 6 students.

TA1 noted, "I believe that teacher self-efficacy plays a crucial role in improving EQAO Grade 6 math scores". TA10 corroborated this statement by adding, "Yes, I strongly believe that teacher self-efficacy plays a critical role in improving EQAO scores. Teachers who are confident in teaching math at the Grade 6 level will build that confidence in his/her students". TA11 agreed and stated, "Yes, I believe that when a teacher shows trust and appreciation to the effort of the student, it can make a difference in his/her

performance". TA12 asserted, "Absolutely. Being confident in math will help teachers in many ways. The explaining of the lesson in itself would be better as a result of the confidence the teacher has". TA13 also validated the concept of students' confidence and an appropriate learning setting, by adding, "Yes, this ability is vital for the development of students' cognitive skills, as a teacher provides a supportive, safe, and encouraging learning environment". TA13 also suggested, "teachers who actively listen to students, provide clear explanations, and offer constructive feedback, can help students understand concepts better", such indicating a warm and constructive learning environment.

TA2 pointed to a correlation between teacher confidence and improved EQAO scores. "Teacher self-efficacy plays a crucial role in improving EQAO scores for students for many reasons. TA8 agreed, "Teacher self-efficacy plays a crucial role in improving EQAO scores. Self-efficacy reflects a teacher's confidence in the ability to exert control and knowledge. Students can feel whether a teacher is confident in what they are teaching", implying that students can intuitively measure teachers' confidence levels. TA5 pointed to an association between self-efficacy in both teachers and students via the mutual demonstration of confidence by stating, "Students feel more confident learning the material when the teacher is more confident teaching the material". TA3 expanded the concept of self-efficacy in teachers as a strategic mechanism to improve the delivery of learning by claiming, "Yes, like I stated earlier, teachers who know their craft and have one focus especially for the higher grades are more likely to know more strategies to teach students effectively".

TA6 inferred that teacher self-efficacy directly relates to improved student performance, “Yes definitely. If a teacher is confident and has good contend knowledge the students will most likely be engaged in the lesson and will be motivated to do better”. TA7 drew attention to the classroom ‘atmosphere/tone’ by noting, “teacher-student behaviour is very important during classroom management and student engagement, and it sets the tone for true teaching and learning”. Teacher self-efficacy is a relationship structured approach to what TA8 defines as the, “social-emotional part of the curriculum allows teachers to have discussions with their students about what they feel and why”. TA9 viewed an outcome of teacher self-efficacy as adapting lesson content to match and align with a student’s capacity to learn, stating, “we have to recognize what our goal is, break down the problem to its simplest form, and proceed in a way and at a speed that is conducive to the age and development of a child”.

Discrepant Cases

There was some data that was unusual, slightly deviant, or different from the other data, such as the one divergent view noted in the Data Analysis Results subsection but the data did not indicate any modification of the resultant themes that emerged from the interviews. It is noted that the discrepant cases did not warrant the allocation of any more themes to inform the study as the existing themes were considered sufficient.

Evidence of Quality

As discussed by Adler (2022), every research must be trustworthy. Multiple strategies exist to establish trustworthiness of a research (Burkholder et al., 2020). To

validate this study, credibility, transferability, dependability, and confirmability are concepts that are depended on for validity. Further, by deliberately seeking deviant cases or nonconforming data, the trustworthiness of this research was established.

Credibility

Credibility was established through member checking by involving participants in verifying the transcriptions and some interpretations of the themes after data analysis at the completion of all interviews. McKim (2023) emphasized member checking as a technique to establish trustworthiness and validity in research. All participants had answered all the interview questions before conducting the actual interview to avoid any bias that could potentially influence participants' opinion. The participants also verified the data and gave feedback about the accuracy of their narratives. I also engaged in reflexivity by reflecting and briefly documenting in journals my personal biases as the data was being analyzed.

Transferability

Although, in qualitative research, the aim is not to generalize from sample to a population (Burkholder et al., 2020), however, it is important that the essence and findings must be relevant beyond the study's limits. The reader reserves the responsibility to transfer the information derived from the study. In this study, efforts were made to provide ample setting, design methods, study duration, and purpose for a reader to make knowledgeable decision regarding the results of this study. Rich and abundant descriptions of participants' narratives were also included to buttress the themes.

Dependability

As discussed by Burkholder et al. (2020), dependability denotes consistency in data collection, analysis, and reporting. There were no methodology shifts to be communicated in this study as all phases of data collection and analysis outlined in Section 3 progressed as planned. Furthermore, giving an opportunity for the 13 study participants to review and verify the accuracy of their interview transcripts and summary, not only assured dependability and accuracy, but also helped strengthen the study. Engagement in reflexive description of my engagement in this study decisions further addressed the issue of dependability.

Confirmability

Confirmability allows readers to recognize participants' experiences detailed within the study, establishing confidence from the participants' perspective to quickly recognize their shared experiences with me as the researcher (Nieminen & Suikkala, 2022). In this study, all the results and findings were based on participants' responses and not on any personal bias or interests. My bias did not disrupt the interpretation of participants' narratives to favor preconceived opinion or assumption. Therefore, it is possible that other researchers will most likely derive the same conclusions or themes from all the analyzed data.

Summary of Outcomes

The first RQ asked about the perceptions of Grade 6 teachers concerning teaching math with the new curriculum to prepare students for the Grade 6 exam in South Ontario

elementary schools. Based on the thematic analysis, all the teacher participants agreed that there is a need for improvement in math performance by students taking the EQAO exams. This was based on their observance of a general downward trend in past exam performance over the past 5 years. There was also a consensus amongst the teacher participants that a poor math background from previous classes and some form of phobia about the subject of math from both some teachers and students constituted the major cause of the declining performance in math Southern Ontario elementary school EQAO examinations.

Despite the noted consensus, opinions pertaining to the reasons for such a decline in performance varied. Some teachers pointed out that they were not grounded enough in the teaching of math, while other teachers claimed that most students were poorly prepared for math in their previous classes. Some teachers testified about their personal math phobia. All the teacher participants agreed that they had experienced varying degrees of burnout and most of them noted that they had a low satisfaction level in their attempt to teach math to arithmetic deficient students.

The second RQ asked about the support and resources that Grade 6 math teachers needed to teach math more effectively in their classrooms. Based on the five themes that emerged from the interviews, it was clear that further investigation is required to combine professional development and training. Furthermore, all of the teacher respondents were unanimous in their agreement that they required more professional training related to the teaching of math courses. The rationale behind this consensus pertained to the need to

address the declining performance of students in EQAO math exams. Another reason for professional training was so that the needs of all the teachers could be addressed so that there would be no shortfall in how math is delivered to Grade 6 students who are tasked to learn the content from the new curriculum in Southern Ontario.

Project Deliverable

In conclusion, the research project will conclude with a 3-day professional training program for those teachers who have had to face the challenges of delivering the curriculum to Grade 6 students while not fully understand its content nor how to deliver the math content to the Grade 6 students. The professional development will be designed to evaluate the best way to leverage all the themes that emerged during the interviews and use the key aspects of these themes to inform how this project is delivered. The primary theme centered around the concept of initiating further training programs so that the teachers do not feel so vulnerable due to their lack of expertise in delivering the curriculum, nor feeling so inadequate in how they can reverse the declining trend in terms of poor math exam scores. Overall, this project will provide all associated stakeholders with more awareness of the current problem with the new curriculum and also the professional development program will provide further opportunities for both theGrade 6 teachers and students to develop new skill sets, especially skill related to teaching and learning Grade 6 math.

Section 3: The Project

Introduction

The purpose of the project is is to provide a foundation for teaching math in elementary schools. Each teacher adopts a procedure that best suits their understanding of their students (Nieminen & Suikkala, 2022). However, from the narration of the participants and the students' declining EQAO math exam performance, it was evident that these teaching procedures were not adequate. Specific professional development modules are a way to increase stakeholder awareness concerning teachers' perceptions and confidence in teaching math that may positively affect students' performance in learning math. This professional development project was scheduled to take place over a 3-day period. The training duration of each day was 5 hours. An aim of this project was for stakeholders to fully understand how to raise levels of teachers' confidence when they teach math so that teachers could have a positive impact on the students' achievement in in math, as demonstrated by better EQAO exam outcomes.

I designed the training program as a way to increase stakeholder awareness of the existing problem of a 5-year decline in math scores and how low levels of teacher confidence can be addressed. Regarding the intended learning outcome, this 3-day training professional development session may increase resources and support for Grade 6 students and teachers. In addition, I plan to implement a new networking channel as a mechanism to connect teachers so that they can acquire and share some math-based resources. With this knowledge, teachers will have both the psychological confidence and

the cognitive capacity to competently teach math to Grade 6 students to prepare the students for the upcoming EQAO exam testing.

The project goals include the ability of all stakeholders to reflect on all the topics that will be covered during the 3-day professional development training. As the teachers reflect on their own learning and knowledge acquisition during the 3-day PD training, they will be able to create their own goals based on what they will have learned. They will be able to set their own personal goals attached to time frames. They will manage and measure their goals based on specific parameters that will be set during the training.

Rationale

The purpose of the professional development training program is to ensure that all the participants have the opportunity to fully optimize and leverage the potential benefits offered by this project study and to increase stakeholder awareness. One of the primary benefits of this project study pertains to the capacity of the teachers to become more proactive and address early on problems associated with absorbing curriculum content and delivery of the content to the students—rather than let curriculum and associated issues get out of hand. This approach could facilitate a math block as a basic foundation for teaching math in elementary schools. Each teacher should adopt a procedure that best suits the ability of their students to absorb and understand the taught content.

Goals

The goal of the professional development is to provide teachers with the ability to access to all the tools and mechanisms that they will need to address the localized issues

in Southern Ontario concerning the poor math scores by Grade 6 students. Another goal is to address the inability of many of the teachers to understand the new math curriculum and to address their inability to competently deliver the new curriculum so that the Grade 6 students can achieve better scores in the EQAO exams held every May.

Learning Outcomes and Target Audience

I anticipate that the professional development training program will help teachers to gain a greater awareness of how their peers view the new curriculum in terms of their competency. Participants should also understand how to deliver all the curriculum content to the Grade 6 students. Another learning outcome from this program is that the teachers will be more agreeable to undergo further training and set aside resources so that they can access and leverage professional assistance both within the school system and from external sources. It is anticipated that the 3-day training program will serve to provide some critical potential solutions to address and meet current curriculum shortfalls within the Grade 6 communities currently located in Southern Ontario. The target audience were 13 Grade 6 math teacher participants who teach in South Ontario elementary schools.

Review of the Literature

This literature review is based on the five themes that emerged during the 13 interviews I conducted. The 12 interview questions were designed to address the two RQs. The interviewee feedback to the 12 semistructured interview questions yielded the five emergent themes I identified. The results of the 3-day training program in part have

provided some solutions to these emergent themes. The teacher participants indicated the following themes related to teacher training in the new curriculum, namely that it

- helps them to meet new curriculum challenges relating to basic learning strategies;
- provides them with resources and develop confidence in themselves and students;
- helps students to improve their EQAO scores; and,
- when attached to professional certification, helps teachers to better educate students

An additional theme is that teacher training in developing relationships and teaching self-efficacy helps students develop math skills.

