Parental Involvement in Mathematics Homework in Elementary and Junior High Schools of the Newfoundland and Labrador English School District: A Mixed Methods Approach

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Introduction to Thesis Proposal

The declining mathematics scores of Canadian students is a great cause of concern for educational stakeholders and is provoking a passionate debate on the need for reform of mathematic curricula implemented across the country. Policy makers, educators, students, and parents alike are left wondering what it is they can do to make a difference. Educational research indicates that parental involvement is a valid means of providing the extra support students need to enhance their learning acquired in formal educational settings (i.e. school) and can have positive effect(s) on student learning. Traditionally, parents become involved in their children's education by engaging in homework tasks completed in the home. While mathematics homework has long been accepted as a means of enhancing student learning by reinforcing lessons/skills taught in class, in recent years it has also been considered an opportunity to increasing parental involvement. Therefore, this study aimed to investigate the role and behaviours parents adopt when engaged with their children's mathematics homework to gain insights to make recommendations for ways to improve parental involvement.

In chapter 1, I outline and specify the problem I investigated by seeking answers to two specific research questions. To provide context for the investigation, an extensive review of past and present educational research is presented pertaining to declining mathematics scores in Canada, parental involvement (adopted roles, behaviours, and direct actions), and types of support/strategies parents typically engage in when involved with their children's homework. Additionally, the following chapter outlines and justifies the mixed methods methodology that was used to collect and analyze data so that meaningful inferences can be made regarding parental involvement in mathematics homework.

Chapter 1 - Statement of the Problem

Introduction

Parental involvement is a widely debated and researched topic in education. As the world is rapidly changing, we are becoming a more diverse society that values varied instruction, critical thinking, and specialized skill sets. Hence, there is a constant need to reform the current education model(s) to meet these standards and expanded demands placed on learners. Often, educational institutions and policy makers look beyond the school setting and count on parental involvement in education as the "extra support" needed for students to succeed. "The importance of parental involvement in their childrens' education, particularly when pupil underachievement is likely, appears largely uncontested." (Edwards & Warin, 1999, p.325). Therefore, it is important to understand what parental involvement is, and to what extent it is useful in helping children advance their knowledge and develop abilities to thrive in school. For years, parents have engaged with their children's learning at home by assisting them with their homework as it serves as a practical, straightforward means of being involved. However, as research indicates (Baker & Soden, 1997; Cooper, Robinson & Patall, 2006; Cooper et al., 2008; Gondia & Cortina, 2014; Hoover-Dempsey, Battito, Walker, DeJong, Jones, 2001) parents' involvement in their children's education through homework is complex, and needs careful consideration for the involvement to make meaningful contributions to learning.

Homework in mathematics is commonly used by educators to support in classroom learning on the assumption that extra practice will reinforce concepts and improve student achievement (Rosario, Nunez, Vallejo, Cunha, Nunes, Mourao & Pinto, 2015). Brochu, Deussing, Houme & Chuy (2012) reviewed the Organisation for Economic Co-operation and Development **(**OECD**)** Programme for

International Student Assessment **(**PISA) report and found that Canadian mathematical scores are comparatively strong. However, the same report indicates that mathematical results for individual Canadian provinces are slipping, with the exception of Quebec. Declining numeracy scores is an area of great concern for ministers of education across the country who have joined together to rectify the problem (Brochu et al., 2012). The reaction of government officials signifies that the development of mathematics education is a real concern. Parental involvement can serve as the extra support needed to increase mathematics scores of Canadian students.

In this chapter, I first present the purpose of my study and articulate my research questions that aim to gain insights into parental involvement in mathematics homework and its impact on student learning. I then discuss the significance of the study by addressing the challenges of parental involvement in children's education by exploring how homework, parental involvement with homework, and more specifically mathematics homework, contributes to student learning. Finally, prior to concluding the chapter, I address assumptions and limitations that are both implied or imposed on the study.

Purpose of the Study

This study aimed to examine how parents involve themselves by focusing on the interactions between the child and the parent during the completion of teacher assigned homework. More specifically, I intended to investigate how parental involvement with mathematics homework influences children's learning by exploring the direct actions, role, and behaviours parents adopt when they engage in their children's mathematics homework.

To learn of parents' involvement in mathematics homework, I intend to examine the practices of parents of elementary and junior high school students in the Ascension family schools in Conception Bay North Region of the Newfoundland and Labrador English School District. As a mathematics educator

working in this area, I have regular contact with this population and I am familiar with the government approved curriculum and district policies regarding homework. Once I obtained a clear understanding of parental involvement with homework, I explored ways their engagement with mathematics homework could improve their children's learning at home.

Research Questions

The research study aimed to answer the following questions.

i. Does the role parents adopt impact their involvement with mathematics homework?

ii. What practices do parents engage in as they assist their children in completing mathematics homework?

Significance of the Study

Homework is not a new concept in education. For many years, educators have used homework to support classroom lessons by providing students with tasks that reinforce learning. Homework can serve as a bridge between the home and the school allowing parents to see lessons taught first hand, and the opportunity to communicate with their children and/or school about their learning. Investigating the positive relationship between the completion of homework practices and student achievement (Cooper et al., 2006) can establish good homework practices, leading to improved student achievement. Homework practices can develop other desirable attributes that contribute to positive behaviours such as self-discipline, independent thinking, and time management skills (Cooper et al., 2006) which are very important in all aspects of life. However, it is rash to assume that assigning "homework" is the solution to the challenges that exist for parents who want to increase their involvement in their children's mathematics homework. In fact, Van Voorhis (2011) states, "Homework is an everyday practice that currently elicits strong and, often negative reactions from student, parents, and teachers." (p.34). Thus, in order to approach

homework from a constructive perspective to improve parental involvement, further investigation into how homework contributes to learning must occur.

Homework support is a distinctive form of parental involvement whereby it requires direct, one-on-one participation with the child. Parental involvement in children's formal schooling is not a newly studied or discussed subject. A quick Google search will produce countless articles and books on the topic, offering a multitude of opinions and perspectives. "While practitioners and researchers support recent policy direction for increased parental involvement in their children's education, little consensus exists about what constitutes effective parent involvement" (Baker & Soden, 1997, p.1). In this investigation, I aimed to uncover effective parental practices that positively impact learning. Rodrigues (2012) found mathematics educators motivated students by providing continuous feedback, reinforcing skills, modeling positive behaviours, and offering solutions. If parents adopt the same approach to involve themselves in their children's mathematics homework, meaningful contributions could possibly be made to children's learning. One of the most prevalent incentives for parents to be involved in their children's education is their belief this will improve student achievement (Cooper et al., 2006). Thus, understanding the role parents adopt to support their children in mathematics homework and the practices they engage in is important to understanding how parental involvement in mathematics homework could improve their children's learning.

One of the goals of this study was to investigate how parents are involved in mathematics homework. Understanding the balance between parental frustration and responsibility is important in understanding parental involvement in mathematics homework. As a mathematics educator, I often feel frustrated and despondent in the face of parents' lack of interest in their child's mathematics education. On the other hand, I encounter parents who want their child to succeed but struggle with their own feelings of incompetence. Still, mathematics educators continue to assign homework to reinforce mathematics

skills with the aim to improve student learning without considering the impact of parental involvement. The range of possible ways parents can engage with mathematics homework is quite broad (Van Voorhis, 2011), allowing ample opportunity for parents to become involved. Tasks are typically individualized in purpose (practice, preparation, and extension), and may be interconnected with other subject areas such as science, technology and engineering (Rosario et al., 2015). However, even with the versatility of mathematics homework, Canadian provincial math scores continue to decline.

> Significantly, ministers of education agreed in July 2013 that numeracy was a key priority and that "provinces and territories would work together to identify and share best practices on innovative teaching and learning strategies to raise student achievement in this area" (Brochu et al., 2012).

Parental involvement in their children's mathematics homework could provide the extra support needed to improve student achievement, and positively challenge declining mathematics scores in Canada. Hence, for these reasons, I examined parents' involvement in mathematics homework and its impact on their children's learning.

Limitations and Assumptions

As with every study, limitations of data collected impacted subsequent conclusions drawn from the investigation. For this reason, it was necessary to consider the assumptions and restrictions to ensure that valuable and reliable findings were reported. To begin, it has been assumed that students are assigned mathematics homework tasks to be completed at home and to minimize misunderstandings throughout the investigation, I provide definitions of key terms. I define "parental involvement" as any action a parent takes to improve a child's performance (McNeal, 2014) and the term "homework" as teacher-assigned tasks to be completed outside the classroom. This study was further limited as self-

reporting limitations influenced data collection and inferences made. Additionally, I chose to limit the scope of the investigation by focusing on parental involvement in mathematics homework of Canadian students as international standard assessments show that math scores are declining.

This investigation of parental involvement using mathematics homework required human participation. Respect for confidentiality and privacy were very important due to the nature of questioning. Questioning parents on their role, practices, and support given during the completion of mathematics homework tasks requires them to examine their involvement and give reason for their actions. This is potentially a sensitive matter for participants rendering the collected data to be less reliable than they would be if the study focused on a less private matter. Finally, I assumed that students were assigned homework tasks to be completed at home, offering parents the opportunity to involve themselves in their child's learning.

Conclusion

There is no quick or simple approach to involving parents in education effectively. The continued efforts of educational researchers indicate that questions regarding how parents can use homework to contribute to their children's learning remain. While it has been found that student homework has the potential to improve student achievement (Cooper et al., 2006) and that parental involvement can have a positive effect on student learning (Edwards & Warin, 1999), there is little to no research that studies the effectiveness of parental support in students learning mathematics. In this study, I first aimed to understand how parents of elementary and junior high aged children engage themselves with their child's mathematics homework. Then using those findings, investigated how parents could meaningfully engage with mathematics homework to make recommendations that can positively impact student learning. In the next

chapter, I examined the research literature on parental involvement in education in order to inform and to set a direction in conducting the study.

Chapter 2 - Literature Review

Introduction

In this chapter, I examine the research findings of peer reviewed literature regarding parental involvement in their children's education. Through a structured review, significant findings of past and present educational research informed this study on parental involvement with mathematics homework at the elementary and junior high levels. Issues that can be attributed to "how" parents engage with their children's mathematics homework are both observable and hidden. For the purposes of this study, the following questions guided the literature review: (i) *How do parents construct their role when involved in their children's education?* (ii) *How do parents engage in the homework process of mathematics?* (iii) *What parental behaviours affect student learning in the completion of homework tasks* and (iv) *what types of parental strategies/support increases student mathematical achievement.* Literature that addresses these questions provided insight into the influences that impact decisions regarding how parents present/perceive themselves *(role*), their motivations to be involved (*behaviour*), how they operate (engagement), and the *strategies* used by parents to support the learning that may lead to increases in student mathematical achievement.

To begin this review, I provided an overview of the literature on parental involvement in student learning. Next, I examine the declining mathematics scores of Canadian students and expert rationalizations for the downward trend as reported by the Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment (PISA). PISA reports, spanning more than a decade (2003-2015), document the decreasing trend in mathematics scores for Canadian students, including students in Newfoundland andLabrador . The 2003-2015 PISA results are alarming to

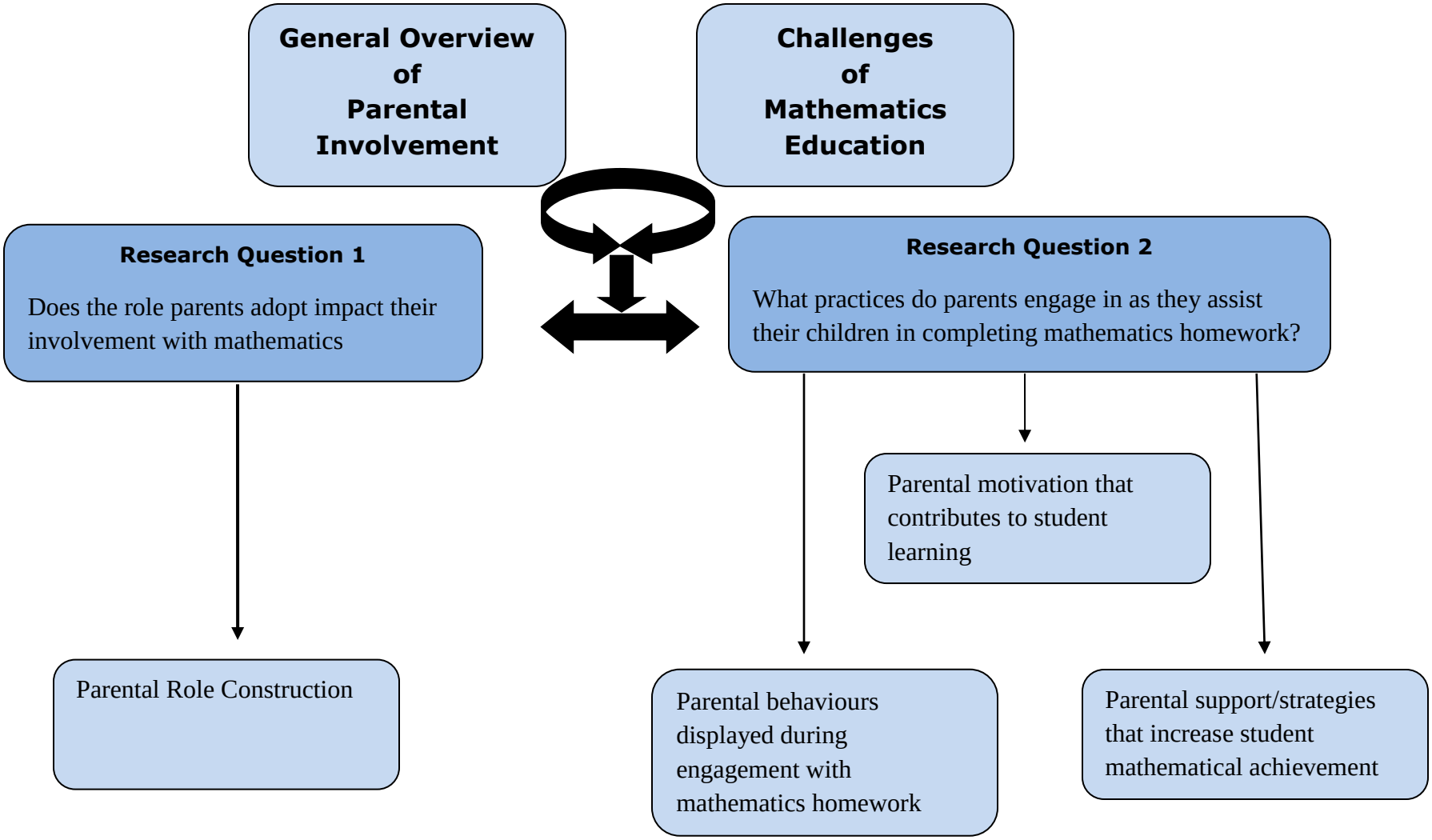
educational stakeholders including government officials, policy makers, and school administrators (Brochu et al., 2012; McMahon, 2014; Richards, 2014b; Stokke, 2015) since "Strong mathematics knowledge is required for success in the workforce, and early achievement in math is one of the best predictors of later academic success and future career options." (Stokke, 2015, p.1). Student achievement in mathematics for this study means increasing mathematic scores on in-class work such as test and assignments.

Examining how parents involve themselves during the completion of teacher assigned homework tasks requires focus on the interactions between the children and the parent. An investigation into how parents construct their role and associate meanings to being an involved parent is crucial. The type of relationship parents have with their children contributes to how they construct their role and influences how they involve themselves and/or take responsibility for their children's education. "Therefore, understanding how and why parents become involved is crucial in building and strengthening the relationship between parental involvement and performance in school." (Wilder, 2015, p.12). Hence, parents' sense of self efficacy and assumed role(s) influences how they support their children when assisting them in the completion of assigned homework, and be examined.

Parental behaviours that are observable (i.e., parents direct hands-on actions), are also important to the study's purpose. The explicit actions and underlying motivations behind parental behaviours are key when exploring practices parents engage in as they assist their children in completing mathematics homework.

Finally, strategies used by parents to support their children's mathematics learning were examined using teacher assigned homework tasks to make recommendations for how parental involvement can improve student achievement. *Figure 1* illustrates the topics included in this literature review.

Figure 1: Overview of Literature Reviewed



Overview of Parental Involvement in Homework

Parental involvement is a topic that has attracted a great deal attention in educational research over the past decades (Baker & Soden, 1997; Gondia & Cortina, 2014; Hoover-Dempsey et al., 2001; Hover-Dempsey & Sandler, 1995, 1997; McNeal, 2014; Patall, Cooper & Robinson, 2008; Wilder, 2015). "Schools are becoming more diverse, and a great challenge facing educators is meeting the needs of all students. Closing the achievement gap and increasing student learning requires the collaboration of various interested groups, most notably parents." (Larocque, Kleiman & Darling, 2011, p.115). Much of the research that has been conducted regarding parental involvement in education supports the claim that an increase in parental involvement in children's education leads to an increase in student achievement (Baker & Soden, 1997; Cooper 1989; Patall et al., 2008; Wilder, 2015). Yet, after decades of research, parents and schools are still left wondering how to factor in parental support effectively to increase academic success. Baker & Soden (1997) critically reviewed more than two hundred articles (of varying methodologies) on parental involvement, and attribute the displacement of parents in education to the gaps that exist in the knowledge base, research, and programs concerning parental involvement in the educational setting. This study also revealed that a major source of the uncertainty parents feel when engaging with their children's homework results from the ambiguity of what being "involved" actually means. In light of this, I am using McNeal's (2014) definition "Constructed most broadly, parent involvement is any action taken by a parent that can theoretically be expected to improve student performance or behavior" (McNeal, 2014, p.564). This definition clearly states the intent of parental engagement strategies and support to increase student learning.

Gonida & Cortina's (2014) study "Parental Involvement in Homework: Relations With Parent and Student Achievement-Related Motivational Beliefs and Achievement" highlights the importance of parental involvement having purpose and direction. They examined whether parental goals (*mastery or performance*), and types of

parental support (*autonomy support, control, interference, cognitive engagement*), have any influence on student learning outcomes. Findings indicate that parents who are *mastery goal* oriented (focus on understanding and skill acquisition rather than high grades), and who provide *autonomy support* (promoting self-regulation and motivational development for their children) during involvement with their children's homework had the most positive impact on student learning outcomes. Conversely, students whose parents have a *performance goal* (focused on scoring high grades) orientation, that offer their support in the form of *control* and/ or *interference* tend to be academically weaker. Findings from the Gonida & Cortina (2014) study emphasize the impact of parental perceptions (for themselves and their children) when they are involved with their children's homework. "Homework involvement is a multicomponent construct including both quantitative and qualitative aspects ranging from concrete support to more complex guidance (e.g., providing space and materials for doing the homework, developing rules to avoid distractions, tutoring, and doing the homework with the child)." (Gonida & Cortina (2014), p.376). Parents' support practices that fosters self-regulation and intrinsic motivation (*mastery goal* orientation) addresses both the physical and emotional needs of the learner and nurture feelings of competency.

> In most circumstances, parent involvement is most accurately characterized as a powerful enabling and enhancing variable in children's educational success, rather than as either a necessary or sufficient condition in itself for that success. Its absence eliminates opportunities for the enhancement of children's education; its presence creates those opportunities" (Hoover-Dempsey & Sandler, 1995, p.319).

Overall, findings in educational research on parental involvement in homework indicate parental support that has purpose and focus, enhances students' ability to achieve designated learning outcomes (Gondia & Cortina, 2014; Hoover-Dempsey et al., 2001; Hover-Dempsey & Sandler, 1995; Patall et al., 2008; Wilder, 2015).

Declining Mathematics Education Scores

Declining mathematic scores of Canadian students have caught the attention of many education policy makers, politicians, and major media reporters in recent years (Brochu et al., 2012; Casanday, 2015; MacDonald, 2015; McMahon, 2014; O'Grady & Houme, 2014; O'Grady, Deussing, Scerbina, Fung & Muhe, 2016; Ricahrds, 2014a/2014b; Stokke, 2015). Most of what is reported to the public is based on data collected by the Organisation for Economic Co-operation and Development (**OECD) Programme for International Student Assessment (PISA)** reports from 2003-2015.

> Over the past decade, the OECD Programme for International Student Assessment, PISA, has become the world's premier yardstick for evaluating the quality, equity and efficiency of school systems. By identifying the characteristics of high-performing education systems, PISA allows governments and educators to identify effective policies that they can then adapt to their local contexts. (https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf)

The OCED PISA reports examine the proficiency levels of fifteen-year-old students in reading, science, and mathematics in participating countries. For the past decade, PISA results reveal a steady decline in Canadian student mathematics scores (O'Grady et al., 2016), with the exception of Quebec. In efforts to increase mathematics scores, Canadian education policies have increased in-class instructional time. "According to the OECD, Canadian students now spend more time in math class than any country in the Western world. At 75 minutes on average, Canadian class periods are also the longest in the world." (McMahon, 2014, para.3). The changes in policy reflects the belief that increasing mathematical instruction time increases student mathematical scores. However, OECD reports confirm that increased instructional times are having little or no impact on learning for Canadian students, as the national mathematics scores continue to decrease year after year (Richards, 2014b).

The Newfoundland and Labrador Department of Education annually assesses the mathematical aptitude of students in grades three, six, and nine using standardized Criterion Reference Tests (CRT's). The CRT's measure individual student performance to determine whether or not students across the province are meeting curriculum outcomes. Results are used to inform policy to improve student learning. The report "Student Performance on Provincial Assessments in Mathematics " analyzed the results from provincial assessment spanning the last five years. Confirming OCED reports, this report's findings indicate that "Student performance on Mathematics has been gradually declining over the previous five assessments in grades 3 and 6. In grade 3, the average score decreased from 80.4% in 2008/09 to 71.0% in 2013/14. For grade 6, it decreased from 68.8% to 62.5%." (Rideout & Smith, 2015). However, provincial assessment results of grade nine students have marginally increased each subsequent year since 2008.

The C.D. Howe Institute is an independent not-for-profit organization in Canada that reviews evidence-based research to inform policy that can raise the standard of living for Canadians. John Richards(2014a/2014b), a member of the C.D. Howe Institute and other social policy forums, examined mathematics PISA results spanning a decade from 2003-2012 in a two-part report. Richards' reports address the shortcomings of the Canadian education system at the provincial level (report one) and the current policies in place that are working/not working as analyzed by PISA (report two). Richards' (2014b) report attributes declining mathematics scores of Canadian students to the deficiencies of current policy to meet the needs of learners. PISA research reports used by Richards indicates that quality mathematics instruction may have a larger impact than quantity. "Increasing instruction time for mathematics is unlikely, by itself, to improve mathematics scores." (Richards, 2014b, p.1). According to Richards (2014b), mathematics education reform must consider curriculum design.

