Teachers’ Perception on the Relationship Between Subject-Specialized Teaching and Students’ Achievement in Elementary Classrooms

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Abstract

The aim of this research study was to develop a deeper understanding of the relationship between subject-matter expertise and students’ learning experiences and academic achievement. In this qualitative research paper, data was collected through semi-structured interviews with two elementary school teachers, who have experience working in a subject-specialized teaching model. Findings of this research study suggest that limited content knowledge, low comfort level, and limited preparation time are barriers for teachers who teach subjects that they struggle with. Interviewed teachers suggested that teachers’ expertise in subject matter is defined by their personal, academic, and professional backgrounds. They indicated that their subject-matter knowledge elevates their comfort level, enriches their teaching experience, and improves their students’ learning and academic achievement. The implications of these findings suggest that teachers need to be teaching subjects in which they have strong content knowledge. This allows them to provide their students with authentic learning experiences, as well as answer their deep and rich content questions.

**Keywords:** Subject-Specialized Teaching, Generalized Teaching, Teachers’ Comfort Level, Content Knowledge, Subject-Matter Knowledge.
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Chapter One: Introduction

1.0 Introduction – Research Context

Teachers are the core influential aspect in students’ learning and achievement. Other essential contributors may include but are not limited to the school attended, the social and economic level of the students’ families, as well as the students’ abilities and characteristics. However, the most powerful and influential contributor to the students’ academic performance will always remain to be the teachers. Accordingly, highlighting the importance of teachers’ qualities and credentials as they shape and define the students’ futures is a non-debatable topic.

Effective teachers have many characteristics that recognize their quality. These characteristic include content knowledge, teaching experience, training and credentials, and overall academic ability (Policy Studies Associates, 2005). In this paper, I will focus on content knowledge, which refers to the body of information which are the facts, concepts, theories, and principles that teachers teach and that students are expected to learn in a given subject or content area, such as English language arts, mathematics, science, and social studies (The Glossary of Education, 2013). One cannot deny that what teachers know and can do is the most important influence on what students learn (National Commission on Teaching and America’s Future, 1996). Specifically in elementary schools, teachers’ professional development and their level of content knowledge go hand-in-hand with discussion of student achievement (Gerretson, Bosnick & Schofield, 2008).

According to Regulations 176/10 of the Ontario College of Teachers Act (1996), entitled “Teacher Qualifications”, teachers in Ontario are certified to teach two consecutive divisions in the school system: Primary/Junior which embrace kindergarten to Grade 6, Junior/Intermediate which includes Grade 4 to Grade 10, or Intermediate/Senior which comprises Grade 7 to Grade
12. Teachers in the primary/junior divisions are considered to be generalists rather than specialists. They are expected to teach all the mandated curriculum for these grades which are language, math, science, social studies and art.

Research has found that teachers’ undergraduate degrees commonly represent their content knowledge and their areas of strength, as these tend to align with their personal interests. Allowing teachers to focus on their strengths is a key in increasing their capacity of incorporating best practices and strategies to guide their lesson planning and delivery (Gerretson, Bosnick & Schofield, 2008). Besides, it is undeniably true, that not all teachers can have the same level of content knowledge in all subjects. Wilson, Macdonald, Byrne, Ewing, and Sheridan (2008) affirmed that subject specialists use their specialized content knowledge to empower students to produce a higher quality of work.

1.1 Research Problem

Expecting teachers to be generalists in elementary classrooms rather than specialists makes them responsible to learn about all the subjects they are teaching. However, no one is expected to be able to learn and have deep content knowledge in everything. Reys & Fennell (2003) were studying how specialized knowledge is needed specifically in mathematics, and they found that “expecting elementary teachers to have this specialized knowledge in mathematics, as well as in every other subject they teach, simply is unrealistic.” And deep content knowledge is a key factor in effective teaching as teachers feel comfortable talking, explaining, and demonstrating a topic that they are not just familiar with, but that they master quite well (Shulman, 1987).

When teachers are uncomfortable with a topic, Harlen and Holroyd (1997) explain, it affects the way they teach it, and eventually affects the students’ achievement. Teachers might
spend less time on the subject, avoid the use of practical tools, as well as avoid having to answer the students’ deep questions (Harlen & Holroyd, 1997). These strategies that the teachers use to cope with the situation severely limit the students’ learning when used on a regular basis (Harlen & Holroyd, 1997). Moreover, they create misconceptions by passing inaccurate information to the students or by conceiving their knowledge in narrow ways (Jadama, 2014). Misconceptions and misunderstandings about multiplication and division may be easily perpetuated by teachers, explained Graeber, Tirosh and Glover (1989). They specified some of the common mathematics misconceptions held by pre-service teachers to be that "multiplication always makes bigger and division always makes smaller,” (Graeber, Tirosh, and Glover, 1989, p.98) and that “the divisor must be smaller than the dividend” (Graeber, Tirosh, and Glover, 1989, p.99). This is extremely severe and worth attention since students’ knowledge is based and shaped mostly during elementary school years, and this is particularly very difficult to change later (Reys & Fennel, 2003).

Kindergarten to Grade 6 represents the early years of students’ learning, and the most important ones as students build their core foundation in understanding the concepts and skills of all subjects. Accordingly, teachers should not only avoid creating misconceptions of knowledge, but also be able to clarify them, which depends on their personal level of understanding of the subject matter. Their subject-matter knowledge also impacts their teaching and learning process which helps them impart their knowledge to the students in an efficient way (Jadama, 2014). When teachers are not comfortable with a subject area, it affects their effectiveness, as it consumes them more time, work, and effort to prepare and deliver their lessons (Swarz, 2005), in contrast to teaching subject areas that they are familiar and comfortable with.

It is also significant to take a look at how teaching programs help prepare pre-service
teachers to teach all subjects. They offer courses in different subjects: language arts, social studies, science, mathematics, art, and music. In these courses, pre-service teachers learn how to teach specific areas in these subjects. These programs often lack significant emphasis on pedagogical content knowledge specific to each subject (Reys & Fennell, 2003). This throws the responsibility back to the teachers to find their ways to learn about the facts, concepts, theories, and the body of information itself of each subject. Boyd, Grossman, Lankford, Loeb, and Wyckoff (2009) concluded that teachers who are effective during their first year of their career, are the ones who attended teacher preparation programs that provided them with the opportunity to study what they will be teaching. And that is because it gives them the time and chance to increase their subject-matter knowledge before actually going to teach. Teachers who do not have the enough knowledge required to teach a subject, feel unprepared and have low sense of efficacy (Mansfield & Woods-McConney, 2012). And since student achievement is the aim of every teacher, Metzler and Woessmann (2012) conducted a research on Grade 6 students, and concluded that the teachers’ subject-matter knowledge is directly related to the students’ achievements. When teachers have deep subject knowledge in one subject area, they feel comfortable with that subject, which promotes effective and innovative teaching and learning (Ojo, Akintomide & Ethindero, 2012). On the other hand, when teachers are less secure about the content of a lesson, they are unable to provide students with opportunities for deep learning (OFSTED, 2009).

1.2 Purpose of the Study

In view of all the problems mentioned above regarding the elementary classroom teachers being generalists rather than specialists, and how it affects their effectiveness as teachers and impacts the students’ level of understanding of different subjects, the goal of this qualitative
research study is to listen to elementary teachers’ perspectives on the relationship between teachers’ subject-matter specialization and students’ experience of learning and academic achievement.

I wish to explore how teachers’ comfort level varies when teaching different subjects, and what are the effective resources that teachers seek to acquire the adequate knowledge required to teach a subject. Moreover, I want to learn about the range of sources that have contributed to developing their subject-matter knowledge, and how it affects their used strategies, demonstrations, enthusiasm and excitement. Finally, I want to study the effects of the teachers’ subject-matter knowledge and their perception of its relationship to the students’ academic achievement. My intention is to share the outcomes of my research with the broader education community.

1.3 Research Questions

My research is driven and guided by a primary question which is: What are elementary teachers’ perspectives on the relationship between subject-matter expertise and students learning experience and academic achievement? Related sub-questions that further guide my study include:

- What challenges do elementary teachers encounter while preparing lessons for a subject which they do not have enough knowledge about? How do they respond to these challenges, and what range of resources support them?
- In what subject areas do these teachers feel they have a level of subject-matter expertise, and what experiences and resources contributed to the development of this expertise?
- How do teachers’ previous undergraduate areas of studies affect their teaching
strategies, comfort level, and enthusiasm when teaching subjects related to their field of study and areas of interests in contrast to other subjects? Also how they feel it is reflected on their students’ learning and achievement?

- What are these teachers’ perspectives on the relationship between their subject-matter knowledge and comfort level teaching particular subject areas, or even particular topics within subject areas?

1.4 Reflexive Positioning Statement

The topic of specialized teaching in elementary classrooms stems out of my personal experience as a student in an elementary school in Egypt, where we had a teacher for each subject. The same way we had different teachers for each of the French, English, and Arabic languages, we also had different teachers for mathematics, science, and social studies, aside from the teachers for religion, arts, music and physical education. Each subject had its own teacher who knew a lot about the subject and who had completed a university degree in its field. This was where I shaped my first and strongest impression of how to become a teacher, by mastering a subject.

I consistently had higher grades in math in comparison with all other subjects. I was inspired by some of my extraordinary mathematics teachers, that my answer to the very famous question “what do you wish to become when you grow up?” for me was definitely “a math teacher”. I pursued an undergraduate degree in computer programming engineering and was hired by my university to work as a tutor in the engineering field. And when I moved to Canada, I considered becoming an elementary teacher, and I was surprised that no matter what was the field of my undergraduate degree, upon completing a teaching degree, I would be teaching all core subject.
As someone who gets excited about numbers and equations, I feel that this excitement will be reflected on my teaching when it comes to teaching mathematics. On the other hand, my lack of interest in other subjects, including social studies for example, will always make me uncomfortable teaching it. I am eventually concerned that my level of knowledge and interest in each subject will have an impact on my teaching behaviour and may affect my students’ interests in learning different subjects.

1.5 Overview

To respond to the research questions, I conducted a qualitative research study using purposeful sampling to interview three teachers about their perspectives on the relationship between subject-matter expertise and student learning in elementary classroom contexts. In Chapter 2, I review the literature in the areas of elementary subject specialized teaching along with teachers’ comfort level and impacts on the students’ academic achievement. Next, in Chapter 3 I elaborate on the research design, the participants, the data collection, and the limitations of my research. In Chapter 4 I report my research findings and discuss their significance in light of the existing research literature, and in Chapter 5 I identify the implications of the research findings for my own teacher identity and practice, and for the educational research community more broadly. I also articulate a series of questions raised by the research findings, and point to areas for future research. My references list as well as the list of appendices are found at the end.
Chapter Two: Literature Review

2.0 Introduction

In this chapter I review the literature in the areas pertaining to pedagogical content knowledge, specialized teaching, students’ achievement, teachers’ comfort level, and challenges in implementing specialized teaching. More specifically, I review the theoretical and practical implications of applying a specialized-teaching model in elementary classrooms, looking particularly at mathematics and science. Moreover, I consider the comfort level of general primary teachers in teaching different and unfamiliar subjects, while considering how it affects the students’ learning. Finally, I study some challenges that face the implementation of specialized teaching.