These five themes offer key insights into how teacher training and professional development can be leveraged to support the successful adaptation to a new curriculum by both Grade 6 students and teachers. Teacher training in basic learning strategies is necessary to provide effective and up-to-date learning strategies that align with the requirements of the new curriculum. This may require teachers to include new methods to address diverse learning styles, integrate technology, and foster critical thinking. If teachers are equipped with innovative yet diverse learning strategies, they can better tailor their instructions and tuition to meet the diverse needs of their Grade 6 students. In turn, this can enhance student engagement and comprehension of the new curriculum content. Teachers will require access to appropriate resources to cope with the new

curriculum and develop confidence-building activities. The lack of appropriate resources and sufficient confidence can hinder effective curriculum implementation.

Teachers also require adequate training in terms of resource utilization and confidence-building strategies empowers teachers to navigate the challenges of the new curriculum. Student observance of such confidence can translate to a more positive learning experience for them. Teachers also need training that is focused on EQAO exam preparation as this approach is crucial for improving student performance. Teachers need to learn strategies to help students navigate and succeed in standardized assessments. Those Grade 6 teachers who may be relatively aware of EQAO exam requirements, can target their preparation by adapting their teaching methods to align with the exam format. This targeted preparation can boost and improve student confidence and performance in the assessments.

Achievement of pre-determined teacher training and professional development targets can be supported and validated by issuing professional certification; such coupled with practical experience is an essential mechanism for effective teaching. If this approach is supported by continuous training, then the acquired knowledge and accumulated experience can contribute to teacher expertise. Moreover, when teacher training in developing relationships and teaching self-efficacy in math becomes a reality within the Grade 6 classroom, this will build positive teacher-student relationships and fostering students' self-efficacy in math. Positive relationships and self-efficacy

contribute to a supportive learning environment in which students are more likely to be motivated and confident in their math skills.

Moreover, this peer reviewed literature review includes an investigation of the relevance and necessity of the training program known as the "Professional Development/Training Curriculum and Materials" program; such create a framework to guide the project development. Google Scholar, ERIC, and the Walden University library and other peer reviewed scholarly databases were used in this literature review. Key search terms included all the noted five themes that qualitatively emerged during the study, namely, declining math performance, new curriculum, challenges of the new curriculum, comfortable solving EQAO math questions, role of the teacher, math ability, self-efficacy, confidence teaching math, EQAO exam preparation, math teaching procedure, poor math problem, and the words "Professional Development/Training Curriculum and Materials program" that will be used in this project. After 136 sources were reviewed, no more new valid peer reviewed data emerged so data saturation was achieved (Mwita, 2022).

Improved Math Performance

It would appear from the interview feedback that Grade 6 math teachers would like to improve their math performance so they can deliver the math program competently to counter the existing decline in math scores in Grade 6 elementary schools in Southern Ontario. Based on research it would seem that professional development and training for the teachers would bring in a better understanding of math concepts,

instruction methods, and teaching techniques and strategies (Burte et al., 2020). Professional development training for math teachers could be conducted both online and on offline via physical and virtual conferences, seminars, and workshops (VaraidzaiMakondo & Makondo, 2020).

New and emerging teaching technologies can be included in these training programs so is the better arm math teachers in Southern Ontario. Moreover, research posits that teachers should spend more time in self-reflection as a way they can identify areas of improvement in terms of creating lesson plans, teaching techniques, and self-assessments (Burte et al., 2020; Petronzi et al., 2019). This could be conducted based on peer-to-peer observations and feedback or from professional training staff.

Math teachers can also help each other via cooperating with mentorship programs thereby sharing acquired information and data followed up by discussion classes in which challenges and problematic issues experienced during the teaching crisis can be evaluated (Petronzi et al., 2019). Furthermore, peer reviewed research indicates that resources can be used that are instructional in design such as interactive software and online textbooks (Burte et al., 2020). Such resources can be accessed which are specifically aligned with the new math curriculum nearby assisting math teachers to adapt to new teaching methods and content and being able to deliver efficiently to their Grade 6 students (Burte et al., 2020; Peteros, 2021).

It is also important for these math teachers to be trained in classroom management so that they learn to become interactive with their students and focus on student

engagement. This will involve pair and group work, and using fun activities to solve problems and to engage in activities and discussions that develop critical thinking so these students can learn to understand and apply math concepts (VaraidzaiMakondo & Makondo, 2020). Students should be encouraged to question their teachers not only about the content but also about how the content is delivered; such would improve math performance both in how math tuition is delivered and in how students understand and internalize it (Petronzi et al., 2019).

It is also important to understand that students have varying learning abilities and disabilities, therefore the teaching should be delivered in such a way that both sets of students are able to learn math efficiently (Peteros, 2021). Therefore, individual needs should be factored into the curriculum search all manner of learning styles are factored into the way content is delivered through to Grade 6 students (Petronzi et al., 2019). In turn, a student orientated method of delivering content to students she creates a happy learning setting so that the students learn the value of risk taking, learning from mistakes, and even learning from the failures of low exam scores (Peteros, 2021). While exams are important, more focus should be allocated to crediting students as of when success occurs, and adopting a growth orientated mindset in which growth is not based on exam results but on daily improvements (Burte et al., 2020; VaraidzaiMakondo & Makondo, 2020).

Improvement in math performance can only become sustainable when all stakeholders are invited to participate and add their voice to the discussion (Burte et al.,

2020; Petronzi et al., 2019). Therefore, parents, teachers and other stakeholders should be encouraged to interact with each other and strategies should be sought in which new innovative ways can be used to encourage students to raise performance levels both at home and in the classroom (Peteros, 2021; Petronzi et al., 2019).

Peer to peer interaction is also essential in which teachers can share experiences and help each other to face and overcome challenges as and when they emerge during the teaching experiences (VaraidzaiMakondo & Makondo, 2020). Collaboration between all stakeholders is an essential mechanism to improve performance levels (Peteros, 2021). These measures will serve to create a supportive learning community in which all stakeholders including students can offer input so that Grade 6 students are able to reverse the current trend and achieve better math exam scores.

Adaptation to the New Curriculum

Research indicates that there are strategies math teachers can use when adapting to a new curriculum especially after a period of declining math scores, such is an improvement compared to the shortfall of training for teachers when the new curriculum was introduced (Skott, 2019). Based on interviewee feedback, many of the interviewees complained that they were not sufficiently familiar with the new curriculum and therefore had problems delivering content (Pepin, 2018). It may seem obvious, but first the teachers should take time out to evaluate the curriculum and understand not only the content but the rationale behind its design and construction (Skott, 2019; Tabach & Schwarz, 2018). Moreover, such evaluation should include the ability to determine what

the intended learning outcomes are, and how topics should be sequenced, and how concepts and learning skills should be measured in Grade 6 students. Understanding of a new curriculum should be supported by professional development and training in which seminars workshops and other classroom-based activities enacted so that teachers can familiarize themselves with the new math curriculum (Skott, 2019).

This approach translates to the ability for peers to work together and collaborate with each other as and when they begin to understand the new curriculum and how it should be delivered to the Grade 6 students (Pepin, 2018). This means that math teachers should share ideas, concepts, and even resources including lesson plans, so that they can all learn from each other; such means that the potential opportunities and benefits offered by new curriculum are optimized via a collaborative effort between peers. Teachers can help each other to learn the new curriculum by simply breaking it down into smaller parts so that it can be easier absorbed and cognitively retained. Each part of the curriculum should be evaluated so that the teachers understand what skills and capacities are needed by each Grade 6 student in order they can acquire curriculum content (Tabach & Schwarz, 2018).

It is posited that a new curriculum requires new lesson plans that are designed to help the Grade 6 students to understand the goals of the curriculum (Pepin, 2018; Skott, 2019). The new math curriculum incorporates many problem-solving tasks and includes various technological-based resources. Teachers should be taught how to break down the curriculum into small manageable parts and thereafter provide specific teaching

instructions using real-life examples and samples, and visual teaching aids that are all designed to make it easier for Grade 6 students to absorb the new math curriculum (Tabach & Schwarz, 2018). This should be followed up by monitoring programs in which students are assessed pertaining to how well they have absorbed the delivered math content derived from the new curriculum (Skott, 2019). Such assessments can be made fun activities in which students can play games, complete quizzes, and others such activities.

The interviewees indicated that not all students possessed the same learning capacity so therefore, the curriculum should be delivered as individualized content in which each student can absorb and learn the delivered math content material (Tabach & Schwarz, 2018). If some students require more support than others, research suggests that smaller groups should be constructed within the classroom environment so that students can learn at their own pace and in their own way within smaller groups (Pepin, 2018). Monitoring of the ongoing progress of Grade 6 students should be accompanied by documenting student feedback so that teachers are aware of both challenges and successes during the learning process an acquisition of the new curriculum content (Tabach & Schwarz, 2018).

Students should be encouraged not just to absorb content but to also question the material and even offer suggestions in the way the new curriculum is delivered (Skott, 2019). This two-way interactive approach the ability of students and teachers to both reflect on lessons learned, challenges overcome, and adapt accordingly (Pepin, 2018;

Skott, 2019). This approach will encourage and foster a growth mindset in which students and teachers will regard mistakes and challenges as essential learning steps as an important part of the mechanism to improving both the new curriculum content and how it is delivered to the Grade 6 students (Yeager & Dweck, 2020).

Based on interviewee feedback, any new curriculum is challenging to implement both for the teacher and for the student, but this is especially true of the new math curriculum for Grade 6 students in Southern Ontario. Therefore, both teaching and learning from the new curriculum requires collaboration between all stakeholders and a patient and incremental step by step approach (Tabach & Schwarz, 2018).

Strategies for Overcoming Challenges of the New Curriculum

Regarding the scenario in which math performance is on the decline among Grade 6 elementary school students in southern Ontario, the math teachers will be tasked to look at strategies and ways such as the CIAE process to overcome the challenges posed by the introduction of a new math curriculum. Research indicates that the first source of assistance should be the immediate institution in which students are learning at (Sevinc & Lesh, 2018). Therefore, each Grade 6 institution should seek to develop professional training programs for all stakeholders, but more specifically, for students and for the teachers so that the content within the new curriculum is delivered efficiently and that the students are able to absorb and benefit from the new curriculum (Morales-López, 2017). Based on research, one way to overcome the changes posed by new curriculum is to create sample lessons and lesson plans that fit within the parameters of the curriculum so

that all the teachers can adopt a standardized proactive approach so the delivery of the teaching is uniform and consistent (Phillips, 2019).

Teaching staff should be encouraged to adopt study groups as a means to construct effective strategies, leverage existing experiences, and share tacit knowledge by way of intuition and insights (Sevinc & Lesh, 2018). Research points out that there is strength in numbers or in adopting a collective stance. Both teachers and students should be persuaded to join the study groups so the collective sum of experiences and knowledge are combined for the benefit of all stakeholders (Morales-López, 2017). Another collective approach is to facilitate learning communities both physical and online in which stakeholders can share experiences and knowledge so that difficulties encountered in the math curriculum can be openly discussed and understood (Morales-López, 2017). As defined and articulated in Theme 1, processing a new curriculum can be done by breaking it down into small manageable parts, so that lessons can be constructed to manage both topics, subtopics, and even themes (Phillips, 2019).

Research suggests that there is another resource to understand the new curriculum pertaining to stakeholders who developed the original new curriculum (Phillips, 2019; Sevinc & Lesh, 2018). These designers should be questions so that not only are objectives known but also the rationale behind the construction of the new curriculum (Morales-López, 2017). It is important to also collaborate with those professionals who have been tasked to operate within the academic environment such a senior university teaching personnel. Their experiences-based insights are invaluable and should be

leveraged by teachers who are struggling to overcome the challenges posed by a new math curriculum (Sevinc & Lesh, 2018).