The "new" discovery-based curriculum has raised many criticisms from parents and mathematics educators since its implementation in Canadian schools (Anderssen, 2014). Advocates for discovery-based instruction (sometimes referred to as inquiry-based instruction) state that learners who are free to "discover"

information on their own through exploration and [open ended] problem solving gain greater understanding and are better equipped to transfer their knowledge to other areas of life. Dr. Anne Stokke, a professor at the University of Winnipeg and co-founder of the Western Initiative for Strengthening Education (WISE) in "What to do About Canada's Declining Math Scores" writes:

> Discovery-based learning environments typically have some of the following characteristics:
> • Minimal guidance from the teacher and few explicit teacher explanations;
> • Open-ended problems with multiple solutions (Example: The answer to my question is 37. What might my question be?);
> • Frequent use of hands-on materials such as blocks, fraction strips and algebra tiles or drawing pictures to solve problems;
> • use of multiple, preferably student-invented, strategies;
> • Minimal worksheet practice or written symbolic work;
> • Memorization of math facts is deprioritized;
> • Standard methods such as column addition or long division are downplayed;
> • a top-down approach in which students work on complex problems, even though foundational skills might not be present. (Stokke, 2015, p.4).

This model of instruction has been widely adopted in mathematics education across the country since the early 2000's including the province of Newfoundland and Labrador. One major opposing argument of discovery-based curriculum is the lack of evidence that exists to prove that it is superior to previous instruction models that use more direct instruction and arithmetic (basic skills) to teach mathematics (Kirschner, Sweller, & Clark, 2006). Additionally, the slow but steady decline of Canadian mathematics scores in all but one province (Quebec) over the past decade give critics of the discovery-based curriculum design even more cause to discredit its instructional value in mathematics education. Based on international and domestic evidence, Stokke (2015), considers direct instruction to be more effective in building the fundamental knowledge and skills needed by students to engage in higher order mathematical reasoning required for discovery-based learning practices; a balance must be met between direct and discovery-based instructional methods. Provincial curricula needs to be revised "to remove ineffective pedagogical directives and to stress specific topics, at appropriate grade levels, that are known to lead to later success in math." (Stokke, 2015, p.1). Stokke's opinion is supported by the continuous decline of

mathematical scores of grade three and six students (whose instruction is heavily based on discovery-based learning) and the steadily increasing mathematical scores of grade nine students (whose instruction and learning outcomes are more direct) in Newfoundland and Labrador. Stokke recommends for provincial curricula to reduce outcomes so that mathematics educators are not overwhelmed with teaching assignments that are impractical and frustrating educators, parents and students. Additionally, Stokke stresses that discovery-based curriculum gives little regard for numeracy literacy and basic mathematics skills; which are the fundamental building blocks of mathematical reasoning need for exploratory learning. "The advantage of guidance begins to recede only when learners have sufficiently high prior knowledge to provide “internal” guidance." (Kirschner et al., 2006, p.77).

The shift in mathematics curriculum and pedagogy (direct to discovery-based) has made it very difficult for parents to assist their children with their mathematics homework. Discovery-based instruction calls for the" use of multiple, preferably student-invented, strategies" (Stokke, 2015p. 4). This is very confusing for parents who have learned mathematics primarily through direct instruction (Patall et al., 2008). Parents are reportedly experiencing feelings of uncertainty and heightened levels of stress during attempts to help their children with mathematics homework (Lapointe, 2011). Parental self-efficacy is decreasing as the parents' "way" of helping their children (through direct instruction) with mathematics homework differs from the methods used by teachers in the classroom. Research indicates that parents who have a positive sense of self-efficacy are more likely to contribute to student learning and subsequently increase mathematical achievement (Hoover-Dempsey et al., 2001; Wilder, 2015; Wu, 2015). As discovery-based curriculum and instruction are lowering parents' self-efficacy levels, the resulting effect is detrimental to parental motivation and support that are essential for positive parental involvement with mathematics homework.

Research Question 1: Does the role parents adopt impact their involvement with mathematics education?

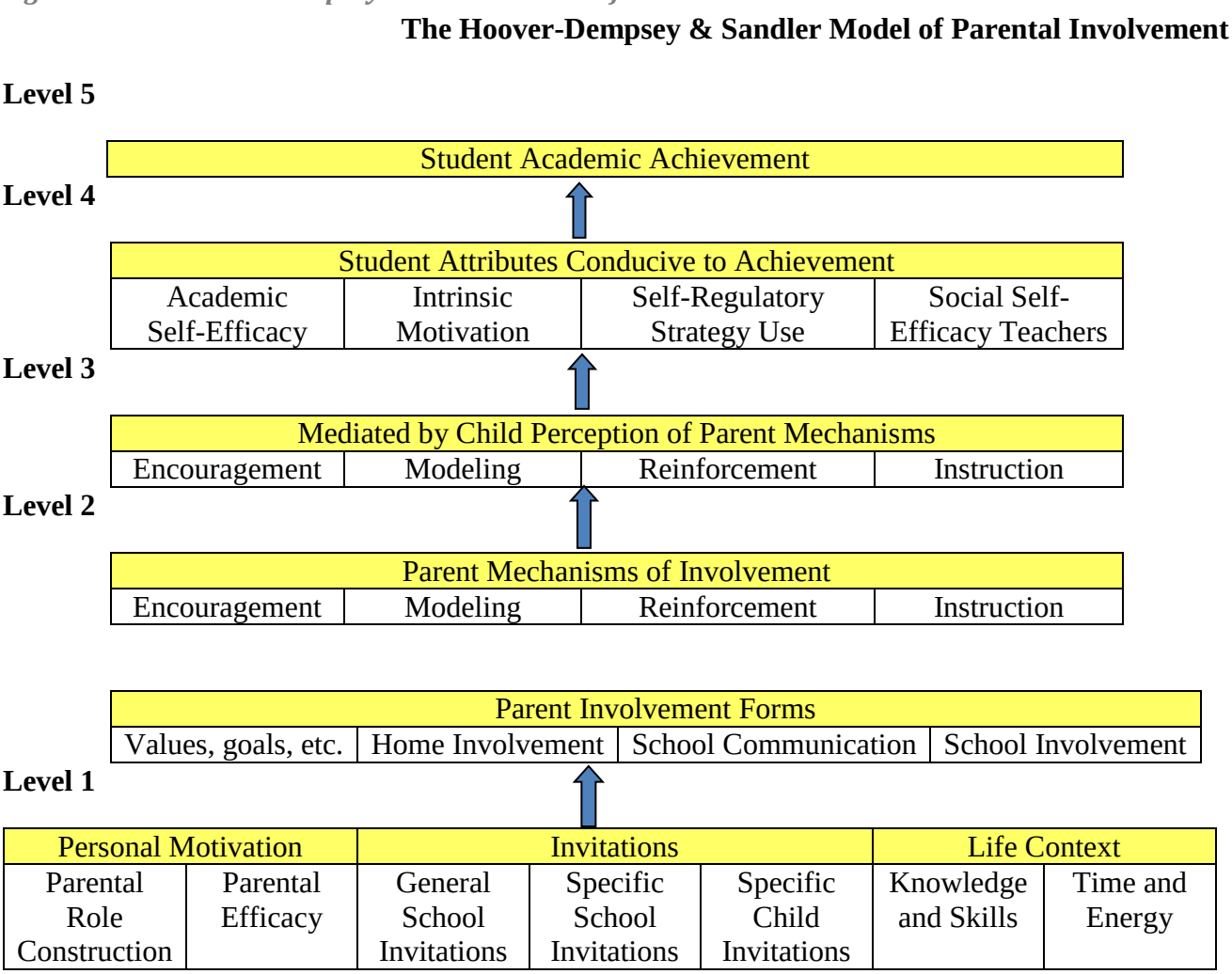
Understanding why parents choose to be involved in their children's homework requires an examination of parental role construction. Given the impact parental involvement can have on children's mathematics learning, it is important to understand parental role construction. Parental role construction identifies what a parent considers to be acceptable as engagement in their children's education (Hoover-Dempsey & Sandler, 1997). "In general, parental role construction appears important to the involvement process primarily because it appears to establish a basic range of activities that parents will construe as important, necessary, and permissible for their own actions with and on behalf of their children." (Hoover-Dempsey & Sandler, 1997, p.9). Therefore, I examined literature on how parents construct their role when involved in their children's education. This provided my study with insights that help me answer my first research question.

Parental Role Construction in Homework

Kathleen Hoover-Dempsey is an educational researcher who has devoted more than two decades to studying parental involvement in education and the influence of the home environment on student learning. Her collaborative studies have significantly contributed to the field of parental involvement in education, and offers much of what is known about parental involvement with homework (Hoover Dempsey et al., 2001; Hoover-Dempsey & Sandler, 1995, 1997; Hoover-Dempsey, Walker, Sandler, Whetsel, Green, Wilkins & Closson, 2005, Green, Walker, Hoover-Dempsey & Sandler, 2007; Walker, Hoover-Dempsey, Whetsel & Green, 2004). Indeed the majority of the literature used to examine how parents construct their role when involved in their children's education in this study is the result of, or is influenced by, research conducted by Hoover-Dempsey and her colleagues. Hoover-Dempsey & Sandler's (1995, 1997) Model of the Parental Involvement Process (See Figure 2) indicates that parental involvement in education starts with the psychological constructs of parents. Level 1of

the model suggests that parental role construction is a personal motivator for involvement, and increasing parental involvement in education begins with understanding parental role construction.

Figure 2: The Hoover-Dempsey & Sandler Model of Parental Involvement



Adapted from Hoover-Dempsey & Sandler 1995; 1997

"Parental role construction includes a sense of personal or shared responsibility for the child's educational outcomes and concurrent beliefs about whether one should be engaged in supporting the child's learning and school success." (Hoover-Dempsey et al., 2005p. 107). Decisions that characterize parental role construction are the result of self-imposed responsibilities and expectations enforced by relevant social groups (Green et al., 2007;

Hoover-Dempsey et al., 2005). Hence, parental role construction reflects parents' beliefs and perceived expectations they have for themselves and other individuals who are involved in their children's education.

The process of parental role construction in education is deeply subjective to the social contexts in which the parents/families exist (Hoover-Dempsey et al., 2001; Keyes, 2002; Wilder, 2015), and influenced by relationships that exist both inside and outside the home. Keyes (2002) focused on the relationships between parents and school that contribute to parental role construction. Keyes (2002) findings demonstrate that parental role construction can be identified as: *parent-focused, teacher-focused,* and *partnership-focused*. *Parent-focused* role construction describe parents who assume it is their primary responsibility to ensure the quality of their children's education. Parents who form their parental role with the viewpoint that the school (i.e. teacher) is primarily responsible for their children's education are said to adhere to *teacher-focused* role construction. Finally, parents who formulate their role based on the belief that their children's education is a shared responsibility between the school and the home construct their parental role with a *partnership-focus*. If parents do not feel responsible for their children's education (*teacher-focused*), their adopted role reflects behaviours that demonstrate minimal involvement. Whereas, parents who are *parent-focused* or *partnership-focused* feel a greater sense of responsibility, increasing their level resulting in a higher level of involvement. Hoover-Dempsey & Sandler (1997) reviewed research and psychological theory regarding why parents become involved in their children's education. Using parent role construction as one of the major themes to investigate parental involvement decisions, Hoover-Dempsey et al. (2005) found that parental decisions are largely influenced by personal choice. Hence, the personal choice to have a responsibility focus that fosters one of the three types of Keyes' (2002) parental role constructs (*parent-focused, teacher-focused,* and *partnership-focused)* impact the type and level of involvement that parents offer to their children.

Understanding the parent-child relationship inside the home is equally instrumental for understanding parental role construction in education. McNeal (2014) investigated relationships that exist as parents involve themselves in their children's education. He categorized these relationships as *parent-child* (discussion and

monitoring) and *parent-school* (visiting school, communication with teachers, volunteering). While the two relationships differ vastly on the means in which parents engage with their children's schooling, both are significant to my study of parental involvement with mathematics homework. The *parent-child* relationship allows for study of psychological constructs that prompt direct involvement with homework, while the *parent-school* relationship permits an investigation of more contextual constructs that influence parental involvement such as invitations from the teacher to be involved. Looking at both the direct and indirect influences of parental involvement using relationships provides me with greater insight into how parental beliefs and expectations impact their parental involvement (Hoover-Dempsey et al.2001). In addition to McNeal's (2014) work, Wilder (2015) explored the relationships parents have with their children's education at the elementary school level, with a special emphasis on the discipline of mathematics. Wilder (2015), found that it is crucial to explore how parents construct their role when considering parental involvement as it is an indicator of student academic success.

The role(s) parents can adopt in their children's education contributes to understanding why parents choose to become involved. The stimulus of parental role construction and sense of parental responsibility are explored through the relationships parents have with their children's education (Keyes, 2002; McNeal, 2014; Wilder, 2015). For my study I concentrated on two categorizations of parental relationships in education. Keyes (2002) grouping of parental relationships based on assumed responsibility roles: *Parent-focused*, *teacher-focused*, and *partnership-focused*, and McNeal's (2014) classification of parental relationships based on the interactions with individuals: *parent-child* and *parent-school.* Whether parental decisions regarding their involvement in education are made on assumed responsibility roles or interactions with their children's schools, relationships have a direct impact on student academic achievement. Izzo, Weissberg & Kasprow's (1999) findings indicate that parental involvement both in-school and at-home was a substantial predictor of student academic achievement. McNeal's (2014) study found that parental involvement that is the result of strong *parent-child* (discussion and monitoring) relationships had a greater impact academic achievement than involvement based on *parent-school*(visiting school, communication with teachers, volunteering) relationships, " not to mention improving educational

expectations and homework and reducing truancy and absenteeism" (p.575). McNeal's (2014) research further specifies that "discussion" associated with *parent-child* relationship has the strongest influence on student attitudes, behaviours and academic achievement. Hence, parental role construction contributes to parental involvement in education and has the potential to positively impact student learning.

Research has proven that understanding parental role construction can significantly increase parental involvement in education by addressing the psychological constructs of parental involvement in education (Hoover-Dempsey & Sandler, 1995, 1997; Green et al., 2007). Influences that characterize how parents construct their role in their children's education informs parental decisions that can lead to increased involvement and student achievement (McNeal, 2004; Hoover-Dempsey et al., 2001; Izzo et al., 1999). For my study, understanding how parents construct their role provided clarification as to why parents involve themselves in their children's homework and its impact on their children's mathematics learning.

Research Question 2: What practices do parents engage in as they assist their children in completing mathematics homework?

Exploring the direct and practical means of involvement parents use to engage in their children's education is essential to extending research regarding how parents become involved in mathematics homework and its impact on student learning. However, before the "action" step of engagement can occur, it is imperative to understand what motivates parents to move from the role construction stage (acknowledgement of their innate desire and responsibility as parents to support their children's education) to engaging in their children's learning through hands-on support. Research attributes parental self-efficacy as a key motivational factor for increasing parental involvement in education (Green et al., 2007; Hoover-Dempsey & Sandler, 1995, 1997; Hoover-Dempsey et al., 2001; Hoover-Dempsey et al., 2005; Wilder, 2015) and increasing student achievement. Parental behaviours influence their means of engagement during involvement and their children's ability to meet educational outcomes (Hoover-Dempsey & Sandler, 1995). Thus, understanding parental behaviours typically

associated with their involvement in their children's education establishes what practices parents engage in as they assist their children in completing mathematics homework.

Parental Motivations that Contribute to Student Learning

Motivation

My study required deep consideration of the underlying motivation(s) that prompt parental engagement with their children's assigned homework tasks. The Hoover-Dempsey et al. (2001) study, "Parental Involvement in Homework" investigates three prevalent motivations of parental involvement in their children's homework. "Findings suggest that parents involve themselves in student homework because they believe that they should be involved, believe that their involvement will make a positive difference, and perceive that their children or children's teachers want their involvement." (Hoover-Dempsey et al., 2001, p. 195). Closely related to parental role construction, parental motivation for involvement in education is derived from various parental needs that are met through their engagement with their children's learning. An instinctive sense of accountability motivates parental involvement as they see their engagement as both necessary and compulsory. Similarly, parents may feel the need to satisfy societal expectations and "invitations" (See Fig.1) from others (children, teacher, school, and other parents) who desire for them to be involved (Hoover-Dempsey & Sandler, 1995, 1997; Hoover-Dempsey et al., 2001). Finally, parental motivation is deeply rooted in the belief that their involvement can make a positive difference to children's learning by increasing their children's academic success. Parental involvement motivated by the need to positively influence their children's academic success is unique from the other motivators, (parental responsibility and societal expectations) as academic success offers tangible feedback (typically numerical scores) that allows parent to see their involvement as either effective or ineffective.

A key element of direct parental engagement is understanding the motivations that prompt parents to become involved and support their children in their learning's. It is through the direct actions of parents that

engagement becomes a concrete resource of increasing student learning. For parents, involvement motivated by the need to improve student achievement increases their level of engagement; which positively impacts student learning (Green et al., 2007; McNeal, 2014; Hoover-Dempsey, 1995:1997; Hoover-Dempsey et al., 2001).

Parental Self-Efficacy

Parental self-efficacy is especially important when considering the impact parental motivation can have on parental involvement in student mathematics homework and student learning. Self-efficacy theory suggests that one's beliefs about their capabilities to achieve set goals "determines how people feel, think, motivate themselves and behave." (Bandura, 1994, p.2). While parents may feel a sense of responsibility and/or need to be involved in their children's homework, their self-efficacy (the belief that they are competent to assist their children in their learning) may lessen or prevent parental engagement altogether. Bandura's (1977,1994) research on self-efficacy theory revealed that individuals who have low self-efficacy tend to withdraw from difficult tasks and have lowered ambition to set or work to accomplish set goals. "When faced with difficult tasks, they dwell on their personal deficiencies, on the obstacles they will encounter, and all kinds of adverse outcomes rather than concentrate on how to perform successfully." (Bandura, 1994, p.2). Self-efficacy theory in relation to parental involvement in education addresses how individuals (parents) are motivated to overcome obstacles that prevent or minimize their direct engagement in their children's learning; and set higher level goals for themselves to support their children's learning. "Perceived self-efficacy influences the level of goal challenge people set for themselves, the amount of effort they mobilize, and their persistence in the face of difficulties. (Zimmerman, Bandura, Matinez-Pons, 1992, p.664). Thus, parents must see themselves as capable of assisting their children to develop a strong sense of efficacy to set goals to increase involvement and help them overcome perceived obstructions and shortcomings to help their children succeed in school (Hoover-Dempsey & Sandler,1995; Hoover-Dempsey et al., 2001; Wilder, 2015).

Hoover-Dempsey & Sandler (1995) found that parental self-efficacy is directed by four different sources: i) previous direct experiences of success with involvement, ii) indirect experiences (of other parents) of success with involvement, iii) verbal confirmation that their involvement is both achievable and worthwhile; and iv) affective incentive that is obtained from increased student and parental success. Hoover-Dempsey & Sandler's (1995) study ascertains that self-efficacy theory (Bandura, 1977, 1994; Zimmerman et al., 1992) has major influence on parental "action" and subsequent decisions regarding their engagement with their children's education. Understanding self-efficacy as motivation for parental involvement helps target and improve parents' self-perceived knowledge and skills by appealing to their cognitive, social, and affective domains; so they feel competent to take "action" and directly engage in their children's education.

Bandura (1994), attributes increased levels of achievement to higher levels of self-efficacy. "Perceived self-efficacy is theorized to influence performance accomplishments both directly and indirectly through its influences on self-set goals." (Zimmerman et al., 1992, p.664). Once an individual perceives themselves as capable of achieving an outcome, they are more likely to set higher level goals and work harder to achieve them (Hoover-Dempsey & Sandler, 1997; Hoover-Dempsey et al., 2001; O'Sullivan, Chen & Fish, 2016). If parents have a strong sense of self-efficacy, they not only increase their level of engagement in their children's education, but also improve the quality of support they offer them by expecting more of themselves; thus positively impacting student learning and achievement.

Parental Behaviours Displayed During Engagement with Mathematics Homework

Parental Behaviours

Parental behaviours that affect direct parental engagement and subsequent student achievement is a topic of interest for many educational researchers (Gondia & Cortina, 2014; Hoover-Dempsey et al., 2001; Hoover-Dempsey & Sandler, 1995; Hyde, Else-Quest, Alibali, Knuth, Romberg, 2006). Parental role construction and motivation determine *whether* parents choose to become involved in their children's education. Parental behaviours displayed during engagement addresses *how* parents are involved in their children's education. Thus, understanding parental behaviours that are typically associated with involvement provided this study with insight into which behaviours and practices contribute to student learning during the completion mathematics homework in the home.

Gonida & Cortina (2014), completed a significant study on parental behaviours exhibited during involvement with homework tasks of students in elementary, junior high, and senior high school. They found that parents with a *mastery-goal* orientation (learning goals that focuses on promoting student autonomy and understanding) display behaviours that contribute to increased student academic achievement far more effectively than those parents who were *performance-goal* oriented (learning goals that focuses on student control and improving grades) in their support. *Mastery-goal* orientated parents tend to model desirable behaviours for their children to be autonomous in their learning, teaching their children to "Show adaptive learning outcomes such as engagement in the classroom and positive coping following a bad learning experience" (Gonida & Cortina, 2014, p.379). Therefore, parental support that is *mastery-goal* oriented allows learners to observe and internalize behaviours that nurture their autonomy and support their cognitive development; all of which Gondia& Cortina (2014) attribute to increased student academic achievement.

In addition to parental goal orientation, Gonida & Cortina (2014) found that implied messages conveyed through overt parental behaviours during engagement has a great deal of influence on student achievement. If parents display behaviours that communicate to their children that they are going to struggle (i.e. the tasks are too difficult or unattainable), then their children may internalize their parents' demeanor, causing them to form negative perceptions of themselves—lowering their self-efficacy and potentially putting them at a higher risk of not completing their homework. Alternatively, those parents who believe their children are capable of accomplishing set tasks, display behaviours that communicate and encourage their children to be autonomous while completing homework tasks and often see an increase in student achievement. For the purposes of my study, the messages conveyed through overt parental behaviour and its effect on student achievement (Gondia & Cortina, 2014) substantiates the significance of how parental behaviours can effect decisions and actions associated with their involvement.