2.1 Pedagogical Content knowledge

When speaking about pedagogical content knowledge, it is crucial to mention the educational psychologist Lee S. Shulman who founded and co-directed the Institute for Research on Teaching (IRT). Shulman introduced the notion of pedagogical content knowledge as a critical constitutive component in the knowledge base of teaching. It includes the best ways of representing a topic with the most convenient illustrations, examples and demonstrations, to make it easy for students to comprehend (Shulman, 1986).

When Shulman (1986) wrote about the teacher subject-matter knowledge, he categorized it into three categories: content knowledge, pedagogical content knowledge, and curricular knowledge. The first category, content knowledge, refers to the teacher’s amount of knowledge and its organization. It is being able to explain to the students the facts and concepts of a topic while being capable of clarifying why these facts are true and what makes them worth knowing. The second category of teachers’ subject-matter knowledge is the pedagogical content
knowledge. It is understanding what can make the learning of a certain topic easy or difficult, by knowing the students’ abilities at different grade level. Shulman’s last category of teacher’s knowledge is curricular knowledge, which is the teacher’s acquaintance of the different instructional materials and how to use them, as well as the teacher’s awareness of the different topics taught in the same subject in different school years (Shulman, 1986).

Shulman (1987) further explained that teachers have special responsibilities when it comes to content knowledge related to their own deep understanding of the subject matter, and their attitudes and enthusiasms for what they are teaching. These responsibilities act as the base foundation of the student understanding of subject matter (Shulman, 1987). He explains that teachers should have a deep understanding of the subjects they are teaching as well as “broad liberal education that serves as a framework for old learning and as a facilitator for new understanding” (Shulman, 1987, p.9).

Teachers teach with the attitude of what they know about the subject, together with their experiences, and beliefs. Grossman, for example, explained that the way teachers approach texts with the students depends on their personal orientation to literature (as cited in Hill, Rowan & Ball, 2005). The same applies to the social studies teachers, where the way they represent historical knowledge for the students is based on their personal disciplinary backgrounds in sociology, anthropology and political science (as cited in Hill, Rowan & Ball, 2005). This goes for all other subjects including mathematics and science which I will discuss in more details in further sections.

2.2 Subject-Specialized Teaching

In Ontario elementary schools’ classrooms, the general classroom teacher teaches all the core subjects of the curriculum, whereas subject specialized teachers are available for the
subjects of art, music and physical education. The three latter subjects are assumed to involve a talent that classroom teachers are not expected to have (Makhila, 2008). Research has found that teachers strongly appreciate the assistance they receive from these subject specialist teachers (Planel, Osborn, Broadfoot & Ward, 1998). Generalist teachers are considered specialized in age-range rather than subject, according to the Office for Standards in Education (as cited in Ardzejewska, McMaugh, & Coutts, 2010), while specialist teachers teach a subject full-time.

Secondary teachers have to complete a major in their specialty subject before teaching it (Shulman, 1986), because the prior area of study is considered to be the teacher’s area of expertise. In elementary years, teachers are not required to specialize in a subject, and it is doubtful that teachers can show the same level of competence in all subjects (Ojo, Akintomide & Ethindero, 2012). For example, Buchmann suggested that it would be unreasonable to expect a teacher who is ignorant about science to plan a lesson about writing reports in science, and evaluate students’ assignments as this teacher will not be knowledgeable of what student progress mean in that specific lesson (as cited in Ball & McDiarmid, 1990).

Subject specialized teachers show greater enthusiasm in teaching their subject of specialization (Fromyhr, 1995), as they value their subject more highly (DeCorby, Halas, Dixon, Wintrup & Janzen, 2005). They spent years learning and deepening their knowledge in a field of study, and will use their specialized content knowledge to empower students to produce a higher quality of work (Wilson, Macdonald, Byrne, Ewing & Sheridan, 2008). In a study conducted by Wenglinsky, the teachers’ educational backgrounds did have a positive influence on the student performance in the mathematics and science parts of the 1996 National Assessment of Educational Progress (as cited in Fong-Yee & Normore, 2013). After examining the scores of 15,000 eighth grade students, they found that students who had teachers with majors or minors in
either math or science scored 39% higher than students who were instructed by teachers who did not have such preparation (as cited in Fong-Yee & Normore, 2013).

Subject specialization helps teachers focus on what they are most capable of instead of spending so much time learning many subjects and not being able to master one or be an expert in a particular one. It also gives the teachers a sense of professionalism by increasing their efficiency and effectiveness (Ojo, Akintomide & Ethindero, 2012). When teachers teach content in areas which they are not familiar with, the skills and abilities that they show when teaching their specialist subject are instantly challenged regardless of their capabilities (Loughran, Berry, & Mulhall, 2012).

There are various implications on students’ learning when teachers feel that they lack content knowledge about a specific lesson. This includes inability to clarify students’ misconceptions, and a failure in responding to their probing questions (OFSTED, 2009). It can also result in a disappointment for higher attaining students who seek more challenge (OFSTED, 2009) as well as failure to intervene with struggling learners (Erskine, 2010).

Elliott (1985) believed that moving towards specialized teaching is the only way to ensure the high proficiency of primary teachers in all subjects. In research, science and mathematics are the two most discussed and studied subjects to require specialist teachers or teachers with deep content knowledge, as both of them require teachers to have deeper understanding than the average individual (Peace, 2012). According to Ball “flawed conceptions about the practice of mathematics and science can lead to ‘cookie-cutter’ education in these subjects.” (as cited in Peace, 2012, p.11) In these two specific subjects, deeper understanding of the content is required from teachers who are able to answer content questions and not just have knowledge in pedagogical practices (Peace, 2012).
In the following two sub-sections, I review the literature in the area of subject specialized teaching in both mathematics and science. I present what several studies reached about the importance of having teachers with deep content knowledge in the primary grades for these two subjects.

2.2.1 Specialization in mathematics

Mathematics is one of the most important subjects taught in schools. It helps develop students’ logic and many other skills that are life essentials. Igboko highlighted that the students’ level of understanding of mathematics in the primary school years is directly proportional to their level of understanding of mathematics in the secondary school years (as cited in Odogwu, 1994). And this in turn influences their success or failure in the university afterwards (Odogwu, 1994), as math becomes more complex and abstract (Erskine, 2010).

Much research has been devoted to studying how primary school teachers deal with mathematics in their classrooms. It was reported that, when teachers have limited mathematical knowledge as a result of being generalists rather than specialists, they choose to spend their time and effort teaching other subjects (Odogwu, 1994). When teaching mathematics, teachers need to focus on helping students with visualizing the mathematics concepts and procedures using pictures and diagrams rather than just being able to make correct calculations. Teachers should be able to provide the students with reasoning and explanations for common mathematical rules and procedures. Teachers need to be able to use the academic concepts and skills and apply it every day and in real world problems (Ball, & McDiarmid, 1990). Teachers are also expected to critically analyze students’ solutions and explanations to the problems (Hill, Rowan, & Ball, 2005), to be able to appropriately assess student progress and make effective planning (Erskine, 2010). This will definitely be affected by the lack of teachers’ conceptual understanding of
mathematics (Erskine, 2010). Students might be under the impression that it is more important to reach the correct result of a problem, rather than truly understand the reasoning behind the correct answer (Erskine, 2010). It is important that teachers avoid giving that impression to the students because the process is more vital than the product.

Content knowledge plays an important role in teachers’ decisions to become teachers, even for the earliest elementary grade levels. When questioned, teachers in kindergarten and first grade level explained their choice of grade level by putting into consideration their lack of enough mathematics knowledge (Hill, Rowan, & Ball, 2005). This in turn shows how the teachers own perceptions of their mathematical knowledge plays an important role on their teaching comfort level and decision making.

When teachers have limited conceptual understanding of mathematics, it influences their teaching effectiveness and ability to refine their math instruction to match with the students’ achievement (Erskine, 2010). It can also result in teachers understanding only one math strategy for solving a problem (Erskine, 2010), which might not be the strategy that matches with all the students. Shulman (1986) demonstrated the importance of having alternative ways for teaching the same concept by asking how “would we trust a physician who did not really understand the alternative ways of dealing with categories of infectious disease, but who knew only one way?” (Shulman, 1986, p.10) More seriously, teachers may not carefully analyze or appreciate students’ explanation of their work, if it does not reflect their personal way of solving that problem (Erskine, 2010). Usually, students need to be exposed to different strategies to meet with their diverse ways of thinking and understanding, and even have the opportunity to develop their personal approaches in solving math problems. Not providing students with different strategies might result in leaving students with a random collection of mathematics rules and definitions,
rather than with real reasoning and understanding (Erskine, 2010).

How teachers were taught mathematics have a strong impact on how they teach it. Erskine (2010) thinks that low student achievement in elementary mathematics, may be a reflection of their teachers being mathematically illiterate or having unsuccessful experiences in math in their own schools. Teachers’ previous experiences should be taken into account as they have guided their interests and shaped the way they will approach different subjects when teaching.

2.2.2 Specialization in science

Science is another extremely significant subject taught in schools. It helps students build a great understanding of how things work. According to the Centre for Education in Science & Technology in the United Kingdom (n.d.), “Science is able to explain the mechanics and reasons behind the daily functioning of complex systems, which range from the human body to sophisticated modern methods of transport” (para. 1). In respect to the complexity and the richness of the content of this subject, not everyone can have the adequate knowledge to teach science. Mansfield and Woods-McConney (2012) claim that teacher educators are familiar with the lack of confidence that pre-service teachers have, because they are lacking the adequate knowledge needed to teach elementary science.

Science has been known to be a subject where primary school teachers do not feel capable of (Howitt, 2007). Teachers from kindergarten to Grade 4 are less likely than teachers in higher grade levels to feel well prepared to “develop students’ conceptual understanding of science, provide deeper coverage of fewer science concepts, make connections between science and other disciplines, encourage students’ interest in science” (Weiss, Banilower, McMahon, & Smith, 2001, p. 29). This might affect students’ perception and interests in science as they
eventually move to higher grades and university level.