Peer reviewed research posits that success in overcoming the challenges posed by a new curriculum can only be a reality if the teachers invest some of their own resources into learning about the curriculum (Sevinc & Lesh, 2018). This means that these math teachers will need to adopt a self-study program and spend time and investigate the curriculum, and if necessary, interrogate the curriculum designers to fully understand not only the content but the rationale behind it (Morales-López, 2017). To overcome these challenges, it is important to open the lines of communication between all stakeholders, so that challenges can be openly discussed and appropriate solutions found (Morales-López, 2017; Sevinc & Lesh, 2018).

Comfor Solving EQAO Math Questions

One of the comments that emerged from the interviews pertained to the need for math teachers to efficiently solve EQAO math questions so that they in turn can deliver the correct tuition and knowledge to the Grade 6 students. When math teachers struggle with tackling and teaching EQAO content and material, such translates to poor EQAO performance among the students. Research points out that math teachers need to allocate sufficient time to study the construction of the exams, and the objectives and rationale behind their construction (Ashraf, 2019; Reid et al., 2018). This can be done relatively easily if existing exam questions and results and the score-based rubrics, are examined and reviewed by Grade 6 math teachers. It is important that this point to understand what

the rubrics expect the student to understand, and how such understanding is scored (Reid et al., 2018).

Another mechanism that peer-reviewed literature indicates is a good way to help teachers and students solve EQAO math questions is to analyze the questions that typically garner more mistakes or wrong answers (Ashraf, 2019). In other words, identify weaknesses and address them so they become strengths. Grade 6 math teachers could take a sample of these existing exam questions and used them as teaching tools and as a part of the lesson plan. When teachers and students become more aware all the format of these questions, and the cognitive mechanism and critical thinking by which they are solved, they should be more comfortable tackling these exam questions (Reid et al., 2018).

Moreover, teachers will be able to help their students to adopt strategies to solve such questions and teach them effective problem-solving strategies in which time management during the exam is key (Larsen & Jang, 2021). One way to adopt these strategies is to relate that critical thinking skills to everyday events and occurrences within the student's lifestyle; such means that these EQAO exam questions can be evaluated based on real world knowledge and context (Ashraf, 2019).

It is important to also conduct pilot tests in which students can practice conducting mini EQAO exams within the classroom setting (Ashraf, 2019). This is a great way that students can learn techniques in which they can eliminate and discard obvious wrong answer choices, improve their reading comprehension, allocate sufficient

time for editing, and learn to adapt to general time management guidelines so that all the questions are answered within the allotted time (Ashraf, 2019; Reid et al., 2018). Research indicates that when students are involved in assessing their own levels of performance in these exams, they will observe where they make mistakes, and identify their strengths and weaknesses in terms of what questions they are more adept at processing (Larsen & Jang, 2021).

An approach in which all stakeholders are involved and contribute will make it more likely that students will be able to solve these exam questions without too much stress or difficulty (Ashraf, 2019; Larsen & Jang, 2021). This means that besides students and teachers working together to learn to solve these types of questions, parents and caregivers should also be invited to participate so the preparation is not only in the classroom but also in the home (Reid et al., 2018).

Role of the Teacher

One of the roles performed by the math teacher is multifaceted and requires their ability to process many disciplines and tasks. One of their roles is to engage daily in self-reflection so that they can ascertain their strengths and weaknesses during the teaching process and what shortfalls need to be addressed (Umarji et al., 2021). Peer reviewed research points out that the math teacher should seek to engage on a journey of continual improvement and then transfer that mindset to their students so they in turn are continuing improving and adapting to the new math curriculum (Al Said et al., 2019). Ongoing development should be supported and leveraged by way of attending seminars,

workshops, and other teaching forums conducted by those who understand the new math curriculum and who already have recorded proven success in that field (Lazarides, Gaspard & Dicke, 2019). Following this process, checks need to be conducted via faculty, department, or grade-level meetings as a way to determine if teachers understand the content in the additional development and training.

This approach translates to the ability for Grade 6 math teachers to conduct periodic review and update themselves as and when new technologies or data emerges that are relevant to the new math curriculum (Al Said et al., 2019; Umarji et al., 2021). Teachers should attempt to identify common weaknesses within the classroom setting and identify questions or areas of the math curriculum which are problematic not only to students but also for those teachers who are delivering the curriculum content (Lazarides et al., 2019). The identification of these weaknesses can be used as part of an assessment from which weaknesses can be translated into strengths in both delivering the math material and content but also in how it is absorbed by the Grade 6 students (Al Said et al., 2019).

The teacher's role is also guided by their ability to build a culture within the classroom in which every student is important regardless of their learning ability or IQ (Al Said et al., 2019; Lazarides et al., 2019). This approach can develop a strong and positive learning approach in which mistakes are embraced and even leaders can emerge from within the body of students; such means that some students who are achieving higher levels of success can help those students who are struggling to adapt to the new

math curriculum (Umarji et al., 2021). Student shipping cards to be reflective and continue analyzes their levels of performance and even be encouraged to observe and monitor each other (Umarji et al., 2021; Lazarides et al., 2019). This strategic approach translates to the role of the teacher being orientated to intervene when students are struggling, and also intervene and encourage higher performing students to share their knowledge with their peers (Al Said et al., 2019).

The role of the Grade 6 math teacher is highly dependent on the collaboration between all the stakeholders as without their collaboration and support it is highly unlikely that the teacher will succeed in fulfilling stakeholder expectations (Lazarides et al., 2019). Various channels of communication between all the stakeholders are a critical resource that needs to be used so that the student's progress is monitored and managed (Al Said et al., 2019). This means that student peers and teacher peers are encouraged to participate and supplement the role performed by the Grade 6 math teacher (Umarji et al., 2021). These strategies will inevitably create the right environment in which the Grade 6 math teacher gains more confidence in delivering the curriculum, and the Grade 6 student equally gains more confidence in achieving high levels of performance when undertaking EQAO math exams (Al Said et al., 2019).

Improved Math Ability

Research indicates that when the majority of students are experiencing reduce performance levels, then the spotlight should be on the teacher to ascertain if their teaching ability a method of delivery needs to be improved. The interviewees indicated

that many of them felt that they lacked the ability to deliver the new math curriculum to their Grade 6 students. There is a direct correlation between reduced academic performance in students and the capacity of the teacher to deliver critical curriculum content (Cross Francis et al., 2018).

The improvement in the ability for teachers to teach math and the ability of Grade 6 students to absorb and learn math is dependent in part on professional support and guidance that may be available in the institution or available from external sources (Stein et al., 2020). As noted in the interviewee feedback, resources in the form of seminars, workshops, and other institutional forums should be used to develop familiarity with math questions and possible answers (Cross Francis et al., 2018). Such familiarity will breed a measure of confidence in both teachers and students alike (Stein et al., 2020). It may be necessary to import expertise from external sources should the institution not have the necessary expertise and knowledge needed to train the math teachers so that the Grade 6 students are taught the necessary math curriculum content (Cross Francis et al., 2018).

It is normal for every curriculum to include learning resources that are available to both teachers and students (Stein et al., 2020). These resources can be in the form of physical or online teaching material, PDF textbooks, Microsoft PowerPoint materials, videos, and even podcasts as a way to inform and tutor both Grade 6 teachers and students. In addition, research indicates that all stakeholders should be encouraged to conduct self-study using the noted resources; such will help to raise the level of EQAO

performance pre-exam, during the exam, and post-exam. Improvements in math ability can be facilitated by both teacher and students when they get engage the cooperation and collaboration of their peers (Cross Francis et al., 2018). This means that ongoing levels of performance can be continually monitored and independently assessed within a two-way format (Beswick & Fraser, 2019).

The learning resources used to support Grade 6 teachers and students in the delivery and learning of the new math curriculum can take different online or physical forms of teaching material. Examples of physical teaching materials are textbooks, workbooks, manipulatives such as math games and geometric shapes, flashcards, and physical models. These different materials can provide tangible resources for both teachers and students to engage with during in-person physical classes. Manipulatives can be used to demonstrate mathematical concepts and textbooks can serve as references for additional practice problems.

Online teaching materials can include interactive simulations, virtual labs, online exercises, and educational websites. These online applications and materials can offer interactive and engaging experiences in which simulations and virtual labs can help students visualize complex math concepts, while online exercises provide immediate feedback, supporting self-paced learning. Pdf textbooks are another learning resource in which textbooks, instructional guides, and study materials can be made available online. Pdf formatted documentation allows for accessibility and easy distribution as teachers

can share digital textbooks with students, and students can access them on various devices.

Microsoft PowerPoint materials, such as presentation slides, lecture notes, and interactive elments, are another online learning resource that can be used for structured lesson delivery. Teachers can create visually appealing presentations to explain easy and complex concepts, showcase examples, and guide discussions. Educational videos, tutorials, and video lectures/workshops are a powerful online resource as they are powerful tools for visual and auditory learners. Grade 6 teachers can use pre-recorded or curated videos to supplement lessons, explain complex (hard to teach) concepts, or provide additional examples. This resource can be accessed by students so they can access these videos for review. Educational podcasts, audio lessons, and interviews/workshops with external professional math experts can offer a convenient way for both teachers and students to engage with and better absorb math content. Such resources can be used as supplementary resources so that students can listen to them at any time of their choosing. Finally, interactive online platforms are another learning resource. Examples are learning management systems, interactive math software, and online forums; such can offer a form of collaborative learning in which teachers/educators can create assignments, quizzes, and discussion forums. This online approach allows Grade 6 students to engage with the multiple forms/formats of content, interact online with peers, and receive timely feedback from their teachers

Research indicates that in an age of emerging sophisticated technology, Grade 6 institutions in Southern Ontario should acknowledge the concerns of the interviewees by making available more technologically based resources by way of online tools, websites, and platforms for the math teachers to access and learn from (Beswick & Fraser, 2019; Stein et al., 2020). There are numerous math-based resources freely available online that can be used to supplement the delivery of the Grade 6 math curriculum. These resources are not only hardware and software based but they are also in the form of human expertise (Stein et al., 2020). Here experts can be hired on a subcontract basis to temporarily expand math teacher knowledge and understanding in terms of math curriculum content and delivery to the Grade 6 students (Beswick & Fraser, 2019).

A growth mindset is a critical component for both teachers and students to adopt to better manage and understand the new math curriculum (Yeager & Dweck, 2020). The adoption of this growth mindset means that challenges are translated into opportunities, and mistakes and the failures are translated into success (Cross Francis et al., 2018). Such a mindset is a natural mechanism for all Grade 6 stakeholders to adopt a culture of self-reflection and self-improvement as a way to adopt a culture of ongoing improvement and growth. The acquisition of new learning abilities and new skill sets is not a once-off activity but rather a process that is ongoing and consistent in its design and delivery (Cross Francis et al., 2018; Stein et al., 2020).

Promotion of Self-Efficacy

Self-efficacy is linked to lesson study which is an approach of collaborative professional growth based on student learning via a content continuum. This approach infers that problems derived from pedagogically-based content knowledge to deeper conceptual matters can be understood and addressed. This can translate into a scenario in which limitations appearing in a lesson study are commonly found as knowledge limitations which can be attenuated by a community of practice that offers subject expertise and relevant resources. The ability to develop self-efficacy as a math teacher is a significant way to enable improvement in math exam scores for Grade 6 students located in Southern Ontario. When self-efficacy is evident in each Grade 6 math teacher, it can be an effective counter against an academic environment in which there is a decline in academic performance. The development of self-efficacy is not an easy task so based on the interviewee feedback and on peer-to-peer literature, the following strategies may be helpful (Larsen & Jang, 2021).