Types of Home-Based Parental Engagement

Through the use of *modeling*, *reinforcement*, and *instruction* (Hoover- Dempsey et al., 2001; Hoover-Dempsey & Sandler, 1995) parental motivation manifests into explicit behaviours shown during parental involvement in the home. Home-based involvement "generally focus on the individual child's learning-related behaviors, attitudes, or strategies and include parental activities such as helping with homework, reviewing for a test, and monitoring the child's progress."(Green et al., 2007, p.534). Hence, *modeling, reinforcement*, and *instruction* are practical means frequently used by parents to involve themselves in their children's education when completing homework tasks.

Bandura (1977) indicated that modeled behaviours offer children the opportunity to acquire new knowledge and improve competency through observation. *Modeling* as a form of parental involvement during the completion of assigned homework allows parents to embody constructive and encouraging behaviours and attitudes towards homework and learning. Typical forms of parental involvement in homework that parents utilize

include: creating time, space, rules, materials, and giving feedback that are conducive to completing homework (Hoover Dempsey et. al, 2001). These behaviours model that homework requires effort, focus, and is important to the learning process. If parents model an interest in their children's school, homework, and learning then those behaviours and mind-set are adopted by children; becoming important to the children too (Hoover-Dempsey & Sandler, 1995). Additionally, if parents model behaviours and attitudes that demonstrate they believe that their children are capable of achieving set learning outcomes, then their children are more likely to perceive themselves as capable as well (Gondia & Cortina, 2014; Hoover-Dempsey et al., 2001). Research attributes increased student academic achievement to student having positive attitudes about homework, school learning and self-efficacy (Hoover-Dempsey et al., 2001). Through *modeling* positive parental behaviours may contribute to student academic success.

Reinforcement as a means of parental involvement in student learning entails parents assigning rewards for good student behaviour and consequences for bad student behaviour. *Reinforcement* is a direct means of parental involvement that can communicate the value of specific tasks. "Reinforcement theory predicts that children will engage in more of the rewarded behaviors, and will thus be more likely to do well in school" (Hoover-Dempsey & Sandler, 1995, p.330). When parents insist that their children must complete homework they are communicating through *modeling* that homework, is an important part of their children's learning. However, when parents offer consistent incentives for their children to complete the homework they are using *reinforcement* by rewarding positive behaviour (Hoover-Dempsey et al., 2001). Additionally, " The more specific and knowledgeable parent can be in offering feedback and reinforcement, the stronger their impact on learning and student self-efficacy is likely to be." (Walker et al., 2004, p.5). Therefore, the mechanisms of parental *reinforcement* in education influences learning by communicating to children the value of the task or activity at hand by the positive reward or significance attached to it. Parent's reactive behaviours to their children's output reflects the value they place on their children's learning.

Instruction during parental engagement is when parents directly instruct their children during homework tasks. "Parents' involvement activities also appear to influence student outcomes through instructional interactions that range from simple queries to processes intended to develop strategic understanding and problem-solving capacity." (Hoover-Dempsey et al., 2001, p.204). *Instruction* is traditionally used by parents as a means to engage with their children's learning as parents are familiar with the hands-on approach of *instruction* involvement (i.e. sitting with their child when completing homework, providing extra practice, helping their children study). Hoover-Dempsey et al. (2001) indicate that parents sometimes are better suited to instruct their children during the completion of homework than teachers because they are more familiar with the learning needs of their children. Therefore, the support they offer their children targets their areas of weaknesses more effectively. Hyde et al. (2006) completed a study entitled "Mathematics in the home: Homework practices and mother–child interactions doing mathematics". The study revealed that parents who were made aware of Vygotsky's theory of Zone of Proximal Development (ZPD) and the technique of scaffolding (readjusting instructional assistance to meet the needs of the learner) were better equipped to assist their children with their mathematics homework. Additionally, results indicate that parents who scaffold their support to match the children's ZPD during the completion of mathematics homework had greater influence on increasing student academic achievement (Hyde et al., 2006). Hence, *instruction* is a valuable means of parental engagement to increase student academic success.

Parental behaviours, both implicit and explicit, set within the context of parental involvement, carries great influence on student achievement. Parental goal orientation *(mastery* or *performance)* (Gondia & Cortina, 2014) addresses the impact parental behaviours have on the type of support and messages conveyed during parental engagement with their children's learning.

> Through such specific manifestations of modeling, reinforcement, and instruction, parents' involvement activities influence not only child achievement, but students' development of learning pertinent attributes, including positive attitudes toward learning tasks, positive perceptions of personal competence and ability, productive attributions about the causes of successful performance, and knowledge of personally effective learning strategies." (Hoover-Dempsey et. al, 2001, p.206).

In light of the studies, parental behaviours during homework tasks have many implications for my study, and further are investigated in the following chapters.

Parental Support/Strategies That Can Increase Student Mathematical Achievement

Bringing attention to modes of practical/hands-on support, increases understanding of how parents become involved in mathematics homework practices through implicit and/or explicit actions. Parental involvement is often solicited by the need to increase student achievement (Edwards & Warin, 1999). Yet, parents are unaware of how to assist their children in a meaningful way that contributes to student learning (Baker & Soden, 1997; Epstein & Van Voorhis, 2001). Student achievement in this study functions as a measure of students' overall comprehension and skill set (through homework assignments and testing) in mathematics education. Research cited throughout this chapter reasserts that parental engagement strategies have the potential to make meaningful contributions to student academic achievement during the homework process if understood fully and carried out in a manner that best supports the learner. (Gondia & Cortina, 2014; Green et al., 2007; Hoover-Dempsey & Sandler, 1995,1997; Hoover-Dempsey et al. , 2001; Hoover-Dempsey et al., 2005; Hyde et al., 2006; Izzo et al., 1999; Keyes, 2002; McNeal, 2014). As a result, it is necessary to have a deeper understanding of the purpose and design of homework, along with the direct parental engagement activities that have the potential to enhance student achievement in mathematics using homework tasks.

Homework Purpose and Design

Homework can serve as a bridge between the home and school in creating purposeful dialogue concerning student progress, learning, and education in general (Wilder, 2015).

> Parents often become involved in their children's education through **homework**. Whether children do homework at home, complete it in after school programs or work on it during the school day, homework can be a powerful tool for (a) letting parents and other adults know what the child is learning, (b) giving

> children and parents a reason to talk about what's going on at school, and (c) giving teachers an opportunity to hear from parents about children's learning. (Walker et al., 2004, p.1)

Considering that the design process and format of homework tasks is significant to the academic success or failure of students (Epstein & Voorhis, 2001; Rosario et al., 2015). Homework needs a purpose (Epstein & Voorhis, 2001) and to be diversified in design (Jong, Westerhof & Creemers, 2010) if aiming to increase student achievement. Rosario et al. (2015) explored three mathematics homework designs (*preparation, practice,* and *extension*) and their impact on student academic achievement. *Preparation* homework prepares students for upcoming lessons, while *practice* homework provides students opportunity to apply skills previously learned in-class by solving new problems (i.e. worksheets). *Extension* activities include problem solving skills that prompt students to transfer their learning to other academic areas. Findings indicate that homework tasks intended for *preparation* and *practice* hold an important place in the student learning process; however, the most significant increase in student achievement was associated with *extension* activities (Rosario et al., 2015). Therefore, parental involvement that "extends" mathematics homework support beyond the traditional modes of *preparation* and *practice* to address the "why" and "how" of completing homework tasks (*extension)* can help students to become more self-aware, and self-regulate their learning; increasing student achievement (Schmitz & Perels, 2011).

Hence, mathematics homework that promotes self-regulation (Schmitz & Perels, 2011), that has purpose (Epstein & Voorhis, 2001) and designed to prepare students, offer them extra practice, and extends their knowledge (Rosario et al., 2015); all contributing to increasing student achievement in mathematics. These findings are significant as parents can adjust their engagement strategies to incorporate support that reflect *preparation, practice,* and *extension* activities in the home during the completion of mathematics homework.

Parental Strategies/Support

Hoover-Dempsey et al., (2001) completed an extensive review (fifty-seven studies) of educational research concerning parental involvement in homework. The following table, summarizes their findings, listing parental behaviours that were determined to be effective when assisting children with their homework, and the practical means of involvement associated with those parental behaviours.

Table 1. Synopsis of 8 Parental Support Strategies when Involved in their Children's Homework

Synopsis of 8 Parental Support Strategies when Involved in their Children's Homework	
Establish physical and psychological structures for the child's homework performance	• Provide space, materials and an environment conducive to student learning. • Establish routines and structured use of time spent on homework tasks. • Develop rules and procedures to maintain student focus on homework tasks. • Clearly communicate expectations (and enforce) for homework behaviour(s) to ensure homework is completed. • Allow students to have a say in the homework process and structure homework time that is conducive to the family's daily activities.
Interact with the student's school or teacher about homework	• Communicate with the children's teacher about homework performance, progress, and needs. • Meet school requests related to homework (e.g., sign completed tasks, offer requested help, participate in homework intervention program.
Provide general oversight of the homework process	• Supervise students during homework process. • Routinely check student understanding using signs of difficulty, success, or motivation to determine support. • Motivate students by showing *interest* in their performance and progress. • If support is beyond parental means, seek support from others.
Respond to the student's homework performance	• Apply principles of reinforcement. • Emotionally support students for their efforts and progress.
Engage in homework processes and tasks with the student	• Assist students with homework tasks that uses both direct and indirect *instruction*.
Engage in metastrategies designed to create a fit between the task and student skill levels	• Scaffold homework tasks for students.

Parental Involvement

Engage in interactive processes supporting student understanding of homework	• *Modeling* appropriate behaviour and attitudes towards homework for students. • Discuss and develop problem-solving strategies with students. • Check for understanding.
Engage in metastrategies helping the student learn processes conducive to achievement	• Establish and support self-regulatory learning strategies for students during the homework process. • Help student organize personal thinking about assignments.

Adapted from Table 2. In "Parental Involvement in Homework" (Hoover-Dempsey et al., 2001)

Conclusion

The literature reviewed in this chapter has enlightened and characterized this study. I have presented and discussed the many aspects of how parents choose to be involved in their children's academic learning using previously conducted research. I examined contributing factors of parental involvement with homework and devised a research plan to investigate parental involvement in mathematics homework for the Conception Bay North Region of the NLESD. Through a vigilant inspection of available literature, I focused on the following factors: (i) *How do parents construct their role when involved in their children's education?* (ii) *How do parents engage in the homework process of mathematics?* (iii) *What parental behaviours affect student learning in the completion of homework tasks* and (iv) *what types of parental strategies/support can increases student mathematical achievement.* While each section of this review attends to different aspects concerning "why" and "how" parents are involved in homework, the chapter as a whole speaks to the positive impact parental involvement can have on student learning and achievement. As shown by the educational research cited in this chapter, parental role construction, motivation, self-efficacy, implicit and explicit behaviours, parental engagement strategies, and homework purpose and design are important constructs of parental involvement during the homework process in mathematics.

Furthermore, using the *factors* listed above to investigate how parents involve themselves in their children's mathematics homework has helped maintain focus on the investigation in to the interactions between the child and the parent during the completion of teacher assigned homework in the home. Under the influence of the designated research questions, (i) Does the role parents adopt impact their involvement with mathematics homework? and (ii) What practices do parents engage in as they assist their children in completing mathematics homework?, and in light of literature cited throughout this chapter, a sound investigation of parental involvement with mathematics homework has been framed and carried out.

Chapter 3 - Methodology

Introduction

This study aimed to examine how parents involve themselves in mathematics homework by focusing on the interactions between the child and the parent during the completion of teacher assigned tasks. As Canadian mathematics scores continue to decline (O'Grady et al., 2016), I investigated parental involvement with mathematics homework using the following research questions: *Does the role parents adopt impact their involvement with mathematics homework?* and *What practices do parents engage in as they assist their children in completing mathematics homework?*; to answer these questions, I have gathered information regarding the direct actions, role, and behaviours parents adopt when they engage in their children's mathematics homework. The focus of this investigation is not on how much homework can be accomplished or to measure the frequency of parental involvement in their children's mathematics homework. The main intent of this study is to interpret data collected to understand how parents engage in their children's assigned mathematics homework tasks. Self-reported words and actions of participants has established patterns and themes (Tite, 2006) that parents attach to their involvement in their children's mathematics homework. Under a mixed methods approach, this study combined both quantitative and qualitative methodologies to gain accurate and reliable insight into the phenomenon that helped me answer the specified research questions mentioned previously. This chapter outlines the mixed methods research design, sampling techniques, instrument, and data analysis procedure.

Research Design

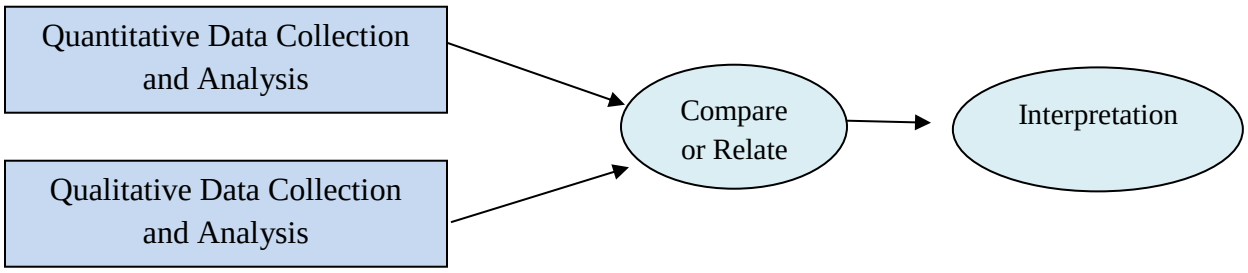
Attending to the research goals specified in previous chapters, this study benefited from combining quantitative and qualitative designs into a mixed methods investigation of parental involvement in mathematics homework. Mixed methods research is an approach in which both quantitative and qualitative methods of research are combined to collect and analyze data. According to Creswell (2014),

> At a *general level*, mixed methods is chosen because of its strength of drawing on both qualitative and quantitative research and minimizing the limitations of both approaches. At a *practical level*, mixed methods provides a sophisticated, complex approach to research that appeals to those on the forefront of new research procedures. It also can be an ideal approach if the researcher has access to both quantitative and qualitative data. At a *procedural level*, it is a useful strategy to have a more complete understanding of research problems/questions. (p.266).

An obvious challenge of utilizing mixed methods to complete research is that the data are "mixed" (Creswell, 2012)--complicating research design decisions regarding data collection and analysis for researchers. However, for the purposes of this study the strengths (*general level, practical level, and procedural level*) (Creswell, 2014) of using mixed methods methodology outweighs its challenges.

Factors concerning *time* (the sequence of data collection), *weight* (importance given to the quantitative or qualitative data answering the research question(s)), and *mixing* (the explicit integration of quantitative and qualitative data) are essential for determining a research design of mixed methods (Creswell, 2004). Giving due consideration to *time*, *weight*, and *mixing* this study operated under Creswell's (2014) Convergent Parallel Design (Figure 16.2).

Figure 3: Convergent Parallel Design



Adapted from Figure 16.2 "Types Of Mixed Methods Design" (Creswell, 2014)

With a mixed data approach, collection of both quantitative and qualitative data occurs concurrently, with neither form of data holding more importance (*weight*) than the other. The quantitative and qualitative data are analyzed separately and side-by-side and then integrated so to determine whether or not the two types of data yield coherent results concerning the phenomenon under investigation (Tashakkori & Teddlie, 2003).

Sample

There are variety of characteristics that have to be considered when determining the sample for a study. The target population for this investigation were parents living rural Newfoundland and Labrador in the Conception Bay North region whose children attend schools that are a part of the Ascension Collegiate school system. This region was chosen for this study as it encompasses 6 schools with approximately 1200 students in elementary and junior high grades; offering the study a large population to select a sample from. As a mathematics educator working in this area, I am familiar with the government approved mathematics curriculum and district policies regarding homework providing the context needed to interpret the results. Additionally, the parents of students living in the Conception Bay North region are representative of diverse family dynamics of students who attend elementary and junior high schools within the provincial wide school board. Therefore, conclusions drawn

from data collected in this study are relevant to the population of parents with children that are a part of the NLESD.

The sampling technique used to compose the sample in a mixed methods study must reflect both quantitative and qualitative sampling methods. According to Onwuegbuzie and Collins (2007), *timing orientation* and the *relationship* between the quantitative and qualitative samples are two important criteria to consider when choosing a mixed methods sampling technique. Hence, combining both probability and purposive sampling techniques and considering *timing* and *relationship* (Onwuegbuzie and Collins, 2007), this study utilizes convergent parallel methods through concurrent identical sampling design; whereby, quantitative and qualitative data are collected from the same participants from one sampling frame - the population from which the sample is chosen (Creswell, 2004) and to which the data can be generalized to.

Using probabilistic sampling, the sample frame is comprised using public record documents of the Department of Education from the Newfoundland and Labrador provincial government website (http://www.ed.gov.nl.ca/edu/faq/schooldatabase.html) resulting in approximately 1200 potential participants (one parent/guardian per student). Direct personal contact information is not necessary for this study. Completed questionnaires are anonymous as participants are asked not to include any identifying information on the instrument. Additionally, once approval to conduct research within the NLESD is obtained, potential participants will receive a package distributed by teachers to students in elementary and junior high schools in the specified region. Students will take home a package to their parent(s)/guardian(s) that includes: a letter providing an explanation of the study and inviting them to participate in the study, consent form, questionnaire, and a return addressed envelope. Simple random sampling is employed to select an identical sample (concurrent identical sampling). Simple random sampling technique ensures that the sample is representative, meaning every parent that is a part of the target population has equal opportunity to be selected (Creswell, 2012). It is important to note that the unit of analysis of this study are the parents.

Ethical consideration for a mixed methods study must attend to issues that may arise from both quantitative and qualitative inquiry (Creswell, 2012). Upon the approval from the Ethics Board at Mount Saint Vincent University, permission was obtained from the Newfoundland and Labrador English School District (see *appendix 1*) ensuring that ethical considerations deemed necessary by the board was met to conduct research in the Ascension family schools within the Conception Bay North Region. The consent form (see appendix 1) included with the questionnaire (see *appendix 2*) clearly addressed ethical concerns typical to both quantitative and qualitative research, yet specific to this study. The consent form informed participants of the study's purpose, what was required of them if they choose to participate, that their participation was voluntary, and at any time they could withdraw from the study without reason. Additionally, the consent form ensured participants that their anonymity and confidentiality would be maintained if they agreed to participate in the study. Since no identifying information was asked on the questionnaire, all responses were anonymous. In addition, participants were asked not sign their name to the questionnaire to further safeguard anonymity and confidentiality. Instead, participants were asked to provide a pseudonym (nickname). Also, the consent form clearly stated that information provided would be used for research purposes only, and completed questionnaires would be stored in a secured location (home office) only accessible to the primary researcher until the completion of the study.

Instrument

Once the sample was established, data collection began. To learn of parents' involvement in mathematics homework, I developed a 20-item questionnaire that reflect findings of the literature cited in the previous chapter pertaining to *i) parental role construction, ii) parental motivation that contributes to student learning, iii) parental behaviours displayed during engagement with mathematics homework iv) parental support/strategies that increase student mathematical achievement*. The instrument (see appendix 3) used to collect data for this study is a self-devised questionnaire that ask "parallel questions" (Creswell & Planco Clark, 2015). "By parallel questions we mean that the same concepts need to be addressed in both the qualitative and quantitative data collection so

that the two databases can be compared or merged." (Creswell & Planco Clark, 2015, p.184).The first nine questions are designed as close-ended multiple choice questions and largely address how parents construct their role and their incentive(s) that motivates engagement with their children's mathematics homework. The following eleven questions (10-20) are a combination of close-ended multiple choice questions (like questions 1-9) with an open-ended follow-up question that offers participants an opportunity to provide additional information (own views and opinions) relevant to their closed-ended response in the question.

The objective of the instrument in this study was to seek answers to the research questions by combining both quantitative and qualitative data collection methods into a single instrument (the questionnaire). As stated in the previous chapter, parental role construction and motivation determines *whether* parents choose to become involved in their children's education. Therefore, the majority of questions on the questionnaire (1-14 and 16) collectively addresses how parents construct their role, how they are motivated to engage with their children's mathematics education, and the subsequent effect on parental behaviours displayed while assisting their children with their mathematics homework. Questions 15 and 17-20 specifically addresses parental support strategies that can attribute to increased student achievement (Hoover-Dempsey et al., 2001).

Operating under convergent parallel design (Creswell, 2004), quantitative and qualitative data was collected simultaneously. "Data-validation variant is a variant of the convergent design in which the researcher includes both open and closed-ended questions on a questionnaire and uses the results from the open-ended questions to confirm or validate the results from the closed-ended questions." (Creswell & Planco Clark, 2015, p. 410). While the questionnaire is largely quantitative in design by using close-ended questions to elicit ordinal and numeric scaled (agreement and frequency) responses, the instrument also includes qualitative open-ended questions, whereby participants are provided opportunities to express their opinions and views pertaining to the research questions. "The advantage of this type of questioning is that your predetermined close-ended responses

can net useful information to support theories and concepts in literature." (Creswell, 2012, p.220). Hence, the questionnaire I developed for my study adheres to the constructs of mixed methods research design by concurrently collecting quantitative and qualitative data to explore parental involvement with mathematics homework by investigating parental experiences and perspectives using both open-ended and close-ended questioning.

According to Creswell & Planco Clark(2015), when addressing validity in a mixed methods study attention must be given to strategies employed to collect, analyze, and interpret data so that the merging of results and subsequent conclusions made by the researcher are true to the study's goals. As stated previously, the questions that comprise the questionnaire were formulated using the findings from the literature examined with a specific intent to seek answers relevant to the role parents adopt and the practices parents engage in as they assist their children in completing mathematics homework. This ensured that data collected by the instrument was purposeful in exploring answers to the specified research questions (Creswell & Planco Clark, 2015) unique to this study, and yielded sound results. In other words, the instrument was constructed with due consideration to validity as it collected data that was pertinent to the study's designated goals.

Furthermore, validity of the self-developed instrument was confirmed through external reviews. A copy of the questionnaire was reviewed by three external persons (a research methodology expert, a junior high mathematics teacher who regularly assigns mathematics homework, and a parent representative of the sample) each chosen for their individual experiences and perspectives relevant to this study. The external reviewers assessed the questionnaire regarding the language used (clarity, length, jargon), variety and suitability of choices offered to respond to the close-ended questions, and if the questions included were appropriate and necessary from their individual viewpoints to address the research questions - parental involvement in mathematics homework.