To help primary students comprehend science lessons, teachers need to have a solid understanding of the content to be able to simplify it for the students. When teachers have a strong background in science content, they tend to have high efficacy to teach science, and use more child appropriate teaching strategies (De Laat & Watters, 1995), which make students, especially in primary grade levels, relate with the lessons.

In a recent study in Western Australia that aimed to investigate self-efficacy of teachers with different number of years teaching, for teaching science in primary schools, they found that some teachers “are scared of teaching science because they think that they don’t have enough background information, they don’t know all the answers” (Mansfield & Woods-McConney, 2012, p.44). This response shows that primary teachers find themselves not ready to teach science as they do not have the adequate knowledge needed to teach certain topics.

2.3 Students’ Achievement

Student achievement is and should always be the most critical concern of teachers because it is the outcome of hard and persistent efforts that they exerted. I call it the fruit of teaching, as it is the real ultimate goal that reflects the teachers’ achievement as well. Teachers work heartily to expand the students’ knowledge with the academic content to prepare them for a life-long journey of learning. Before exploring the factors contributing in students’ achievement, let us take a quick look at Canada’s youth performance in mathematics, science and reading.

There are definitely differences across Canada’s provinces that we should acknowledge; however, we will only look at the general performance of students in Canada. The Programme for International Student Assessment (PISA) is a worldwide study by the Organisation for Economic Co-operation and Development (OECD) that evaluates education systems worldwide.
across 65 countries and economies. According to their ranking, Canada has fallen in the math ranking from the seventh place in 2003 to the thirteenth in 2012. However, analyzing this ranking over time, we have to take into consideration that the number of participating countries increased over the time of this study. They also have a six-level scale for mathematical literacy, where level 1 is the lower end of the scale, which is easier and less complex than the higher end which is level 6. Looking at a nine-year span, the percentage of Canadian students performing at levels 5 and 6 slipped from 20.3 to 16.4 percent between 2003 and 2012, while the percentage of students performing below the level 2 rose from 10.1 to 13.8 percent. According to their results, these differences are considered statistically significant.

Other than mathematics, Canada’s rank in reading according to PISA’s study has similarly dropped from the second place in 2000, to the ninth in 2012. In science, the average Canadian scores dropped from 534 on a 1000-point scale in 2006 to 529 in 2009, and eventually to 525 in 2012, which is also considered a statistically significant difference. In general, there is a considerate decline in the students’ achievement in Canada in major subjects that requires immediate attention and consideration. And although this study reflects the scores of Canadian youth and not primary students, however the change is always required at the earlier age where students build and form their solid base and interest, upon which following knowledge is based. For this reason, and for the sake of our focus on the importance of teachers’ content knowledge, it is significant to study the relationship between the students’ achievement and the teachers’ subject knowledge.

Numerous factors can contribute to student achievement, however many researchers claimed that the most significant and directly related factor is the teachers’ academic skills. A very interesting study and right to the point of our discussion, is one in Peru that used dataset of
primary schools that contained test scores in two academic subjects for each student and each teacher as well. Metzler and Woessmann (2012) wanted to relate the students’ academic performance in a subject, to the teachers’ academic performance in that specific subject. In their study, they wanted to explore if a teacher taught two different academic subjects to a student, will that student achieve better results in one of the subjects if the teacher’s knowledge is relatively better in that subject? Their findings confirmed that teacher subject knowledge has a statistically significant impact on student achievement. More technically and specifically “a one standard deviation increase in teacher test scores, raises student test scores by about 10 percent of a standard deviation” (Metzler & Woessmann, 2012, p. 1). This is a study that showed a direct relation and revealed the great importance of the teacher’s subject knowledge and academic performance as factors in students’ achievement.

Research suggests that teachers with particular knowledge, interest, and expertise in mathematics content and pedagogy, create the best environment for learning mathematics (Reys & Fennell, 2003). Moreover, teachers’ undergraduate major in their subject area is the most reliable predictor of students’ achievement scores in math and science. Goldhaber and Brewer stated that, an advanced degree that was specific to the subject area that a teacher taught, was also associated with students’ higher achievement (as cited in Policy Studies Associates, 2005). Giving the teachers the opportunity to teach subjects related to their interests and expertise, is definitely reflected on their enthusiasm and confidence in teaching, and in consequence, the students’ learning and understanding.

2.4 Teachers’ Comfort Level

Teaching is a passionate and an enjoyable career for many. And similar to any other job, teachers need to feel comfortable during teaching in order to succeed. Feeling comfortable may
depend on various factors including the school and classroom environment, the language of instruction and the level of confidence teaching the subject content. This section focuses on the teachers’ comfort level teaching different subjects in primary classrooms.

A research study in the United States studied the perception of 5728 elementary classroom teachers of their preparedness and qualification to teach different subjects (Weiss, Banilower, McMahon, & Smith, 2001). According to the research, 76 percent of the participants indicated feeling very well qualified to teach reading and language arts. Additionally, 60 percent of the teachers reported feeling very well qualified to teach mathematics. On a declining curve, 52 percent felt qualified to teach social studies compared to 29 percent in teaching life science, 25 percent in earth science and 18 percent in physical science (Weiss, Banilower, McMahon, & Smith, 2001). These percentages will surely have implications and will be reflected when teaching these subjects in the classrooms, as teachers do not feel equally qualified to teach every subject.

A very recent questionnaire was conducted in Nigeria, to study how strong primary school teachers feel comfortable with generalized teaching (Ojo, Akintomide & Ethindero, 2012). The results of the questionnaire used in this study revealed that out of 251 primary teachers, only 4 claimed feeling extremely comfortable with a single teacher teaching all the school subjects. 71 of the participants felt comfortable, compared to 44 who felt slightly comfortable. Finally, 132 of the respondents affirmed that they are not comfortable with the generalized teaching, which represent 52 percent of the questionnaire participants. This study shows that the majority of in-service primary school teachers are not comfortable with the idea of teaching all the core subjects. Another aspect of this questionnaire was to study to what extent is the teachers’ level of agreement with applying specialized teaching in their primary schools.
The results of this survey revealed that 81.9 percent of the participants agree with specialized teaching along with 1.5 percent who extremely agree. This is compared to 13 percent of the respondents disagreeing with the specialized teaching along with 1.2 percent who slightly disagree. 2.4 percent of the questionnaire participants were undecided about their level of agreement (Ojo, Akintomide & Ethindero, 2012). This study indicates that teachers who believe in specialized teaching outweigh the teachers who acknowledge the generalized teaching. These teachers believe that focusing on their areas of specialization would promote effective teaching and make teachers more competent. This study encourages all governments and policy makers to increase their efforts and make more primary schools acquire and practice specialized teaching rather than generalized one.

Teachers’ comfort level in teaching is a very strong parameter in their teaching effectiveness. When teachers are hesitant about aspects of a lesson, they are unable to provide students with deep learning opportunities. They feel that these lessons require subject-specific knowledge that they do not acquire (OFSTED, 2009). According to Ojo, Akintomide & Ethindero (2012), most teachers would want to be specialized in subjects that they majored, as they feel comfortable teaching what they know.

Another important aspect and a component of teachers’ comfort level is their self-efficacy. A person’s self-efficacy is a person’s own belief in his/her personal capabilities to perform a specific task. It is what motivates a person to accomplish a goal. Many researches outlined the importance of the teacher’s self-efficacy, and how it is reflected in the teacher’s classroom. It is, according to Lockman, how a teacher believes in his/her own effectiveness and ability to practically overcome any challenges related to student learning (as cited in Wimsatt, 2012). Woolfolk and Hoy claimed that it influences teachers’ behaviors and practices in
classroom, as well as leads to positive student results (as cited in Mansfield & Woods-McConney, 2012). Furthermore, Lockman, Wingfield, Galper, Denton and Seefeldt, all explained that those with high self-efficacy and high expectations for themselves and their students, benefit from advanced gains in their students’ achievement (as cited in Wimsatt, 2012).

A teacher’s high self-efficacy is obviously an essential factor in effective teaching and students’ achievement, as it brings positive and enthusiastic attitudes in the classroom. It is important to acknowledge that the subject matter or the curriculum that the teachers are required to teach influence the teachers’ own perception of their self-efficacy, as some teachers may have higher efficacy levels in one subject compared to other subjects (Mansfield & Woods-McConney, 2012).

### 2.5 Challenges in Implementing Specialized Teaching

There were various proposals throughout the history to move from generalized teaching to specialized one, however all requests were widely challenged. One of the critiques of the subject-specialized teaching is from Bailey who did not agree that students in primary and middle schools should be moving continuously from one specialist to another (as cited in Elliott, 1985). Although he did not disagree with the concept of having subject-expert teachers in primary grades, however, he did not accept its setup in the schools.

Another argument that faced specialized teaching was that students in primary grades are exploring the various aspects of the world and teachers need to have a breadth of perspective along with the depth of specialized knowledge to guide and mentor the students at that age (Elliott, 1985). Which should also be taken into consideration as being too focused into a specific knowledge of subject may negatively affect the students’ learning.

Interestingly, Elliott (1985) did make a proposition of arrangement for specialized
teaching as he claimed that there is an explosion of knowledge that makes it unreasonable for primary teachers to be competent generalists. He proposed that all teachers should have at least one field of expertise, and that the requirement for that is to have a first degree standard in that subject. This is along the requirements for teachers’ education.

I was extremely impressed to find similar models already implemented by few universities across the world. Since 2014, the Master of Teaching for primary grades in the University of Melbourne in Australia, qualifies prospective teachers to become generalists with specialist knowledge in literacy and numeracy education. In addition to that, teacher candidates choose either mathematics or science as a subject specialization. This program allows teachers to choose an elective subject that reflects their interests while still fitting into the generalist model of teaching.

Fear of change is often a challenge. Principals and vice-principals may be resistant to try and change something that schools have been using for centuries. Mostly all decisions taken in schools are driven by the principals’ educational philosophies and their personal beliefs. Some of their responses to specialized teaching was “I really believe that teachers need to teach their own class those particular skills [Maths and Literacy] because they are skills that are transferred across all other key learning areas throughout the week” (Ardzejewska, McMaugh, & Coutts, 2010, p.209). Another response from a principal about specialists was “If you say to me that you are a primary teacher and you don’t have an interest in maths then I think there is a major problem. I’d say to go to high school and be an English teacher” (Ardzejewska, McMaugh, & Coutts, 2010, p.210). On the other hand, a principal in that same study acknowledged that language needs to be taught by specialists, while another admitted that computers is a common area in schools that really needs experts. I believe that this will continue to be a debate as it may
contradict principals’ beliefs.