Self-efficacy can be achieved by the Grade 6 math teacher when they adopt a more reflective stance in which they can honestly ascertain their own historical levels of performance. This self-efficacy-based approach can be used to understand and learn from past failures and build on past successes. Moreover, such an approach can leverage the capacity to be persistent and develop skills and knowledge through continue effort and practical applications. Self-efficacy is a way for the Grade 6 math teacher to develop and foster professional teaching skills to address poor performance in students' math scores.

It is important that the math teacher set out goals and objectives that are realistic and achievable; such serves to create self-efficacy (Larsen & Jang, 2021). This approach can also be transferred to the students. Teachers can use their own self-efficacy and teach the associated concepts and skills to their Grade 6 students so they in turn can adopt self-efficacy (Larsen & Jang, 2021). These students will then be able to honestly analyze and come up with solutions to address their own weaknesses and points of failure; such thereby leading to overall improvements in the ability to achieve higher EQAO math scores (Larsen & Jang, 2021).

Self-efficacy also lends itself to the capacity to develop relationships both peer-to-peer and between student and teacher (Peteros, 2021). This can create a positive and harmonious atmosphere or environment within both the virtual and physical classroom setting (Larsen & Jang, 2021). A harmonious atmosphere cultivated by teacher and student self-efficacy creates an environment in which the Grade 6 students will feel as an important team member as well as a highly performing individual. Students will feel highly valued by both their peers and their teachers; such will lead to higher levels of personal motivation and inspiration to acquire and retain math-based knowledge and to raise math performance levels (Peteros, 2021). Self-efficacy leveraged via the development of patience and consistency will also engender the ability to increase levels of self-confidence and well-being in both students and teacher alike (Larsen & Jang, 2021; Peteros, 2021).

Confidence in Teaching Math

Based on the interviewee feedback, peer reviewed literature indicates that when the teachers become more confident in teaching math, so will student performance levels rise (Ren & Smith, 2018). Confidence can be built not just on reality and factual outcomes but also on perceptions (Ren & Smith, 2018). Therefore, teachers need to carefully analyze student data pertaining to their coursework within the classroom and also how their Grade 6 students perform during the EQAO exams (Mahmud et al., 2022). Quantitative data can provide indicators that not only help the teacher to identify student weaknesses, but can also raise levels of self-confidence as the math teacher feels more capacitated to teach math (O'Keeffe et al., 2019; Ren & Smith, 2018).

Research indicates that self-confidence can also be acquired as a teacher identifies their own strengths and capabilities and transfers the acquisition of those same strengths over to their Grade 6 students (O'Keeffe et al., 2019). In addition, as personal weaknesses are identified and addressed by the teacher, and these weaknesses translated into strengths and opportunities, such can engender increased self-confidence (Ren & Smith, 2018). Additional professional training and development programs by way of conferences, seminars, workshops, and other teaching platforms are also opportunities for math teachers to acquire more self-confidence as personal goals are reached (Mahmud et al., 2022).

Such developments can be supplemented when conducted via networking mechanisms so that the support of peers can be leveraged allowing qualitative feedback

to be shared between all the Grade 6 teachers (Mahmud et al., 2022). These support systems that creates self-confidence in these math teachers can be geared for the short term, medium term, and long term (O'Keeffe et al., 2019). This suggests that achievements and successes however small or insignificant, can be accumulated over the longer term leading to the capacity for teachers to reflect on past performances and outcomes thereby gaining greater levels of self-confidence (O'Keeffe et al., 2019).

Self-confident teachers are inevitably able to accept constructive criticism and critique (Mahmud et al., 2022). They are more able to conduct their own self-criticism of their own performance levels resulting in the ability to deliver more sophisticated levels of performance in their students. While some outcomes may be a long time in maturing, teach yourself confidence can grow over the shorter term purely by the perception of potential and future success (Mahmud et al., 2022; O'Keeffe et al., 2019).

EQAO Exam Preparation

Based on the interviewee feedback, it is apparent that Grade 6 math teachers are seeking ways to improve EQAO math exam preparation outcomes in their students. The math teachers viewed the capacity to find practical ways as a viable counter to declining math performance in the Grade 6 elementary schools in Southern Ontario. Research sources indicate that when teachers investigate and familiarize themselves with the exam format, they are more likely to transfer that same knowledge and understanding to their students (Bychko, 2018). Therefore, the review of past exam documentation is a critical component of the preparation process (Bychko, 2018). Review of the rubric will enable

the math teacher to understand what goals the designers of the EQAO exam wanted to achieve in terms of students' exam outcomes (Eizadirad & Eizadirad, 2019).

Exam preparation can be enhanced via using past exam questions and creating and conducting lesson plans that are constructed to identify and process strategies to answer complex math questions (Bychko, 2018). When math teachers understand and absorb the format and structure of these exam questions, they can transfer the same knowledge to their students so that they in turn can also familiarize themselves with not only the format of the questions, but also the rationale behind how they can be solved and answered (Bychko, 2018; Eizadirad & Eizadirad, 2019). Moreover, lesson plans can be designed by the math teachers to conduct mini exams so that the students learn to manage their time, to improve the ability to comprehend the questions, and to process strategies to answer the questions (Bychko, 2018).

Role playing exams can be an important part of raising student performance as students become more confident about their ability to achieve good exam results. Practice by role playing can help teachers teach their students different strategies and time management techniques so that the students complete all the exam questions on time (Bychko, 2018). Teachers should get together with their peers and compare notes in terms of role-playing exams with their students. Obviously, some role-playing models and techniques will achieve more favorable outcomes than other role-play models. Discussions between teachers about the outcomes obtained from role playing models

should serve to counter the current decline in math performance by Grade 6 students (Eizadirad & Eizadirad, 2019).

It is critically important that EQAO math exam preparation is consensually conducted between all stakeholders, namely students, parents, teachers, and curriculum constructors (Bychko, 2018). This means that lines of communication should be kept clear and open so the stakeholders can communicate their concerns and ideas to each other prior to the exam taking place (Eizadirad & Eizadirad, 2019). Even parents should be encouraged to review old exam questions and the correct answers and thereby ascertain with their children if they understand how to process and answer these exam questions (Bychko, 2018).

Math Teaching Procedure

Many of the interviewees also indicated that as math teachers they need to better understand math teaching procedures as based on the new math curriculum in Grade 6 elementary schools in Southern Ontario. The math curriculum normally includes procedures that encourage math teachers to identify and address learning weaknesses evident in their Grade 6 students (Mishra, 2020). These witnesses can be statistically identified by way of looking at student performance data and evaluating trends, themes, or even patterns that may characterize students' levels of performance.

It should be checked that all teaching procedures are included within the math curriculum, and that these procedures are understood by the teachers prior to the delivery of the curriculum content to their students (Mahmud et al., 2022). Therefore, concepts

and theories identified and incorporated within the math curriculum should be translated by the teachers into practical applications at the point of intervention within the virtual or physical classroom environments. By using practical applications to solving math-based problems, the math teachers are teaching their students so apply concepts that are applicable to real-life scenarios (Mahmud et al., 2022; Mishra, 2020).

Such practical applications at the point of intervention can include hands on activities so that students are not only learning theory they are also learning about tangible applications leverage by interactive systems and technologies (Mishra, 2020). Students should be encouraged to not only conduct individual studies, but also learn via pairing and group analysis. It is important to learn how to perform as a team member and even be given the opportunity to demonstrate leadership qualities (Mahmud et al., 2022). The development of team member and leadership skills within the classroom setting should be monitored and managed so that as student skill sets emerge, they can be harnessed and optimized. This will require peer networking and collaboration not only within a single institution but also between schools and other teaching institutions within a jurisdiction (Mishra, 2020).

Transformation of Math Problems Into Opportunities

Many of the interviewed math teachers claimed that their ability to teach math was poor. They also believed that such poor performance has led to an overall decline in math performance in their Grade 6 students. In some cases, the interviewees conceded that they felt overwhelmed by the inability to transfer curriculum content and material to

their students. They all believed they needed professional training and developments and that both the institution and the teachers should jointly invest in the acquisition of new skills and knowledge. Some of the teachers believed that they did not fully understand the new math curriculum and therefore this lack of understanding translated into poor student performance in the classroom. This infers that teacher performance and student performances are closely correlated (Baloyi-Mothibeli et al., 2021).

Some of the teachers inferred but they did not collaborate with their peers as they felt that their performance levels were so poor that they were not willing to expose or express their shortfalls to other teachers (Baloyi-Mothibeli et al., 2021). However, research informs this doctoral study that it is essential for teachers to collaborate with their peers so that they gain further insights in how to leverage strategies within the classroom, and how to share available resources (Afandi et al., 2021).

Both interviewee feedback and peer reviewed research indicated that any new curriculum should first be broken down into small items and units to enable teachers to identify, absorb, and understand not only the contents but also the mechanism from which it needs to be delivered (Afandi et al., 2021). Due to the inherent complexity commonly found in a math curriculum, research indicates that foundational theories, ideas, and concepts should first be understood prior to learning more sophisticated mathematical theories and concepts (Afandi et al., 2021). Research sources also points to the validity of utilizing external expertise as a way to supplement existing individual institutional resources (Baloyi-Mothibeli et al., 2021).

By sharing resources between institutions, a better cost and benefit ratio can be achieved for all stakeholders (Afandi et al., 2021). Therefore, should one institution have more expertise pertaining to one area of mathematics such as algorithms and even coding, such expertise can be shared between all the institutions (Baloyi-Mothibeli et al., 2021). It is important that expertise whether found within only one institution or accumulated in many institutions should be identified and shared so that teachers can receive the best training and development (Afandi et al., 2021). This invaluable expertise can then be passed on by the math teachers to their Grade 6 students. It is important that teachers learn to not only adopt better teaching procedures but also learn to adapt their teaching procedures to meet the needs and aspirations of their students (Afandi et al., 2021).

Professional Development and Training

Such development and training can be leveraged by applying adult learning theory in which the teacher can create an appropriate learning environment in which complex physiological and psychological value systems, the physical and cultural environment, and experiences, such can influence how teachers can learn and adapt to a new curriculum. The need for further professional development and training was almost unanimous among the participant interviewees. Based on the findings the interview feedback and evidence obtained from peer reviewed literature, when students are struggling to achieve basic math performance levels, that the investigative spotlight should be directed at teacher performance or evidence concerning the lack thereof, and at further teacher training and development (Jackson et al., 2020). However, for Grade 6

math teachers to adopt and optimize professional development and training, they need to first develop a growth mindset so that they develop the academic stamina and durability to accept and learn from past mistakes and failures in order to embrace transformational changes and how they teach and deliver the new math curriculum to their Grade 6 students (Yeager & Dweck, 2020).

Research indicates that this type of program (online or physical) requires an enthusiastic approach as it is often extensive and challenging to complete (Jackson et al., 2020). This approach translates to the concept of continually looking for answers to questions, clarifying issues that are unclear, and forming networks and relationships with influencers and those possessing professional expertise (Martin et al., 2018). Such an approach can be leveraged if the professional development and training is processed by the math teachers so that they learn together within a group format. This more collective and collaborative approach is more likely to result in better outcomes in terms of how the math teachers deliver the new math curriculum content (Martin et al., 2018).