There were limitations associated with data collected using the self-reported instrument that threatened the reliability of a study. Typical risks associated with questionnaires include: Honesty/image management, introspective ability, understanding/interpretation, rating scales, and response bias (Hoskin, 2012). Questions 1-9 include rating scales which requires respondent honesty, understanding, and interpretation to minimize participant response bias. As a result, the conclusions drawn from data collected using a questionnaire relies heavily on participants answering questions truthfully. However, respondents may answer questions to present themselves in a more favourable manner resulting in a response bias. Therefore, to offset the potential threat of response bias, answers to the close-ended questions offers participants a variety of choices to encourage honesty and truthfulness. In the same way, while participants may believe that they are answering questions truthfully, self-reported answers may reflect an inaccurate portrayal of personal involvement due to a lack of introspective ability to assess their involvement practices accurately. That is, often people perceive themselves in a more favourable manner than those on the outside looking in. Therefore, the pre-determined responses to questions included on the questionnaire attempt allow participants to assess their involvement attitudes, behaviours, and strategies more accurately. Further attempts to make the instrument more reliable can be attributed to the opportunity for participants to select more than one answer (questions 1-16), permitting a more holistic depiction of their involvement. Additionally, questions 10-20 are a combination of close-ended and open-ended questions whereby participants select one or more close-ended responses and asked to provide an open-ended response in light of their selected response.

Data Analysis

The purpose of analyzing data is to take useable information obtained by the instrument and transform it into useful information. "In concurrently gathering both forms of data at the same time, the researcher seeks to compare both forms of data to search for congruent findings (e.g., how the themes identified in the qualitative

data collection compare the statistical results in the quantitative analysis)" (Creswell, Clark, Gutmann, Hanson, 2003, p. 217-218).

To begin the data analysis process, both the quantitative and the qualitative data was organized so that responses to the questions could be scored/coded. Scoring data gave each participant response a numeric value (Creswell, 2004). The close-ended questions (questions1-9) included on the instrument were categorical, ordinal and continuous in format. Therefore, the responses were scored accordingly (i.e. child=1, teacher=2, parent/guardian=3). For the remaining questions (10-20) that were comprised of a close-ended question and a corresponding open-ended question yielded both quantitative and qualitative data. As open-ended responses cannot be scored easily like a predetermined close-ended response, each open-ended response was listed and then examined to identify common themes that existed in participant responses. Once a list of common themes was established a frequency count of those themes "transformed" (Creswell, 2015) the qualitative data into numeric information that could be analyzed with the other quantitative results. Creswell & Planco Clark (2015) defines data transformation as "the conversion or transformation of one data type into the other so that both can be analyzed together;" (p.213). The significance of transforming the qualitative data into quantitative data lied in the ability to merge the results to see to what extent the two databases converged and use the results from the transformed qualitative data to help interpret the numbers of the quantitative data.

Once data were organized, scored, and transformed, they were then prepared to be inputted in to Microsoft Excel program for further analysis. To analyze the close-ended questions, descriptive statistical analysis provided measures of central tendency (mean and mode) and measures of variability which were used to summarize data collected to report findings in a meaningful way. Scored themes from the analysis of the open-ended questions provided perspective to the close-ended questions and informed the discussion that followed the data analysis. Analysis of both the quantitative and qualitative data is displayed using tables and figures. Using visual representations augmented the relationships established through the statistical analysis by depicting trends and the distribution of the data (Creswell & Planco Clarke, 2015).

Conclusion

Investigating how parents involve themselves in their children's mathematics education has led to a better understanding of the role parents assume during the process of completing homework and allowed meaningful recommendations that aim to improve parental involvement in mathematics homework. The intent of this chapter was to outline the methodology used to collect and analyze data for my study. The *general*, *practical*, and *procedural* (Creswell, 2014) parameters described has justified the study operating under a mixed methods research design. More specifically, this study has a convergent parallel design as both ~~the~~ quantitative and qualitative data are collected at the same *time*, both forms of data held equal *weight*, and the data were integrated by *mixing*. The instrument used to collect the data also adhered to the design of a mixed methods convergent parallel design as data was collected through parallel questioning on a questionnaire. Using literature cited in chapter two and attending to issues of validity and reliability, twenty questions (close-ended and open-ended) were devised to seek answers regarding parental involvement in mathematics homework to gain insight into their formed roles and behaviours. According to Creswell & Planco Clark (2015), a convergent parallel design requires that the quantitative and qualitative data once collected concurrently be kept separate during the initial stages of analysis (i.e. coding). It is through the process of data transformation that the results from both sets of data could be merged for interpretation and yielded useful information for subsequent inferences.

Using simple random sampling techniques to form the population sample, this study required ethical consideration from the overseeing academic institution (MSVU), cooperating school board (NLESD), and voluntary participants. Procedures and protocols were carefully considered to meet the necessary requirements to conduct research within the elementary and junior high schools that are a part of the Ascension family school system in the Conception Bay North Region of the NLESD. Additionally, to lessen limitations associated with

self-reported responses and their potential effect on the quality of data collected, a consent form (see appendix 2) detailing participant anonymity and confidentiality was provided to each potential participant.

Following the operating guidelines of a convergent parallel design this chapter outlined the procedural steps that established a sample, collecting data, data analysis, and ethical considerations for my study. With approval from MSVU's Ethics Board of Review and the NLESD to collect data, analysis took place. In the next chapter of the thesis, the results of the analysis are discussed in relation to the study's research questions.

Chapter 4 – Results and Discussion

Introduction

This study aimed to examine parental involvement in their children's mathematics homework. As mentioned previously, the intention of this study was not to measure how much homework can be completed in the home when parents are involved. This study focused on parental role construction along with the direct and indirect actions between parents and their children when completing teacher assigned mathematical tasks at home. To find answers to my research questions i) *Does the role parents adopt impact their involvement with mathematics homework?* ii) *What practices do parents engage in as they assist their children in completing mathematics homework?*), I conducted an extensive literature review of parental involvement and mathematics education and then designed a questionnaire.

My goal for the instrument was to gather information regarding the direct actions, role, and behaviours parents adopt when they engage in their children's mathematics homework to gain a better understanding of what constitutes parental involvement in mathematics. Using a mixed-methods approach, participant responses uncovered patterns and themes in the ways parents perceive their involvement in their children's mathematics homework. The Baker & Soden (1997) study revealed that a major source of the uncertainty parents feel when engaging with their children's homework results from the ambiguity of what being "involved" actually means. Therefore, participant responses reveal information regarding the constructs of parental responsibility, self-efficacy, motivation, and overt behaviours parents deem important and/or necessary to their involvement with their children's mathematics homework.

In this chapter, I present the results of data collected from the survey on parental involvement in mathematics homework. Results are organized into two categories in reference to the two research questions. While all questions pertain to parental involvement in mathematics homework, questions 1-6 and 9 are more relevant to the first research question regarding parental role construction. The remaining questions are more

closely related to the overt behaviours and practices parents engage in when assisting their children with their mathematics homework. Questionnaire responses underwent descriptive analysis for the pre-determined quantitative data identifying the mean and mode for each individual category of all 19 questions on the instrument. Additionally, themes were identified in participant qualitative responses (questions 10-20) and used as support for the trends demonstrated by quantitative results when needed.

The anticipated contribution of this research is to better inform educational stakeholders (policy makers, teachers, parents, etc...) of the overt behaviours and direct practices that may impact student learning in mathematics education at times when parents are involved in homework tasks completed in the home.

Analysis of the Results

The sample of participants for this investigation are parents living in the Conception Bay North region of Newfoundland and Labrador whose children attend elementary or junior high schools of the Ascension Collegiate family of schools. 1085 take-home packages were distributed by homeroom teachers at each of the 6 schools to students to take home to their parent(s)/guardian(s) in early February 2018. Each package included a letter providing an explanation of the study and inviting them to participate in the study, a consent form, a questionnaire, and a return addressed envelope. Of the 1085 packages that were distributed, 131 completed questionnaires were returned. 120 questionnaires (11.06%) were used in the data analysis of this study as the remaining 11 arrived past the self-determined deadline date (8 weeks from their distribution date) of which completed questionnaires would be accepted for data analysis. No questionnaires were disqualified, however some participant responses for individual questions were left incomplete (with the exception of question 16). Consequently, during the analysis of the data, such participant responses were accounted for as a "blank" response. A mean and mode were calculated for "blank" responses just as a mean and mode were calculated for the pre-determined responses of all 19 questions individually. Additionally, participant responses that were contradictory were counted as a "blank" response.

To begin the data analysis process, completed questionnaires were assigned a participant number (1-120) to make them identifiable. Participants were asked not to report any self-identifying information to ensure anonymity and confidentially. Both the quantitative and the qualitative data were organized so that responses to the questions could be scored/coded. Scoring data gave each participant response a numeric value (Creswell, 2004). Since the close-ended questions (questions1-9) included on the instrument were categorical, ordinal, and continuous, the responses were scored accordingly (i.e. child=1, teacher=2, parent/guardian=3). The remaining questions (10-20) were comprised of a close-ended question and a corresponding open-ended question which yielded both quantitative and qualitative data. As open-ended responses cannot be scored easily like a predetermined close-ended response, each open-ended response was listed in Microsoft Word and then examined to identify common themes that existed in participant responses. Once a list of common themes was established, a frequency count of those themes "transformed" (Creswell, 2015) the qualitative data into numeric information that could be analyzed with the other quantitative results. Creswell & Planco Clark (2015) defines data transformation as "the conversion or transformation of one data type into the other so that both can be analyzed together" (p.213). The significance of transforming the qualitative data into quantitative data lies in the ability to merge the results to see to what extent the two data sets converge and use the results from the transformed qualitative data to help interpret the numbers of the quantitative data.

Once data were organized, scored, and transformed, they were then prepared to be inputted into Microsoft Excel program for further analysis. To analyze the close-ended questions, descriptive statistical analysis provided measures of central tendency (mode and median) that were used to summarize the nominal and ordinal data collected to report findings in a meaningful way. As there is no strong measure of variability when reporting results using the median and mode of the data set, interpretation of the results are reported using the measures of central tendency in relation to the range of data.

Scored themes from the analysis of the open-ended questions provided perspective to the close-ended questions and informed the discussion that follows the data analysis. Analysis of both the quantitative and

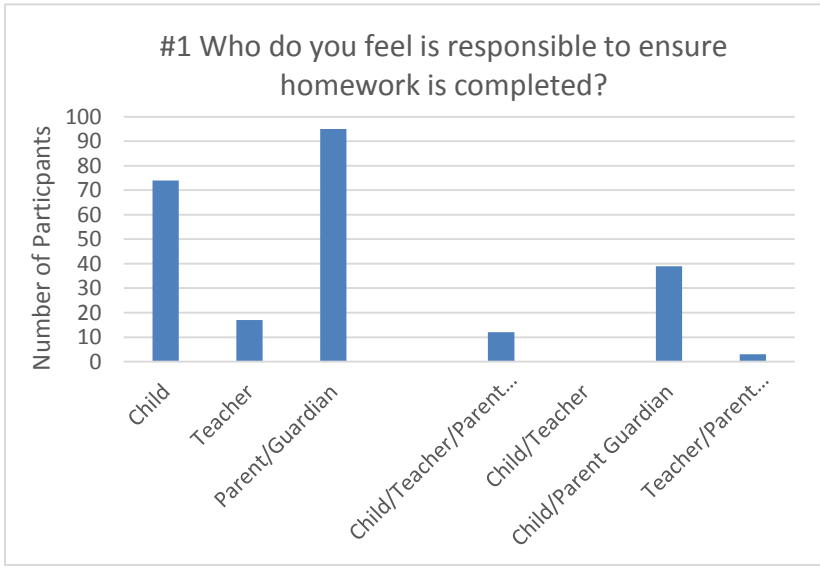
qualitative data is displayed using tables and figures. Using visual representations augments the relationships established through the statistical analysis by depicting trends and the distribution of the data (Creswell & Planco Clarke, 2015).

Research Question 1: Does the role parents adopt impact their involvement with mathematics homework?

Below are the results from the descriptive analysis of data resulting from questions 1-6 and 9 on the instrument. These questions gathered information regarding parents' sense of responsibility in their children's mathematics homework as it is largely important to role construction (Hoover-Dempsey & Sandler, 1995, 1997; Green et al., 2007 Keyes, 2002, McNeal, 2004). The questionnaire instructions ask participants to select all answers that apply. Therefore, results presented using tables and charts summarize the results of the close-ended responses and the various combinations participants selected, with a brief explanation that will be expanded on later in the discussion.

Fig. (4.1) Question 1: Who do you feel is responsible to ensure homework is completed?

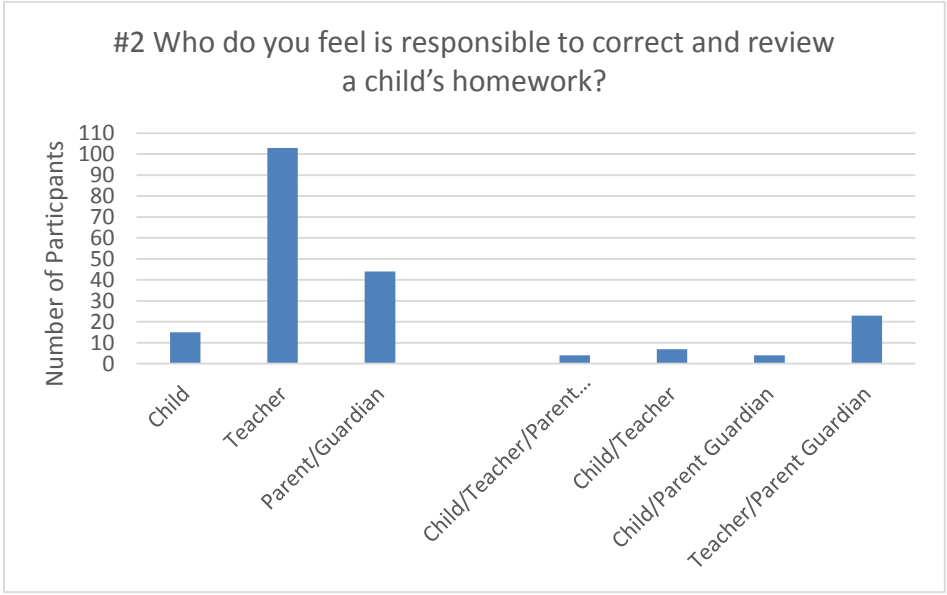
Response	Yes	Percentage
Child	74	61.67%
Teacher	17	14.17%
Parent/Guardian	95	79.17%
Child/Teacher/Parent Guardian	12	10.00%
Child/Teacher	0	0.00%
Child/Parent Guardian	39	32.50%
Teacher/Parent Guardian	3	2.50%
n=120		



In response to question 1: "Who do you feel is responsible to ensure homework is completed", the majority of participants indicate that they hold the parent/guardian to either be primarily responsible to ensure homework is completed or share in that responsibility with their children, and/or teacher. Parents consider teachers to have the least amount of responsibility or shared responsibility to ensure homework completed as only 14.2% of participants selected "teacher" as their response or part of their responses.

Fig. (4.2) Question 2: Who do you feel is responsible to correct and review a child's homework?

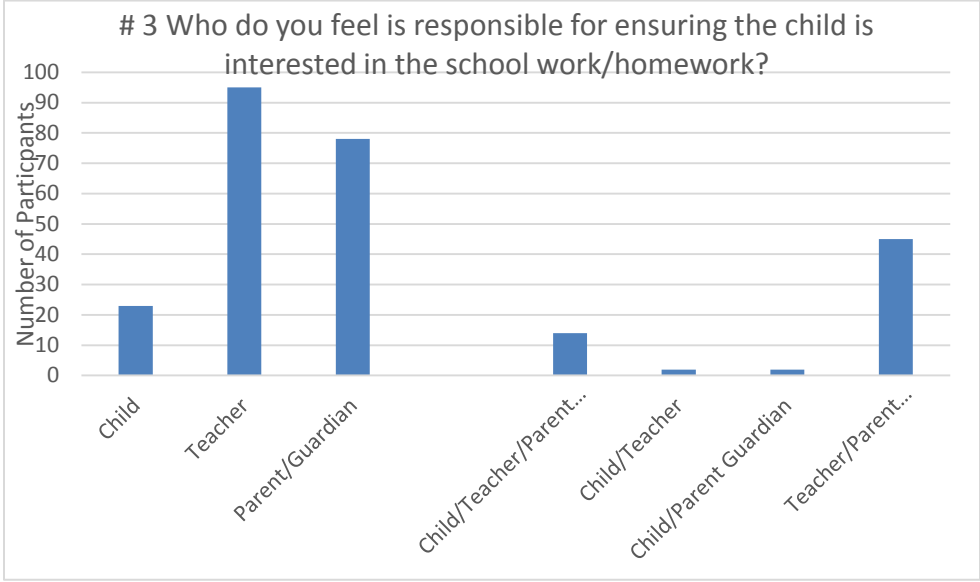
Response	Yes	Percentage
Child	15	12.50%
Teacher	103	85.83%
Parent/Guardian	44	36.67%
Child/Teacher/Parent Guardian	4	3.33%
Child/Teacher	7	5.83%
Child/Parent Guardian	4	3.33%
Teacher/Parent Guardian	23	19.17%
n=120		



Results illustrated in Fig 4.2 in response to question 2: " who do you feel is responsible to correct and review a child's homework?" demonstrates that participants report teachers to be largely responsible for correcting/reviewing children's homework as 85.8% of participants selected "teacher" as their response. Very few responses included parent/guardian (36.7%) and/or children (12.5%) as being responsible for ensuring homework is correct.

Fig. (4.3) Question 3: Who do you feel is responsible for ensuring the child is interested in the school work/homework?

Response	Yes	Percentage
Child	23	19.17%
Teacher	95	79.17%
Parent/Guardian	78	65.00%
Child/Teacher/Parent Guardian	14	11.67%
Child/Teacher	2	1.67%
Child/Parent Guardian	2	1.67%
Teacher/Parent Guardian	45	37.50%
n=120		



The data for question 3 illustrates how participants perceive teachers to be most accountable for ensuring their children are interested in his/her school work/homework as 95 participants out of 120 (79.2%) selected "teacher" as their response or part of their response. In question two, analysis reveals that participants feel reviewing their children's homework to ensure it is correct is somewhat their responsibility (36.7%). However, analysis of participant responses to question 3, indicate that participants (parents) have a greater sense of responsibility in their children's level of interest in their school work/homework as more than half of them selected responses that included "parent/guardian" (65.0%). Parents perceive children being the least responsible for warranting their own interest in their school work/homework (19.2%).

Fig. (4.4) Question 4: Who do you feel is mainly responsible for ensuring communication between home and school?

Response	Yes	Percentage
Child	25	20.83%
Teacher	96	80.00%
Parent/Guardian	72	60.00%
Child/Teacher/Parent Guardian	12	10.00%
Child/Teacher	8	6.67%
Child/Parent Guardian	1	0.83%
Teacher/Parent Guardian	40	33.33%
n=120		

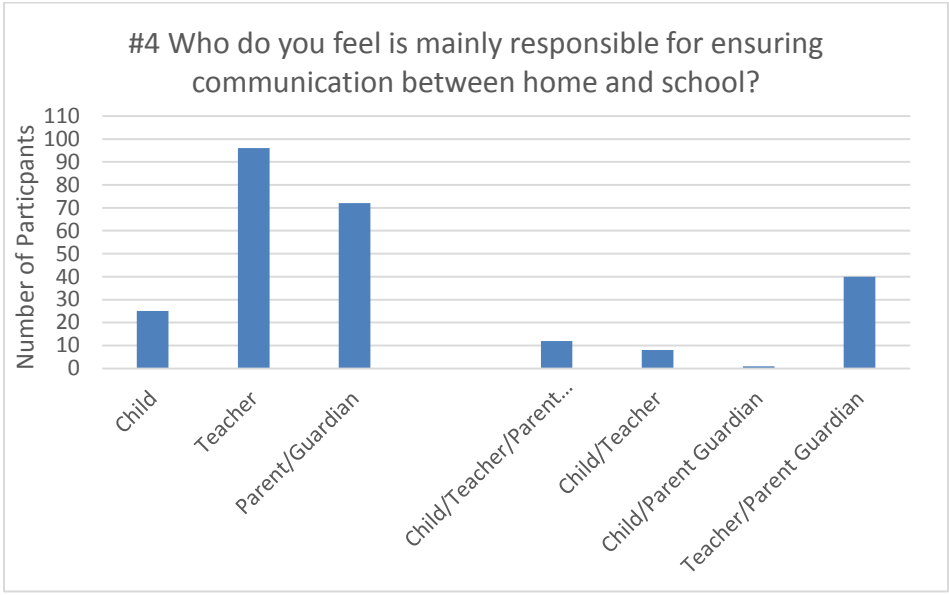
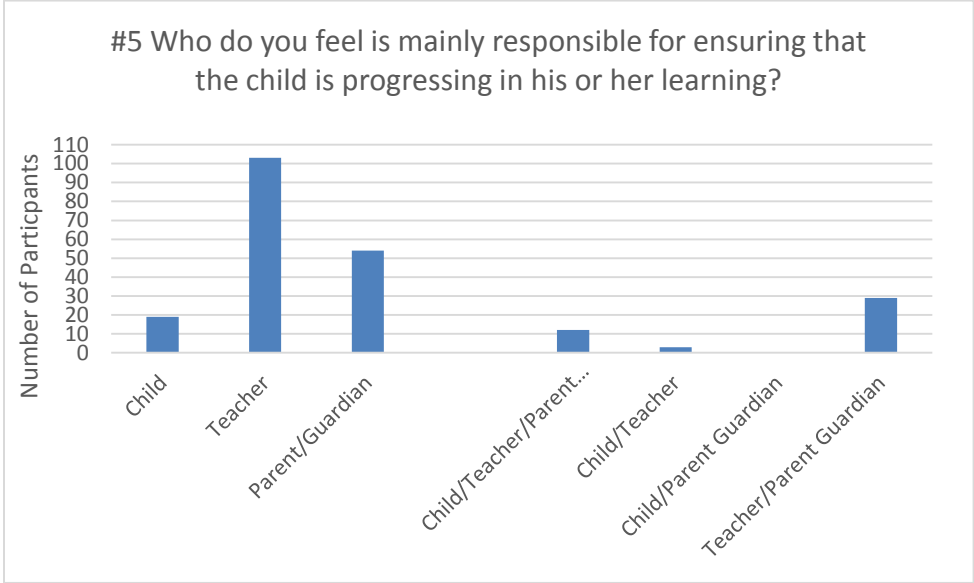


Fig (4.4) presents the results for data collected regarding who participants feel is mainly responsible for ensuring communication between home and school. Similar to questions 2 and 3, participant responses indicate that teachers (80%) closely followed by the parent/guardian (60%) largely share in the responsibility of keeping open communication between the home and school; with children holding one-third to one-quarter of the responsibility of a parent/guardian and teacher respectively.