Not only the principals may be resistant to change, but teachers may too. Thornton conducted a study in England and found that most of the teachers acknowledge the importance of specialists, however they did not want them to replace generalists, they just wanted to use them as consultants under special circumstances (as cited in Ardzejewska, McMaugh, & Coutts, 2010). Accordingly, implementing specialized teaching requires schools to ensure that new teachers are only assigned to teach their subjects, and that teachers are constantly updating their own subject knowledge (Elliott, 1985).

2.6 Conclusion

In this literature review I explored what the literature says about pedagogical content knowledge, advantages of specialized teaching, students’ achievement, teachers’ comfort level, and challenges in implementing specialized teaching. This research shows that many are acknowledging the effectiveness of specialized teaching and relating it to higher teachers’ comfort level which contributes to gains in students’ achievement. Changing to specialized rather than generalized teaching will face some challenges that need to be professionally handled in order to achieve better learning outcomes which is our ultimate goal.

This paper connects theory with practice by focusing on teachers’ perceptions on the relationship between subject-matter expertise and student learning and achievement, using semi-structured interviews with elementary classroom teachers. By considering how teachers deal with unfamiliar topics, and whether it affects their comfort level in teaching, it is my hope to provide a better understanding of the teaching approach that provides our students with the best learning experience to attain higher achievements.
Chapter Three: Research Methodology

3.0 Introduction

In this chapter I provide an overview of the key methodological decisions in this research, along with my rationale for these decisions, given the purpose and questions of the research. I review the research approach and procedures, followed by a description of the used data collection instruments. I present the participants who contributed to the findings of this research, the list of sampling criteria and procedures defined to recruit them, along with the biographies of the participants. Following, I describe the process of data analysis and I review the ethical procedures considered in the study. Finally, I identify some of the methodological limitations, while acknowledging the strengths of this research study.

3.1 Research Approach and Procedures

This research study is conducted using a qualitative research approach, including a review of the existent literature about the relationship between the subject-matter specialization and the students’ learning and achievement, which is the purpose of my study. Semi-structured interviews were conducted with two in-service teachers, to relate the literature with real life experiences. The interviews were recorded and transcribed to be able to code the data and synthesize research findings.

According to Fossey, Harvey, McDermott, and Davidson (2002), the main goal of a qualitative research is to address questions to gain a deeper understanding of the meaning and experiences of people and their social lives. In relation to my research purpose, I aimed to develop a deeper understanding of the relationship between the subject-matter specialization and the students’ learning and achievement through in-service teachers’ perspective. An important advantage of qualitative research according to Flick (2009), is that it allows for the reflexivity of
the researcher and the research, as it provides an opportunity for the researchers to express their observations, emotions, impressions, frustration, and their own thinking, and make them part of the research interpretations. This privilege is of an extreme significance to me, as the purpose of this study stemmed out of my personal experience and my own concerns that I am bringing with me to the teaching profession.

3.2 Instruments of Data Collection

Data in this study was collected using in-depth semi-structured interviews with teachers, which is the most convenient instrument in relation to the purpose and research questions of this study. A semi-structured interview is a qualitative method to explore perspectives and opinions of participants, through a pre-determined set of open-ended questions. Interviews exist on a continuum, ranging from structured, through semi-structured, to unstructured interviews. According to Gill, Stewart, Treasure, and Chadwick (2008) structured interviews consist of predetermined questions that allow for limited participants’ responses, with no variations and no space for clarification or follow-up questions to the responses, which do not lead to deep understandings and elaborations. They are mostly used in quantitative research (Edwards & Holland, 2013). On the other end of the continuum is the unstructured interview, which is characterized by being casual and very flexible (Kajornboon, 2005).

The interviews conducted in this study were semi-structured, they included a set of predetermined key questions that guided the interview into the areas that needed to be explored, while being flexible to allow for follow-up questions to pursue more details (Gill et al., 2008). There are several advantages of using the semi-structured interviews; however, being able to probe for clarification of responses is most convenient when exploring perceptions of participants in relation to complex or sensitive issues (Barriball & While, 1994). This is very
relevant and is of significant importance to my study, as I aimed for teachers’ perceptions of their comfort level teaching different subjects and its relation to the students’ achievement. Accordingly, it is important to provide a space for the participants to talk about their personal experiences and even explore areas where the interview questions did not plan to foreseen.

The interview questions were grouped into five main categories (see Appendix B). The first set of questions were for the participants to share their professional background and experiences. The second set of questions were about the participants’ perspectives and beliefs about the relationship between the subject-matter specialization and the students’ learning and achievement. Following, were questions that allowed the participants to speak about their instructional practices and strategies dealing with their comfort level teaching different subjects, and how it is reflected into their teaching. Subsequently, I engaged the participants into describing the resources that supported them, and what other resources do they wish to have. Lastly, I asked for advices they may have for beginning teachers who are uncomfortable teaching specific subjects.

3.3 Participants

Participants are the heart of any research study, as they constitute the major contributions to the research findings. Accordingly, this section is dedicated to all the methodological decisions related to the participants of this research. In the following sub-sections, I provide an overview of the sampling criteria defined for this study, followed by an elaboration of the procedures that were considered in the sampling process. Lastly, I present my participants’ biographies including their background experiences and interests, as well as their motives to participate in this study.
3.3.1 Sampling criteria

Since the aim of qualitative researches is for in-depth information and perspectives from participants, the sampling size is usually small in number. Therefore, it is extremely important to carefully choose the inclusion criteria that will reflect the research question and purpose, to guarantee that the participants recruited are the most suitable, and adequate for the research, and who will add rich and substantive information to the study. Below are the criteria that my participants should meet:

- Teachers who have experience working in elementary school years (Grade 1 to 8).
- Teachers who had completed their previous study programs in different fields of study from each other.
- Teachers who have different number of years of experience from each other in the field of teaching.
- At least one teacher is a specialist in one subject area and/or has experience working in a subject specialized elementary school system.

In order to get the teachers’ perspectives on the relationship between the subject-matter specialization and the students’ learning and achievement, several factors were taken into account. First of all, since my study focus is on elementary school years hence, my participants needed to have experience working in elementary school years. Most importantly, they needed to have different previous study focus, to understand how their subject-matter expertise affects their comfort level teaching different subjects. Moreover, I am concerned about how the teachers’ years of experience affect their comfort level and their subject-matter knowledge, therefore, I was interested in interviewing in-service teachers who have different years of experience from each other. It was also valuable to interview at least one teacher who had an experience working
in a subject-specialized elementary school system to get a different perspective other than that of generalist teachers. Lastly, it was likewise favorable to have a participant who is working as a specialist in one subject area like a math coach, or an ESL/ELL teacher, to listen to a different perspective from a teacher who is specialized in a certain area, and how this affects the student learning and achievement.

3.3.2 Sampling procedures

Choosing the sample for the study is a very critical and an important stage in a research study, as we need to be able to generalize our findings back to the population (Marshall, 1996). In this qualitative research, it was important to choose a sample that provides in-depth understanding of the various comfort levels and/or struggles experienced by teachers from diverse background studies and different years of experience, hence the random sampling process was not convenient to this type of research study. Marshall (1996) categorizes the sampling methods of qualitative researches into three approaches: convenience, judgement/purposeful, and theoretical sample. He explains that the convenience sample approach is the least costly in terms of time, money, and effort. The purposeful approach is described by Patton as choosing the sample that will provide rich information in terms of the purpose of the study (as cited in Polkinghorne, 2005). While the theoretical approach is described as an iterative process where the sample is selected based on interpretative theories from the emerging data (Marshall, 1996).

Given the methodological parameters of this study and its small-scale nature, I combined the two sampling approaches of the convenience and the purposeful sampling to recruit my participants. The fact that the participants need to meet certain criteria makes the sampling process a purposeful one, and on the other hand, being immersed in a community of teachers,
professors, and mentors, is allowing me to rely on some existing contacts that I have collected during my placements in elementary schools, as well as their networks. I also provided an overview of my research focus along with my contact information to principals and school boards to communicate with teachers who are interested to volunteer in my research study.

3.3.3 Participant biographies

Both participants of the study are teachers in the Greater Toronto Area in Canada. In order to protect the anonymity of all participants, each individual will be referenced using a pseudonym.

Laura

At the time of research, Laura was a math and science teacher for Grade 2 and 3, in a subject-specialized private school in Toronto. She went directly into the education field starting with the five years Bachelor of Education specialized in kindergarten and elementary, then completed her Master degree. She has eight years of teaching experience in addition to some supply teaching that she did overseas. Laura knew she wanted to become a teacher since a young age, and described herself as not being the strongest math student, and not liking science during high school. However, she believed that because she struggled with the concepts, she became a better math and science teacher. In this research, Laura contributed great insights since she was working in a subject specialized teaching school at the time of research, while the public schooling system in Canada is a generalized one.

Jaimie

At the time of research, Jaimie was teaching language and social studies to Grade 6/7 split and Grade 8, in a public elementary school in Toronto. Jaimie had a rich journey of teaching full of experiences that contributed greatly to this research study. She has been working as a
teacher for eighteen years. Jaimie graduated with a Bachelor of Art Honors in English and Drama, and pursued her graduate studies by completing the Master of Business Administration. Her Grade 1 teacher inspired her to enter the career of education because her classroom was a world of imagination for Jaimie. It was very artistic and thematic. Her father made her fall in love with books because he would read for her every night and dramatize all the readings. Jaimie had teaching experience abroad in several countries around the world in subject-specialized systems, and in this research we focused on how she uses her knowledge and expertise she gained from her undergraduate degree in English and drama, while being in the generalist teaching system in Canada.

3.4 Data Analysis

The interviews I conducted are transcribed from speech to text, in order to have raw data to work with. This is the phase we call data analysis, where researchers need to be able to communicate results to the audience. However, in qualitative analysis we do not use statistics or hypothesis tests like in quantitative analysis, we use categories of data instead (Blank, 2004). Basit (2003) described the analysis of qualitative data as a dynamic, intuitive and creative process of inductive reasoning, thinking and theorizing. She elaborated on the process, by describing that we label phrases or paragraphs of the data by giving them a code, which is done by using the research question as an interpretive tool. Then we group these coded data into theoretically relevant categories (Basit, 2003), and we look for over-arching themes to these categories. These are the procedures that I followed during the data analysis process that Lichtman (2012) referred to as the three C’s: Coding, Categorizing, and Concepts.

The later stage of data analysis was to identify the connection between my data and the relevant existing literature I presented in my literature review chapter. This is where we make
meaning from our findings. I also looked to acknowledge the null data, which are the areas that the participants did not mention or speak to during the interviews, while exploring its significance to the research.