This means that individual skill sets and learning preferences can be shaped into a more cohesive and consistent approach to teaching the new math curriculum (Jackson et al., 2020). A more standardized and uniform curriculum delivery mechanism is more likely to result in better levels of performance in the EQAO exams (Umit, 2018). This more collective approach will result in better teaching practices and a more effective learning outcome for the Grade 6 students (Jackson et al., 2020; Umit, 2018). Should the efforts of all the professional development and training stakeholders be leveraged

collectively, the opportunities afforded by such programs will create an ongoing learning process that is sustainable not only for the teachers but also for their students (Umit, 2018). These professional developments and training programs can be further developed and used to create an ongoing learning culture that can become an institutional default setting (Jackson et al., 2020). The specific best practices that were the foundation of the 3-day professional development training were to ensure that Grade 6 elementary math teachers' perceptions and understandings about the new curriculum have factored in the existing declining math EQAO scores. These practices include the need to provide training, support, and resources to Grade 6 math teachers so they are more able to teach math more effectively in their classrooms. Another best practice would be to obtain feedback from the participant teachers to ascertain whether their experiences during the 3 days was positive or if there were any unforeseen problems.

The following six principles of andragogy pertaining to adult learning theory, will guide the development of the learning and activities (Knowles, 1980). First, there is the 'Learner's Need to Know' principle which is designed to ensure that the professional development and training activities will directly address the needs and concerns of Grade 6 math teachers. It will focus on aspects that are relevant to their current challenges in teaching the new math curriculum and improving EQAO scores. The second principle, 'Self-Concept of the Learner' is regarding the recognition and support of the development of a growth mindset among Grade 6 math teachers. This multi-faceted approach will encourage these teachers to see challenges as opportunities for growth, to

learn from mistakes, and to embrace transformative changes in their teaching methods. The third principle concerns the ‘Experience of the Learner’ in which stakeholders acknowledge and incorporate the diverse experiences of Grade 6 math teachers into the curriculum and teaching practices. This will serve to create a learning environment that values the expertise they will bring to the table, and encourage collaborative learning in which teachers can share their experiences and develop a peer learning culture (Knowles, 1980).

The ‘Readiness to Learn’ is the fourth principle that when implemented will recognize that Grade 6 math teachers may have varying levels of readiness for professional development and training. Therefore, differentiated support will be provided to meet teachers’ situational status in terms of their readiness to adopt new teaching methods and curriculum changes. The fifth principle, ‘Orientation to Learning’ pertains to ensuring that the professional development and training activities are designed with a problem-solving orientation (Knowles, 1980). This can help connect the learning directly to the challenges faced by Grade 6 math teachers, such as addressing declining EQAO scores. This fifth principle of andragogy will encourage and foster a solutions-focused approach. The sixth and final principle is regarding ‘Motivation’. This approach will encourage the leverage of the core and driving motivation of Grade 6 math teachers by aligning the professional development and training activities with their professional goals and the improvement of student outcomes. These Grade 6 teachers will be encouraged to

recognize and celebrate their own achievements thereby providing positive reinforcement to students for their efforts (Knowles, 1980).

Project Description

Resources

An important resource is regarding the support and collaboration by all stakeholders including that of students, teaching staff, parents and caregivers, curriculum constructors, and the project administrators. The participation and collaboration by all these stakeholders are a critical component to ensure that the project objectives are reached and that the needs and aspirations of all the stakeholders are met. The willingness and availability of the participating teachers in the 3-day training and also in the early interviews is an important criterion to the overall success of this project.

Another important resource was the technological hardware and software that was used throughout the project. The transcripts from the interviews were processed using the 3-step data analysis process and many different hardware variants will be used throughout the 3-day training program. The 3-day training program will be conducted in a venue that is deemed appropriate for the purposes of conducting around 15 hr of training for 13 training participants and they will be offered guidelines regarding the procedures and processes during this 3-day period (see Appendix A).

Implementation Schedule and Timelines

This will commence at a date agreed to between the stakeholders, the institution, participants, and the university, all monitored and guided by a supervisor. Day 1 of the

teacher professional development day is from 10 a.m. to 3 p.m., and starts with introductions, followed by a random mystery card exercise, then after discussions they will create a poster based on the exercise supported by the rationale behind the poster. After lunch, they will discuss the EQAO exam in southern Ontario and the existing challenges associated with the new math curriculum, such is so that teachers understand the necessity of the training program and its purpose. This followed by a video about the importance of math, followed by being paired together to review historical data. Finally, the teachers will present what they have learned that day. Day 2 is similar to Day 1, however the teachers will be paired together and asked to design a card based on their knowledge about the new math curriculum and share with peers. Then there will be comprehensive training about the new curriculum, its objectives and expectations. After lunch, discussion about available online and offline resources followed by a fun activity in which they will play the role of teacher and student and conduct a Grade 6 EQAO exam. On Day 3, teachers are randomly paired together again and tasked to create a lesson plan complete with a design and create the most effective math block within 15 min. They will then judge and score each other in terms of how they best served the needs of the students in learning the math block. After lunch, the teachers will network and share resources and based on the 3-day training program, each teacher will present about how they would teach math to Grade 6 students and how they would prepare themselves and their students for the EQAO test starting in September of each school year. This is followed by other potential effective techniques, and concluding the 3-day

training program, each teacher is invited to share feedback in terms of what they have learned and their overall experiences over the 3-day period.

Project Evaluation Plan

Outcomes based assessments will be used for this project. These assessments will be based on understanding what the expected learning outcomes will be in terms of acquired knowledge and skills by all those participating in this 3-day training program. It is believed that the training participants will bear to demonstrate an improvement in how they teach the curriculum to their students, and in how they interact with them. The outcomes will be considered relatively successful should the students begin to achieve better math EQAO exam scores. Therefore, outcomes face assessments are a valid measurement mechanism as they are measurable in terms of past performances and future outcomes. These assessments will be designed to reflect the evidence of the potential of enhanced authentic EQAO math exam results as a result of the 3-day training program. It is posited that the success of outcomes-based assessments will be measured against feedback from participants and even from the teachers' students. Therefore, the evaluation and assessment outcomes will be used to inform how future researchers can inform how Grade 6 teachers can better deliver the new math curriculum to their students.

Overall Goals of the Project

An overall goal of this project is to fill the gap in practice which was found in the five themes. This project seeks to address these five themes, namely, 'Teacher training in

the new curriculum helps meet new curriculum challenges relating to basic learning strategies, teacher training in the new curriculum to provide resources and develop confidence in themselves and students, teacher training in the new curriculum EQAO math exam preparation helps students improve EQAO scores, teacher training and professional certification of teachers coupled to more experiences helps them to better educate students', and 'teacher training in developing relationships and teaching self-efficacy helps students develop math skills'. Another goal will be to obtain feedback from the participant teachers who will attend the 3-day professional training program to ascertain whether their experiences during the 3 days will be a positive one or whether there will be any unforeseen or unexpected issues. Their feedback will help me to appreciate and measure the value of this 3-day training program in terms of the benefits that will be attributed to this program.

Stakeholders

There are numerous stakeholders that will benefit from this project. Firstly, it is hoped that Grade 6 students will become the most important beneficiaries of this project. Then there are the participating Grade 6 mathematics teachers who have provided so much invaluable data and information to inform this project study. It is hoped that other stakeholders such as the parents may be given the opportunity to play an important role in determining how math teachers can be helped to deliver the new math curriculum to their Grade 6 students. Educational institutional staff play an important in supporting Grade 6 math teachers as do senior administrators and other decision makers. Other indirect

stakeholders include the scholars tasked within the body of knowledge and the public domain which all have a stake in the success of delivering the new math curriculum efficiently to Grade 6 students in the southern Ontario region of Canada.

Project Implications

The purpose of this qualitative study was to examine the perceptions of Southern Ontario elementary school teachers had on the likely effect of the introduction of a new math curriculum on the performance of students in the EQAO math exams and to explore the likely challenges of teachers (in terms of resources and training) in meeting the objectives of the new curricula introduction. The 5 themes that emerged offer possible social change implications as the findings pointed to the need for new training programs to be implemented to counter the declining performance of math grades with Grade 6 students. These implications will require that the levels of teacher confidence will need to be raised as and when they become competent at teaching math to Grade 6 students. Other implications from this project indicate that for the teachers to better deliver a viable math curriculum they need to attenuate their fear of teaching math to Grade 6 students.

This project is important to local stakeholders as these 5 themes have revealed that improper math teaching procedures (math block) and the lack of training, professional development, and other modern pedagogical resources affected the teaching of math leading to the decline in students' performance in the subject. Therefore, the interview results and the 3 full days of teacher training will serve to motivate local stakeholders such as students, parents, teachers, and curriculum designers to acquire

adequate learning resources to effectively perform their duties so that the levels of students' math grades are raised up to expectations of all involved stakeholders.

In terms of the key findings set out in this section, it is anticipated that the professional development training program will be used as a tool to help teachers to gain a greater awareness of their competency to deliver all the curriculum content to Grade 6 students. Moreover, Grade 6 teachers will consensually agree to further training to access and leverage professional assistance both from internal and external sources. The 3-day training program will provide critical potential solutions to address and meet current curriculum shortfalls within the Grade 6 communities currently located in Southern Ontario. Another key finding is that professional development and training for teachers will improve understanding of math concepts, instruction methods, teaching techniques and strategies, develop confidence in themselves and students, help students improve EQAO scores, and develop relationships and to teach self-efficacy; such helps students develop math skills.

Other keys findings indicated that improvement in math performance can only become sustainable when all stakeholders are invited to participate. Therefore, all stakeholders should be encouraged to interact so that new innovative ways can be used to encourage students to raise performance levels both at home and in the classroom. Overcoming challenges in the new curriculum can happen if Grade 6 teachers invest some of their own resources into learning about the curriculum via adoption of a self-study program investigating the curriculum, and interrogating the curriculum designers.

Communication between all stakeholders is essential so that challenges can be openly discussed and appropriate solutions found. It was found that self-efficacy is leveraged via the development of patience and consistency; such engenders the ability to increase levels of self-confidence and well-being in both students and teacher. This leads to the teacher self-confidence to accept constructive criticism and critique and conduct self-criticism of their own performance to deliver more sophisticated levels of performance in their students. EQAO math exam preparation should be consensually conducted between all stakeholders, namely students, parents, teachers, and curriculum constructors. Findings suggest that sharing resources between institutions results in a better cost and benefit ratio for all stakeholders.

Finally, teachers' adoption of a growth mindset to develop the academic rigor to accept and learn from past mistakes is a way to embrace transformational changes in how they teach and deliver the new math curriculum to their Grade 6 students. By recognizing their own achievements, Grade 6 teachers can provide positive reinforcement to their students. Section 4 begins with the introduction and reiterating the purpose and nature of the study. This is followed by a summary and interpretation of the key findings and discussion of the study's limitations. Recommendations for further research will then be discussed followed by consideration of the study's implications. The section ends with a conclusion to the study.

Section 4: Reflections and Conclusions

Project Strength and Limitations

Strengths

From a reflective perspective, the rationale for this doctoral study was to examine why Grade 6 student standardized mathematics scores had continued to deteriorate over the past 5 years within the Southern Ontario region, despite the more recent addition of a new math curriculum as a way to improve Grade 6 math students' academic performance. However, despite this attempt to improve math scores, math teaching staff within this jurisdiction had reservations regarding both existing teaching material and content and the new math curriculum, both in terms of content and instructional guidelines. I used qualitative methodology simply because I wanted to access tacit and implicit knowledge concerning the participating math teachers' experiences and feelings about the Grade 6 math curriculum. Semistructured interviews comprised of 12 open-ended questions were conducted with 13 mathematics teachers.