Fig. (4.5) Question 5: Who do you feel is mainly responsible for ensuring that the child is progressing in his or her learning?

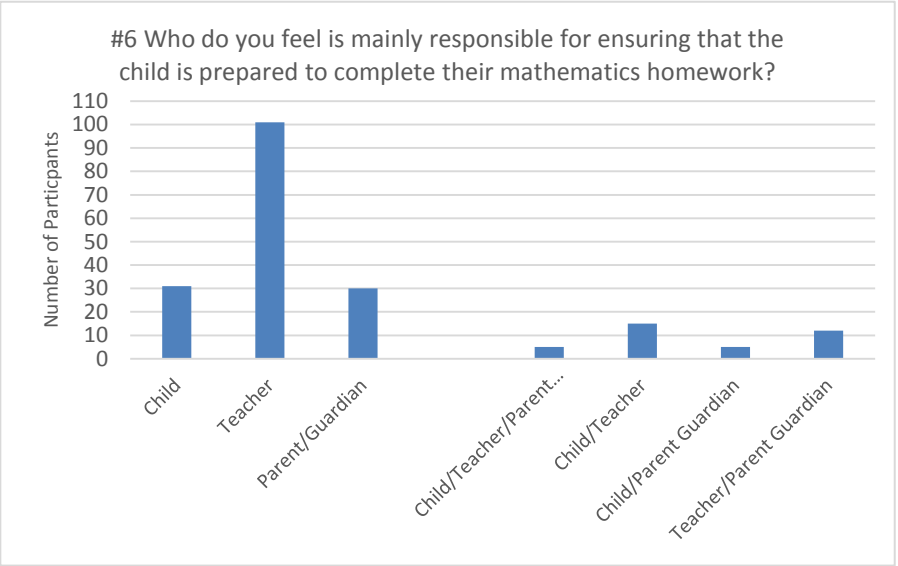
Response	Yes	Percentage
Child	19	15.83%
Teacher	103	85.83%
Parent/Guardian	54	45.00%
Child/Teacher/Parent Guardian	12	10.00%
Child/Teacher	3	2.50%
Child/Parent Guardian	0	0.00%
Teacher/Parent Guardian	29	24.17%
n=120		



The participant responses to question 5 indicate that participants hold teachers primarily responsible for ensuring that the child is progressing in his or her learning. Over 100 participants out of the 120 included in the sample selected “teacher” when answering question 5. Less than half of participants reported that they were responsible for their child’s progression in learning and even significantly less felt their child was responsible for their own learning. No participants selected that it was the child and parent/guardian’s responsibility.

Fig. (4.6) Question 6: Who do you feel is mainly responsible for ensuring that the child is prepared to complete their mathematics homework?

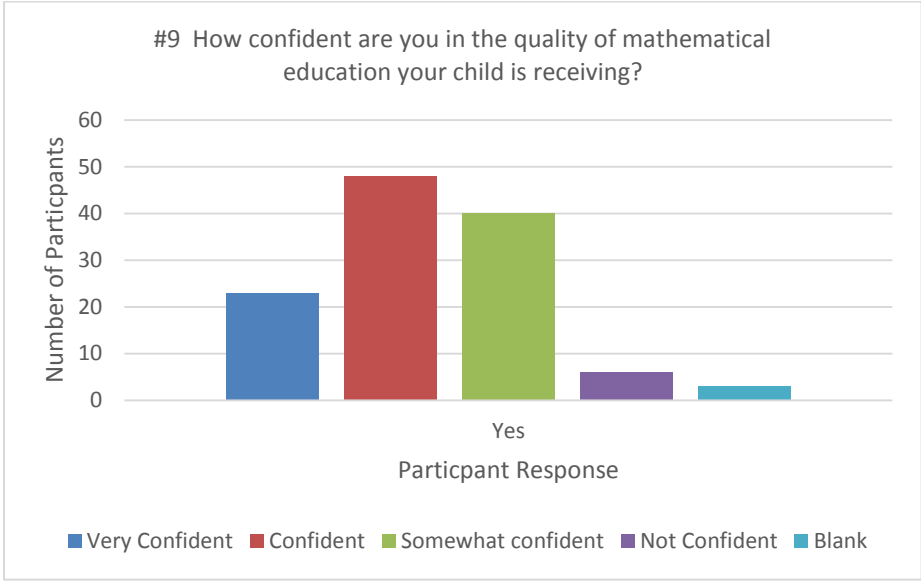
Response	Yes	Percentage
Child	31	25.83%
Teacher	101	84.17%
Parent/Guardian	30	25.00%
Child/Teacher/Parent Guardian	5	4.17%
Child/Teacher	15	12.50%
Child/Parent Guardian	5	4.17%
Teacher/Parent Guardian	12	10.00%
n=120		



Analysis of participant responses to question 6: "Who do you feel is mainly responsible for ensuring that the child is prepared to complete their mathematics homework?" reveal that over 100 participants selected "teacher" when completing the questionnaire (84.2%). Similarly, a frequency count and data analysis of the other close-ended responses of "child" and "parent/guardian" yielded a significantly smaller percentage (~25.0%); indicating that participants hold teachers to be most responsible for a child's level of preparedness to complete their mathematics homework. However, question 6 results do reveal that participants feel the "child" should be held more accountable for preparedness (question 6) than progressing in their learning (question 5).

Fig. (4.7) Question 9: How confident are you in the quality of mathematical education your child is receiving?

Participant Response	Very Confident	Confident	Somewhat confident	Not Confident	Blank
Yes	23	48	40	6	3
Percentage Yes	19.17%	40.00%	33.33%	5.00%	2.50%
n=120					



Unlike questions 2-6, question 9 permitted participants to select only one response as selecting two would result in an illogical response and be recorded as a "blank" response. Analysis of participants' confidence in the quality of mathematical education their child is receiving indicates that the majority of parents are confident (40.0%) or somewhat confident (33.3%); which account for more than 70% of completed questionnaires. Additionally, as shown in Fig (4.9), more than 100 participants report having some level of confidence with a median of 2 (confident).

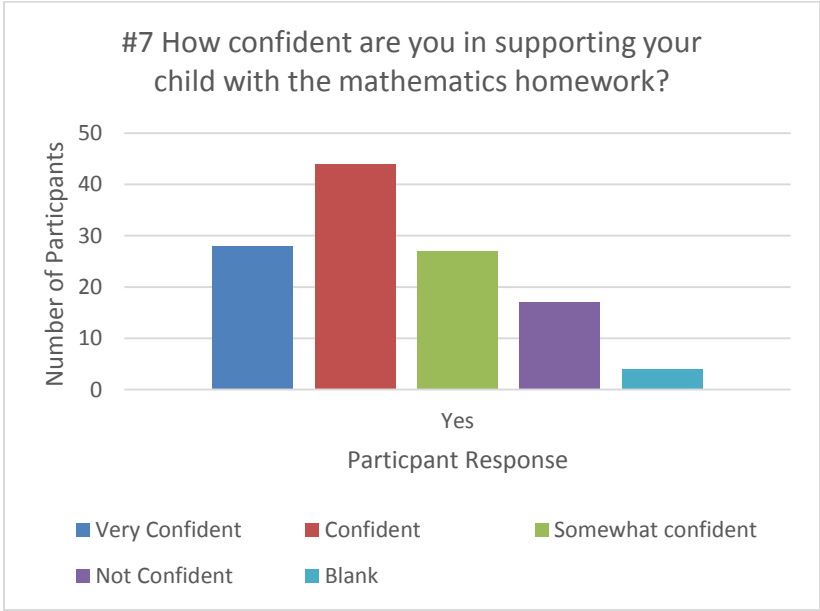
Research Question 2: What practices do parents engage in as they assist their children in completing mathematics homework?

Below are the results from the descriptive analysis of data resulting from questions 7, 8, and 10-19 of the questionnaire. I have subdivided the second research question into two categories: i) *Parental motivation that contributes to student learning* and ii) *Parental behaviors displayed during engagement with mathematics homework and support/strategies that increase student mathematical achievement*. Similar to questions 1-6 and 9, the questionnaire instructions ask participants to select all answers that apply. Thus, the results presented below use tables and charts to summarize the results of the close-ended responses and the various combinations participants selected, with a brief explanation that will be expanded on later in the discussion.

Parental motivation that contributes to student learning

Fig (4.8) Question 7: How confident are you in supporting your child with the mathematics homework?

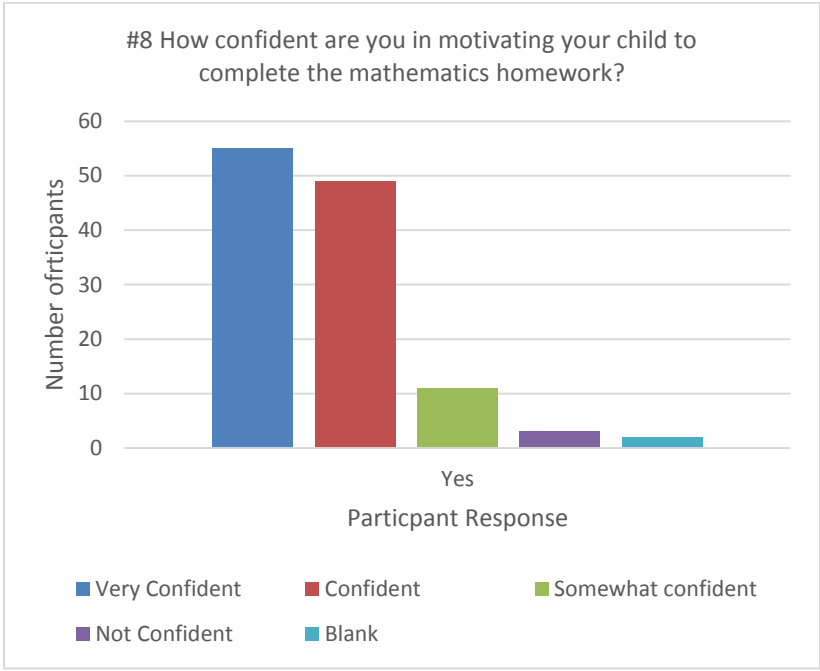
Participant Response	Very Confident	Confident	Somewhat confident	Not Confident	Blank
Yes	28	44	27	17	4
Percentage Yes	23.33%	36.67%	22.50%	14.17%	3.33%
n=120					



As seen from the result presented in Fig (4.8), participants have confidence in their ability to support their children with their mathematics homework. The majority of parents are "confident" (35.0%) with 26.7% of participants feeling "very confident" and "somewhat confident"; totaling 78.4% of responses reporting some level of confidence with a median level of "confident".

Fig (4.9) Question 8: How confident are you in motivating your child to complete the mathematics homework?

Participant Response	Very Confident	Confident	Somewhat confident	Not Confident	Blank
Yes	55	49	11	3	2
Percentage Yes	45.83%	40.83%	9.17%	2.50%	1.67%
n=120					



Participants report feeling a strong sense of confidence (median level of 2) in their ability to motivate their children to complete their mathematics homework. As seen in the table above, over 86% of participants report that they are either confident or very confident in motivating their children to complete their mathematics homework.

- An explanation of the data analysis for questions 10-12 follow the presentation of Fig (4.10) to Fig(4.12).

Fig (4.10) Question 10: Which of these statements do you feel best define the purpose of learning mathematics?

Participant Response	To develop practical skills such as measuring and calculating	To connect mathematical ideas among themselves, to everyday experiences, and to other subject areas	To broaden future career opportunities	To succeed in school	To develop good reasoning skills	To be prepared to face today's challenges	To calculate quickly in everyday life situations	To gain future employment in the sciences	To ensure access to post-secondary schooling	To develop a good memory
Yes	83	82	67	56	51	39	62	34	62	23
Percentage	69.17%	68.33%	55.83%	46.67%	42.50%	32.50%	51.67%	28.33%	51.67%	19.17%
n=120										

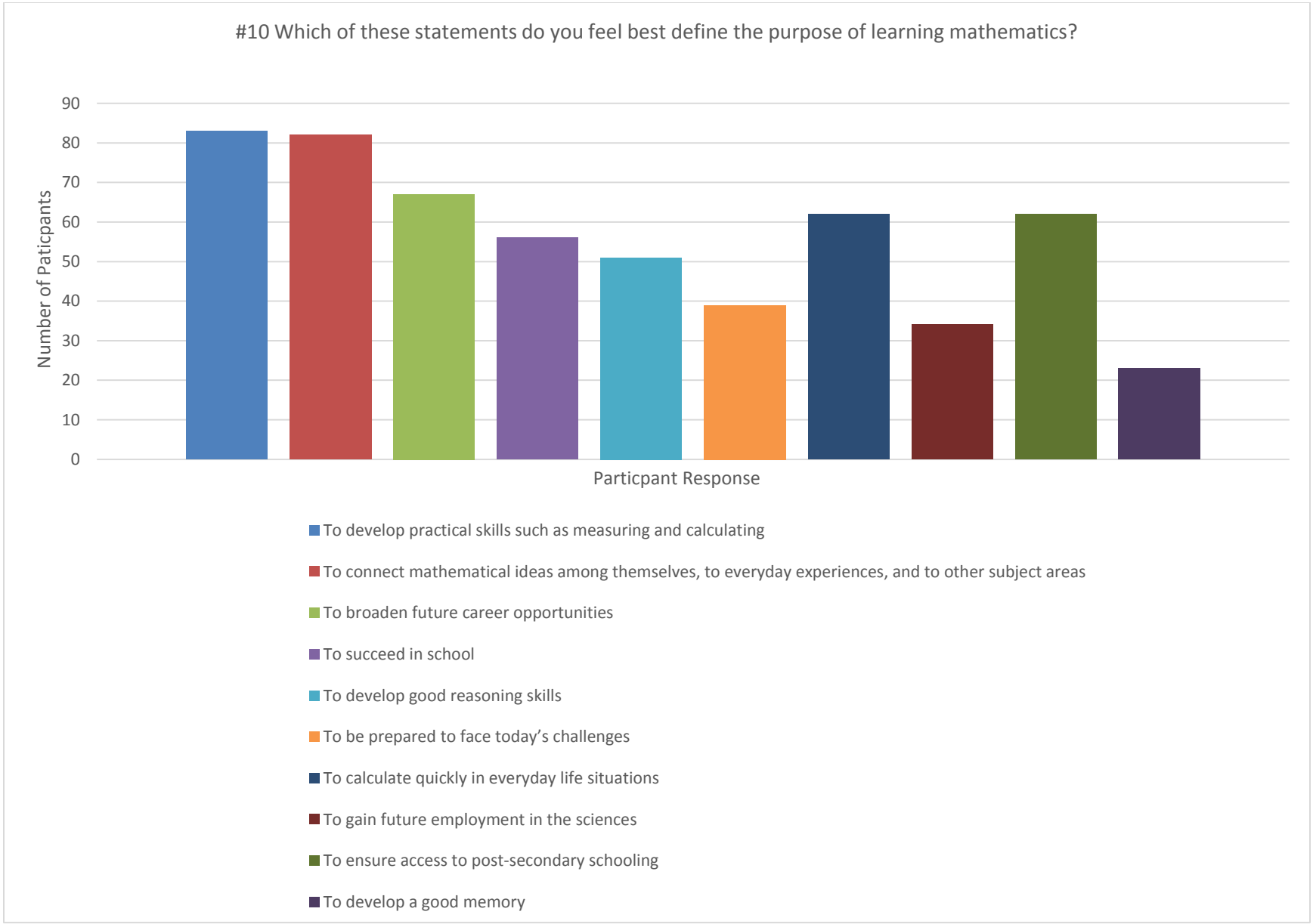

#10 Which of these statements do you feel best define the purpose of learning mathematics?
Number of Paticpants
90
80
70
60
50
40
30
20
10
0
Particpant Response
To develop practical skills such as measuring and calculating
To connect mathematical ideas among themselves, to everyday experiences, and to other subject areas
To broaden future career opportunities
To succeed in school
To develop good reasoning skills
To be prepared to face today's challenges
To calculate quickly in everyday life situations
To gain future employment in the sciences
To ensure access to post-secondary schooling
To develop a good memory

Fig (4.11) Question 11: Which of these statements do you feel best define the purpose of mathematics homework?

Participant Response	Mathematics homework does not help your child learn	To improve your child's grades	To provide extra practice of skills taught in class	To complete work that your child did not finish in class that day	To help your child learn mathematics	To prepare your child for upcoming lessons	To improve your child's ability to transfer skills to other subject areas or to real-world situations	To keep you informed of what your child is learning in mathematics	To teach your child responsibility for his or her own learning	To understand the mathematics better
Yes	2	27	99	71	49	46	33	29	60	51
Percentage Yes	1.67%	22.50%	82.50%	59.17%	40.83%	38.33%	27.50%	24.17%	50.00%	42.50%
n=120										

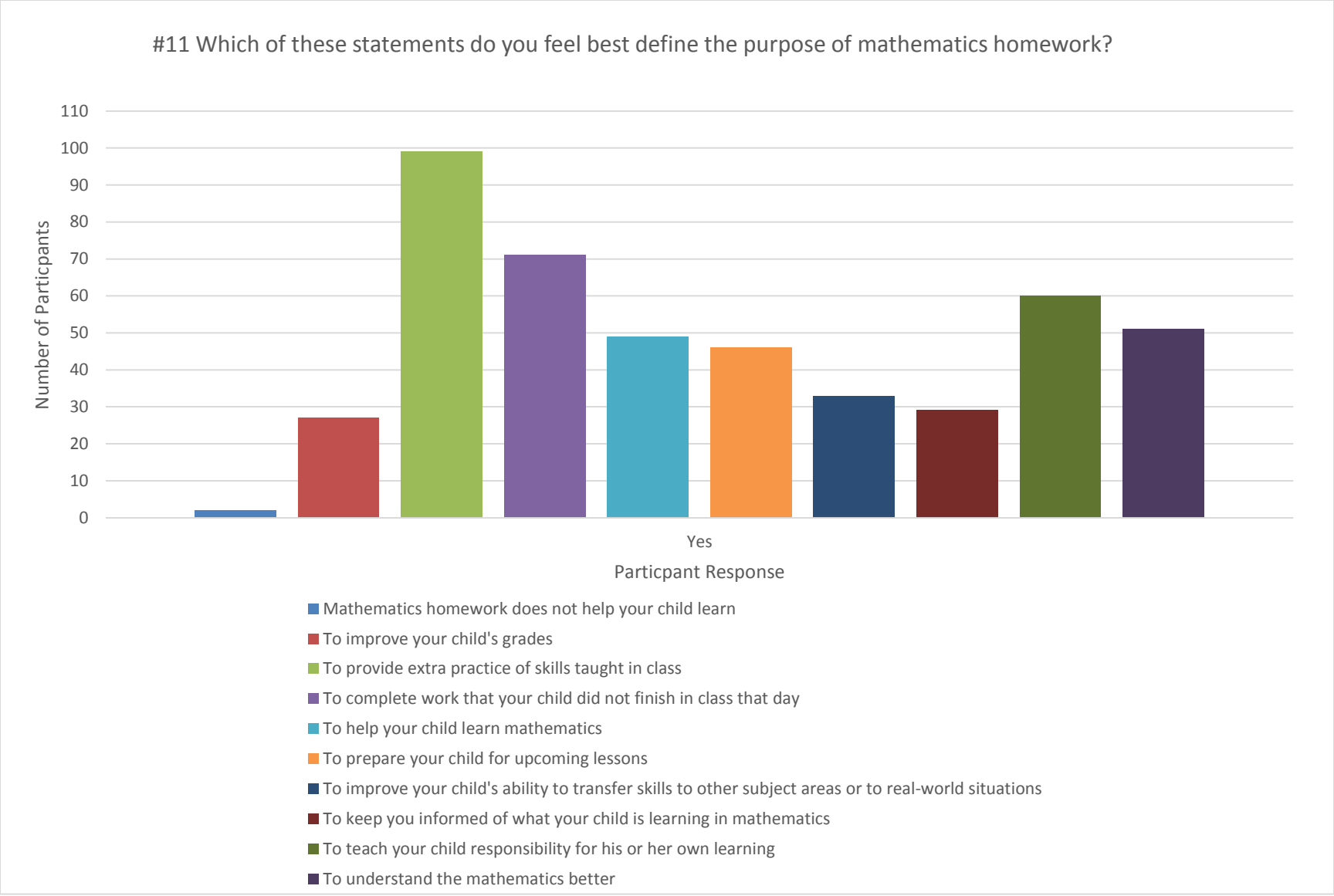
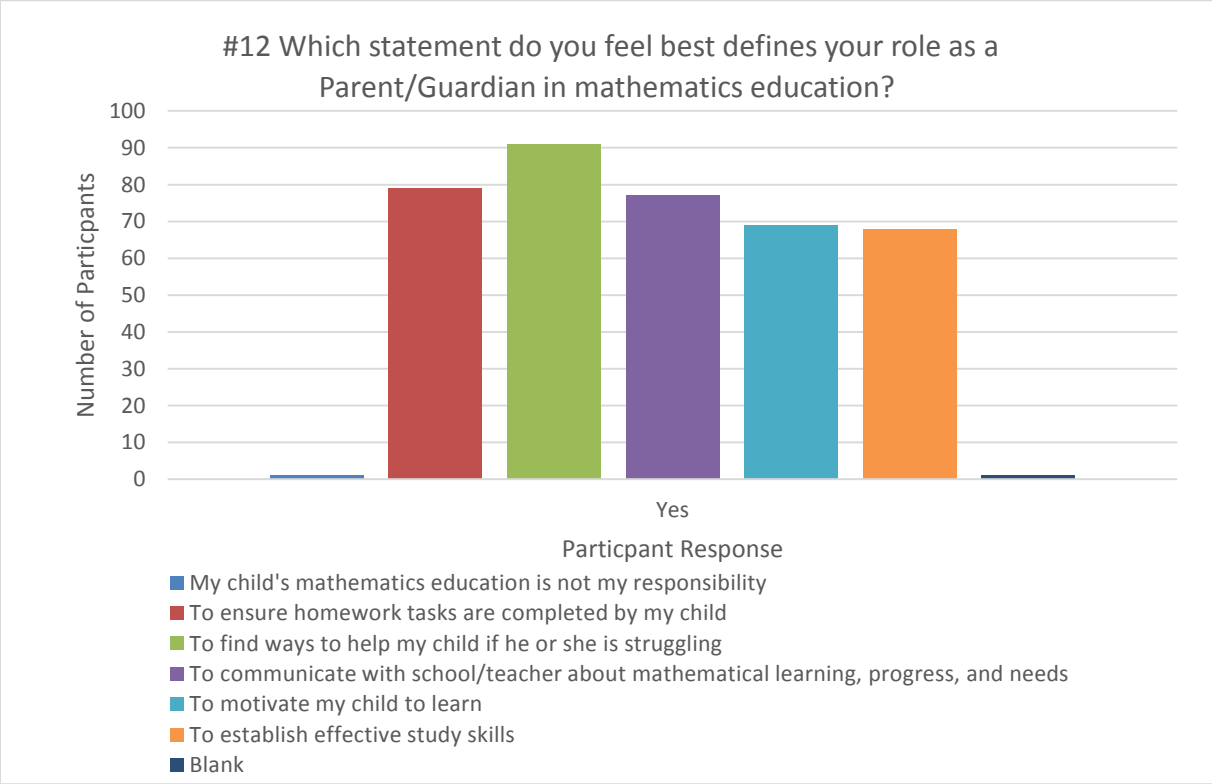

#11 Which of these statements do you feel best define the purpose of mathematics homework?
Number of Particpants
110
100
90
80
70
60
50
40
30
20
10
0
Yes
Particpant Response
Mathematics homework does not help your child learn
To improve your child's grades
To provide extra practice of skills taught in class
To complete work that your child did not finish in class that day
To help your child learn mathematics
To prepare your child for upcoming lessons
To improve your child's ability to transfer skills to other subject areas or to real-world situations
To keep you informed of what your child is learning in mathematics
To teach your child responsibility for his or her own learning
To understand the mathematics better

Fig (4.12) Question 12: Which statement do you feel best defines your role as a Parent/Guardian in mathematics education?