3.5 Ethical Review Procedures

This qualitative research study requires participating teachers to release some general information about themselves, including their background and experiences, as well as some personal information including their comfort level teaching different subjects, their struggles, perspectives and beliefs, and instructional strategies that they use. Therefore, it is important to be aware of the ethical issues that are associated with such interviews since researchers are the ones responsible for protecting the participants (Orb, Eisenhauer, & Wynaden, 2001). Accordingly, participants were given a consent letter (see Appendix A) to sign prior to the interview, that explained the topic and purpose of the study, the structure of the interview being 45-60 minutes, at a place and time that is convenient to them, as well as an overview of all the ethical implications related to their participation, highlighting that there are no known risks to their participation in this study.

Capron described that we show respect to our participants by recognizing their rights to be informed about the study, and their rights to withdraw at any time without any penalty (as cited in Orb et al., 2001). Hence the consent letter informs the participants that they can decide to withdraw at any point even after signing the consent. I also recognized the importance of the participants’ ease and comfort during the interview, so I sent them a copy of the interview questions that have been reviewed and approved along with the ethical protocols by the Research Ethics Board of the University of Toronto. Having the questions available to the participants prior to their participation gives them the opportunity to prepare, and be comfortable by the time
of the interview. The participants were also assured that they have the right to refrain from answering any of the questions without providing any reason.

A very important factor that contributes to the quality and in-depth information shared by the participants is their guarantee of confidentiality (Woods & McNamara, 1980), as it protects them from any personal and/or professional harm. To ensure confidentiality in this research, participants were assigned a pseudonym to maintain anonymity, and their names are not to be disclosed in any related work. In addition, any identifying information to their students, schools, and colleagues were excluded. Moreover, the participants were informed that the interviews were audio-recorded, and then transcribed, and that they will be provided with a copy of the transcript before conducting the data analysis to review, clarify, or withdraw any statement, and to also confirm that it reflects their theories and viewpoints since Davidson claimed that the interview transcripts are sometimes influenced by the researcher’s attitude and assumption regarding the information (as cited in Mero-Jaffe, 2011).

In relation to the storage and use of data, all the information obtained from the interviews including the audio recordings are kept on a private password-protected device, and my course instructor is the only person who will have access to these research data. Furthermore, the audio recordings will be destroyed after the paper is presented and/or published, which is within five years from the interview dates. It is worthy to mention that the content of the interview is to be used in the final paper, as well as in informal presentations in my institute. I may also present my research findings via conference presentations and/or through publications.

3.6 Methodological Limitations and Strengths

Every research method, whether a qualitative or a quantitative one, will have its strengths and limitations (Carr, 1994). Given the approved ethical parameters of my program, and its
requirements, the only approved method for data collection is interviews with 2-3 educators. This relatively small sample size, may not motivate policy makers and/or other academic researchers to take the research findings seriously (Griffin, 2004), since it is argued that the sample size of qualitative researches limits its opportunity for generalization (Edwards & Holland, 2013). However, one should remember that the primary aim of qualitative researches is to develop deeper understanding of people’s experiences (Fossey et al., 2002), which was the focus of my study.

The fact that I only interviewed educators but not students, limited the reliability of the findings, since it would have been valuable to get the students’ perspectives, as their learning and achievement were the purpose of this study. However, I agree with Marshall (1996) that an appropriate sample size is one that adequately answers the research question. I believe that the teachers I interviewed were well knowledgeable about their students’ experiences, and that these interviews allowed them to share their authentic perspectives, to speak to their personal experiences, and to give relevant advices to future teachers. Moreover, the fact that I could not conduct classroom observations or surveys, restricted the opportunity of relating the teachers’ perspectives to their real classroom practices. Conclusively, I believe that although this study had several limitations, it definitely added a body of information to share with the broader education community.

3.7 Conclusion

In this chapter, I highlighted the significance of qualitative research to my research purpose, as I aim to gain a deeper understanding of the meaning and experiences of teachers. I then discussed my instrument of data collection being interviews with teachers, underlining the different interview natures, while stressing on the advantages of using the in-depth semi-
structured interviews. These interviews provided a space for the participants to elaborate on their personal experiences, as well as explore areas where the interview questions did not plan to be foreseen. Following, I defined the sampling criteria used to choose the participants that are best adequate to answer my research question and to provide rich information that will benefit my study. I clarified the sampling procedures used to recruit my participants, relying on the convenience and the purposeful sampling approaches. I also introduced brief biographies of the participants who agreed to volunteer in the study. Furthermore, I described the data analysis process following Lichtman’s (2012) three C’s process of coding, categorizing, and concepts, which allowed me to make meaning from the findings by identifying the connection between the data and the relevant existing literature from the literature review chapter. I reviewed the ethical procedures related to the participation in the interview, describing the participants’ right to withdraw, the guarantee of their confidentiality and anonymity, and the procedures regarding the storage and use of data. Finally, I drew attention to the limitations of this study, given that I only used interviews to collect data, while also highlighting the strengths of interviewing teachers, who are the focus of the study, and who are the best adequate to speak about their lived experiences and practices. In the next chapter, I provide a full analysis of my data, and findings.
Chapter Four: Research Findings

4.0 Introduction

This chapter provides findings from the research interviews conducted with the two participants, Jaimie and Laura. The purpose of these interviews was to investigate the research question: What are elementary teachers’ perspectives on the relationship between subject-matter expertise and students’ learning experience and academic achievement? Findings from these interviews are collected into the following themes:

1. Limitations in content knowledge, comfort level, and preparation time are challenges to teaching subjects that teachers struggle with.
2. Personal, academic, and professional backgrounds define the teachers’ expertise in subject matter.
3. Subject-matter knowledge elevates teachers’ comfort level, enriches their teaching experience, and improves students’ learning and academic achievement.

In each theme, I will first present the participants’ experiences and their valuable views, then highlight the similarities and differences between their responses. Afterwards, I connect the findings with the literature review, and lastly I emphasize the relevance of the findings to the research purpose. This chapter provides very useful resources and advice that would support all teachers, especially first-year teachers.

4.1 Teachers Indicated That Limitations in Content Knowledge, Comfort Level, and Preparation Time are Challenges to Teaching Subjects They Struggle with.

Teachers are often encountered with subjects or topics to teach that they are not familiar with. Both participants indicated that this happens frequently, and that it is part of the teaching profession. They highlighted that their limited content knowledge affects the way they teach
those subjects because their comfort level decreases and it impacts their teaching and affects their students. Moreover, both Jaimie and Laura shared concerns about how short their preparation time is, and how it is a challenge to plan lessons for subjects that they are not familiar with, while having limited preparation time.

4.1.1 Teachers explained that limited content knowledge affects their way of teaching certain topics.

General teachers teach a vast amount of material every day, which requires an extensive and rich bank of content knowledge. Not every teacher will be expert in all subjects. Being a math and science teacher, Laura was grateful for her specialized teaching school. She explained that in a general teaching model, teachers need to teach themselves a new set of skills and a new set of content every day. She expressed, “I don’t think I would be able to put the same amount of effort into my teaching if I was also teaching all the rest of the subjects.” Jaimie also described generalist teachers as being “constantly challenged” because they have to teach all subjects for a different grade level every year. She shared the same doubts as Ojo, Akintomide, and Ethindero (2012) that teachers cannot show the same level of competence in all subjects. They will always have subjects that they master more than the others.

When teachers lack the content knowledge, they “struggle with coming up with rich meaning for inquiry questions…and are not connecting the theories to real life authentic learning which affects their [the students’] academic achievement,” Jaimie heatedly explained. She provided an example of math teachers who need to relate the concepts to the real world because some students are not abstract thinkers, saying that teachers will not be able to do so unless they have a strong knowledge of their content. Strong content knowledge also allows teachers to communicate ideas in simple language and to better assess the students’ achievement by
assigning activities that meet the students’ levels. Fromyhr (1995) also highlighted the advantage of having strong background knowledge and being specialized in one subject, explaining that subject-specialized teachers show greater enthusiasm in teaching their subject of specialization. This may be because they value their subject more highly (DeCorby, Halas, Dixon, Wintrup & Janzen, 2005).

4.1.2 Teachers indicated that their comfort level is a barrier when they have to teach specific topics that they do not have enough knowledge about.

Jaimie described the role of the comfort level in teaching as follows: “Teachers are humans; we want to operate in our comfort level as much as possible. When you are in your comfort level, you are passionate, you are happy and motivated, you do your best”. Both participants related low comfort levels to teaching math. Laura stated, “there are a lot of teachers who do not want to teach math”, and Jaimie supported this claim by saying “there is a huge problem with a lot of teachers feeling uncomfortable about math”. This is why the new strategy to support math learning in Ontario requires all teachers to spend sixty minutes per day of math learning in Grades 1 to 8 starting September 2016 (Ontario Ministry of Education, 2016). This would guide teachers who are uncomfortable to teach math, to spend more time doing math activities daily, to prevent what Odogwu’s (1994) claimed that general teachers do not spend enough time teaching math every day because they are not comfortable with it and lack the content knowledge.

Both participants, Jaimie and Laura, indicated that it is very normal to have low comfort levels when teaching unfamiliar subjects or topics. Jaimie expressed her feelings when she had to teach science, saying, “I was not comfortable, I was very insecure.” She felt like she had to fake confidence in front of the students. She needed to act enthusiastic so the students would not feel
her insecurity. However, she doubted that she would be able to “make it meaningful for kids… that would be a difficult piece for me, because I do not have that comfort level”. She also explained that because she is not comfortable with teaching math she prefers to do it traditionally, which is “Here is Chapter 1 … do group work, work on questions 1 to 4, and we will come together at the end”. Laura has also shared that she “burst into tears” when she was asked to teach Language Arts to a grade level that she did not teach before. According to Swars (2005), when teachers are not comfortable with a subject area, it affects their effectiveness, as it consumes them more, time, work, and effort to prepare their lessons, and conveying them, in contrast to teaching subject areas that they are familiar and comfortable with.

4.1.3 Teachers specified that time is a barrier that they encounter when they are preparing lessons with limited knowledge about the topic.

Time is a valuable resource for everyone, especially for teachers. They spend a lot of time planning, organizing, marking, and communicating with parents and colleagues. According to Laura,

- planning a lesson for a subject or a topic that you are not familiar with, or that you are not comfortable with, requires a great amount of time in advance, to try and familiarize yourself with the content, and learn it.

Jaimie supported this by sharing that it can personally take her two or three hours to plan a math lesson that requires critical thinking because “you have to actually work through the problem, understand it, and think of the possible answers that the students will be coming up with so you are prepared”. Thus, both participants indicated that the more uncomfortable teachers are with a subject, the more they need time to familiarize themselves with the content and gain the adequate comfort and knowledge to teach it. And, participants indicated, this can encroach into teachers’
personal time.