I designed the 12 questions to examine and seek answers to the two RQs detailed in Section 1. The first RQ asked, What are the perceptions of Grade 6 teachers of teaching math with the new curriculum to prepare students for the Grade 6 exam in South Ontario elementary schools? The second RQ asked, What support and resources do Grade 6 math teachers need to teach math more effectively in their classrooms? Five themes emerged from these semistructured interviews ranging from declining math performance to the need for professional development and training. It was apparent that

these themes supported, confirmed, and extended the knowledge gained from the secondary research that was discussed in the review of the literature in Section 1.

Limitations

I designed and implemented this doctoral project to ensure that the collection of both primary and secondary data was both rigorous and trustworthy. However, despite my intentions and planning, as with most research there are limitations imposed on this study. In terms of sample size, the participation of 13 teachers, while adequate for the purposes of gaining primary and subjective knowledge an understanding, could have been expanded thereby gaining a greater understanding of the research problem. It is possible that the same problem regarding poor math exam outcomes found with Grade 6 students in the southern Ontario region may have existed with students in other grades.

Moreover, the practice problem may not be limited to students' learning of mathematics; it may extend to students studying other subjects and topics. However, I was limited to only studying the poor math exam performances in Grade 6 students due in part because of the lack of time and financial resources. However, I believe that, despite the limitations on the sample size and the amount of data collected, I was able to reach saturation as no new themes emerged. In addition, there were limitations in terms of generalizability of the findings in how they can be applied to other population groups.

Student populations in other grades, in other regions in Canada, and also in other learning institutions such as private and international schools were not included in this doctoral study. Therefore, there may be limitations regarding the study's generalizability.

Furthermore, there were other limitations imposed on this study due to the initial problems I encountered in using the NVivo software due to my lack of expertise and understanding about how to process the qualitative data.

Another limitation pertains to the qualitative methodology that I used to collect the data. Although this methodology is ideal for gaining an understanding of subjective perceptions, experiences, and opinions, there are limitations in terms of overall statistical knowledge that is objective in its design and objectives (Scharp & Sanders, 2019). Quantitative methodology may have provided a wider scope of the research problem. However, I believe that a more subjective understanding was more relevant to this doctoral study. I also concede that there may have been research bias as I am also a math teacher and know some of the participants. Despite the possibility of such bias, I believe that the 12 interview questions posed to the 13 participants were sufficiently open-ended so as to allow each participant to freely voice their own opinions and feedback without any rhetorical influence from me. There was no attempt on my part to mislead or misinform any of the participants or deliberately influence the participants to answer the open-ended questions based on my own opinions and experiences.

Recommendations for Alternative Approaches

This doctoral study recommends that the 5 themes obtained from both the secondary and primary data derived from peer reviewed literature and from interviewee feedback should be included by those peer reviewed scholarly researchers conducting future research. First, it is recommended that all stakeholders concerned with this

research problem, namely the poor math exam outcomes by Grade 6 students should be granted free access to these findings. Grade 6 students or perhaps the primary stakeholders as they are the most affected by the inefficient and substandard current delivery of math to Grade 6 students in elementary schools in Southern Ontario, Canada.

It is recommended that these students should be asked to participate in future research initiatives so that their subjectively constructed feedback is obtained to inform future research. Grade 6 students may have entirely different perspectives and opinions based on their own unique experiences and intuition; such could uniquely inform future research. Participation by the students could facilitate an early intervention and avoid such similar problems from continuing due to the lack of research, the existence of a research gap, or the absence of understanding by adult stakeholders. It is also suggested that the students' parents and authorized carers should be invited to participate in this type of study as they will have a unique and perhaps more emotional aspect concerning this research problem and may have perceptions and knowledge about these students that is not available to the teachers and other educational stakeholders.

It is recommended that future research investigates not only the problems experienced by teachers tasked to deliver math in Southern Ontario and other regions in Canada, but also those teachers who are tasked to teach other subjects some of which subjects may be essential components of the curriculum. Moreover, a greater number of teachers in these regions should be asked to participate in interviews as well as survey questionnaires so a mixed methods form of doctoral study can be undertaken in order to

gain a wider viewpoint of this serious academic problem that currently exists in Canadian academic institutions.

A mixed methods approach would provide statistical viewpoints that could capture not only the depth of the research problem but also the extent of this problem. It is also recommended that these teachers should be encouraged to be more critical of not only the system under which they operate, but also of their own expertise and capabilities. This more reflective and introspective approach should not be attached to any retribution or punishment should such reflection point to their own personal inadequacies; such translates to the necessity for full anonymity for all participants in future research.

It is also recommended that these findings are made available to system administrators who are responsible for not only Grade 6 curriculums in Canadian education regions, but those who are also responsible for the administration of all young Canadian students in elementary schools and in all learning institutions in Canada. As senior decision-makers, they are ultimately responsible what happens lower down the academic hierarchy, so it is recommended that these senior administrators be held to account, and if possible, be asked to participate in future research leveraged by the mixed methods methodological approach.

Finally, but not least, these doctoral findings should be made freely available throughout the public domain. This is because what happens to emerging generations directly impacts the sustainability of humanity here on Earth. Therefore, we are all

ultimately responsible for what happens to our future teachers, engineers, entrepreneurs, and even parents, regardless of if we have children, and regardless of gender, ethnicity, and demographic background. If learning and knowledge is not delivered efficiently and seamlessly to emerging generations, then life itself on Earth may become compromised and unsustainable.

Scholarship, Project Development and Evaluation, and Leadership and Change

Evidence derived from this study findings clearly point to a scenario in which the current way of teaching math to Grade 6 students is unsustainable due to the decline in exam outcomes. The five themes that have emerged from the interviews are clearly supported by peer reviewed research is that the lack of motivation and confidence, and that the absence in some cases of relevant experiences in teaching math has led to the attenuation of students' performance in achieving expectations in EQAO math exams.

The first principle that is derived from these findings pertains to the necessity for key senior decision makers in the Southern Ontario region to interview all teachers who are involved in delivering math to Grade 6 students. All these teachers should be reassessed in terms of their cognitive and psychological capacity and ability to deliver math to Grade 6 students. Moreover, all shortfalls in delivering math to Grade 6 students should be tackled by implementing ongoing training programs so that all aspects of the new curriculum can be delivered seamlessly to all the Grade 6 students. This would serve to increase current low motivation levels that are evident in all those stakeholders who

are concerned with the delivery of math to Grade 6 students in the Southern Ontario region.

Another principle that should guide the process to address both teachers' and students' low performance in achieving good math exam outcomes concerns the concept of adequate preparation first by the teacher and then by the student. The themes clearly indicate that many of the teachers are not sufficiently cognitively and psychologically aware or sufficiently knowledgeable about how to prepare to teach the new math curriculum to Grade 6 students. In turn, this has led to the students being unable to prepare for these important math exams thereby contributing to the lack of motivation among the students.

Based on these two principles alone, the current situation with Grade 6 students in Southern Ontario in terms of current math exam outcomes is clearly unsustainable and requires urgent attention by all relevant and involved stakeholders within the Grade 6 academic jurisdiction including administrators, curriculum constructors, teaching staff, parents, and students. The emerging themes noted in Section 3 combined with the peer reviewed literature detailed in Section 1 clearly point to the scenario in which teachers, the delivery of learning and knowledge, and all the supporting academic networks and systems, should all be directed at a student-orientated approach in which the students' needs are the primary consideration and focus by all stakeholders.

Reflection on Importance of the Work

This research project is important to all the stakeholders associated with Grade 6 students studying the new math curriculum who are located in Southern Ontario, Canada. This project is important all beyond it as it examines the problems that emerge when teachers are unable to understand and interpret a new math curriculum in such a way that it can be delivered effectively to their students. While many researchers have looked at the problems posed when teachers cannot deliver the expected content from within the curriculum, there is a research gap based on the lack of evidence pertaining to the perceptions of Grade 6 math teachers in South Ontario elementary schools when they are faced with teaching math based on the new curriculum to students who experiences a declining performance in math exams. There is also a research gap regarding what support and resources these Grade 6 math teachers need to teach math more effectively in their classrooms.

This project is critically important as it provides multiple concerns qualitatively elicited from participant teachers who are representative of those teachers who are tasked to teach these Grade 6 students. Interview results and subsequent findings in this project indicate that all the 12 themes that emerged from the semistructured interviews supplied the missing evidence of what resources these teachers need in order to take care of those students who have been allocated within their realm of responsibility. This project suggests that if the recommendations stated in this section are carried out by future researchers, there is a reasonable possibility that the current problems that currently exist

with Grade 6 elementary school stakeholders can at least be attenuated if not removed altogether.

Implications, Applications, and Directions for Future Research

This doctoral study believes that most people are stakeholders of emerging generations which at some point require education in schools as they evolve into adulthood. This study has looked closely via secondary and primary research into the compromise and decline of the delivery of math to Grade 6 students in Southern Ontario, Canada. The utilization of the qualitative methodology has allowed this study to extract both general and tacit knowledge from those who deliver math-based learning to young Canadian students. Therefore, documented and peer reviewed facts have emerged from peer reviewed scholarly research based on real life scenarios and theoretical concepts that pose implications in terms of reversing an unsustainable decline in teaching methods to Grade 6 elementary students in Southern Ontario.

This inductive approach by accessing teacher perspectives, experiences, and intuitions serves not to measure the extent of the problem but rather understand the depth and seriousness of this research gap. There are implications in terms of better exploiting the potential of the new Grade 6 curriculum and leveraging the talents and skills inherent in human resources tasked to deliver knowledge to students. This doctoral study offers significant potential impact to facilitate transformational changes within the Canadian education system so that emerging Canadian generations are provided with every possible opportunity to grow and be successful in the new global economy.

The results and findings have implications not only for Grade 6 students and math teaching staff, but also for all early noted stakeholders. This translates into the need for action and not words from those who are able to deliver meaningful decisions at senior levels of hierarchal authority within the Canadian educational system. Should the recommendations be undertaken, then the input of all stakeholders including that of students would better inform the discussion in how knowledge and learning should be delivered to all students throughout the Canadian educational system.

It is posited that not one student should be left behind, and that not one teacher should be left untrained or unable to deliver math or any other subject efficiently and seamlessly to Canadian students. When the bar is raised, and standards are improved, it becomes a win-win scenario for all stakeholders. As and when the delivery of learning and knowledge standards are improved, then there are important implications not only for academic institutions in Southern Ontario, Canada but also for all Canadian society. It is essential that the input and contributions made by immediate stakeholders namely students, parents, teachers, and senior administrators should be supported and actively encouraged by wider society in terms of funding and the input of other societal resources.

Conclusion

It is concluded by this doctoral study, that the current scenario of declining EQAO scores in math exams in elementary schools in Southern Ontario, Canada, cannot be left to continue as this scenario is unsustainable and if left unchecked can impose significant and perhaps irreplaceable damage to the emerging generations of Canadian students.

There is significant qualitative evidence that points to the awareness of teachers who are tasked to teach math to Grade 6 students that cannot be left to continue in its present downward trajectory. The rationale behind this doctoral study was to investigate the teachers' perception on the decline in math exam EQAO scores. The findings clearly demonstrate that the input and cooperation of all stakeholders who are involved in the delivery of Grade 6 math to the students is needed in order to transform the current inadequate Grade 6 Canadian educational system. These stakeholders should support the delivery of knowledge and learning that best serves Canadian students.

It is concluded that all the participants agreed that the current Grade 6 delivery of math to their students is problematic due in part to the lack of training for the teaching staff and also the lack of preparation for those students tackling the EQAO math exams. It was also found that there were serious shortfalls in many of the teachers with regards to their basic knowledge and expertise in terms of how they should deliver the math curriculum to their students. This doctoral research study looked closely at Bandura's SCT and found that the teaching and learning process is dependent not only on an academic framework but also on the social context.