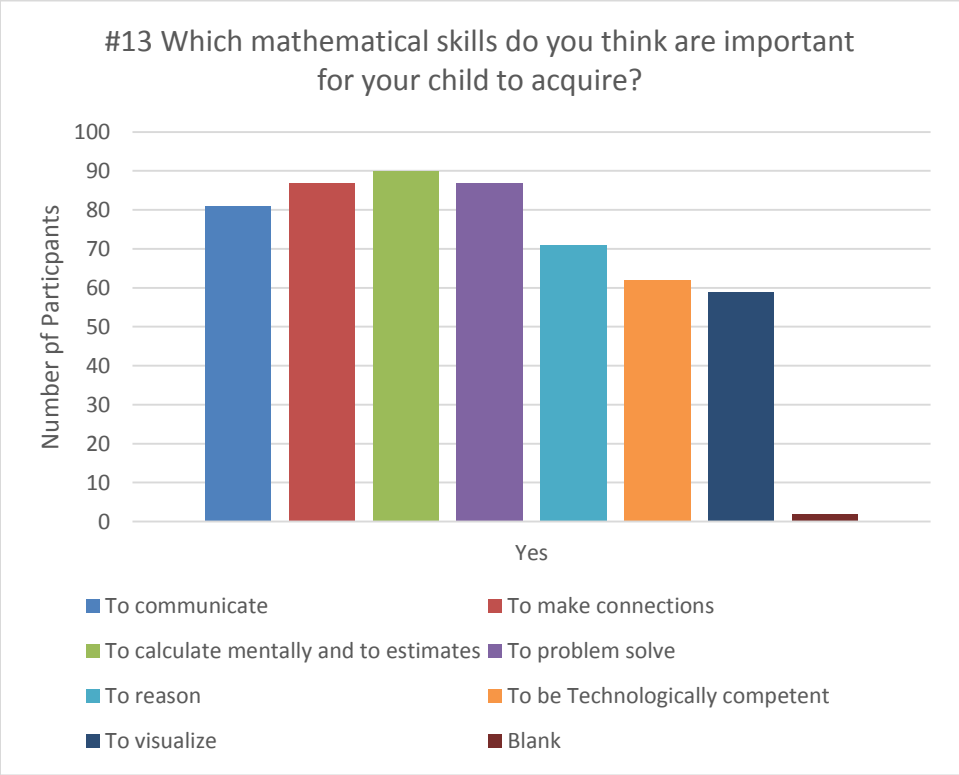
Participant Response	My child's mathematics education is not my responsibility	To ensure homework tasks are completed by my child	To find ways to help my child if he or she is struggling	To communicate with school/teacher about mathematical learning, progress, and needs	To motivate my child to learn	To establish effective study skills	Blank
Yes	1	79	91	77	69	68	1
Percentage Yes	0.83%	65.83%	75.83%	64.17%	57.50%	56.67%	0.83%
n=120							



Questions 10 and 11 examined participant opinions regarding the purpose of their children learning mathematics and the purpose of mathematics homework. The data reveal that parents feel that learning mathematics (question 10) is purposeful in their children obtaining practical skills of measuring and calculating (69.2%) and that mathematics homework largely serves the purpose of providing extra practice of the skills taught in class (82.5%). However, as Fig (4.10) and Fig (4.11) illustrate, participants do not perceive mathematics education or mathematics homework as having one single motive as demonstrated by many of the other categories being selected in combination with "To develop practical skills such as measuring and calculating" and "to provide extra practice of skills taught in class". Similarly, the responses to question 12: **"**Which statement do you feel best defines your role as a Parent/Guardian in mathematics education?" indicate that parents perceive their role as being diverse as well. All categories listed for participant selection were chosen in more than 50% of the responses with the exception of one category, "My child's mathematics education is not my responsibility" who was chosen only by a few of the participants (<1%).

Fig (4.13) Question 13: Which mathematical skills do you think are important for your child to acquire?

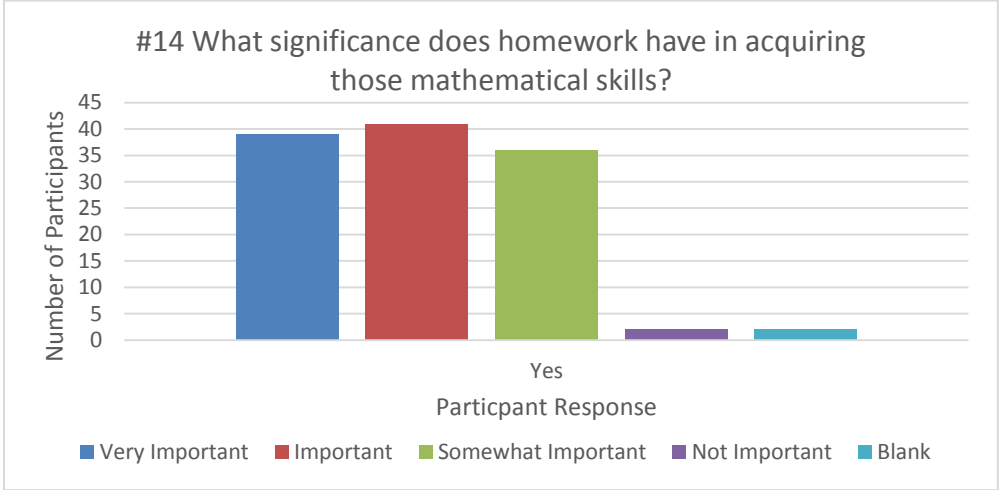
Participant Response	To communicate	To make connections	To calculate mentally and to estimates	To problem solve	To reason	To be Technologically competent	To visualize	Blank
Yes	81	87	90	87	71	62	59	2
Percentage Yes	67.50%	72.50%	75.00%	72.50%	59.17%	51.67%	49.17%	1.67%
n=120								



Data collected on the participants' perceptions of the mathematical skill(s) they deem are important for their children to acquire indicate that parents value a variety of skills involved in the mathematical processes of mathematics education; with "to calculate mentally and estimate" having a marginal increase over "to make connections" and "to problem solve" (<3%), and minimal increase over the other close-ended categories.

Fig (4.14) Question 14: What significance does homework have in acquiring those mathematical skills?

Participant Response	Very Important	Important	Somewhat Important	Not Important	Blank
Yes	39	41	36	2	2
Percentage Yes	32.50%	34.17%	30.00%	1.67%	1.67%
n=120					



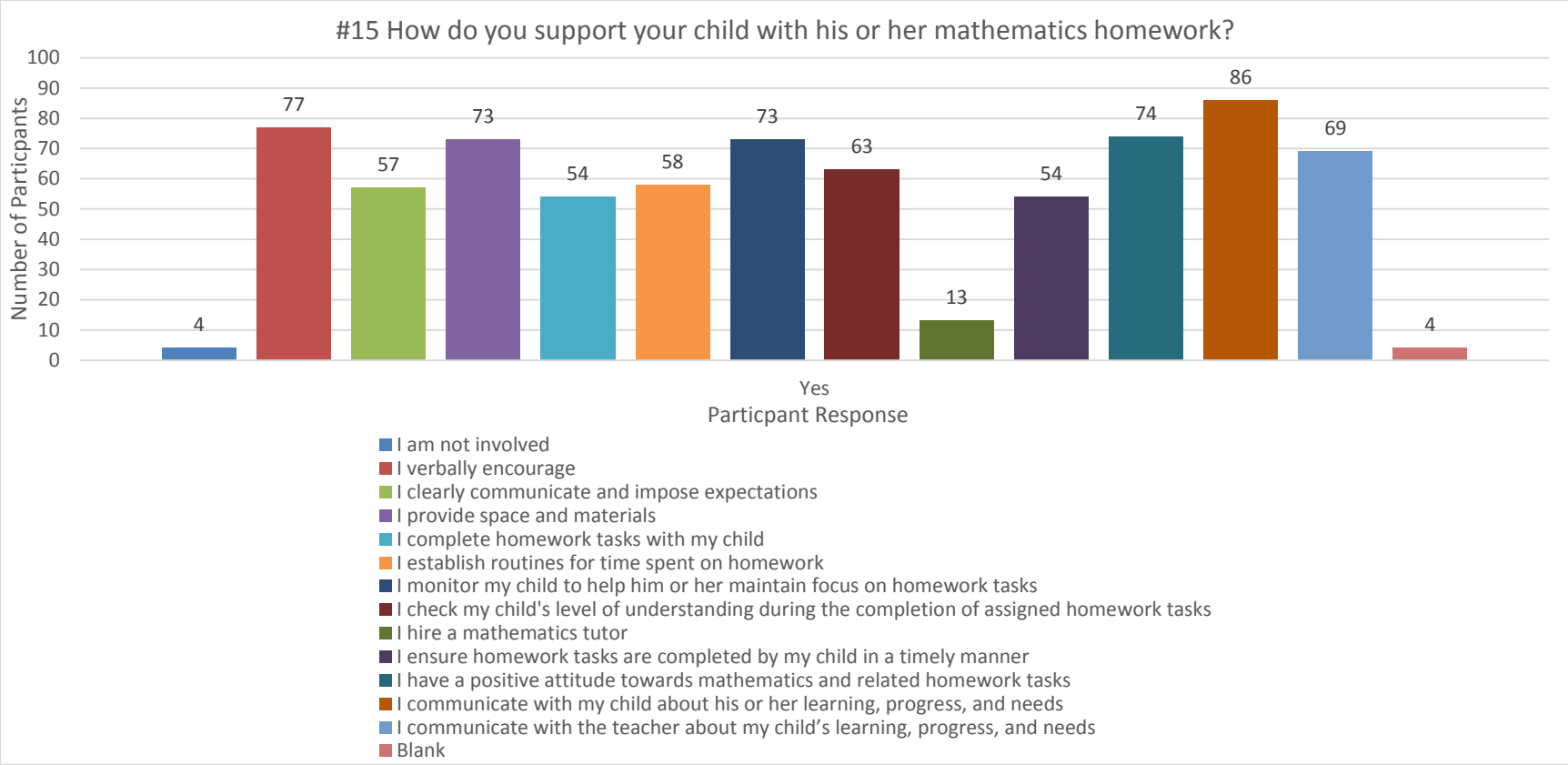
In response to question 14: "What significance does homework have in acquiring those mathematical skills?", the majority of participants reported that mathematics homework is significant (median score of 2 = important) in their children acquiring those mathematical skills listed previously in question 13. Over 90% of participant responses report that they see mathematics homework as either "somewhat important" (30.0%), "important" (34.2%), or "very important" (32.5%) with neither category with a greater majority than the other.

Parental behaviors displayed during engagement with mathematics homework and support/strategies that increase student mathematical achievement

Fig (4.15) Question 15: How do you support your child with his or her mathematics homework?

Participant Response	I am not involved	I verbally encourage	I clearly communicate and impose expectations	I provide space and materials	I complete homework tasks with my child	I establish routines for time spent on homework	I monitor my child to help him or her maintain focus on homework tasks	I check my child's level of understanding during the completion of assigned homework tasks
Yes	4	77	57	73	54	58	73	63
Percentage Yes	3.33%	64.17%	47.50%	60.83%	45.00%	48.33%	60.83%	52.50%

Participant Response	I hire a mathematics tutor	I ensure homework tasks are completed by my child in a timely manner	I have a positive attitude towards mathematics and related homework tasks	I communicate with my child about his or her learning, progress, and needs	I communicate with the teacher about my child's learning, progress, and needs	Blank
Yes	13	54	74	86	69	4
Percentage Yes	10.83%	45.00%	61.67%	71.67%	57.50%	3.33%
n=120						

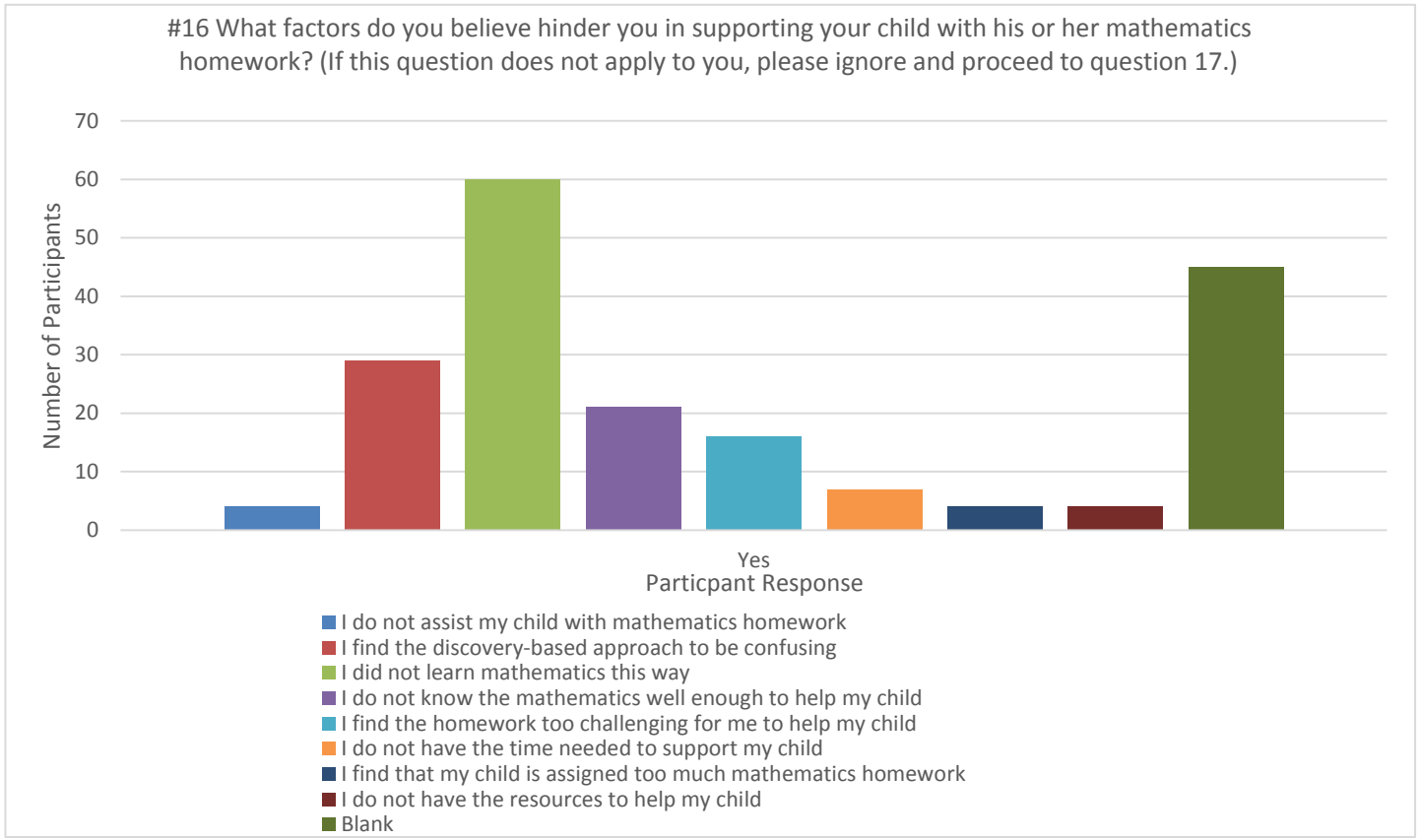


Data analysis reveals that parents employ a variety of support strategies when involved with their children's mathematics homework with the exception of hiring a mathematics tutor (>1%). Results presented in Fig (4.15) indicate that more than half of participants support their children with their mathematics homework by communicating with their children about his or her learning, progress, and needs (71.7%), by providing verbal encouragement (64.2%), by demonstrating a positive attitude towards their mathematics and related homework tasks (61.2%), by providing space and materials(60.8%), by monitoring their child to help him or

her maintain focus on homework tasks (60.8%), and by checking their child's level of understanding during the completion of assigned homework tasks (52.5%).

Fig (4.16) Question 16: What factors do you believe hinder you in supporting your child with his or her mathematics homework? (If this question does not apply to you, please ignore and proceed to question 17.)

Participant Response	I do not assist my child with mathematics homework	I find the discovery-based approach to be confusing	I did not learn mathematics this way	I do not know the mathematics well enough to help my child	I find the homework too challenging for me to help my child	I do not have the time needed to support my child	I find that my child is assigned too much mathematics homework	I do not have the resources to help my child	Blank
Yes	4	29	60	21	16	7	4	4	45
Percentage Yes	3.10%	22.48%	46.51%	16.28%	12.40%	5.43%	3.10%	3.10%	34.88%
n=120									



Unlike the other questions included on the questionnaire, question 16 gave participants the option of leaving the question blank if it did not apply to them. Results shown in Fig (4.16) reveal that many participants (34.9%) did indeed skip question 16, indicating they felt their support was not impeded by external factors such as those listed in question 16. However, analysis of the responses that were selected by the remaining 65% of participants indicate that the discovery-based curriculum is somewhat problematic for them (22.5%) and " I did not learn mathematics this way" (46.5%) as the biggest hinderance to supporting their children.

Fig (4.17A) Question 17A: How much time per week do you believe should be devoted to homework in general?

Participant Response	No time	0-1 Hour	1-2 Hours	2-3 Hours	3-4 Hours	5+ Hours	Blank
Yes	3	8	23	28	33	21	4
Percentage Yes	2.50%	6.67%	19.17%	23.33%	27.50%	17.50%	3.33%
n=120							

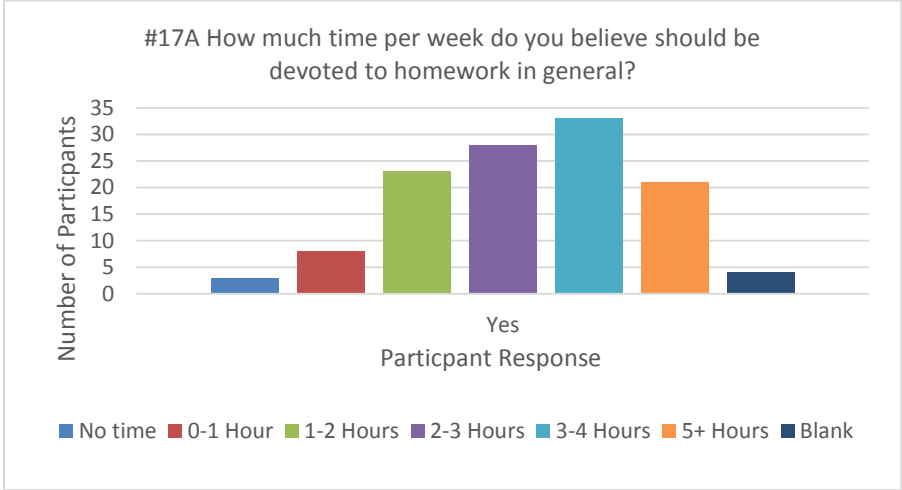
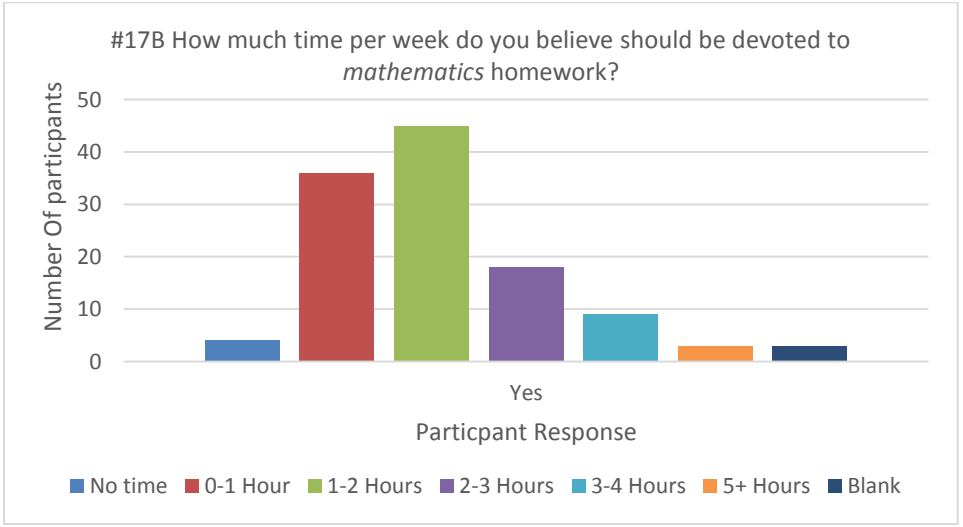


Fig (4.17B) Question 17B: How much time per week do you believe should be devoted to mathematics homework?