Teachers have a responsibility towards deepening their understanding of the subject matter, and their attitudes and enthusiasm for what they are teaching, explained Shulman (1987). However, when teachers do not have sufficient time to study a topic, they end up taking “the easy way out, by just sticking with the textbook, and with the teachers’ curriculum and that is that,” according to Jaimie. This would directly impact the quality of the lessons, which eventually affects the students’ learning. It aligns with the findings of Johnson (2006) who indicated that lack of time is one of the teachers’ greatest barrier to implementing standards-based instruction, as well as a constraint in responding to the students’ wishes to extend on certain topics. Oppositely, specialized teachers have the ability to focus their time specifically on one or two subjects, as Laura explained. This provides them with enough time to think through the activities that would make learning fun and exciting, and spark the knowledge to the students, and help deliver the content effectively.

4.2 Experiences That Shaped Teachers’ Expertise in Subject Matter Included Personal, Academic, and Professional Backgrounds.

Several experiences can help build and shape the teachers’ subject-matter knowledge. Personal and academic backgrounds are often the most common sources of teachers’ content knowledge. Participants indicated that professional and working experiences have also led to their development of subject-matter expertise. Interestingly, teachers have indicated that having struggled themselves in certain subjects helped them develop proficiency in teaching those subjects.
4.2.1 Teachers indicated that their academic backgrounds and personal experiences helped develop their subject expertise.

Academic backgrounds usually represent personal interests, and teachers develop extensive knowledge of subjects and topics from their degrees and study fields. Jaimie completed her undergraduate degree in English and Drama. Therefore, she is confident in these fields and incorporates the arts in everything she does. She gives her students diverse art ideas to present and share what they have learned. They can dramatize their learning, write a song about it, play a musical piece, or build a model. She enthusiastically described how arts can be very easily integrated with every other subject. When it comes to math, if students are to show how to problem solve equations, they can draw a picture book, or a comic strip, they can make a movie or sing about it and dramatize it. She had numerous ideas of how to include arts in every assignment to meet the students’ multiple intelligences (Gardner, 1983).

Personal experiences can also act as a source of content knowledge. Jaimie explained that students learn and engage more with authentic and personal stories. Having frequently travelled herself, she highlighted that most of the knowledge that she brings to her classroom is from her personal travel experiences. She explained that students get excited to see pictures and artefacts, because they know it is meaningful and true, and has a personal story attached to it. These stories engage students and give them an incentive to learn and connect personal experiences with academics. They give them reasons to learn.

Together, academic and personal experiences, affect the way we teach. Jaimie described her teaching profession, as being a “performer up on the stage”. And having a background in drama, supports her to choose her instructional strategies. She is aware of the importance of moving around in the classroom, and utilizing the space. She is also mindful to not being
monotone, so the students stay engaged. Her way of teaching goes along with what Wilson et al. (2008) indicated about the teacher’s previous field of study: that teachers spend years learning and deepening their knowledge in a field of study, therefore, they will surely use their specialized content knowledge to empower students to produce a higher quality of work. In a similar way, participants indicated they were more eager to transfer the knowledge that they acquired to their students, and that students were more interested to learn from teachers who have a personal connection with the content.

4.2.2 Teachers specified that their professional experience helped develop their expertise in certain areas over time.

Teachers do not only gain subject-matter knowledge from academic background, but also from professional experiences, whether in the education field, or outside of it, as teachers learn from their experiences. Laura explained that she feels more comfortable the more she teaches the same lesson. She gets another chance to find a new approach, or a new resource to teach the lesson differently, if it was not delivered as she expected it to be the first time. She also highlighted the advantages of teaching the same grade level for several years in a row. It makes her feel more comfortable and confident with the material, because she knew in advance what to expect, and could improve the lesson by adding new ideas for the next time she would teach it. At least, she will not need to plan it from scratch the following time. On the other hand, Jaimie indicated that teachers need to be cautious not to get too comfortable with the material relying on the fact that they have taught it before several times. She explained that curriculums change, new resources become available every year, and students are not the same from one classroom to the next. Even if the lessons are already planned, she said, they will need to be adjusted to better suit every classroom.
Similarly, teachers benefit from work experiences outside the education field. Jaimie had the opportunity to step out of the teaching field for few years, and she worked in an environment with engineers who were predominantly male. She indicated that this experience allowed her to notice how men and women communicate differently, particularly in writing. She realized that if students can “get to the point and make their meaning clear, it is as good as someone who may take more time to go detailed.” And since then, she has taken this into consideration when she assesses her students’ writing.

Most importantly, teachers are surrounded by resources that constantly support the development of their subject-matter knowledge. Both participants pointed to useful resources that they rely on to help them with the content knowledge. Laura mentioned that the science coach in her school is knowledgeable of the science program, and helps her and all other teachers understand where they need to be on the science curriculum, and help them plan to achieve it. Jaimie also highlighted the usefulness of the math coach at the school, especially for teachers who are not confident with math. She indicated that the math coach can help her plan a detailed outline for the year, so she covers everything throughout the five strands. Teachers can also invite the math coach to their classroom to teach a lesson, or watch them teach and get a feedback onto how to improve the lesson. It was interesting to see that both participants highlighted the effectiveness of the science and math coaches. In Peace’s (2012) research, he pointed to these two specific subjects, believing that they require deeper understanding of the content from teachers who are able to answer content questions and not just have knowledge in teaching.

Moreover, both participants acknowledged learning the most from their colleagues, and team teaching. Laura indicated that she approaches her colleagues who have previously taught
the same grade level in the past, and ask them about how they planned their unit, and the activities that the students enjoyed the most. If they are open to share their knowledge, they can plan and set up lessons and unit plans together. “They help develop that knowledge base”, Laura believed. Jaimie has also expressed her happiness about team teaching saying, “it is a confidence booster that I can get help from them”. In team teaching, teachers bring different strengths to the table, look at the content through different lenses and perspectives, and complement each other. “This is the ideal teaching situation”, explained Jaimie. She team taught before with a teacher who was a “math genius, but was not comfortable in language”, which is the exact opposite of her. She loves language, and considers herself not comfortable in math. So each one of them would learn from the other, and when she teaches a lesson, he would act as a temperature check in the classroom. He would ask her to slow down or stop and re-explain, or he would ask questions on behalf of the students who would be embarrassed to ask simple questions.

4.2.3 Teachers indicated that struggling themselves in certain subjects can help provide insight that help them develop expertise in teaching those subjects.

Some teachers may have had a subject that they struggled with as students. Surprisingly, both participants indicated they struggled with math when they were in school. However, they both shared how advantageous the experience of struggling was to their own teaching now. As Jaimie indicated, “having struggled in math makes me a great teacher for kids who struggle, because I know how they feel like because I was there.” At one time, she considered becoming a math coach because she deeply understands what kids struggle about, and can make a connection with them. Laura also struggled with math, and actually become a math teacher herself. She also believes that having struggled herself gave her a better lens to approach the subject through, as it was not where she grew feeling most confident.
Having struggled as a student helped Laura and Jaimie to not expect perfection from students. Laura recognized that not all subjects will be easy for everyone. They are going to struggle and face difficulties in different ways, and “have a hard time understanding certain things that seem very straight forward,” as Laura emphasized. Having felt their frustration before, it seemed that teachers have a different level of passion to help their students through it. Jaimie confirmed this by indicating that teachers who were brilliant mathematicians did not understand where she was struggling in math, or what she needed. They could not deliver the knowledge they mastered in a simple form that suited her needs. Both participants hinted towards how their previous struggles at schools affected their teaching, which the research supports as well. Erskine (2010) confirmed that the unsuccessful experiences that teachers have had in mathematics and how it was taught to them at school have a direct impact on how they are going to teach it to their own students, as well as on their students’ academic achievement. In this case, both participants did not want their students to go through the same struggles that they went through, and they worked hard to support their struggling students.

4.3 Teachers’ Increased Subject-matter knowledge Elevates Their Comfort Level, Which Enriches Their Teaching Experience and Improves Their Students’ Learning and Academic Achievement.

Teachers’ level of subject-matter knowledge was shown to have a direct impact on their comfort level, as well as on their students’ comprehension of the content and academic achievement. Participants indicated that when teachers master a subject, they feel more confident delivering it to the students. They create an rich learning environment and use diverse instructional strategies to meet the students’ multiples intelligences. They make the material more meaningful and understandable to the students, which enriches their learning experiences.
4.3.1 Teachers indicated that having extensive knowledge of content material enables them to be more comfortable teaching their subjects.

Teachers with high comfort level appear to be less likely to experience stress or anxiety because the content becomes familiar, and they feel that they are in control. Both participants reported that their comfort level was directly proportional to the familiarity of the content that they taught. Laura suggested that teaching the same material several times makes her more experienced and comfortable with it because she gains more subject-matter knowledge each time she teaches it, which helps her be confident. She highlighted that her comfort level allows her to be a better teacher. She stated,

because I am comfortable with math and science, it is just much easier for me to think about a creative way to approach a lesson, or to think about a more fun and exciting or beneficial way to deliver a lesson.

Research supports Laura’s claim, as Reys and Fennell (2003) suggested that teachers with particular knowledge, interest, and expertise in mathematics content and pedagogy create the best environment for learning mathematics. This makes subject-specialized teachers more willing to create lessons that are appealing to students.

Teachers might have powerful skills and abilities while teaching their specialist subject; however, those talents and capabilities become instantly challenged when they teach content that they are not familiar with (Loughran, Berry, & Mulhall, 2012). Some might expect that when teachers become challenged, they perform poorly. However, Laura argued that being not comfortable with a subject can turn out to be advantageous. She acknowledged that if she was asked to teach something new, she would be nervous, and that this would transgress her comfort level. However, this would push her to put more effort to study the topic, and prepare a great
lesson. It might require more planning time but she believed that “sometimes we might surprise ourselves, because being nervous or feeling less able in a certain subject can actually help us do better.” Laura suggested that teachers should use their weaknesses to their advantage. Jaimie also mentioned how she deals with being uncomfortable. She stated that perhaps she might not be confident with the content of the subject, but she is absolutely confident with her “art of teaching”. She defined the art of teaching as the ability to assess where the students are, what their learning and instructional needs are, and what resources are available to help and support her.