This SCT is a process in which individuals such as students and teachers can interact and reciprocate to ensure that learning is delivered efficiently and seamlessly. The 5 themes that emerged from the results and findings served to address the two RQs detailed in Section 1 in that there is a decline in math scores for Grade 6 students in the

Southern Ontario region, and there is a shortfall of resources and capabilities within the current Canadian elementary school system.

Based on the participation of teacher participants, NVivo thematic coding, and subsequent analysis, it is concluded that the 13 participants validated my own personal perception that the new curriculum is not optimized or leveraged to its full potential to the extent that the physical and psychological well-being of Grade 6 students in this region is compromised as they are consistently underperforming in their EQAO math exams. It was also concluded that Canadian students in elementary schools deserve the very best education that Canada can offer, so therefore it is important that the full resources and talents available in Canadian teachers are exploited and utilized. When the human resources in teachers are fully exploited only then can the full potential of Canadian students be developed.

From a more reflective stance, as a Grade 6 math teacher, I have been significantly psychologically challenged over a long period of time about this significant academic problem that has been allowed to deteriorate into a downward trajectory. The doctoral journey has indeed been a challenging one due to material and financial limitations. Moreover, it has not been easy to investigate a problem in which I am a part of and may even be an unwitting contributor to the problem.

As a possible part of the causation of this unsustainable and unacceptable academic problem, I have had to overcome any guilty feelings or lack of self-confidence. Instead, I have had to learn to look more towards the future and ask how such so called

insurmountable problems can be identified, addressed, and overcome. I believe that if these academic problems can be quickly addressed and resolved, then our students can be given every possible chance and opportunity to face what the future offers within the Canadian political, educational, and social landscape.

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Appendix A: The Project

Day 1: Teacher Professional Development Day (10 a.m. to 3 p.m.)

10:00 a.m.	Introductions - Welcome and introducing each other.
10:15 a.m.	Teachers will pick a random mystery card from the jar and read it. Each card will present a fact about the decline in EQAO Grade 6 math results.
10:30 a.m.	Teachers will be paired in groups and tasked to discuss and come up with suggestion/s pertaining to all the possible reasons and causations for this decline. Based on each teacher group's perspective, each group will design, create, and construct a poster on ways regarding how to avoid this decline.
11:10 a.m.	Each teacher group will present their poster and clarifies the rationale behind the poster message details.
12:00 p.m.	A 30-min brunch break. Food will be served to the participants.
12:30 p.m.	Presentations will be about the EQAO exam in southern Ontario and how the new math curriculum may impact the students' performance levels in math. The presentation will be designed so that the teachers understand the entire project training program and the purpose behind this training.
1:30 p.m.	A video will be shown pertaining to why math is an important subject for all students and how poor math results may negatively impact their choices at the post education level.

2:00 p.m.	More group work in which teachers will be paired together to review the past historical results from the EQAO website. Teachers will be made aware of the necessity to determine the urgent need for academic intervention in terms of the delivery of math to Grade 6 students; such will require immediate change and improvement.
2:30 p.m.	Teachers will be asked to present some of the facts they will learn from the EQAO website and some other previous projects that had been conducted to overcome the current unsustainable situation which impacts Grade 6 students.
3:00 p.m.	In closing, will thank all the teacher training participants.

Day 2: Teacher Professional Development Day (10 a.m. to 3 p.m.)

10:00 a.m.	Greetings to all training participants and each teacher will be randomly paired into groups. Each group will be asked to design a card based on their knowledge about the new math curriculum. The groups will be invited to present and share their cards with each other.
10:30 a.m.	Full training will be conducted about the new curriculum, and what will be the expectations and learning objectives derived from G1-G6.
12:00 p.m.	A 30-min brunch break. Food will be provided for the participant teachers.

12:30 p.m.	Presentations will pertain to all the possible resources (institutional and online) that can be accessed to support the teachers' needs.
1:30 p.m.	Teachers will participate in a fun activity. They will conduct a Grade 6 EQAO teacher and student version of exam (questions and answers) to determine both their math background and competence, and their confidence in teaching math. Teachers will take their exam complete with the with the answer key.
2:30 p.m.	Teachers will receive folders/binders with all the possible resources to teach Grade 6 math, and a practice sample for the EQAO test.
3:00 p.m.	In closing, will thank all the teacher training participants.

Day 3 Teacher Professional Development Day (10 a.m. to 3 p.m.)

10:00 a.m.	Greeting to all training participants and each teacher will be randomly paired into groups. Each group will be tasked to design and create the most effective math block within 15 min. They will present their lesson plan including their design for the math block. They will compete and then judge each other to consensually determine the most effective best math block.
11:00 a.m.	As groups, subsequent to presenting the most effective math block, they will judge each group regarding to what extent the students' needs and abilities were met by the math block.

12:00 p.m.	A 30-min brunch break. Food will be provided for the participant teachers.
12:30 p.m.	Teachers will be tasked to create networking connections and then to create a platform between the teachers as a means to share resources, lessons plans, quizzes and worksheets.
1:30 p.m.	Based on the 3-day training material and content, each teacher will present about how they would teach math to Grade 6 students and how they would prepare themselves and their students for the EQAO test starting in September of each school year. Other potential effective techniques will be presented and documented to be used in the near future by the teachers.
2:30 p.m.	In concluding the 3-day training program, each teacher is invited to share their thoughts and provide written leave feedback based on their experiences and perceptions of the training program.
3:00 p.m.	In closing, I will thank all the teacher training participants for their participation.

Appendix B: Teacher Interview Questions

1. Please tell us about your role as an elementary certified Ontario teacher
    a) How many years of experiences do you have?
    b) Which grades have you taught during your journey as a teacher?
    c) Do you prefer to teach primary or junior level? Why?
    d) Did you teach math to Grade 6 students? When? For how long?
2. Please tell us about the new curriculum
    a) What do you think about it?
    b) Do you think the new curriculum may affect student performance?
3. Tell us about the professional development you have for the new curriculum.
    a) Do you have all the required resources? Explain
4. Are you aware of Grade 6 EQAO scores in math for the past decade? Please explain.
5. Describe your level of confidence teaching mathematics to Grade 6?
6. From your perspective, describe the students' performance in math for the past 5 years
7. What are your experiences in preparing Grade 6 students for EQAO?
    a) Have you encountered any challenges?
    b) What can be done to overcome their challenges?
8. Explain if teacher self-efficacy in teaching math may improve the EQAO Grade 6 math score? How?
    a) Does the teacher-student behavior capability make a difference?

9. Are you comfortable answering some sample questions from the EQAO test in this interview? Explain
10. How do you plan for math lessons including integrating the new math curriculum?
11. Please describe a typical math block in your daily schedule
12. From your experiences, why do you think that there is a major decline in EQAO math scores in Grade 6?

Appendix C: Recruitment Email

Greetings,

My name is Asma Dahbour. I am a doctoral candidate at Walden University. I am currently pursing my Ed.D degree in curriculum, instruction, and assessment. I am inviting you to participate in a research study.

The title of my study is Teachers' Perceptions of challenges and support needed to teach mathematics to Grade 6 students. I am seeking approximately 12-15 Ontario certified teachers who are certified to teach K-6 in southern Ontario. These teachers must have a minimum of 3-5 years of experiences.

Participation in this study is voluntary and volunteers may opt out or withdrawal for any reason. This research is anticipated to benefit the EQAO test scores. The study recommendations may provide some recommendations for resources and professional development sessions to improve student achievement.

Kindly, if you are interested in participating in this study, please review the consent form. I attached it in this email. Please email me back at [email address redacted] with a confirmation by including the words "I consent".

The chairperson in this research is Dr. Heather Caldwell [email address redacted]. You may contact her for any reasons or concerns.

Thank you for your consideration. I am looking forward to hearing from you soon.

Best Regards,

Asma Dahbour

Appendix D: Codes From Interview Questions

Table D1

Codes Derived From Interview Question 1

Interview question (IQ)	In vivo code	Process code
IQ1: "Please tell us about your role as an elementary certified Ontario teacher." a) "How many years of experiences do you have?" b) "Which grades have you taught during your journey as a teacher?" c) "Do you prefer to teach primary or junior level?" "Why?" d) "Did you teach math to Grade 6 students?" "When?" "For how long?"	TA1: Relationships and teaching self-efficacy TA2: Certification and experiences TA2: Resources and confidence TA3: Resources and confidence TA4: EQAO math exam prep	Developing relationships and self-efficacy improves students' math skills. Certification and experiences help teaching students. Resources and confidence help teachers and students. Resources and confidence help teachers and students. Ability to teach math improves students' EQAO scores.

Table D2

Codes Derived From Interview Question 2

Interview question (IQ)	In vivo code	Process code
IQ2: "Please tell us about the new curriculum." a) "What do you think about it?" b) "Do you think the new curriculum may affect student performance?"	TA5: New curriculum TA6: EQAO math exam prep	Teacher adaptation to new math curriculum helps students to learn. Ability to teach math improves students' EQAO scores.

Table D3

Codes Derived From Interview Question 3

Interview question (IQ)	In vivo code	Process code
IQ3: "Tell us about the professional development you have for the new curriculum." "Do you have all the required resources? Explain."	TA7: New curriculum	Teacher adaptation to new math curriculum helps students to learn.
	TA1: Relationships and teaching self-efficacy	Developing relationships and self-efficacy improves students' math skills.
	TA4: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
	TA2: Certification and experiences	Certification and experiences help teaching students.

Table D4

Codes Derived From Interview Question 4

Interview Question (IQ)	In vivo code	Process code
IQ4: "Are you aware of Grade 6 EQAO scores in math for the past decade? Please explain."	TA8: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
	TA4: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
	TA2: Certification and experiences	Certification and experiences help teaching students.

Table D5

Codes Derived From Interview Question 5

Interview question (IQ)	In vivo code	Process code
IQ5: "Describe your level of confidence teaching mathematics to Grade 6?"	TA4: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
	TA2: Certification and experiences	Certification and experiences help teaching students.
	TA13: Resources and confidence	Resources and confidence help teachers and students.

Table D6

Codes Derived From Interview Question 6

Interview question (IQ)	In vivo code	Process code
IQ6: "From your perspective, describe the students' performance in math for the past 5 years."	TA6: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
	TA13: EQAO math exam prep	Ability to teach math improves students' EQAO scores.

Table D7

Codes Derived From Interview Question 7

Interview question (IQ)	In vivo code	Process code
IQ7: "What are your experiences in preparing Grade 6 students for EQAO?"	TA4: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
	TA2: Certification and experiences	Certification and experiences help teaching students.
a) "Have you encountered any challenges?"	TA9: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
b) "What can be done to overcome their challenges?"	TA1: Relationships and teaching self-efficacy	Developing relationships and self-efficacy improves students' math skills.

Table D8

Codes Derived From Interview Question 8

Interview question (IQ)	In vivo code	Process code
IQ8: "Explain if teacher self-efficacy in teaching math may improve the EQAO Grade 6 math score? How?"	TA8: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
	TA4:EQAO math exam prep	Ability to teach math improves students' EQAO scores.
"Does the teacher-student behavior capability make a difference?"	TA2: Certification and experiences	Certification and experiences help teaching students.
	TA10: Relationships and teaching self-efficacy	Developing relationships and self-efficacy improves students' math skills.

Table D9

Codes Derived From Interview Question 9

Interview question (IQ)	In vivo code	Process code
IQ9: "Are you comfortable answering some sample questions from the EQAO test in this interview? Explain."	TA1: Relationships and teaching self-efficacy	Developing relationships and self-efficacy improves students' math skills.
	TA11: Resources and confidence	Resources and confidence help teachers and students.

Table D10

Codes Derived From Interview Question 10

Interview question (IQ)	In vivo code	Process code
IQ10: "How do you plan for math lessons including integrating the new math curriculum?"	TA7: New curriculum	Teacher adaptation to new math curriculum helps students to learn.
	TA1: Relationships and teaching self-efficacy	Developing relationships and self-efficacy improves students' math skills.
	TA4: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
	TA2: Certification and experiences	Certification and experiences help teaching students.

Table D11

Codes Derived From Interview Question 11

Interview question (IQ)	In vivo code	Process code
IQ11: "Please describe a typical math block in your daily schedule."	TA1: Relationships and teaching self-efficacy	Developing relationships and self-efficacy improves students' math skills.
	TA4: EQAO math exam prep	Ability to teach math improves students' EQAO scores.
	TA2: Certification and experiences	Certification and experiences help teaching students.
	TA12: EQAO math exam prep	Ability to teach math improves students' EQAO scores.

Table D12

Codes Derived From Interview Question 12

Interview question (IQ)	In vivo code	Process code
IQ12: "From your experiences, why do you think that there is a major decline in EQAO math scores in Grade 6?"	TA8: EQAO math exam prep TA4: EQAO Math exam prep TA2: Certification and experiences	Ability to teach math improves students' EQAO scores. Certification and experiences help teaching students.

Appendix E: Initial Transcript Codes

Interview question (IQ)	In vivo code	Process code
IQ1: Please tell us about your role as an elementary certified Ontario teacher. a) How many years of experiences do you have? b) Which grades have you taught during your journey as a teacher? c) Do you prefer to teach primary or junior level? Why? d) Did you teach math to Grade 6 students? When? For how long?	TA1: Role TA2: Teaching Ability TA2: Teaching Ability TA3: Teachers class choice TA4: Math Ability	The role of the teacher as a mentor and direction giver The ability to impart knowledge at the level based on past experiences. The ability to impart knowledge at preceding levels. Teachers' preferences for classes and subjects based on qualifications, experiences, and language. The ability to teach math based on the training received.
IQ2: Please tell us about the new curriculum. c) What do you think about it? d) Do you think the new curriculum may affect student performance?	TA5: New Curriculum TA5: New Curriculum TA5: New Curriculum TA6: Performance	How the new math curriculum falls within the understanding of the teachers. How the new math curriculum can be used to improve students' math performance.
IQ3: Tell us about the professional development you have for the new curriculum. a) Do you have all the required resources? Explain	TA7: Training TA1: Role TA4: Math Ability TA2: Teaching Ability	The ability to adapt to the new math curriculum through training. Applying the role of the teacher in ensuring the success of the new curriculum in impacting the students' math performance
IQ4: Are you aware of Grade 6 EQAO scores in math for the past decade? Please explain.	TA8: Maths Performance TA4: Math Ability TA2: Teaching Ability	The ability to review past students' performance in math with the aim of making adjustments for improvements.

Interview question (IQ)	In vivo code	Process code
IQ5: Describe your level of confidence teaching mathematics to Grade 6?	TA4: MathAbility TA2: Teaching Ability TA13: Confidence	The use of training and peer evaluation, and the ability to teach and solve Grade 6 math.
IQ6: From your perspective, describe the students' performance in math for the past 5 years	TA6: Performance TA14: Poor-Math-Problem	The ability to review past students' performance in math and proffer solution.
IQ7: What are your experiences in preparing Grade 6 students for EQAO? c) Have you encountered any challenges? d) What can be done to overcome their challenges?	TA4: Math Ability TA2: Teaching Ability TA9: EQAO Preparation TA1: Rôle	The ability to adapt to the new math curriculum through training. Applying the role of the teacher in ensuring the success of the new curriculum in impacting the students' math performance
IQ8: Explain if teacher self-efficacy in teaching math may improve the EQAO Grade 6 math score? How? a) Does the teacher-student behavior capability make a difference?	TA8: Performance TA4: Math Ability TA2: Teaching Ability TA10: Self-Efficacy	The ability to adapt to the new math curriculum through training. Applying the role of the teacher in ensuring the success of the new curriculum in impacting the students' math performance
IQ9: Are you comfortable answering some sample questions from the EQAO test in this interview? Explain	TA1: Role TA11: EQAO Confortable	Reviewing the role of the teacher in curriculum development and implementation
IQ10: How do you plan for math lessons including integrating the new math curriculum?	TA7: Training TA1: Role TA4: Math Ability TA2: Teaching Ability	The ability to adapt to the new math curriculum through training. Applying the role of the teacher in ensuring the success of the new curriculum in impacting

Interview question (IQ)	In vivo code	Process code
		the students' math performance
IQ11: Please describe a typical math block in your daily schedule.	TA1: Role TA4: Math Ability TA2: Teaching Ability TA12: Math block	Applying the role of the teacher in laying the foundations for subjects taught
IQ12: From your experiences, why do you think that there is a major decline in EQAO math scores in Grade 6?	TA8: Performance TA4: Math Ability TA2: Teaching Ability	The ability to review past students' performance in math and how the previous curriculum has impacted on their performance

Appendix F: Site Agreement

Subject: Request for Data Collection

Dear [redacted],

I'm writing in regard to data collection to complete the requirements for a Doctor of Education degree at Walden University in USA. My project study is about Math. Mathematics is an essential backbone subject for any individual attending any learning institution and is applicable in almost all fields and industries. However, current literature shows that mathematics is being poorly performed, specifically by Grade 6 students in Southern Ontario. The purpose of this study is to look at the perception of Grade 6 teachers regarding teaching math and implementing the new math curriculum that has been adopted in 2020.

I declare in this letter that I will only interview certified teachers to collect information about their perception of teaching math to Grade 6 students. School name, students' information or the organization information will not be used in any part of my study. Walden University has a strict ethical standard and clear privacy policy towards using the data.

I intend to use the data collected to support the findings which will be utilized to construct a 3-day professional development program to improve Grade 6 teachers' math instructions and enhance the teaching strategies. This could lead to positive social change by helping teachers increase their behavior and learning in mathematics instruction which could positively impact student learning as they continue with testing now that the pandemic is subsiding.

I will be sharing this data with the Walden University in accordance with your organization's protocols.

I heartily express my gratitude in considering our request for data collection. We assure you that all protocols will be followed, and privacy regulations will be adhered to. If you have any questions or concerns, my chair's contact information is (heather.caldwell@mail.waldenu.edu).

Best regards,

Asma Dahbour

For the School Board only:

✓ Agree	○ Not Agree
Name:	Position:
signature Redacted	

Contact Information;

[redacted]

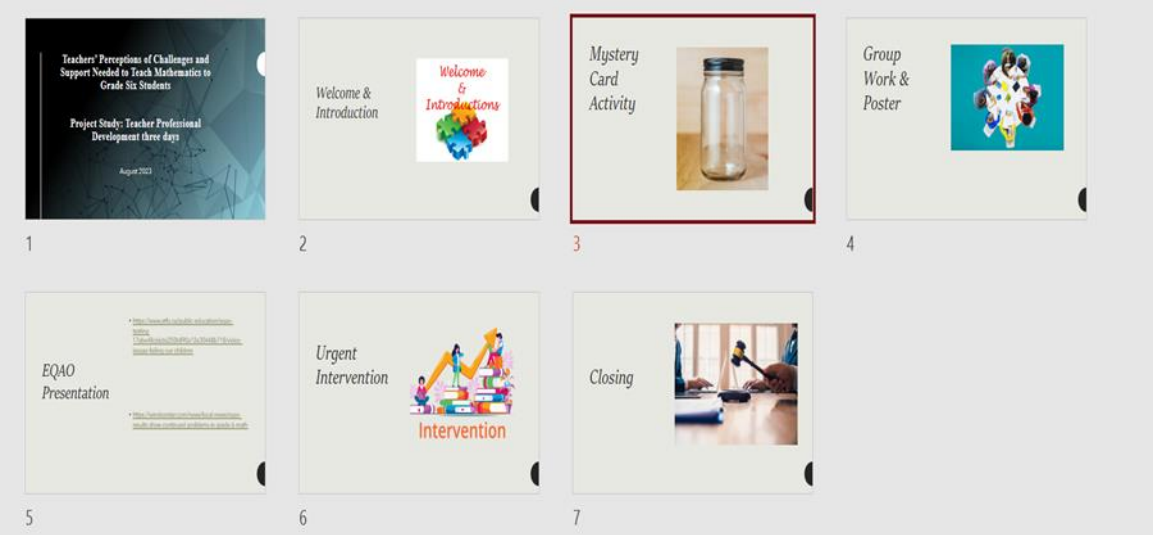
[redacted]

Chair Person

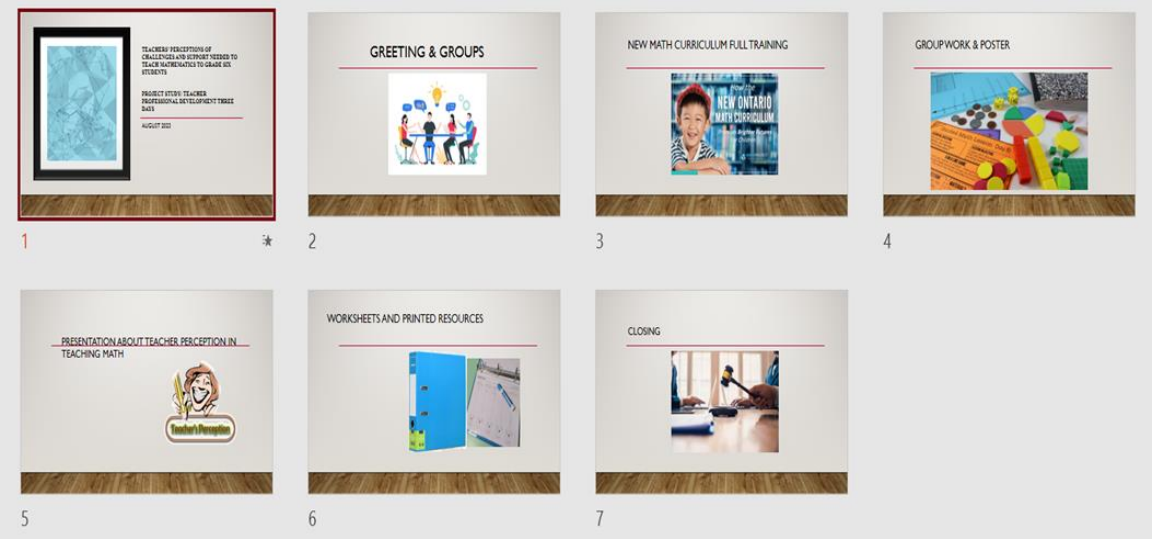
519-253-3000 ext: [xxxx]

Slides

Day 1 Slides



Day 2



Day 3 Slide


Teachers' Perceptions of Challenges and Support Needed to Teach Mathematics to Grade Six Students
Project Study: Teacher Professional Development three days
Greeting
Effective Math Block Full Training
Training for techniques and methods to conduct the most effective math lesson plan
Our Teaching Techniques
MENTAL
VERBAL
VISUAL
WRITTEN
TACTILE
Platform to share recourses and create active networking
Preparation for EQAO math test
EQAO Test Ready
NELSON
EQAO
Closing
1
2
3
4
5
6
7