Participant Response	No time	0-1 Hour	1-2 Hours	2-3 Hours	3-4 Hours	5+ Hours	Blank
Yes	4	36	45	18	9	3	3
Percentage Yes	3.33%	30.00%	37.50%	15.00%	7.50%	2.50%	2.50%
n=120							



Parental Involvement

The results regarding the time participants believe that should be spent on completing homework in general per week (17a) are wide-ranging with the majority of participants indicating that their children should be spending somewhere between 1-4 hours completing homework (70%). The data reveal that the time allocation of 3-4 hours has a slight increase over the other categories (27.5%). Correspondingly, responses regarding participant beliefs on time their children should devote to mathematics homework per week (17b) are somewhat varied with majority of participants responses indicating that they believe that their children should be spending somewhere between 0-2 hours (67.5%).

Fig (4.18A) Question 18A: How much time per week does your child spend on completing homework in general?

Participant Response	No time	0-1 Hour	1-2 Hours	2-3 Hours	3-4 Hours	5+ Hours	Blank
Yes	1	31	29	27	22	13	0
Percentage Yes	0.83%	25.83%	24.17%	22.50%	18.33%	10.83%	0.00%
n=120							

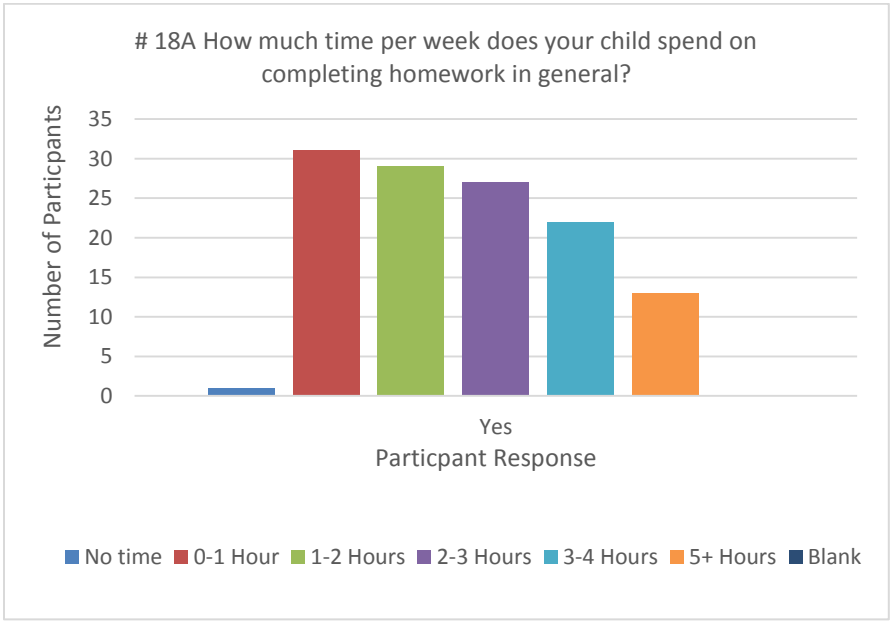
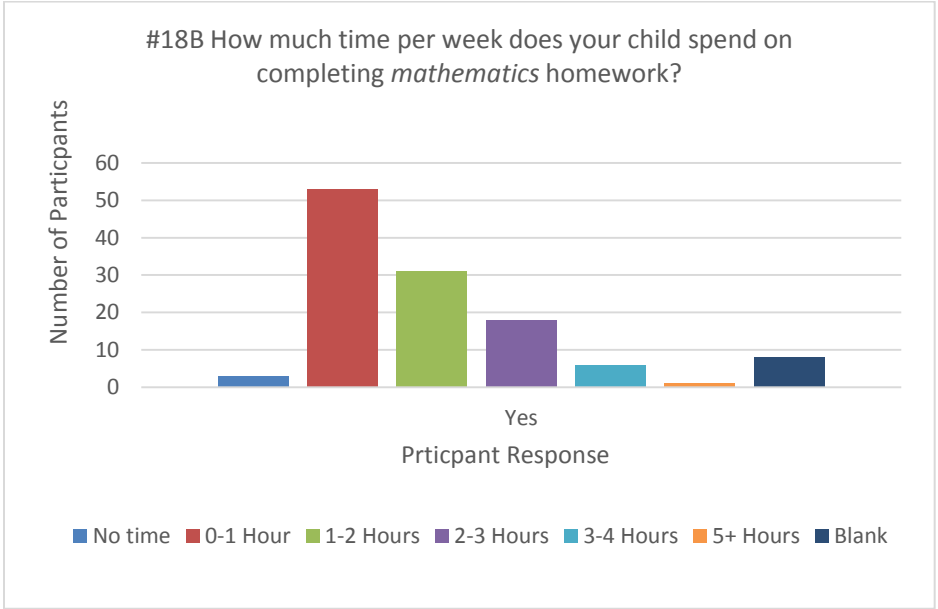


Fig (4.18B) Question 18B: How much time per week does your child spend on completing mathematics homework?

Participant Response	No time	0-1 Hour	1-2 Hours	2-3 Hours	3-4 Hours	5+ Hours	Blank
Yes	3	53	31	18	6	1	8
Percentage Yes	2.50%	44.17%	25.83%	15.00%	5.00%	0.83%	6.67%
n=120							



A frequency count of participant selections to question 18a: "How much time per week does your child spend on completing homework in general?" yielded results similar to those in question 17a as they are vague with no clear category being selected more than another is. As seen in Fig (4.18a), participants selected all categories ranging from 0-4 hours with the time of allocation of 0-1 hours having a slight increase with a mode of 31 (25.8%). Results for question 18b clearly disclose that the majority of participants' children are actually spending 0-1 hours completing mathematics homework per week (44.2%).

Fig (4.19A) Question 19A: How much time per week do you spend helping your child complete homework in general?

Participant Response	No time	0-1 Hour	1-2 Hours	2-3 Hours	3-4 Hours	5+ Hours	Blank
Yes	19	42	28	12	12	5	2
Percentage Yes	15.83%	35.00%	23.33%	10.00%	10.00%	4.17%	1.67%
n-120							

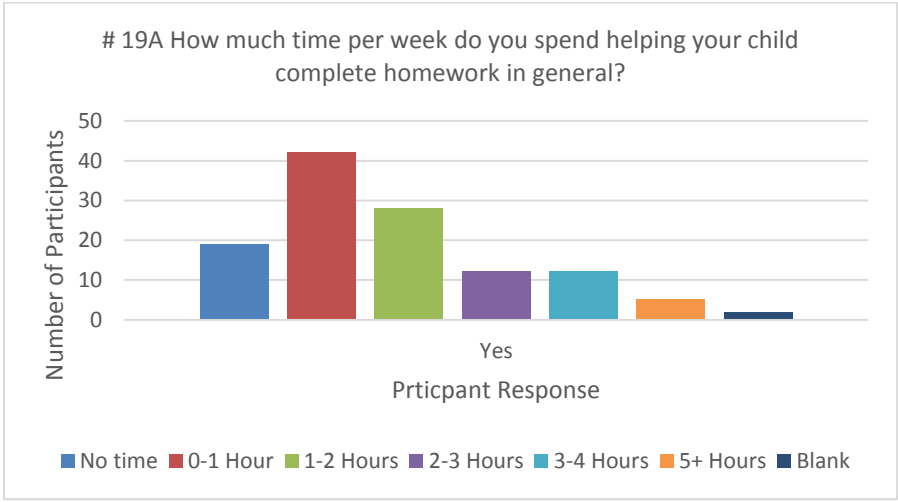
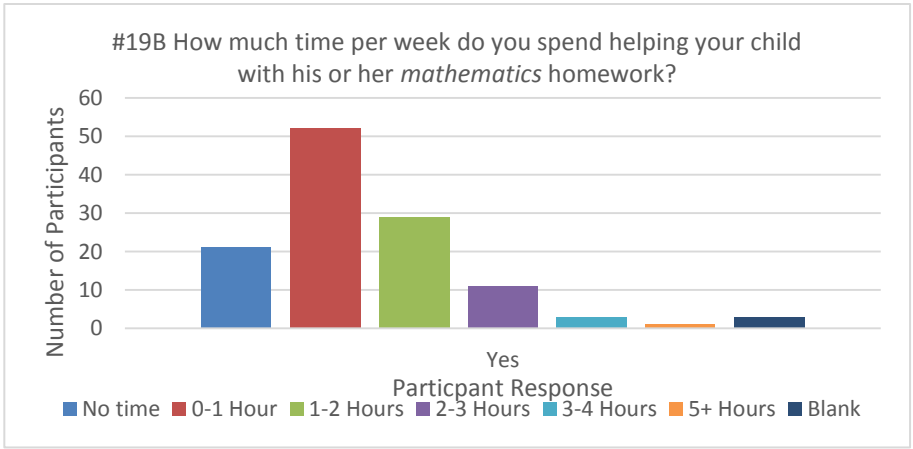


Fig (4.19B) Question 19B: How much time per week do you spend helping your child with his or her mathematics homework?

Participant Response	No time	0-1 Hour	1-2 Hours	2-3 Hours	3-4 Hours	5+ Hours	Blank
Yes	21	52	29	11	3	1	3
Percentage Yes	17.50%	43.33%	24.17%	9.17%	2.50%	0.83%	2.50%
n=120							



The data for questions 19 a-b show that participants' beliefs and actions are aligned regarding time spent on supporting their children during the completion of mathematics homework. Results indicate participants believe they should spend 0-1 hours per week on supporting their children with their mathematics homework (19a), and in fact report spending 0-1 hours supporting their children with their mathematics homework (19b).

Discussion of Results

In Chapter 2, studies conclude that appropriate parental involvement in homework impacts student achievement (Baker & Soden, 1997; Cooper, 1989; Patall et al., 2008; Wilder, 2015). The aim of this study is to better understand parental involvement specifically in mathematics homework. To this end, I conducted an investigation into parental role construction and their explicit behaviours when and if engaged in their children's mathematics homework in the home. Self-reported data collected from parent participants regarding their direct actions, role, and behaviours has been analyzed and subsequently interpreted to better understand and to frame support strategies parents could use to potentially increase their effectiveness. The descriptive analysis of participant generated data presented and illustrated in this chapter provides insights for this study.

Questions 1 through 6 and question 9 were designed to respond to the first research question, "*Does the role parents adopt impact their involvement with mathematics homework*?" Research studies reviewed in Chapter 2 state that understanding role construction, including a parent's sense of responsibility (questions 1-6), and their assurance in the mathematics education their children are receiving (question 9) significantly increases parental involvement (Hoover-Dempsey et al., 2001; Hoover-Dempsey et al., 2005; Hoover-Dempsey & Sandler, 1995, 1997; Green et al., 2007). Results from this study reveal that parents hold teachers largely responsible for their children's mathematics homework, with the exception of question 1, for which participants reported they feel it is their responsibility to ensure

homework is completed. All the other question responses reported that parents perceive teachers to be primarily responsible for all remaining tasks (the correction of mathematics homework, for maintaining student interest, for home-school communication, for tracking student progress in learning, and for student preparedness (questions 2-6)) listed on the instrument associated with mathematics homework. Additionally, data analysis of responses to questions 1 through 6 discloses that participants hold students least responsible for matters associated with homework completion. This data is particularly important for verifying the constructs on which parent participants have formed their role. A parent's perceived sense of responsibility is intrinsically linked to their role construction, "Parental role construction includes a sense of personal or shared responsibility for the child's educational outcomes and concurrent beliefs about whether one should be engaged in supporting the child's learning and school success." (Hoover-Dempsey et al., 2005, p.107). Results from this research study show that parents, to some extent, assume a shared sense of responsibility with their children's teacher, but overall hold the teacher largely accountable for their children's mathematics homework; indicating that they are less likely to be involved in engaging in the completion of mathematics homework in the home.

Furthermore, Keyes (2002) found that those parents who are *teacher-focused* – parents who assume no responsibility in their children's education – adopt a role and display behaviours that reflect minimal involvement. Data collected indicate that the majority of participants do feel some sense of responsibility, meaning they believe that their children's mathematics homework is a shared responsibility between themselves and the teachers, a *partnership-focus*. Therefore, results are anticipative in that participants have the *focus* and constructs in place to increase their level of responsibility resulting in a higher level of involvement.

Question 9, *"How confident are you in the quality of mathematical education your child is receiving?"* is foundationally connected to parental role construction. If parents are confident that their

children's mathematics education has value, than they are more likely to deem their involvement as important and necessary (Hoover-Dempsey & Sandler, 1997); and in turn they are supportive and involved. The majority of participants reported that they are either confident or somewhat confident (73.3%), indicating that parents do indeed value their children's mathematics education.

The remaining questions 7, 8, and questions 10 through 19 address the second research question "What *practices do parents engage in as they assist their children in completing mathematics homework?"* These questions targeted parental motivators (questions 7, 8,10-14) and the direct actions/behaviours (questions 15-19) that participants overtly display when engaged with their children's mathematics homework at home.

Results of questions 7 and 8 reports on participant self-efficacy and on their level of confidence in their ability to support and motivate their children with their mathematics homework. Both questions yielded results indicating that participants are mostly confident in supporting their children with their mathematics homework and possess assurance in motivating their children to complete their mathematics homework. These results indicate that participants of this study have a well-established sense of self-efficacy. Bandura's (1994) theory of self-efficacy attributes that one's belief about their capabilities "determines how people feel, think, motivate themselves and behave." (p. 2). Likewise, educational researchers cited parental self-efficacy as a crucial motivational factor for increasing parental involvement in education which in turn can potentially increase student achievement (Green et al., 2007; Hoover-Dempsey & Sandler, 1995, 1997; Hoover-Dempsey et al., 2001; Hoover-Dempsey et al., 2005; Wilder, 2015). Therefore, if parents are confident in their ability to motivate and to support their children with their mathematics homework, it can be concluded that participants of the study have the basis to engage with their children's mathematics homework, and in turn potentially positively impact their children's academic achievement.

Parental Involvement

Questions 10 and 11 investigated participant perceptions of the purpose of mathematics education and the purpose of mathematics homework. The results demonstrate that participants consider their children's mathematics education and mathematics homework to have diverse purposes, with many of the participants selecting more than one of the predetermined responses. Similarly, responses to question 12, "*Which statement do you feel best defines your role as a Parent/Guardian in mathematics education?*" had many of the predetermined responses selected. This indicates that parents believe mathematics education, mathematics homework and their role in their children's mathematics education not only to be important, but to be multifaceted. The analysis of predetermined responses selected by participants along with the qualitative open-ended responses, it can be inferred that the participants have a multitude of inherent motivations to be involved in their children's mathematical learning; which in theory provides ample opportunity for parents to become involved in their children's mathematics homework. Additionally, results from these three questions are of great importance for this study since they are at the crossroads of the study's two governing research questions (parental role and overt behaviours during parental involvement with mathematics homework); it reveals that participants believe to be of worth (purpose and role). Selected responses revealed participants' foundational motivation(s) (the purpose of mathematics education (question 10)), the purpose of mathematics homework (question 11) and their perceived role in their children's mathematics education (question 12)) of role construction (Hoover-Dempsey et al. , 2001, 2005, 2007; Hoover-Dempsey & Sandler, 1995, 1997; Keyes, 2002; McNeal, 2014; Wilder, 2015) and the factors that may attribute to their sense of self efficacy (Bandura, 1977,1994; Hoover-Dempsey & Sandler, 1995). Likewise, it somewhat forecasts participants' explicit behaviours (Gondia & Cortina, 2014; Hoover-Dempsey et al., 2001; Hoover- Dempsey & Sandler, 1995; Hyde et al., 2006) by investigating participant's cognizance of what they as parents value, see as attainable goals, and subsequently what behaviours they will most likely engage in during involvement.

Furthermore, responses to Question 11, "*Which of these statements do you feel best define the purpose of completing mathematics homework?"* revealed further information regarding parental perceptions on which types of mathematics homework they deem purposeful. The mathematics homework design (*preparation*, *practice*, and *extension*) by Rosario et al. (2015) served to frame many of the predetermined responses included on the questionnaire. The majority of participants see mathematics homework valuable for *practice* and *preparation* with a small percentage (<30%) of participants indicating that *extension* homework (activities include problem solving skills that prompt students to transfer their learning to other academic areas) having purpose. Ironically, the most significant increase in student achievement is associated with *extension* activities (Rosario et al., 2015). These results demonstrate that parents are more supportive of the direct-instruction model (*preparation* and *practice* activities) than the discovery-based model (*extension* activities) which the Newfoundland and Labrador mathematics curriculum utilizes. This is further illustrated by the results from question "*What factors do you believe hinder you in supporting your child with his or her mathematics homework?*" discussed later.

Questions 13 and 14, collected data regarding "*Which mathematical skills do you think are important for your child to acquire?*" and "*What significance does homework have in acquiring those mathematical skills?*" respectively. Participant responses were varied indicating that parents consider all the mathematical processes listed to be important, with a large majority of the sample (approximately 94%) reporting that mathematics homework is indeed an important component for their children in acquiring those skills. Therefore, keeping in mind that parents deem mathematics education and homework to have varied purposes, their role as parents to be diversified, and mathematics homework to be an important component of achieving mathematical skills, it can be inferred that parents see homework as a valuable means of continuing their children's mathematical education. These results align with the Hoover-Dempsey & Sandler (1995, 1997) Model of the Parental Involvement Process (Figure 2). Once

again, reaffirming that participants of the study have the psychological constructs (level 1) that positively influences their personal choice to become involved in their children's mathematics homework.

Question 15, "*How do you support your child with his or her mathematics homework?*" investigated parental behaviours displayed during engagement with mathematics homework and support/strategies that increase student mathematical achievement. This question offered participants the most selection with 13 possible predetermined answers designed using the Hoover & Dempsey (2001) Synopsis of 8 Parental Support Strategies when involved in their Children Homework (Table 1). Most participants chose more than one of the predetermined responses, which suggests that participants are already involved in their children's mathematics education in a variety of ways. According to Gonida & Cortina (2014), "Homework involvement is a multicomponent construct including both quantitative and qualitative aspects ranging from concrete support to more complex guidance (e.g., providing space and materials for doing the homework, developing rules to avoid distractions, tutoring, and doing the homework with the child)." (p.376). In agreement with data collected for this study, parents are indeed involving themselves in the children's mathematics homework by offering both tangible and intangible support. Additionally, the predetermined responses were indicative of behaviours of parents whose goals are *mastery or performance* oriented and the subsequent types of parental support they offer (*autonomy support, control, interference, cognitive engagement*) (Gondia & Cortina, 2014). As illustrated in Fig 4.15, participants utilize a variety of support strategies indicating that their support is rooted in both *mastery* and *performance*. Gonida & Cortina's (2014) research revealed that those parents who focus on understanding and skill acquisition rather than high grades (*mastery)* by providing *autonomous support* during involvement with their children's homework had the most positive impact on student learning outcomes. However, as the results from question 15 indicate, participants are still employing a *performance* oriented support ("*I ensure homework tasks are completed by my child in a timely manner*").

Interestingly, "I communicate with my child about his or her learning, progress, and needs" was selected by the majority of participants (71.7%) as the leading support strategy used. As established in the literature review, one of the most direct and effective ways for parents to become involved in their children's education is through homework by creating purposeful dialogue concerning student progress, learning, and education in general (Wilder, 2015). Therefore, participants have indicated that they currently engage with their children's mathematics homework by employing a variety of support/strategies that increase student mathematical achievement. A very small percentage of the sample (<4% for both responses independently) indicated that they are not involved or left the question blank.

Question 16, "*What factors do you believe hinder you in supporting your child with his or her mathematics homework? (If this question does not apply to you, please ignore and proceed to question 17.)*" addresses how parental self-efficacy materializes to have an effect on the overt behaviours parents demonstrate when presented with the task of being or even becoming involved in their children's mathematics homework. Unlike the other questions included in the questionnaire, participants were given permission to leave this question blank and move on to the next question. Surprisingly, a little more than one-third of participants (45 of 120 participants) did indeed leave question 16 blank. Of the remaining 75 participants who answered the question, all but 15 chose "I did not learn mathematics this way". This notable finding was confirmed by the open-ended responses collected for question 16. Many participants indicated that they as parents find the "new" curriculum (discovery-based) too difficult/different to be of assistance for their children and would prefer their children to receive mathematical instruction (direct) and homework similar to what they learned as students. Educational research cited in the literature review also confirms that the shift in mathematics curriculum and pedagogy (direct instruction to discovery-based) has proven to be troublesome and elicits strong feelings of inadequacy amongst parents when attempting to assist their children with their mathematics education (Lapointe, 2011, Patall et al., 2008,

Stokke, 2015). This feeling of incompetence is having a major negative effect on parental self-efficacy and overall opinion of the mathematics curriculum and its worth as a whole to their children's education. Research indicates that parents who have a positive sense of self-efficacy are more likely to contribute to student learning and subsequently increase mathematical achievement (Hoover-Dempsey et al., 2001; Wilder, 2015; Wu, 2015). While the results of previous questions indicate that participants do indeed have a well-developed sense of self-efficacy and utilize many positive motivators to be involved in their children's mathematics homework, the results of this question indicate that our current curriculum model is nevertheless lowering parents' sense of self-efficacy. The resulting effect is detrimental to parental psychological constructs that permit and motivate their involvement and the quality of their support. This is a serious concern arising from the current mathematics curriculum, especially when educational stakeholders are seeking ways to increase parental involvement to improve students' learning of mathematics.

The remaining three questions on the questionnaire investigated the length of time participants believed necessary/spent completing and supporting their children with their mathematics homework on a weekly basis. Question 17 addresses participant *beliefs* about how much time should be spent on completing homework in general (17a) and mathematics homework specifically (17b). Both questions generated data that suggests participants feel that their children should most certainly be completing homework and that the length of time mathematics homework has its place. The results from this question illustrates the majority of participants (approximately 94%) *believe* their children should complete mathematics homework; making it more likely that they will support their children using strategies (such as those listed in question 15) to positively impact their learning. The following question on the questionnaire sought out information on the amount of time participants' children *actually* spent completing homework in general and mathematics homework specifically (18a & 18b) during the span of

one week. The objective of this question was to reveal, if any, discrepancies that exist between participant beliefs and actual time their children spend completing homework during a week. As illustrated in the figures above, results from questions 17 and 18 are mostly in sync. However, selected responses to questions 18b) "*How much time per week does your child spend on completing mathematics homework?*" was a little lower than reportedly *believed* by participants as the amount of time that should be spent on completing mathematics homework specifically (17b). To further investigate this discrepancy, I looked to the analysis of the qualitative responses from completed questionnaires. Some of the cited reasons for participants reporting their children actually spending less time completing mathematics homework than believed to be sufficient alluded to the lack of homework being assigned by the classroom teacher, children having their homework completed during school time, and interference from extracurricular activities. Nevertheless, results from both questions 17 and 18 yielded sufficient evidence to conclude that the majority of participant children are completing mathematics homework on a weekly basis, allowing the opportunity for parents to engage and be involved in their children's mathematics education.