Regardless of the familiarity of the content, participants indicated teachers need to be flexible. Jaimie noted that sometimes she feels insecure and uncomfortable, but she challenges herself to gain further knowledge and strategies. She stated, “you would have to operate outside of your comfort level sometimes to grow.” She also emphasized that no one knows everything, even after teaching for twenty years, we are still learning every day, so we need to be more flexible for change. Laura has also hinted towards the constant changes in the curriculums, and the inclusion of new topics. However, she indicated that these adjustments were a lot easier for her to make because she is comfortable and familiar with the curriculum and the content that she needs to cover. This is because subject-matter knowledge impacts the teachers’ learning process, which helps them impart their knowledge to the students in an efficient way (Jadama, 2014). Accordingly, subject-matter knowledge directly affects the teachers’ comfort level which is reflected on their teaching.

4.3.2 Having subject-matter knowledge can enhance the breadth and depth of teachers’ instruction.

Being expert with a subject helps teachers transfer the breadth and depth of understanding of that subject to the students. Because Jaimie had her undergraduate degree in
drama, she had a bigger picture of the power of drama, and she had numerous ideas about how to integrate it with different subjects. She expressed her interest in thematic planning, which helps her to integrate a specific topic or inquiry into several subjects, and cover more curriculum expectations at once. It helps students realize links between the subjects. However, she highlighted that the opportunity to plan cross-curricular is not always possible in a subject-specialized teaching model. This was confirmed by Laura when she indicated, “integration is not happening as much for us. Obviously, I have the opportunity to connect math and science together, but that is not always as easy as you think it might be.” She expresses her frustration of not necessarily connecting the skills that her students learned in Language Arts into Science because it is not the focus of her lesson. Both participants valued the significance of integration and allowing students to have a bigger picture of topics and subjects. However, they indicated that integration is not possible in a subject-specialized teaching model, and this is a drawback.

Being a subject expert empowers teachers to answer the students’ questions in depth and connect learned concepts with real life situations. Jaimie believed that teachers should always strive to connect the theories to real life authentic learning. She explained that students always question why they need to learn these concepts, and that she struggles to give them convincing answers, especially in mathematics. She mentioned the concept of fractions and realized that teachers who have a bigger picture of what fractions really mean, and who are able to put this concept into real life situation, would have the key to success. She questioned herself, “can I still answer the rich thinking as someone who is natural at math? No I cannot because it is not built into my brain.” Jaimie also feared that her lack of conceptual knowledge would transfer misconceptions to students. Jadama (2014) also highlighted this issue, recognizing that teachers can cause students to create misconceptions by passing inaccurate information or by conceiving
their knowledge in narrow ways. This can be prevented by team teaching that Jaimie discussed earlier.

4.3.3 Participants’ believe that students’ learning experiences can become richer and more meaningful if their teacher is an expert in subject-matter knowledge

Participants indicated that subject-matter knowledge plays an important role in their students’ academic achievement. Laura explained that subject-specialized teaching “does really develop a little bit of love for a subject matter, maybe a little earlier in them because they have a little bit more of a differentiation in their mind.” And when a teacher likes a subject, participants believe it gets directly reflected on the students. Laura described that when she shares with her students that a particular science unit is her favourite and that she is looking forward to teaching them about it, they get excited too because they know they are probably going to like it.

Woolfolk and Hoy agreed that teachers’ self-efficacy of teaching a subject influences their behaviors and practices in the classroom, as well as leads to positive student results (as cited in Mansfield & Woods-McConney, 2012). Similarly, participants’ students felt their teacher’s enthusiasm, and it affected the way they perceived the lessons their teacher was thrilled to teach. They became more ready to learn about it.

Participants also believe students learn the most when they are able to connect the concepts taught to real life situations. Jaimie described how her co-teacher gave the students an authentic project to work on. He started with “I am an engineer, I have been tasked with building a 24-storey apartment building, this is my budget, and here are the materials and their cost, how can I do it?” Jaimie explained that because her students knew that this was an authentic project from a real life situation, they were motivated to work on it, pretending that they are the engineers. She believed that students become successful when they see the connection between
what they are learning and the real life, because she is not just teaching them to be in academics but she is preparing them for a variety of professions. This was validated by Lombardi (2007), who explained that “students involved in authentic learning are motivated to persevere despite initial disorientation or frustration, as long as the exercise simulates what really counts—the social structure and culture that gives the discipline its meaning and relevance.” (p.4) So participants’ subject expertise appears to contribute to the students’ engagement in the learning and to their success.

4.4 Conclusion

In conclusion, this research study allowed for three main themes to emerge: challenges that teachers face while teaching subjects that they struggle with, experiences that develop teachers’ expertise in subjects, and the effect of teachers’ subject-matter knowledge on their teaching and on their students’ academic achievement. It has been highlighted that teachers’ comfort level drops while teaching a subject that they lack its content knowledge, which affects their enthusiasm teaching it. They also struggle to make their teaching authentic by connecting it with real life situations. On the other hand, their expertise in a subject allows them to be confident teaching it and permits them to answer their students’ rich inquiry questions. Moreover, teachers develop their subject-matter knowledge from their personal and academic backgrounds, as well as from their experience teaching the same content over the years, and by relying on the available resources in their schools. In elementary schools in Canada, teachers are considered generalists as opposed to subject specialists. Accordingly, the findings of this research contribute to the existing body of literature of the teachers’ subject-matter knowledge, and extends it by focusing on its relationship to the students’ academic achievement from the perspective of teachers working in subject-specialized elementary schools. In Chapter 5,
implications of this research study are presented and discussed, along with recommendations for further areas of study.
Chapter Five: Implications

5.0 Introduction

In this chapter, I provide an overview of the key research findings that emerged from studying elementary teachers’ perspectives on the relationship between subject-matter expertise, and students’ learning experiences and academic achievement. Following, I elaborate on the valuable implications of these findings for the educational community as well as for my professional identity and practice. Accordingly, I present recommendations for teachers, administrators, professional development, and teacher education programs. Finally, I suggest areas that require further research and discussion.

5.1 Overview of Key Findings and Their Significance

This qualitative research project relied on the data derived from conducting semi-structured interviews with two Ontario elementary teachers, to investigate the main research question mentioned above. The interviews with Jaimie and Laura resulted in the following three themes emerging:

1. Limitations in content knowledge, comfort level, and preparation time are challenges to teaching subjects that teachers struggle with.
2. Personal, academic, and professional backgrounds define the teachers’ expertise in subject matter.
3. Subject-matter knowledge elevates teachers’ comfort level, enriches their teaching experiences, and improves students’ learning and academic achievement.

Elementary teachers are expected to teach several subjects that require a rich and extensive bank of content knowledge. This is challenging for generalist teachers, as they have to constantly teach themselves new content. Otherwise, they struggle to connect theories to real life authentic
learning and communicate concepts in simple language. This has a direct effect on the students’ academic achievement. Their lack of content knowledge affects their motivation and enthusiasm to teach the subject, which sometimes they have to simulate so their lack of enthusiasm does not reflect on their teaching. Moreover, their lack of comfort results in less student-oriented lessons, or what Jaimie referred to as “teaching traditionally,” and not being able to incorporate cross-curricular lessons. Seeking the advice from colleagues who have previously taught the same grade and/or the same subject was the common source of support that the participants referred to. This is because teachers do not have sufficient time to plan and familiarize themselves with the new content to gain the adequate comfort and knowledge to teach what they are not familiar with. On the other hand, subject-specialized teachers have the opportunity to focus on their one or two subjects in which they have strong background knowledge, and deliver the content effectively to the students.

Teachers build their subject-matter expertise from various sources, including their previous academic studies. They acquire deep knowledge in a field that makes them more eager to transfer it to their students in meaningful ways that connect concepts to real life, resulting in authentic learning. Their field of study influences the way they teach, as well as the strategies they use in the classroom. Moreover, teachers’ personal experiences, including travel, add to their content knowledge and help them attract students’ attention by attaching realistic experiences to the academic learning. These personal connections give students reasons to learn. Furthermore, professional experiences, whether inside the education field or outside of it, empower teachers with new approaches and resources to teach the subjects. Teaching the same grade level for several years also helps the teachers feel more comfortable and confident with the material, and helps them enrich their lessons and improve them every time. Additionally,
teachers indicated that having struggled themselves in specific subjects as students helped them better teach those subjects. It made them more aware of the struggles that the students experience, which allowed them to have realistic expectations of their students. Teachers’ experiences, whether successful or not, shape their teaching philosophies, as well as their teaching strategies.

Finally, when teachers possess subject-matter knowledge, it directly improves their teaching experiences by elevating their comfort level, and this enhances the students’ learning and academic achievement. The familiarity with the content allows teachers to work in their comfort zone with less stress and anxiety. It allows them to be more creative in the way they deliver the lesson by using their interests and expertise they have in their specialized subject. Teachers’ expertise allows them to have a bigger picture of what they are transferring to the students. They are able to deliberately answer students’ deep questions, clarify misconceptions, connect concepts with real life examples, and integrate cross-curricular expectations. However, in a subject-specialized teaching model, integration is not always possible because a teacher might only be teaching one subject. Most importantly, students sense their teacher’s enthusiasm. When a teacher is an expert of a subject, he/she shows great interest in teaching it, and this gets directly reflected on the students, and on the way they perceive the lessons. And when they engage in authentic projects that reflect real life situations, students engage in the learning and become more successful.

5.2 Implications

Through the process of analyzing the themes that emerged from this research study and comparing and contrasting the existing body of literature, various implications were determined. I begin by discussing the broad implications of the research findings, as relevant to the greater
education community and society as a whole. Following, I elaborate on the narrow implications, as relevant to my professional identity and teaching practice.

5.2.1 Broad: The educational research community

This research study has implications on the educational community because it aims to improve the teachers’ teaching experiences while enhancing the students’ academic achievement. It discusses the teachers’ perception on subject-specialized teaching in elementary schools, which is a different teaching model than the currently implemented one in Ontario public schools. This research indicated that general teachers experience lack of content knowledge due to the fact that they are expected to teach all core subjects in elementary classrooms. Their comfort level varies when teaching different subjects, which affects their teaching proficiency. They struggle to make their lessons authentic by connecting them to real-life experiences, and they find difficulties in answering students’ rich and deep questions. From a broad perspective, this research has the potential to influence policy makers and Ministries of Education to revise the current generalized teaching model in elementary schools to consider the teachers’ expertise and comfort level. It can also influence school boards, to provide teachers with adequate resources needed to expand their subject-matter knowledge. Moreover, it can encourage teacher education programs to consider new techniques to empower pre-service teachers with the adequate content knowledge needed to teach all subjects.

5.2.2 Narrow: My own professional identity and practice

My professional identity and practice have been influenced by this research study. I became more aware with the challenges that general teachers face in the generalized teaching model, which I am expecting to work in. It was made clear to me, through the interviews I have conducted with my participants, that it is completely normal to have different comfort levels
while teaching different subjects, and that it is very common for teachers not to have the content knowledge to teach all subjects. This was a personal issue that I consistently thought of, due to the fact that I am not confident myself to teach social studies in comparison with my confidence to teach mathematics, as I have a background in engineering.

Not only did my interview with Jaimie confirm to me that teachers’ fields of educational background and expertise affect their teaching experiences, but also both participants indicated that their struggles as students themselves, particularly in math, helped them to better cater their teaching to the students who are struggling in math. I found this to be extremely encouraging for me. I hope that my struggles in Social Studies as a student will eventually help me better understand what the students might be going through, and adjust my teaching accordingly.

I also learned that the teachers’ best support is their colleagues. I will be extremely keen to develop positive relationships with my colleagues, and ask for their help and support whenever needed. In sum, I gained a lot of knowledge from the interviews, which will help me develop better practices to become the teacher I wish to be.

5.3 Recommendations

The findings and implications of this study helped to formulate the following practical recommendations for the educational community:

- *For the Ontario Ministry of Education:* Consider introducing the subject-specialized teaching model in elementary schools. Subjects would be taught by specialized teachers who have a strong background knowledge in their subjects. This should allow teachers to teach in their comfort zones, while having strong content knowledge of their subjects. Students would also be given the opportunity to maximize their comprehension and learning of each subject.
For school boards and administrators: It is important to provide teachers with materials and resources to strengthen their content knowledge in different subjects. This requires dedicated communication between boards and teachers. Additionally, allow for longer preparation time for the teachers to study and plan their lessons, especially if they are teaching a grade level that they have not taught before. There can also be an allocated time per week for teachers of the same grade level to plan together. This would create a space for teachers to share their ideas and resources together. In case of subject-specialized teaching schools, this would allow teachers to be in line with what the students are doing in different subjects, and can integrate different topics in their own subjects.

For professional development associations: Provide teachers with diverse professional development opportunities in all subjects, and at affordable prices. Teachers need to stay current with the changes in curriculums and should not be spending a lot of money to learn new content with every change.

For faculties of education: Pre-service teachers should be exposed to more content knowledge in addition to the pedagogical knowledge. They need to be prepared to teach the content, and be more familiar with it. Teacher candidates should have the opportunity to choose a subject area where they feel less comfortable to teach, and take a content course in that area. This would allow for every pre-service teacher to strengthen an area of choice, and gain strong content knowledge in that subject.

For teachers: It is important to recognize the subjects that require additional content knowledge as early as possible to seek the available resources in a timely
manner. Teachers should take advices from colleagues who have taught the same grade level before, and should consider sharing materials and resources. Teachers should collaborate together, and create integrated learning opportunities for the students. Moreover, teachers should seek help from program heads and coaches, like the math coach in some schools. These coaches should be able to provide teachers with the adequate support needed to teach their subject. Teachers should also make use of the professional development opportunities available to them, and keep themselves updated with all the curriculum changes.

5.4 Areas for Further Research

This present study has contributed to the growing body of knowledge surrounding the teachers’ comfort level teaching different subjects, and its relationship to the students’ academic achievement. The small-scale sampling methodology of this study limited its results to the experiences of the two teachers interviewed. It would be interesting to interview more teachers who do teach in subject-specialized school systems, and examine its effects compared to the common generalized teaching model in Ontario. Such further study would be beneficial to the field of research and can yield to stronger correlations and conclusions.

Additionally, this study yielded questions for future areas of research. Several questions emerged, including: What should the qualifications be to teach each subject in a subject-specialized teaching school model? What would the long-term effects on students be if they had a different teacher for each subject, in comparison to having one classroom teacher in the generalized teaching model? How would teachers be able to implement cross-curricular integration into their lessons while teaching their specialized subject? How do the teachers’ areas of specialization affect their comfort level and self-efficacy to teach a subject related to that
specialization? Also, what other resources do teachers need to support their pedagogical content knowledge in schools? Finally, further research should continue to examine different aspects that will create the best teaching environment for teachers, to enhance the students’ learning experiences and academic achievement.

5.5 Concluding Comments

To conclude, the purpose of this study was to examine elementary teachers’ perspectives on the relationship between subject-matter expertise and students’ learning experience and academic achievement. Participants have both agreed that the subject-matter expertise helps teachers work in their most comfortable area of study, which allows them to be more enthusiastic while teaching and be more creative in their lessons and activities. It also allows teachers to answer their students’ deep and rich content questions. They also correlated the subject-matter expertise to being able to connect abstract concepts to real-life practical examples, which makes the students’ learning experiences authentic. There are advantages and disadvantages for both teaching models—generalized and subject-specialized—so the aim should always be to maximize the students’ learning experiences. This will most likely be achieved through guaranteeing a teaching environment that is comfortable for the teachers.
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Appendix A: Letter of Consent

Date:
Dear _______________________________,

My Name is Nada Attia and I am a student in the Master of Teaching program at the Ontario Institute for Studies in Education at the University of Toronto (OISE/UT). A component of this degree program involves conducting a small-scale qualitative research study. My research will focus on teachers’ perspectives on the relationship between subject-matter specialization and elementary students’ learning and achievement. I am interested in interviewing elementary teachers who have experience with subject-specialist teaching in elementary school. I think that your knowledge and experience will provide insights into this topic.

Your participation in this research will involve one 45-60 minute interview, which will be transcribed and audio-recorded. I would be grateful if you would allow me to interview you at a place and time convenient for you, outside of school time. The contents of this interview will be used for my research project, which will include a final paper, as well as informal presentations to my classmates. I may also present my research findings via conference presentations and/or through publication. You will be assigned a pseudonym to maintain your anonymity and I will not use your name or any other content that might identify you in my written work, oral presentations, or publications. This information will remain confidential. Any information that identifies your school or students will also be excluded. The interview data will be stored on my password-protected computer and the only person who will have access to the research data will be my course instructor Dr. Angela MacDonald-Vemic. You are free to change your mind about your participation at any time, and to withdraw even after you have consented to participate. You may also choose to decline to answer any specific question during the interview. I will destroy the audio recording after the paper has been presented and/or published, which may take up to a maximum of five years after the data has been collected. There are no known risks to participation, and I will share a copy of the transcript with you shortly after the interview to ensure accuracy.

Please sign this consent form, if you agree to be interviewed. The second copy is for your records. I am very grateful for your participation.

Sincerely,

Nada Attia

Phone number:
E-mail: nada.attia@mail.utoronto.ca

Course Instructor’s Name: Dr. Angela MacDonald-Vemic
E-mail: angela.macdonald@utoronto.ca
Consent Form

I acknowledge that the topic of this interview has been explained to me and that any questions that I have asked have been answered to my satisfaction. I understand that I can withdraw from this research study at any time without penalty.

I have read the letter provided to me by Nada Attia and agree to participate in an interview for the purposes described. I agree to have the interview audio-recorded.

Signature: ______________________________________

Name: (printed) _______________________________________________

Date: ______________________________________
Appendix B: Interview Questions

Thank you for agreeing to participate in this research study, and for making time to be interviewed today. This research study aims to hear elementary teacher perspectives on the relationship between subject-matter specialization and students’ learning experience and academic. This interview will last approximately 45-60 minutes, and I will ask you a series of questions focused on your background, experiences, beliefs, and challenges you face or overcame. I want to remind you that you may refrain from answering any question, and you have the right to withdraw your participation from the study at any time. As I explained in the consent letter, this interview will be audio-recorded. Do you have any questions before we begin?

Background Information

1. How long have you been working as a teacher?
2. What did you study before teaching?
   a. Undergraduate studies? Major/Minor
   b. Graduate studies?
3. What made you pursue a career in elementary teaching?
4. Where did you do your teacher certification? Were you enrolled in the Primary/Junior option?
5. (For teachers who are specialized in a specific subject area) What made you decide to specialize in that specific subject area?
6. In your experience of teachers college, how were you prepared to teach a range of curricular subject areas? Did you supplement that experience with additional qualifications in any specific areas? If yes, which ones?
7. What experiences contributed to developing your subject area expertise?
   a. Personal experiences?
   b. Educational experiences?
   c. Professional experiences?
8. What was your favorite and your least favorite subjects during your own K-12 schooling experience?
   a. What, if anything, do you recall about your own teachers’ subject expertise in the elementary grades?
9. What is your current teaching position?
   a. What grades and/or subjects do you currently teach? And what did you previously teach?
   b. Are you involved in any different roles in the school like coaching, advisor, or resource teacher?
10. Can you tell me more about your school? (e.g. size, demographics, program priorities)
    a. Who are the subject-specialists teachers in your school? What do they teach?
Teacher Perspectives/Beliefs

11. What does subject-matter knowledge mean to you? What do you think contributes to teachers’ subject-matter knowledge?
12. What do you believe is the role of subject-matter knowledge in teaching?
13. What benefits do you think there are, for teachers and students, as a result of teachers’ subject-matter knowledge and expertise? *listen first and then probe re:
   a. Teacher comfort level?
   b. Teacher enthusiasm?
   c. Student engagement?
   d. Student academic achievement?
14. In your experience, what are some of the consequences of teacher’s limited subject-matter knowledge?
15. In your view, what are the disadvantages of generalized teaching in elementary schools?
16. What do you think is the role of comfort level with subject-matter knowledge in teaching?
17. What do you think is the relationship between a teacher’s comfort level with their subject-matter knowledge and the students’ engagement and achievement?
18. What do you think about the current Canadian system for elementary teaching and learning in terms of the generalist model? Do you like this model or would you prefer to see something different?
19. Why do you think elementary generalized teaching is the common system applied in Canada?

Teacher Practices

20. In what ways did your subject-matter learning in your undergraduate study impact your current professional practice?
21. What are your preferred subjects to teach and why?
22. How is your teaching experience different when you are teaching your most favored subjects compared to your least favored ones and why?
23. How do you think your students’ learning experience in these subject areas is different as a result?

Supports and Challenges

24. How do you feel when you have to teach a subject area that you are less confident in or comfortable with in terms of subject-matter knowledge? What challenges do you experience?
25. What do you do to prepare yourself when this happens? What sources do you typically consult and why? What resources help prepare you to teach subject areas that you are less comfortable with?
26. Do you feel the Teachers College prepared you well to teach all the subjects you are
teaching? 
27. Did the Teachers College focus on subject-matter knowledge or instructional strategy? Or both?

Next Steps

28. What are your own goals when it comes to subject-matter knowledge development, and how do you plan to fulfill them?
29. What advice can you give to beginning teachers who have concerns about teaching subjects that they feel ill prepared to teach?
30. Is there anything else related to subject specialized teaching and its relationship to student’s learning experience and academic achievement that you would like to add?

Thank you for your participation in this research study.