Question 19, investigated how much time per week participants spent supporting their children while they are completing their homework in general (19a) and how much time participants spend supporting their children with their mathematics homework (19b). Over 50% of participants reported that they believe they should either spend "no time" (15.83%) or "0-1 hours" (35.00%) supporting their children. Similarly, over 60% of respondents indicated the same belief for how much time they actually spend supporting their children with their mathematics homework. These results are surprising given the results from previous questions indicating that parents possess the psychological constructs to be motivated, believe mathematics homework to be important, and support their children in a variety of ways; all of which suggests that parents are indeed already involved in their children's mathematics homework. However, upon closer examination of the qualitative open-ended responses, it became clear that a majority

of participants that reported spending either “no time” or “0-1 hours” assisting their children with their mathematics homework was the result of their child not bringing home assigned homework tasks or not experiencing trouble with assigned tasks. Finding the “new” math difficult and lack of time due to work/life commitments were also commonly cited reasons for offering little to no support to their children when completing their mathematics homework.

Conclusion

Chapter 4 has taken the self-reported participant data collected from completed questionnaires and transformed them into meaningful results that have been interpreted to garner insights regarding the two research questions governing this study. The process of analyzing the quantitative and qualitative responses has provided an understanding of how participants construct their role as parents and has provided clarification as to why they involve themselves in their children's mathematics homework. Additionally, data analysis revealed the overt behaviours participants display and support strategies they utilize when and if engaged with their children’s mathematics homework.

Questions 1 through 6 and question 9 on the instrument investigated research question 1 “*Does the role parents adopt impact their involvement with mathematics homework?”*. These questionnaire items were designed to reveal the influences that characterize how parents construct their role in their children's mathematics education and homework. The information collected from these questions detailed parental decisions that can lead to increased involvement and student achievement (McNeal, 2004; Hoover-Dempsey et al., 2001; Izzo et al., 1999). Understanding how parents construct their role clarified why participants choose to involve themselves in their children's mathematics homework. Research cited throughout the study implies that understanding parents’ sense of responsibility is instrumental in understanding how they construct their role as parents and how they deem what is necessary for their

involvement. The results, demonstrate that participants hold teachers primarily responsible for the majority of tasks associated with the completion of mathematics homework (the correction of mathematics homework, for maintaining student interest, for home-school communication, for tracking student progress in learning, and for student preparedness), but they feel they also partake in those responsibilities. Furthermore, research has revealed that understanding parental role construction can significantly increase parental involvement in education by addressing the psychological constructs of parental involvement in education (Hoover-Dempsey & Sandler, 1995, 1997; Green et al., 2007). The results illustrate the presence of the influencers research cites as necessary when characterizing how parents construct their role (McNeal, 2004; Hoover-Dempsey et al., 2001; Izzo et al., 1999) which may lead to increased involvement with their children's mathematics homework.

The second research question, "*What practices do parents engage in as they assist their children in completing mathematics homework*?" was subdivided into two parts: i) *Parental motivation that contributes to student learning* and ii) *Parental behaviors displayed during engagement with mathematics homework and support/strategies that increase student mathematical achievement*. Descriptive analysis of responses to questions 7, 8, and 10 through 19 yield results which suggest that participants possess several of the key motivational factors ("invitations" to be involved, innate parental sense to assist their children, etc…) and have a well-developed sense of parental self-efficacy (Bandura's 1977,1994). Therefore, it can be concluded that participants of the study are motivated to overcome obstacles that prevent or minimize their direct engagement in their children's learning and to set higher level goals for themselves in supporting their children's learning during the completion of mathematics homework. Additionally, the results demonstrate that participant's exhibit many of the behaviours (*mastery goal orientation*) deemed necessary by educational researchers to promote involvement in their

children's education. The parents are using a variety of support strategies (i.e., *modeling*, *reinforcement*, and *instruction)* when engaged in their children's mathematics homework.

Under the mixed methods approach (outlined in chapter 3), the data analysis of self-reported responses from completed questionnaires have established patterns and themes (Tite, 2006) to gain insights that address the research questions in this study.

Chapter 5 - Conclusion to Thesis

The ongoing decline of student mathematics scores in Canada has highlighted many deficiencies in the present mathematics education model(s) implemented across the country. Mathematics is considered to be a core subject in the formal education of children and as mathematics scores continue to slip both provincially and nationally (Brochu et al., 2012; Casanday, 2015; MacDonald, 2015; McMahon, 2014; O'Grady & Houme, 2014; O'Grady, et al., 2016; Ricahrds, 2014a/2014b; Stokke, 2015), it is essential for educational research to address this issue head on. The aim of this research study was to investigate parental involvement in mathematics homework of children who attend elementary and junior high schools. Homework is a direct and practical means to engage parents in their children's education and promote involvement. After compiling and reviewing relevant literature on declining mathematics scores, parental involvement in education, and parental engagement strategies during the completion of homework -- it is clear that parental involvement in mathematics homework is a worthy means of addressing some of the recurring issues that are thought of as failing practices in mathematics education. Yet, educational research specific to parental involvement with mathematics homework is very limited. Therefore, it is my intention that this study will contribute to literature used to inform policy on improving mathematics education through parental involvement with their children's mathematics homework.

This study aimed to investigate the roles parents adopt when involved with their children's mathematics homework and the varying behaviours/strategies of engagement used by parents to augment lessons taught in school. Participants of the study included 120 parents living in the Conception Bay North region of Newfoundland and Labrador whose children attended either an elementary or junior high school of the Ascension Family of Schools of the NLESD. Participants were asked to complete a questionnaire

comprised of both close-ended and open-ended responses. Under a mixed methods approach, data analysis provided insights regarding the two research questions.

It can be concluded that parental role construction is predominantly responsible for the role parents adopt when involved in their children's mathematics homework. Results indicate that those parents who have a *partnership-focus* with their children's teacher/school (Keyes, 2002), and *parent-child* (discussion and monitoring) interactions (McNeal, 2014) have the constructs to positively impact their involvement with their children's mathematics homework (Hoover-Dempsey & Sandler 1995;1997); providing appurtenant information to answer research question 1 "*Does the role parents adopt impact their involvement with mathematics homework?"*.

Data analysis regarding question 2 "*What practices do parents engage in as they assist their children in completing mathematics homework?*" produced results that gave greater insight into the overt behaviours and support strategies that parents employ when and if engaged in their children's mathematics homework. Results revealed motivational factors that prompt the "action" step of parental involvement with mathematics homework. Participant responses together with cited research indicate a well-developed sense of parental *self-efficacy* (Bandura, 1977,1994) empowers parents to engage in behaviours that positively impact student learning such as *mastery goal orientation* (Gondia & Cortina, 2014) and different types of home-based involvement strategies such as *modeling*, *reinforcement*, and *instruction* (Hoover- Dempsey et al., 2001; Hoover-Dempsey & Sandler, 1995).

Implications

The findings of this research study has important implications for educational stakeholders, specifically educators and parents of students enrolled in core mathematics courses. With Canadian provincial mathematical scores on a continual decline (except Quebec) for the past decade (O'Grady et

al., 2016), student mathematical learning/achievement is an immediate concern for all those involved in the education system, across the country. Research has indicated that parental involvement is a viable means of improving student learning (Baker & Soden, 1997; Cooper, Robinson & Patall, 2006; Cooper et al., 2008; Edwards & Warin, 1999; Gondia & Cortina, 2014; Hoover-Dempsey et al., 2001), and homework is a direct, practical means of engagement. Therefore, investigating parental involvement in mathematics homework provides insights into the psychological constructs and behaviours that make parental involvement in mathematics homework purposeful.

Results from completed questionnaires in coordination with relevant literature indicate that those participants/parents who have the necessary constructs to positively influence how they present/perceive themselves when making decisions *(role*) and possess the motivation to engage with their children's mathematics homework, tend to display more of the positive *behaviours* and *support strategies* associated with improving student achievement. For instance, participants who reported to be confident in their ability to assist their children with their assigned mathematics homework (well-developed parental role with a strong sense of self-efficacy) and viewed mathematics education to be diverse in its purpose reported that they use a wide variety of support strategies when engaged with their children's mathematics homework.

In light of the results, suggestions for how parents could meaningfully engage with their children's mathematics homework to positively impact student learning can be made. Mathematics homework can serve as a direct link between the home and the school by providing parents the opportunity to communicate with their children and/or school. Therefore, for meaningful parental involvement in homework to commence, parents must provide and/or respond to *invitations* (Hoover-Dempsey & Sandler, 1995; 19997) to engage and share in the responsibility of their children's mathematical learning.

This action is deeply rooted in parental role construction shaped by parental self-efficacy (confidence) and motivations (the purpose of mathematics education, the purpose of mathematics homework, and their perceived role in their children's mathematics education) as seen throughout this study; but fundamental in creating the necessary behaviours deemed necessary to positively impact student learning.

Additionally, in consideration of research cited and results presented in this study it is recommended that parents support their children using a variety of strategies such as those listed in Table 1. *Synopsis of 8 Parental Support Strategies when Involved in their Children's Homework*. For instance, parents should provide a physical space (including time) and materials for children to complete homework at home while engaging in *modeling*, *reinforcement*, and *instruction* (Hoover- Dempsey et al., 2001; Hoover-Dempsey & Sandler, 1995) behaviours. Parents must also promote a *mastery-goal* orientation (Gondia & Cortina, 2014) by establishing and supporting self-regulatory learning.

Findings from this study provide parents with information/skills that allow them to initiate/improve their existing role development and subsequent overt behaviours and/or support strategies. Likewise, findings have produced tangible information that parents can utilize to constructively engage with their children's mathematics education and increase student learning. Additionally, there is information in the results that can inform both educational policy and practice. Policy makers may use the results to reform current ideology on the role parental involvement plays in mathematics homework, the purpose of mathematics homework and their importance in student learning. Similarly, educational practice benefits from the information gathered in this study in that it can inform parent-teacher communication/invitations and homework design to be reflective of positive behaviours/practices that have been identified to positively impact student learning.

Limitations

When drawing conclusions to a study it is important to acknowledge its limitations, in this case, those due to the method used to collect and analyze data. The findings and implications of this study must take into account the limitations that exist regarding issues associated with sample selection and a self-reporting instrument used to collect the data.

The sample of this study was comprised using probabilistic sampling permitting a potential sampling bias. Of the 1085 questionnaires that were distributed, 120 completed questionnaires were returned, but may not be a true random sample; The limited scope of the investigation focusing only on parental involvement in mathematics homework for elementary and junior high students of one particular region in the province of Newfoundland and Labrador, may not be an accurate reflection of parental involvement in mathematics homework in the general population; affecting the external validity of the study. Furthermore, those participants who completed the questionnaire are likely parents who already engage in their children's mathematics homework and see the value of their involvement. Likewise, qualitative responses collected indicated that many of the participants' children did not experience difficulty in mathematics, therefore requiring little to no assistance/involvement from the parent. This study required human participation in responding to questions producing self-reported data. Measures were taken to respect and ensure the confidentiality and privacy of the participants in an effort to yield more truthful responses, but self-reported data, particularly when it comes to matters that are sensitive (parental role, practices, and support given during the completion of mathematics homework) tend to be less reliable. Findings from the self-reported data are dependent on the honesty of participants and their ability to assess introspectively their own beliefs and behaviours, again contributing to a lessened reliability of collected data and internal validity of results.

Future Investigation

Findings and educational research cited throughout this study has indicated that parental involvement/support in homework that has purpose and focus, enhances students' ability to achieve designated learning outcomes (Gondia & Cortina, 2014; Hoover-Dempsey et al., 2001; Hoover-Dempsey & Sandler, 1995; Patall et al., 2008; Wilder, 2015). However, there is little to no research that focuses specifically on parental involvement in mathematics homework. This study contributes to fill the gap present in educational research regarding parental involvement in mathematics homework, but it is not sufficient in itself. As declining mathematics scores catch national attention (O'Grady et al., 2016), expanding this study to include a larger sample and possibly focus groups or interviews to verify self-reported data could potentially improve the external validity of results and give greater insight into the involvement (or lack thereof) parents have with their children's mathematics homework and its effect on their mathematical learning.

In light of information from relevant literature, in concurrence with the results of this study, it can be concluded that parental involvement in homework can indeed have a positive impact on student learning. Therefore, further investigation into how to support parents who wish to be involved is needed. This study investigated the role parents adopt and overt behaviours/strategies they use when and if they are involved with their children's mathematics homework, but it did not consider how to support parents in their efforts to be involved. Exploring how to support parents in their efforts to be involved is particularly important to educators and policy makers. Such research could potentially produce significant information that would assist parents to improve classroom learning and, consequently, positively impact students' learning of mathematics.

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Appendices

Appendix 1 - Participant Consent Form

PARENT/GUARDIAN SURVEY

Dear Parent(s)/Guardian(s),

I am a graduate student in the Faculty of Education at Mount Saint Vincent University. As part of the requirements for my Master of Arts in Education, I am conducting research under the supervision of Dr. Genevieve Boulet, and I am inviting you to participate in my study on parental involvement in mathematics homework. Before you decide to participate in this study, it is important that you understand why the research is being conducted and what it will involve. Please read the following information carefully. You are welcome to contact me if you need clarification or further information.

The purpose of this study is to learn about parents' involvement in their children's mathematics homework in order to improve support at home. If you agree to be part of the research study, you are asked to complete a questionnaire of 20 multiple choice items. The questions provide spaces for you to elaborate on your choice of answers or to offer alternative answers that better reflect your experience or opinion. While participants are encouraged to answer all questions, you may choose not to answer one or more of the questions by simply leaving them blank. Expected time for the questionnaire may vary from 20 to 40 minutes. The amount and level of difficulty of mathematics homework typically increases from elementary school to junior high. Therefore, understanding factors that may affect parental involvement with mathematics homework at these specified grade levels will inform the study and lead to meaningful recommendations of strategies that will better support parents.

If you agree to participate in this study, please complete the enclosed questionnaire, place it in the stamped, addressed envelope, and return by mail at your earliest convenience. If you do not wish to answer any one of the questions, simply leave it incomplete and move on to the next question.

Since no identifying information is asked on the questionnaire, all responses are anonymous. Information provided will be used for research purposes only. To ensure your anonymity and confidentiality, please do not sign your name to the questionnaire. Instead, you are asked to provide a pseudonym (nickname).

Trudy Clarke

Completed questionnaires will be stored in a secured location until the completion of the study, at which time they will be destroyed. The information recorded will be kept confidential and will only be accessible to Dr. Genevieve Boulet, thesis supervisor and Trudy Clarke, primary researcher.

This research project has met the ethical standards of the University Research Ethics Board of Mount Saint Vincent University. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with me or my research supervisor, please contact the Chair of University Research Ethics Board at Mount Saint Vincent University Research Ethics Board (UREB) at 902-457-6350 or by e-mail at research@msvu.ca.

By completing and submitting your response to the questionnaire, you are indicating that you fully understand the above information and that you agree to participate in the study. If you are interested in receiving the results of the study, please communicate with me.

Thank you,

Trudy Clarke

Mount Saint Vincent University Graduate Student

Appendix 2 - Instrument

Parental Involvement in Mathematics Homework

Participant Pseudonym: _____

Child's Grade Level: _____

(Should you have more than one child, please indicate the grade level for each child)

Please check the appropriate box in response to each question. You may check more than one box for some of the questions.

1) Who do you feel is responsible to ensure homework is completed?
   ☐ Child ☐ Teacher ☐ Parent/Guardian

2) Who do you feel is responsible to correct and review a child's homework?
   ☐ Child ☐ Teacher ☐ Parent/Guardian

3) Who do you feel is responsible for ensuring the child is interested in the school work/homework?
   ☐ Child ☐ Teacher ☐ Parent/Guardian

4) Who do you feel is mainly responsible for ensuring communication between home and school?
   ☐ Child ☐ Teacher ☐ Parent/Guardian

5) Who do you feel is mainly responsible for ensuring that the child is progressing in his or her learning?
   ☐ Child ☐ Teacher ☐ Parent/Guardian

6) Who do you feel is mainly responsible for ensuring that the child is prepared to complete their mathematics homework?
   ☐ Child ☐ Teacher ☐ Parent/Guardian

7) How confident are you in supporting your child with mathematics homework?
   ☐ Very confident ☐ Confident ☐ Somewhat confident ☐ Not confident

8) How confident are you in motivating your child to complete the mathematics homework?

☐ Very confident ☐ Confident ☐ Somewhat confident ☐ Not confident

9) How confident are you in the quality of mathematical education your child is receiving?

☐ Very confident ☐ Confident ☐ Somewhat confident ☐ Not confident

10) Which of these statements do you feel best define the purpose of learning mathematics?

☐ To develop practical skills such as measuring and calculating

☐ To connect mathematical ideas among themselves, to everyday experiences, and to other subject areas

☐ To broaden future career opportunities

☐ To succeed in school

☐ To develop good reasoning skills

☐ To be prepared to face today's challenges

☐ To calculate quickly in everyday life situations

☐ To gain future employment in the sciences

☐ To ensure access to post-secondary schooling

☐ To develop a good memory

What do you think are other purposes for learning mathematics?

11) Which of these statements do you feel best define the purpose of mathematics homework?

- ☐ Mathematics homework does not help your child learn
- ☐ To improve your child's grades
- ☐ To provide extra practice of skills taught in class
- ☐ To complete work that your child did not finish in class that day
- ☐ To help your child learn mathematics
- ☐ To prepare your child for upcoming lessons
- ☐ To improve your child's ability to transfer skills to other subject areas or to real-world situations
- ☐ To keep you informed of what your child is learning in mathematics
- ☐ To teach your child responsibility for his or her own learning
- ☐ To understand the mathematics better

What do you think are other purposes for completing mathematics homework?

12) Which statement do you feel best defines your role as a Parent/Guardian in mathematics education?

- ☐ My child's mathematics education is not my responsibility
- ☐ To ensure homework tasks are completed by my child
- ☐ To find ways to help my child if their struggling
- ☐ To communicate with school/teacher about mathematical learning, progress, and needs
- ☐ To motivate my child to learn
- ☐ To establish effective study skills

What other roles do you adopt as a parent/guardian with regards to your child's mathematics education?

Parental Involvement

13) Which mathematical skills do you think are important for your child to acquire?

☐ To communicate: read, represent, view, write, listen, and discuss mathematical ideas
☐ To make connections: see how mathematical ideas connect to each other and to the real-world

☐ To calculate mentally and to estimate*:* determine answers without paper and pencil; make mathematical judgments and develop useful strategies for dealing with daily life situations

☐ To problem solve: use critical thinking and mathematical skills to determine a solution that is not obvious to the learner

☐ To reason: use a logical process to analyze a mathematics problem, reach a decision, and justify or defend a decision

☐ To be technologically competent: use appropriate tools to explore and create patterns, examine relationships, test conjectures, and solve problems

☐ To visualize: to think in pictures and images in order to understand and solve mathematics problems

What other mathematical skills do you think are important for your child to acquire?

14) What significance does homework have in acquiring those mathematical skills?

☐ Very important ☐ Somewhat important

☐ Important ☐ Not important

What reasons do you have for your answer above?

Parental Involvement

15) How do you support your child with their mathematics homework?

- ☐ I am not involved
- ☐ I verbally encourage - to show interest in their learning and progress
- ☐ I clearly communicate and impose expectations
- ☐ I provide space and materials
- ☐ I complete homework tasks with my child
- ☐ I establish routines for time spent on homework tasks
- ☐ I monitor my child to help their maintain focus on homework tasks
- ☐ I check my child's level of understanding during the completion of assigned homework tasks
- ☐ I hire a mathematics tutor
- ☐ I ensure homework tasks are completed by my child in a timely manner
- ☐ I have a positive attitude towards mathematics and related homework tasks
- ☐ I communicate with my child about their learning, progress, and needs
- ☐ I communicate with the teacher about my child's learning, progress, and needs

In what other ways do you support your child with his or her mathematics homework?

16) What factors do you believe hinder you in supporting your child with their mathematics homework? (If this question does not apply to you, please ignore and proceed to question 17.)

- ☐ I do not assist my child with mathematics homework
- ☐ I find the discovery-based approach to be confusing
- ☐ I did not learn mathematics this way
- ☐ I do not know the mathematics well enough to help my child
- ☐ I find the homework too challenging for me to help my child
- ☐ I do not have the time needed to support my child (work, other commitments, scheduling conflicts, etc.)
- ☐ I find that my child is assigned too much mathematics homework
- ☐ I do not have the resources to help my child

Parental Involvement

What other factors do you believe hinder you in your support?

17) A) How much time per week do you *believe* should be devoted to homework in general?

☐ No time ☐ 1-2 hours ☐ 3-4 hours

☐ 0-1 hour ☐ 2-3 hours ☐ 5+ hours

B) How much time per week do you *believe* should be devoted to *mathematics* homework?

☐ No time ☐1-2 hours ☐ 3-4 hours

☐ 0-1 hour ☐2-3 hours ☐ 5+ hours

Please provide reasons for your selections:

18) A) How much time per week does your child spend on completing homework in general?

☐ No time ☐1-2 hours ☐ 3-4 hours

☐ 0-1 hour ☐ 2-3 hours ☐ 5+ hours

B)How much time per week does your child spend on completing *mathematics* homework?

☐ No time ☐1-2 hours ☐ 3-4 hours

☐ 0-1 hour ☐2-3 hours ☐ 5+ hours

Please provide reasons for your selections:

Parental Involvement

19) A) How much time per week do you spend helping your child complete homework in general?

☐ No time ☐ 1-2 hours ☐ 3-4 hours

☐ 0-1 hour ☐ 2-3 hours ☐ 5+ hours

B) How much time per week do you spend helping your child with their *mathematics* homework?

☐ No time ☐ 1-2 hours ☐ 3-4 hours

☐ 0-1 hour ☐ 2-3 hours ☐ 5+ hours

Please provide reasons for your selections:

20) You are welcome to share additional thoughts you may have regarding mathematics homework, whether or not these relate to the topics addressed in the questions: