Educational Accountability: A Case Study of the Creation, Implementation and Cancellation of the Math Proficiency Test in Ontario, Canada

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A thesis submitted to the University of Ottawa

in partial fulfilment of the requirements of the degree of

Doctor of Philosophy

Concentration in Leadership, Evaluation, Curriculum and Policy Studies

Faculty of Education

University of Ottawa

Abstract

This thesis examines the evolution of the Math Proficiency Test (MPT), a large-scale teacher certification test in Ontario Canada that was initiated in 2019 and was cancelled due to a court challenge in 2021. Designed as a large-scale computer-based evaluation for prospective teachers, the MPT focused on mathematical content knowledge and pedagogy. The study uses a mixed methods research design to explore the creation, implementation, and cancellation of the MPT. Because of the complexity surrounding the MPT a case study method is used to look at the test within a bounded timeframe. Using a case study model, complex relationships between seven educational accountabilities (bureaucratic/ administrative, legal, market, moral, performance, political, and professional) are analysed. Through document analysis, surveys, and interviews, the multiple views from connected stakeholders are examined. These include teacher candidates, professors at Faculties of Education, politicians, and others. This study brings a comprehensive understanding of the multifaceted issues of implementing a large-scale teacher certification exam. The findings also address the inherent conflicts and overlaps in educational accountabilities. Ultimately, this research contributes to a deeper understanding of the complexity of educational accountability.

Acknowledgements

I dedicate this work to the women who came before me:

Margaret (Peggy) Munkittrick, Marjorie McGinnis, and Nicole Docksteader.

While completing this PhD from the University of Ottawa, I spent relatively little time in Ottawa. I entered the PhD program in the Fall of 2019, excited and ready to see what the next chapter of my educational journey would look like. That fall, I was able to meet and create friendships in my cohort, many of whom I still keep in contact with today. Those initial friendships were what I needed to get through the rest of the program.

In 2020, along with the rest of the world, my life moved online. What I didn't realize at the time was that the rest of my PhD would be completely remote. Once it sunk in that we would not be going back to an in-person model, I ended up moving with my husband to the Eastern Townships in Quebec. This move was one that I did not anticipate making, but it has been one of the best things in my life so far. Completing comprehensive exams in my family cottage, defending my proposal in Rochester, New York, and collecting and analyzing my data in my first home were experiences I could not have anticipated. Applying to Bishop's University to "start the process" and getting a Limited Term Appointment there has made me realize in real-time the importance of research and teaching and the link between the two. Even though this process has looked very different than I thought it would, I would not have had it any other way.

First, I would like to express my gratitude to all of my participants. Sharing stories is at the heart of research, and I feel privileged that I had the opportunity to write about a moment in time that impacted so many.

To my supervisor, Dr. Christine Suurtamm, thank you for taking a chance on me and for figuratively holding my hand through this process, editing countless drafts, and encouraging my passion for research. Your expectations have pushed me to create something I never thought was possible. I am honored to be your last PhD student.

A huge thank you to my dissertation committee: Dr. Michelle Schira-Hagerman, Dr. David Trumpower, and Dr. Joel Westheimer, and to my external examiner Dr. Jessica Holloway. I appreciate all of your comments, questions, and excitement throughout this process. Your flexibility during times of uncertainty was much appreciated.

I am forever thankful to have had a supportive network of family, friends, and mentors who have encouraged me every step of the way. Special thanks to:

- My Grandma, Dr. Annabelle Dryden, thank you for diligently reading over my first draft and constantly encouraging me, while still affirming that "this is really hard!"
- Dr. David Hursh, I am forever grateful that I took your social studies methods course at the University of Rochester. Meeting and working with you changed the trajectory of my life. Thank you for showing me how to document an educational movement. Your work will always be inspirational to me.
- My uOttawa online community: Elise, Nat, Kelly, Monsurat, Hannah, and Marianna, thank you for the continued friendship, check-ins, and talking about non-academic topics.
- Billie-Jane, thank you for always being one step ahead of me and letting me know what was coming down the line. I will be your TA any day!
- My friends, The Gals, Leah and Josh (and occasionally Cory).
- My Munkittrick Family, Dan and Kathy, Matt and Abby, Ben and Bethany, and Jed.

- My McGinnis Family, Andrew's Family, Coach, Angela, Michael, Aaron, Kelsey, and Addie.
- My cousins, sisters, and friends: Mackenzie Anne (for our almost daily chats), Ella, Britta, Tara, and Sister (Daniela) for always believing in me.
- My running community, thank you for providing me with an activity that was the opposite of typing on a computer.
- My Bishop's community, who referred to me as "Almost Dr. Sarah McGinnis," your encouragements throughout this past year reminded me that finishing this thesis was a priority. Thank you for inviting me into the world of Teacher Education.
- My book clubs, thank you for constantly reminding me that reading is fun, for having good conversations, and better wine.
- My Nana, Lois, for starting the line of teacher educators, and to my mum, Kathy Munkittrick, thank you for being inspirational to me and everyone you come in contact with.
- Lastly, to Andrew, thank you for feeding me, loving me, and always, always, believing in me. We did it!

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List of Abbreviations

Abbreviation	Meaning
APPR	Annual Professional Performance Review
CCSS	Common Core State Standards
ESSA	Every Student Succeeds Act
EQAO	Education Quality and Accountability Office
ETFO	Elementary Teachers' Federation
FEA	Faculties of Education Administration
ITE	Initial Teacher Education Program
MKT	Mathematical Knowledge f or Teachers
MPT	Math Proficiency Test
MPP	Members of Provincial Parliament
NCLB	No Child Left Behind
NDP	New Democratic Party
OADE	Ontario Association of Deans of Education
OCT	Ontario College of Teachers
OME	Ontario Ministry of Education
OSSLT	Ontario Secondary School Literacy Test
OTCC	Ontario Teachers Candidates' Council
OTF	Ontario Teachers' Federation
OTQT	Ontario Teacher Quality Test
PC	Progressive Conservative
PD	Professional Development
PISA	Programme for International Student Assessment
RTTT	Race to the Top
TC	Teacher Candidate
TIMSS	Trends in International Mathematics and Science Study
VAM	Value Added Measure

Chapter One: Introduction

This thesis examines the evolution of the Math Proficiency Test (MPT), a large-scale teacher certification test in Ontario, Canada that was initiated in 2019, cancelled due to a court challenge in 2021, and appealed in a higher court challenge in November, 2023. The data for this research project was collected before the latest appeal, and looked at the creation, implementation, and the cancellation of the MPT from 2016 - 2021. The MPT was designed as a large-scale computer-based assessment for prospective teachers and focused on mathematical content knowledge and pedagogy. There were many stakeholders impacted by the MPT, some of whom included TCs (Teacher Candidates), Faculties of Education Administration (FEA), and other stakeholders involved or impacted by the MPT. Data was gathered about the MPT though document analysis, surveys, and interviewing stakeholders. The findings address the ways that interactions between educational accountabilities and connected stakeholders played out in this situation. Ultimately, this research contributes to a deeper understanding of the complexity of educational accountability.

Statement of Problem

In Ontario, there has been a push to raise students' math scores on the provincial assessment (Abedi & Patton, 2018). The push to raise scores was especially intense in 2016, when only 50% of Grade 6 students in Ontario met the provincial mathematics standard on the assessment (The Canadian Press, 2016). In Ontario, the standard is set at level 3, the equivalent of obtaining a mark of B, or 70-80% (Education Quality and Accountability Office (EQAO), 2019c, p. 9). These results prompted members of the provincial government to call for increased accountability, particularly with respect to teacher effectiveness in teaching mathematics.

Subsequently, Doug Ford, Premier of Ontario, made many statements on the state of education in Ontario. For example, on August 14, 2018, in the Legislative Assembly of Ontario, he stated:

> We have the greatest teachers around, but one third of the teachers who are teaching our students are failing grade 6 and grade 7 math. How can you teach your students when one third of the teachers are failing math? I can assure you, we will give them the tools and we will give them the hours they need in teachers' college to be able to teach our kids, to make sure our grade 6 students are at the highest level in the country (Arnott, 2018b).

Comments, such as this, might call into question the math knowledge of teachers as well as the quality of teacher education programs in the province. Although I have found no evidence to support the Premier's claim of "one third of the teachers failing math". Premier Ford's government inferred that low student assessment scores were related to teachers' math competency, which prompted the creation of a math teacher certification test. The MPT was a main component of the "Safe and Supportive Classroom Act" in 2019, and after that bill was passed the implementation of the MPT began (Bill 48, 2019). On August 28, 2019, the Ontario College of Teachers (OCT), the regulating body that establishes the certification requirements to teach in Ontario, posted a statement on their website saying:

> Aspiring teachers who complete their application for a certificate of qualification and registration on or after March 31, 2020, which includes the receipt of all required documentation and fees by the College, must pass a Mathematics Proficiency Test in order to become certified. (Ontario College of Teachers, 2019c)

The MPT was initially supposed to be available to write in March 2020, however because of the COVID-19 pandemic, the MPT became available to write in an online format beginning May 10, 2021 (OCT, 2021a). The MPT was a large-scale computer-based assessment for

prospective teachers that focused on two key components: math content and pedagogy (Mathematics Proficiency Test, 2021a). To pass, TCs had to obtain a score of 70% on both mathematics and pedagogy sections of the MPT. The math section covered the Ontario mathematics curriculum from Grade 3 through Grade 9 and the pedagogy section focused on understanding Ontario education documents and policies, rather than effective teaching practices, which are an important focus of teacher education in Ontario (Mathematics Proficiency Test, 2021b). However, the MPT was cancelled as a certification requirement on December 17, 2021, due to a court challenge. On January 4, 2022, the OCT put out a statement stating, "as a result of a recent decision of the Ontario Superior Court of Justice – Divisional Court, the Mathematics Proficiency Test (MPT) is no longer a certification requirement" (Ontario College of Teachers, 2022). In November 2022 that decision was appealed by the Ontario Court of Appeal. They ruled that the "divisional court was provided preliminary and incomplete data to assess a math proficiency test (MPT) that was rolled out by the province in 2021" (Alphonso, 2023a).

This case study examines the perspectives and reactions of impacted stakeholders in each stage of the MPT journey, its creation, implementation, and at the time of data collection, the cancellation. Through the analysis of the creation, implementation, and cancellation of the MPT, I look specifically at different accountability systems (bureaucratic/ administrative, legal, political, professional, moral, market and performance) and their interactions with stakeholders involved in creation, implementation, and cancellation of the MPT. Some suggest that educational improvements can result from standardized test results as they are "intended to draw attention to academic performance so educators will improve teaching and learning" (Jaafar & Earl, 2008, p. 699). For the purposes of this thesis, educational "improvements" represent positive actions that are made to benefit teachers and students. However, several researchers

have suggested that standardized tests do not gauge the quality of the student or teacher and that using standardized tests for accountability purposes undermines educational improvement and teaching as a profession. For instance, this type of accountability increases teachers teaching to the test, as well as cheating and fabrication of test results (e.g., Hargreaves, 2020; Jang & Sinclair 2018; Kempf, 2016; Koretz, 2017).

The research literature suggests that there are numerous accountabilities that come into play when talking about educational accountability (Dulude & Milley, 2021). Each accountability is responsible for holding a system or stakeholder to a set of standards or goals, that is either set for them by another group or by them personally. I explore seven different accountabilities, which are outlined and defined in more detail in my theoretical and conceptual framework chapter. I am going to unpack those seven different accountabilities and bring to light the complexity of accountability by showcasing the multifaceted way in which accountability surrounds large-scale assessment. Through this study, I document my findings of the Ontario context while being critical in considering the transferability of my research to other contexts.

Purpose of Study

This study's purpose is to analyze, characterize, and examine the creation, implementation, and cancellation of the MPT in Ontario, Canada. Using a case study method, the study makes connections between how different educational accountabilities and connected stakeholders interacted within the different stages of creation, implementation, and the cancellation of the MPT.

Research Questions

This study addresses the following three major questions:

1. How have different educational accountabilities and connected stakeholders interacted with the creation of the MPT?
2. How have different educational accountabilities and connected stakeholders interacted with the implementation of the MPT?
3. How have different educational accountabilities and connected stakeholders interacted with the cancellation of the MPT?

Background and Ontario Context

The education system in Ontario is publicly funded and divided into three stages: early childhood, elementary school, and secondary school (Government of Ontario, 2024; People for Education, 2024). There are many key stakeholders in Ontario's education system, some of whom will be described in the following section. In this next section I present the current education content by drawing on the history of EQAO, the fundamentals of the MPT and its connection to EQAO, and finally relating EQAO and the MPT to the past and current context of teacher testing in Ontario.

EQAO

The EQAO, created in 1996, is responsible for Ontario's province-wide literacy and numeracy assessments in Grades 3, 6, 9, and 10 and briefly, the MPT required for teacher certification. For the Grade 3 and 6 tests, the assessment focuses on reading, writing and mathematics in the primary division (Grades 1-3) and the junior division (Grades 4-6). The assessment "tests the reading, writing and math skills students are expected to have learned by the end" of Grade 3 and Grade 6 (EQAO, 2022a). Similarly, "The Grade 9 Assessment of Mathematics tests the math skills students are expected to have learned by the end of the Grade 9 mathematics course" (EQAO, 2022a). The Ontario Secondary School Literacy Test (OSSLT) has

a different purpose than the Grade 3, 6, and 9 assessments. It "measures whether students are meeting the minimum standard for literacy across all subjects up to the end of Grade 9. Successful completion of the literacy test is one of the requirements to earn an Ontario Secondary School Diploma" (EQAO, 2022a).

EQAO's Grade 3, 6, and 9 tests are mid-stakes, large scale assessments, unlike the Grade 10 OSSLT. Hargreaves (2020) describes mid-stakes testing as:

> The use of large-scale assessments to report on the progress of schools and systems, and to guide districts' and schools' improvement efforts. It also reports these results online to inform parents' choice of school and, in various ways, to compare schools' performance. However, mid-stakes testing does not come with the punitive consequences of high-stakes testing. (p. 3)

Jang and Sinclair (2018) explain that EQAO student assessments are aligned with the Ontario curriculum and seek to focus on both long- and short-term impacts on Ontario's diverse student population. By gathering the data generated from the EQAO student assessments, conclusions have been drawn about how students and schools are achieving from year to year, as well as over time. EQAO's first available annual report in 2003 indicated that "the information pertaining to student achievement is used to bring about improvement for individual students and for the education system as a whole" (Jang & Sinclair, 2018 p. 662).

However, many scholars (e.g., Hargreaves, 2020; Jang & Sinclair, 2018; Kempf, 2016; Li, 2015) have reported that EQAO may serve to undermine educational improvement. Hargreaves (2020) details the different ways EQAO mid-stakes assessments have negatively impacted teachers and students. These include "teaching to the test, cultural bias, avoidance of innovation, dilemmas of whether to include highly vulnerable students in the testing process or

not, and emotional ill-being among students and teachers" (Hargreaves, 2020, p. 393). Some suggest there is a disconnect between the intended use of EQAO and the actual experiences of teachers and students who are affected by EQAO (Kempf, 2016). This disconnect comes from the intended use of EQAO and the realities of what it looks like to be in a classroom preparing for EQAO. The time that is spent on test preparation uses up the limited class time that teachers have to engage their students in creating, researching, and exploring ideas or concepts that are of interest to the student (Kempf, 2016). The teachers who teach in the EQAO testing years expressed that they increased test preparation, instead of new learning, with their students closer to the test date, consequently taking up valuable time they have with their students (Hargreaves, 2020; Kempf, 2016). When Kempf (2016) interviewed Grade 3, 6, and 10 teachers, he found that they spent an average of one month per school year preparing students for the assessments. Furthermore, there are discrepancies between what teachers know to be best assessment practices, for their students, and what they are told to spend time on (Kempf, 2016).

The 2016 EQAO report on student achievement, along with continual negative news coverage on student achievement (Alphonso, 2023b; The Canadian Press, 2016) seemed to propel Premier Ford to urge Ontario schools to "get back to teaching the basics" (Abedi & Patton, 2018, para. 4), with regards to the mathematics curriculum. On May 10, 2019, Premier Ford commented: "kids used to learn math by doing things like memorizing a multiplication table and it worked. Instead, our kids are left with experimental discovery math…Instead, everyone gets a participation ribbon and our kids are left to fend for themselves" (Abedi & Patton, 2018, paras. 5–6). This sentiment was followed by the government requesting reforms to the math curriculum and eventually introducing a teacher math certification test. The MPT was

first mentioned in the Legislative Assembly of Ontario on October 30, 2018. The Honorable Lisa M. Thompson stated:

> We know that for the past five years, there has been an overall decline in the education quality and accountability of math scores. As I've said before, and we all echo it, this is absolutely unacceptable. We recognize that more needs to be done, and we will work with teachers to ensure they are prepared to teach the fundamentals of math in order to improve the success of Ontario's students. The Safe and Supportive Classrooms Act would require any new teacher seeking to be registered with the OCT to successfully complete a math knowledge test. All of these changes will provide more confidence that our PC government is working to make sure that Ontario continues to have the best education system in the world. (Arnott, 2018c, p. 1989-1990)

However, it is not clear that teacher testing impacts student achievement and some advise that teacher tests should be used with caution (EQAO, 2019b). In 2019, EQAO commissioned a report that provided a "review of the current research and evidence available on the topic of the compulsory standardized testing of teachers and the relationship between these tests and student achievement" (EQAO, 2019b, p. 3). The report concluded that "until standardized teacher competency tests become associated with consistent, measurable benefits, they should be used with caution and with consideration for the potential impact on local communities" (EQAO, 2019b, p. 15). This report was released in August 2019, the same time the MPT was announced. Interestingly, in 2021 this report no longer appeared on the EQAO website, which sparked concerns on social media, specifically X-formerly-Twitter and Facebook, as people questioned EQAO's actions in the creation and implementation of the MPT. The Ontario Ministry of Education (OME) commissioned EQAO to construct and implement the MPT. The MPT was

mandatory for TCs seeking their initial teacher certification from March 2020 to December 2021 (Alphonso, 2019). Though there are opposing views on teacher tests, the OME anticipated that by testing teacher content knowledge, student outcomes on the EQAO math assessments would improve (EQAO, 2020).

Math Proficiency Test

To become a certified teacher in Ontario, teachers need to "have completed a minimum three-year postsecondary degree from an acceptable post-secondary institution; have successfully completed a four-semester teacher education program; apply to the College for certification; pay the annual membership and registration fees; successfully completed the sexual abuse prevention program; [and for a short time,] pass the Math Proficiency Test" (Ontario College of Teachers, 2021c). Between March 2020 and December 2021, once these qualifications were met, the OCT certified the TC.

As previously mentioned, the MPT was a response to low student math scores on the grade 6 EQAO mathematics test. The following statement explained: "the Ontario government requires all teacher applicants to demonstrate their mathematics proficiency through the successful completion of a mathematics proficiency test" (EQAO, 2019a). The MPT was implemented after a long, complex rollout, starting with a field test conducted by EQAO. The field test ran from February 18 to March 7, 2020 (EQAO, 2020). Due to the pandemic, the actual test was postponed until May 2021. However, all TCs graduating on March 31, 2020, or later were informed that they must pass the MPT before December 31, 2021 (Ontario College of Teachers, 2020) to complete their Ontario teacher certification. The MPT was administered by EQAO and TCs were to receive test results 10 days after taking the test, with successful results being shared with OCT. According to the *Ontario Mathematics Proficiency Test (MPT)*

Assessment Blueprint, TCs could "reattempt the MPT as many times as they would like, or as needed, based on the test session availability" (EQAO, 2019a, p.6). There was pushback from different organizations beginning with the implementation of the MPT in 2019 and one group, the Ontario Teacher Candidates' Council (OTCC), took the government to court over the test. On December 17, 2021, "The Divisional Court found that the Math Proficiency Test had an adverse impact on entry to the teaching profession for racialized TCs and other reasonable alternatives should have been implemented" (Ontario Teachers' Federation, 2021). With the recent appeal of the cancellation (Jones, 2023), my research project is a case study that is bound by time and looks at three stages of the MPT: creation, implementation, and cancellation. My study explores many stakeholder perspectives and examines them through the lens of seven educational accountabilities and across the three stages of the MPT.

There were mixed reactions of various stakeholders during each stage of the MPT, especially because the MPT was a requirement for teacher certification, making it a high-stakes test. EQAO put out many links on X-formerly-Twitter directing TCs to the practice test as well as tweets, like the one below, giving bits of information regarding the MPT. On May 21, 2021 @EQAO Tweeted:

> The MPT includes a voluntary questionnaire consisting of identity-based questions and a Mathematics Attitude and Perceptions Survey composed of questions designed to assess overall attitudes and dispositions towards mathematics at the undergraduate level: http://bit.ly/MPTonthetest

Evidence from X-formerly-Twitter demonstrated that responses from TCs varied. Some TCs felt that teacher education programs and Professional Development (PD) could help TCs who are not

strong in math. There were other TCs who were enraged with the short notice and poor rollout of the MPT. @DelicatePlower (2021), a TC at the time, responded to @EQAO's tweet, stating that:

> My mathematics attitudes and perceptions have plummeted since the #mpt. The Math Curriculum elucidates the importance of imparting a positive attitude about math on students. Math AQs, math pedagogy courses in education programs, and practice with feedback would do that. #onted

The OTCC stated that the MPT "will serve only to devalue the teaching profession at large and, consequently, initial teacher education (ITE) programs" (Ontario Teachers' Federation, 2019, p. 4). The Ontario Teachers' Federation (OTF) boldly stated "the MPT represents an undue hardship on future generations of teachers who are being forced to meet a requirement that in no way predicts, supports or reflects their capacity to be effective educators" (OTF, 2019, p. 1). This hardship came on the back of a global pandemic and a teacher shortage in Ontario's public schools (Versolatto, 2021).

Some education professionals remained positive about the implementation of the MPT. According to Nancy Naylor, Deputy Minister of Education, the purpose of the MPT was to "enhance teacher confidence and sense of efficacy in teaching mathematics, which will ensure that students are better prepared for success in all aspects of their lives" (Colgan, 2019, para. 3). Ann Kajander, an Associate Professor at Lakehead University, "encouraged Faculties of Education to view the MPT as an opportunity to reach their TCs who are most in need of support in mathematics" (Mendaglio, 2020, p.15). With the cancelation of the MPT more questions emerged surrounding teachers' math competency (Denley, 2021) and certification requirements. Some argued that "Ontario teachers should be required to know basic math" (Sun & Zhu, 2022), this opinion assumes that the MPT was able to assess teachers' math competency. However,

even with the cancellation of the MPT, the question remained: *who* was responsible for supporting TCs in their mathematics preparation for the MPT?

The Context of Teacher Testing in Ontario

Teacher tests, like the MPT, have been used as a form of teacher accountability in Canada, the United States, Australia, and the UK (Portelli et al., 2005). The MPT was not the only short-lived teacher test that was implemented as part of the teacher certification process in Ontario. In 2002 the Ontario Teacher Qualifying Test (OTQT) was implemented as it was believed that it would improve teacher competency (Portelli et al., 2005). For the three years (2002-2004) that TCs took the QTQT they had very high passing rates of 96% (Glassford, 2017). The Portelli et al. (2005) study used a mixed methods approach to gather "teacher candidates' responses to the process and content of the OTQT" (p. 281). Using a survey and focus group interviews, they collected quantitative and qualitative data from TCs. The survey was completed by 603 TCs within two weeks of taking the OTQT. Following the survey, Portelli et al. (2005) asked select participants to elaborate on their survey answers, which provided more in-depth information about the test (Portelli et al., 2005). Portelli et al. (2005) found that, "according to the participants, the test neither achieves accountability nor does it secure excellence in teaching" (p. 292). Portelli et al. (2005) suggested that the content being tested did not reflect the complexity of the teaching profession. Almost 20 years later, the OME implemented the MPT to address similar concerns using a similar method.

Positionality

Graduating from Houghton University (Houghton College at the time) in New York State, with my B.S. in Inclusive Childhood Education, I was given the option to obtain certification to teach in New York State. In 2014 each prospective teacher had to take five

standardized assessments to be certified to teach: Social Studies Content Specialty Test, Multi-Subject Test, Students with Disabilities Test, EAS (Educating All Students) Test, ALST (Academic Literacy Skills) as well as a newly rolled out EdTPA. However, I held reservations about the efficacy of these standardized tests in truly assessing teaching proficiency. Despite successfully graduating from a New York State registered teacher education program, I believed these tests were not a suitable or an accurate measure of my teaching competence and abstained from taking the tests. Teaching, in my opinion, cannot be quantified through a numerical score, as it encompasses multifaceted skills that defy conventional assessment methods. My decision to abstain from pursuing certification in New York State was a personal stance that guided my career trajectory over the following decade.

Throughout my master's program at the University of Rochester, I developed both a theoretical and practical understanding of the effects of high stakes standardized testing. The combination of extensive reading as well as interviewing parents, teachers, administrators, and government officials, gave me a well-rounded understanding of the opt-out movement. The opt-out movement was started by a group of parents who opted to remove their children (grades 3-8) from high stakes standardized tests taking place in New York elementary schools. New York was not the only state to partake in the opt-out movement; there has "been an uptick in opting out observed in 11 other states" (Pizmony-Levy, et al., 2021). Having worked with a community of opt-outers in New York, I learned the importance of storytelling around educational issues. Storytelling became an effective way to showcase how the numbers alone, specifically connected to high-stakes standardized test scores, were not telling why and how high-stakes tests have been detrimental to schools and students. Through storytelling I, as a researcher, was able to present a different side of the argument. I also practiced my interviewing skills, transcript analysis skills,

as well as manuscript writing skills, to create themes which became the basis of a book, *The Grassroots Parent Movement for Whole Child Public Schools* (Hursh, et al., 2020). These experiences propelled me to look at standardized testing in Ontario, Canada.

I acknowledge that my past experiences with high-stakes standardized testing have significantly influenced my thoughts, feelings, and perceptions of it as an assessment method. I cannot separate myself from these experiences. The emergence of mainstream news coverage of the MPT coincided with the time I began drafting my proposal. Given my personal experiences with teacher certification tests, the MPT resonated with me. Learning about resistance efforts to the MPT solidified my decision to make it the focus of my thesis.

During the proposal writing phase, the MPT was cancelled due to a court challenge, prompting me to adapt my study into a case study encompassing its three stages: creation, implementation, and cancellation. As I present this thesis, it's noteworthy that the MPT's cancellation had been appealed, and the MPT will be reinstated (Ontario College of Teachers, 2023).

Overview of the Dissertation

I have organized this dissertation into seven chapters. Following the introductory chapter, where I introduce my research questions, is the comprehensive literature review, Chapter Two, which informed my theoretical and conceptual framework, research questions, data collection instruments, and analysis. The literature review touches on three main concepts: educational accountability, tensions created by accountability in large-scale assessment, and ensuring effective teaching. Next, Chapter Three provides an overview of the theoretical and conceptual framework. Chapter Four provides a detailed description of my methodology and methods. This chapter goes into detail about the types of data collected (document analysis, surveys, and

interviews), and the multiple stakeholders included (TC, professors at Faculties of Education, politicians, and others).

Chapter Five presents the findings of my study. The first part of the chapter showcases the findings related to the seven educational accountabilities (administrative/ bureaucratic, legal, political, professional, moral, market and performance), in each of the three stages of my study. The second part of Chapter Five addresses my three research questions, which includes the themes within each of the three stages of my study, creation, implementation, and cancellation. Chapter Six presents the discussion which situates my study in connection to the literature. Chapter Seven concludes the thesis, which includes a summary of the study, contributions of this research, limitations, and an epilogue.

Chapter Two: Literature Review

In this chapter, I review literature related to educational accountability, large-scale assessments, and effective teaching. First, I start with an overview of educational accountability and explain its relationship to large-scale assessment. I then give examples of large-scale assessments that have been used as accountability measures. Secondly, I review literature surrounding the tensions created by accountability in large scale assessment. I highlight equity issues connected with standardized testing and also present research on unintended uses of large-scale assessments. Lastly, I review literature related to ways of ensuring effective teaching. I start by defining effective teaching and then give examples of how teacher qualification tests can be used as a form of educational accountability. I then explain that teacher tests are often seen as a means to ensure effective teaching; while this is one view, I go on to present a few alternatives to teacher tests. In this section I also present the literature connected to teacher's mathematical content knowledge as well as teachers content knowledge in relation to student achievement.

Educational Accountability

Verger et al. (2019) describes educational accountability as "educational actors made responsible for their actions/results through some form of evaluation linked to consequences" (p. 9). Educational accountability has been described as a method of monitoring and improving student achievement, as well as proving that educational systems are producing well-rounded and literate citizens (Kearns, 2016). Also, educational accountability serves to inform policy by drawing data from large-scale assessments and using it to incentivize "teacher effectiveness and student achievement" (Nichols et al., 2012, p. 3).

Nagy (2000) wrote about how educational accountability "does not appear to hold much benefit for teacher and students. In fact, the comparative aspect seems to hinder positive

instructional uses of the data" (p. 276). When comparing and ranking both teachers and students, it fails to create a classroom environment where mistakes can be made without the fear of failure (Nagy, 2000). Earl and Torrance (2000) also expressed concern that accountability reforms were driven more by ideology or philosophy than evidence, calling for more research regarding "actual outcomes" of assessment practices for accountability. These "actual outcomes" do not necessarily need to be test scores, they could be portfolios or performance-based assessments (Darling-Hammond, 2020), which draw a mutual connection and benefit between teacher and student.

The Relationship Between Educational Accountability and Large-Scale Assessment

The use of large-scale assessment for educational accountability has been at the forefront of educational discussion for over twenty years (Earl & Torrance, 2000; Nagy, 2000). Large-scale assessments are widely used as a means of educational accountability (Hall & Ryan, 2011) in public education systems, and as an assessment tool across several countries for accountability purposes (Hitchcock et al., 2015). However, not all scholars agree with the use of large-scale assessment as the best from of educational accountability. As Sahlberg (2010) claims, "test-based accountability, public ranking of schools based on those tests, and related rewards and sanctions are not contributing to ongoing efforts to sustainable improvement of the quality of public education" (p. 58).

Though standardized tests are used as a main form of educational accountability, there is regrettably little evidence that they have led to educational improvement despite the time, money and energy put into accountability reforms that rely on standardized tests (Earl & Torrance, 2000; Nagy, 2000). While educational improvement as a concept can be somewhat subjective, for the purposes of this literature review, "improvements" will serve to represent positive actions

that are made in education to benefit teachers and students. It is thought that standardized test results may prompt educational improvements and are "intended to draw attention to academic performance so educators will improve teaching and learning" (Jaafar & Earl, 2008, p. 699). However, despite this intention, standardized tests are just one piece of evidence and should not be the only tool used to gauge the quality of the student or teacher.

Data driven assessment practices have gained prominence, and "are used to monitor student progress and certify student achievement in relation to national standards" (Koch & DeLuca, 2012, p. 99). Instead of reflecting current literature surrounding the use of standardized tests for educational accountability, the United States has regrettably made standardized tests "high-stakes". Stobart and Eggen (2012) states that "tests become 'high-stakes' when the results lead to serious consequences for at least one key stakeholder" (p. 1). Linking standardized tests to different educational accountabilities has caused the tests to become high-stakes, one example of this is when educational funding for schools is linked to student test scores. On the contrary, some countries, such as Finland, do "not have test-based accountability applied to schools, [and] teachers are free to teach for productive and worthwhile learning, not for the standardized achievement or race for higher public rankings" (Sahlberg, 2010, p. 56). By looking at different accountability examples it showcases that large scale assessment as a form of accountability has influenced the public's perception of teachers, which has brought up concerns among students, teachers, and schools (Brewer et al., 2014).

Educational accountability involves being accountable for the outcomes and effectiveness of the education system. Standardized tests are often employed as tools to measure this accountability, assessing the performance of schools, teachers, and students. However, relying solely on standardized tests for accountability can give an incomplete or narrow picture of how a

school, teacher, or student are doing. Putting the emphasis solely on test results may undermine broader educational improvement efforts, which can take the focus away from teachers and students.

Examples of Large-Scale Assessment Used for Accountability

Examples of large-scale assessments include EQAO, in Ontario, Canada, and NCLB (No Child Left Behind) in the United States. These two assessments programs have been selected to highlight variations between different types of large-scale assessments, both mid-stakes and high-stakes testing. I will first examine EQAO, followed by NCLB, in order to illustrate different approaches to assessments on a provincial level, for EQAO, and a national level for NCLB.

EQAO. EQAO was created in 1996 (Kempf, 2016), and is responsible for Ontario's province-wide literacy and numeracy assessments in Grades 3, 6, 9 and the OSSLT, which is given in Grade 10. The OSSLT "measures whether students are meeting the minimum standard for literacy across all subjects up to the end of Grade 9" (EQAO, 2022b). To graduate high school in Ontario each student needs to successfully complete and pass the OSSLT, which makes it a high stakes test. The EQAO literacy and numeracy assessments in Grades 3, 6, and 9 assessments are mid-stakes standardized tests which are used to guide districts and schools on improvement efforts and progress (Hargreaves, 2020). EQAO is also used to "keep the public education system accountable to taxpayers" (EQAO, 2022c). Hargreaves (2020) describes mid-stakes testing as:

> The use of large-scale assessments to report on the progress of schools and systems, and to guide districts' and schools' improvement efforts. It [EQAO] also reports these results online to inform parents' choice of school and, in various ways, to compare schools' performance. (p. 3)

Students are not penalized if they do not pass the EQAO literacy and numeracy assessments in Grades 3, 6 and 9, which makes the tests mid-stakes. However, Hargreaves (2020) explains that mid-stakes testing can have similar consequences to high-stakes tests. The five negative consequences of mid-stakes are: cultural bias, ignoring individual student needs, excessive test preparation, lack of efforts to innovate, data driven assessment, students' test anxiety (Hargreaves, 2020). This distinction between mid-stakes and high-stakes is necessary as Ontario has avoided international criticism because EQAO is not qualified as "high-stakes." Jang and Sinclair (2018) explain that EQAO is aligned with the Ontario curriculum and can be used as a useful "yardstick" in measuring and identifying students who may be at academic risk. EQAO's first available annual report in 2003 indicated that "the information pertaining to student achievement is used to bring about improvement for individual students and for the education system as a whole" (Jang & Sinclair, 2018, p. 662). While the Ontario educational system is still highly ranked internationally, the use of EQAO has not significantly contributed to the success of Ontario's school system (Hargreaves, 2020).

Many scholars (e.g., Hargreaves, 2020; Jang & Sinclair, 2018; Kempf, 2016; Li, 2015) have reported that EQAO actually serves to undermine educational improvement. Hargreaves (2020) details the different ways EQAO has negatively impacted teachers and students, which include "teaching to the test, cultural bias, avoidance of innovation, dilemmas of whether to include highly vulnerable students in the testing process or not, and emotional ill-being among students and teachers" (p. 393). These consequences will be explored in a later section of this literature review. Next, I will give a brief history of standardized testing in the United States over the past 20 years.

NCLB. Over the past 20 years, the United States has been using high-stakes standardized tests to justify accountability measures (Berliner, 2011; Hursh, 2015; Ravitch, 2020). In 2001 NCLB was passed, which required every student in every public and charter school in the country to be tested in Grades 3 through 8 in math and reading (Berliner, 2011, p. 287). At the time, President Bush promised the United States that by 2014, 100 percent of public-school children would be performing at grade level in math and reading. This law resulted in schools and school districts being evaluated on whether they were making adequate yearly progress (Rook, 2017). NCLB was described as an accountability system that would outline "differences between students in terms of their educational outcomes, as measured by the tests, should be largely, if not wholly, attributable to differences in the quality of education provided by schools" (William, 2010, p. 110). The intent of NCLB was to identify differences in achievement so states and schools could identify targeted resources for improvement.

Considering the unrealistic expectations of NCLB, Race to the Top (RTTT) was implemented in 2008, by President Obama, to create a more competitive environment for schools and permitted schools to compete for grant money geared towards the improvement of test scores. The rationale presented on the RTTT fact sheet was to "reward states for past accomplishments, create incentives for future improvements, and challenge states to create comprehensive strategies for addressing the four central areas of reform that will drive school improvement" (U.S. Department of Education, 2016). In order to qualify for RTTT grant money, states needed to adopt Common Core State Standards (CCSS) and articulate a CCSS implementation plan. States were required to apply for the money as well as agree to the ideals of RTTT. Hursh (2015) acknowledged that while participation in RRTT was not mandatory, in the wake of a recession, many states, felt they needed the additional funding and therefore applied

for RTTT funding. In 2011, “after reviewing the new standards, state boards of education members, governors, legislators, and/or chief state school officers took action to replace their existing standards with the Common Core State Standards” (Common Core State Standards Initiative, 2021). Written swiftly and implemented quickly, educators as well as the previous United States Assistant Secretary of Education, felt that the process of approving the CCSS had been rushed (Ravitch, 2013). As it happened, there was no field testing of the new standards and as Darling-Hammond (2020) states “standards that are improperly designed can undermine accountability” (p. 305).

Next, the Every Student Succeeds Act (ESSA), signed into law by President Obama in 2015, reauthorized the Elementary and Secondary Education Act of 1965. When ESSA was reauthorized, by law, it established rigorous standards and incorporated policies aimed at preparing all students for success in both college and future careers. It prioritized “excellence and equity and recognizes the importance of supporting great educators in our nation’s schools” (U.S. Department of Education, 2017, p.6). ESSA required, for the first time, that all American students be taught to high academic standards to ensure their readiness for success in both college and careers (U.S. Department of Education, n.d.). ESSA did not put as much pressure on teachers to prove adequate yearly progress, however, the focus on standardized testing did not diminish in schools (U.S. Department of Education, 2017; Chen et al., 2021).

NCLB was not able to define what a quality education should look like, and it became clear that test scores seemed to correlate to socio-economic status. Studies have shown that household income serves as the only reliable indicator of standardized test performance (Campbell & Levin, 2008; Hursh, 2015). NCLB tests are one example that confirms this; Amrein-Beardsley and Geiger (2017) found that classrooms with large populations of English

language learners, racial minority students and special education students, tended to come from low-income families and had significantly lower test scores. This led to the perception that the students who were being "left behind" lived in neighborhoods where the average family income was below the poverty line. This contributed to the misconception that teachers in inner-city schools were not effectively fulfilling their responsibilities. The lack of positive educational outcomes from these students further led to the characterization of schools as failing. The NCLB Act's emphasis on accountability testing reinforced the simplistic idea that differences in educational outcomes should be "attributable to differences in the quality of education provided by schools" (William, 2010, p. 110). The emphasis on accountability testing serves "as a criterion for making decisions about student academic growth, teacher instructional effectiveness, and school performance" (Acosta et al., 2019, p. 329).

EQAO and the standardized tests implemented under NCLB are just two examples of standardized tests that have been used with the intention of improving educational accountability. However, these examples emphasize the complexities surrounding standardized testing, revealing ongoing challenges in using tests to measure educational quality and student success.

Tensions Created by Accountability in Large-scale Assessment

Educational accountability puts a strong emphasis on improving teacher effectiveness to improve student learning (Burroughs et al., 2019). Student data collected from large-scale assessments have been used to gauge if teachers are doing their job effectively. Large-scale assessments of students "are used to monitor student achievement over time, to assess student competency, to serve gate-keeping functions, to evaluate teacher effectiveness, to ensure accountability in educational systems and for many other purposes" (Koch & DeLuca, 2012, p.

101). Jang and Sinclair (2018) examined the Ontario context to find that teachers experience tension between professional responsibilities and provincial assessment mandates. Their article examined Ontario's assessment policies and found that tensions arise when student assessments are being used for multiple, conflicting purposes (Jang & Sinclair, 2018). Teachers "feel confused about their roles and may be resistant to changing their practice, even if they receive substantial training" (Jang & Sinclair, 2018, p. 670).

Large-scale assessments are not always used for their intended purposes, but are used for multiple purposes, which can skew the data and lead to negative consequences for teachers and students (Koretz, 2017). The term "multiple-use" is used by Koch and Deluca (2012) "to refer to situations where the results from a single administration of an assessment are used for more than one purpose" (p. 101). This practice can raise concerns about the validity of the assessment. For instance, when the same assessment is applied to evaluate an entire province's performance on a subject, while simultaneously measuring individual teacher effectiveness or student achievement, the results of the assessment can be interpreted differently. Depending on who is interpreting those results, the results of the assessment can be used to back up a point or policy that the assessment results were never intended to be used for. Another thing to consider is the preparation for the assessment; this can look very different depending on the purpose of the assessment or the "stakes" of the assessment (Koch & Deluca, 2012). For example, students and teachers may prepare more for the OSSLT EQAO assessment because it is connected to high school graduation. When assessments are used for multiple purposes, and sometimes conflicting purposes, that are not always clear to the taker of the assessment, tensions between classroom teachers and policy makers inevitably arise (Jang & Sinclair, 2018).

Despite teachers being qualified professionals, tensions inevitably arise when mandates used to undermine a teacher's authority are imposed upon teachers. Brewer et al., (2014) explain that tension comes from imposed accountability systems and public perceptions that demonstrate a mistrust of teachers. In many cases Brewer et al. (2014) found that teachers felt they needed to teach to the test instead of challenging their students to reach their full potential. Results from a New Jersey study that interviewed teachers, found that teachers "view high-stakes teacher accountability policies as undermining teachers by challenging the building blocks of their professional status (e.g., expert knowledge, specialized training, and autonomy)" (Pizmony-Levy & Woolsey, 2017, p. 23). Similarly, in Kempf's (2016) book, he draws on classroom observations, combined with teacher surveys, to reveal how teachers are being undermined in their own classrooms because of the pressures put on them, and their students, to perform on large-scale assessments, in both Canada and the United States. Kempf (2016) argues that teachers, who are understood as experts and professionals, should once again be responsible for assessment practices in their own classrooms, as they are working directly with the students. Teachers should be able to observe their students and make informed instructional decisions based on what they see working, or not working in their classrooms. This is especially true because standardized tests tend to measure a far narrower piece of achievement and potential than what is covered in K-12 schools (Cai, 2020, p. 35).

Equity Issues in Standardized Testing

Bias in standardized testing is a significant concern, as test scores have been linked to negative consequences, specifically for teachers who teach English language learners or students with learning exceptionalities (Kempf, 2016). In both Canada and the United States, various justifications have been made to account for the disparity in which different populations of

students perform on standardized tests (Knoester & Au, 2015). Unfortunately, there is "strong evidence that the gaps in average achievement across subgroups of students along economic status or race/ethnicity lines are not getting noticeably smaller" (Cai, 2020, p. 35). Even though these assessments are not meant to discriminate against lower achieving students, standardized tests have not been shown to help improve student learning (Nagy, 2000).

Standardized tests have been used to "bubble" students into groups of learners who are achieving at the same rate, which is thought to assist teachers who are constantly striving for fairness in their classrooms (Jennings & Sohn, 2014). However, standardized test scores are often used for streaming or categorizing students into different educational tracks, which has implications beyond the classroom. "These tests produce the data upon which important decisions about students, teachers, administrators, and schools are being made" (Knoester & Au, 2015, p. 5). However, standardized tests fail to provide objective measures and can promote cultural and racial inequality by unfairly disadvantaging students who belong to minority groups (Au, 2016; Kearns, 2016).

The issue becomes complex and multifaceted when looking at the impacts on marginalized groups. Ryan and Whitman's (2013) study on First Nations students in Ontario, Canada emphasized that standardized tests cannot be fair unless they are culturally neutral and consider the diverse population they assess. They explained that:

> as tests require standardization in their development, implementation and interpretation, it would be reasonable to assume that this is simply not possible as context and human elements are difficult to control for. Yet, because of the way these tests are written, with a "standard" set by the dominant culture, there is little chance of tests being changed to suit ethnic minorities. (p. 174)

While standardized testing gives rise to many different ethical concerns, it is essential to recognize the valid use of educational assessments. When assessments are used appropriately, they can provide evidence that may contribute to improvements in educational practices and outcomes (Cai, 2020). Despite the ethical dilemmas, many scholars still argue that high-stakes test scores may still be particularly important in understanding accountability's impact on educational inequality (Jennings & Sohn, 2014).

Unintended Uses of Large-Scale Assessments

When standardized tests are not used for their intended purpose there are many consequences that may unintentionally undermine educational improvement (Hargreaves, 2020; Jennings & Sohn, 2014; Nagy, 2000; Pinto, 2016). Nagy (2000) explains that "these exams were intended to ensure a common standard and provide a sense of fair" (p. 264). Standardized test results that are designed for educational improvements, often get used to rank schools, teachers, and students. These uses of test results can have unintended consequences, for instance, neighbourhoods perceived to have high-performing schools based on test scores may become more desirable places to live, additionally the test scores may impact teachers' salaries. Unintended consequences in standardized testing often arise when the test results are used for purposes other than their original intent. For instance, if a test initially designed to assess student proficiency is later used to gauge teacher proficiency in the subject, it distorts the intended purpose of the test. Sometimes when the data is used to align with a specific agenda, the assessment function of standardized tests can be undermined. Below I outline the consequences that undermine educational improvement starting with teaching to the test, then cheating and fabrication of test results, and lastly, using test scores for other purposes that undermine teachers.

Teaching to the Test. There are many unintended consequences that result from teaching to the test. Teachers have found the need to prioritize certain parts of the curriculum and tailor instruction toward particularities, such as filling out a scantron, for test preparation. Hursh (2005) explains that "because of the pressure to raise test scores, particularly in the urban school districts, teachers are compelled to teach the skills and knowledge that will be tested, neglecting other usually more complex aspects of the subject and some subjects altogether" (p. 613).

Below, I focus on the unintended consequences described by Scogin et al. (2017), which include narrowing of the curriculum, placing undue pressure on educators, and limiting holistic student learning (p. 42). Narrowing of the curriculum has had direct negative effects on teachers and students, those interacting most closely with standardized tests (Ravitch, 2014). As stated above, the use of EQAO has caused teachers to narrow the curriculum and teach to the test (Hargreaves, 2020). Blazar and Pollard's (2017) findings suggest that "coaching that focuses on particularities of test items rather than the content they aim to measure may be especially detracting from ambitious instruction" (p. 420). Moreover, external mandates can put pressure on educators and shift their focus to teach to the test. Jang and Sinclair (2018) explain that teaching to the test can result from the pressure imposed upon educators who are trying to "meet goals of their organisations at the cost of improving practices" (p. 664). Although limiting holistic student learning may not be intentional, it happens over time as teachers adapt their practices to the standardized tests (Blazar & Pollard, 2017). An example of this was shown in Kempf's (2016) book, when he interviewed grades 3, 6, and 10 teachers. Kempf (2016) found that they spent an average of one month per school year, preparing for year-end standardized tests.

Literature suggests that teaching to the test undermines the overall goal of improving teaching and learning (Blazar & Pollard, 2017; Sahlberg, 2010; William, 2010). By narrowing

curriculum, teachers are unable to spend time on important concepts such as "curriculum development, school and classroom leadership, and school–community contexts" (Sahlberg, 2010, p. 53). Standardized tests can distract students from engaging in their own communities, because the focus is on the individual. This is even more so when the curriculum being taught is not culturally or locationally relevant for all students; it narrows the curriculum focus to what will be on a test and not what is relevant to their communities. Instructional resources may be reallocated to test preparation (Blazar & Pollard, 2017) which encourages surface level teaching to ensure that test material is covered.

Cheating and Fabrication of Test Results. In some situations, test scores have been continually manipulated to show desired results, showing little evidence of educational improvement (Koretz, 2017). In a 2013 report, the United States Government Accountability Office reported that "40 states suspected, and 33 states confirmed accountability test cheating during the two-year period from 2010 to 2012 alone" (Hibel & Penn, 2020, p. 331). The nature of high-stakes standardized testing has created a competitive environment for teachers and schools. Standardized testing becomes high-stakes when teachers and schools feel they need to cheat to prove that there is genuine teaching and learning occurring (Stobart & Eggen, 2012). Darling-Hammond and Adamson (2014) remind the reader that "when stakes are attached to the scores, teachers will feel pressure to focus narrowly on improving performance on specific tasks, which will undermine the interpretability of scores from those tasks" (p. 49). By shifting the focus from authentic learning to raising test scores, there can be pressure to increase inappropriate test preparation, which, in some cases, led to cheating (William, 2010). I argue that standardized tests do not result in educational improvement, especially when cheating is involved. Cheating and fabrication of test results undermine the credibility of the test results

themselves (Hargreaves, 2020). This was the case of NCLB; the high stakes consequences of the standardized tests, and schools striving to meet adequate yearly progress, resulted in cheating and gaming of the accountability system (Ravitch, 2014). In Koretz's (2017) book, *The Testing Charade*, he shows that rather than students failing large-scale assessments, the assessment themselves have been failing to accurately represent the students and teachers subjected to these tests over the years. Koretz (2017) goes into detail about the cheating and fabrication of test results, in order to meet specific targets, with specific examples in the United States, such as NCLB and RTTT. With unrealistic achievement targets, NCLB resulted in school closures and systemwide cheating to receive government funding or to avoid being closed (Hargreaves, 2020).

Standardized test scores have contributed to concerns about public schooling, particularly in the United States. Standardized test scores have contributed to "the low percentage of urban students scoring proficient on the tests [which has] provided a rationale for charter school operators to call for more charter schools" (Hursh and Martina, 2016, p. 199). Public schools have been replaced with for-profit schools, usually in the neighbourhoods that most benefit from what public schools have to offer (Au, 2015). Other authors (Au, 2015; Hursh, 2015; Ravitch, 2014; Ravitch, 2020) have explained that "school choice" is being used to hide the privatization of public schools, and that we need to protect our schools against privatization and corporate takeovers.

Undermining Teachers. The results from standardized tests are often used for purposes in which they were not designed (Kotch & Deluca, 2012; Nichols & Williams, 2009) which can severely undermine teachers in their own classrooms. Jang and Sinclair (2018) examined the Ontario context to find that "when teachers experience such tension along with changes in top-down assessment policies, they feel confused about their roles and may be resistant to changing

their practice, even if they receive substantial training" (p. 670). Despite being qualified professionals, when mandates that undermine a teacher's authority are imposed upon teachers, tensions inevitably arise. Brewer et al., (2014) explain that the tension comes from a public mistrust of teachers through imposed accountability systems. In many cases Brewer et al. (2014) found that teachers felt that they needed to teach to the test instead of challenging their students to reach their full potential. Unfortunately, standardized tests are dictating classroom curriculums and hindering the use of experiential-type learning pedagogies (Kempf, 2016; Scogin et al., 2017). Results from a New Jersey study that interviewed teachers, found that teachers "view high-stakes teacher accountability policies as undermining teachers by challenging the building blocks of their professional status (e.g., expert knowledge, specialized training, and autonomy)" (Pizmony-Levy & Woolsey, 2017, p. 23). Similarly, in Kempf's (2016) book, he draws on classroom observations, combined with teacher surveys, to reveal how teachers are being undermined in their own classrooms as a result of the pressures put on them, and their students, to perform on high-stakes standardized tests. Kempf (2016) argues that teachers should once more be responsible for assessment practices as they are the ones who have done the educational research and are working directly with students. Teachers should be able to observe their students and make informed instructional decisions based on what they see working, or not working in their classrooms.

Darling-Hammond and Adamson (2014) acknowledge that, for school improvement to take place, teachers need to be "center stage" in supporting student learning. This means that teachers need to be involved in every phase of the assessment process, development, marking and discussing results with their students. This would lead to a dramatic shift from the high and mid-stakes measures currently in place. With the appropriate training of educators, the need for

accountability in the form of standardized testing is eliminated (Darling-Hammond, 2020, Salhberg, 2010). A level of public trust in teachers becomes inherent when their training is certified to ensure that quality teaching and learning will take place in the classroom. Darling-Hammond (2020) suggests that teacher preparation which relies on experience and portfolios can help restore teaching as a respected and revered profession.

Ensuring Effective Teaching

There has and continues to be tension surrounding large-scale assessment of teachers as a form of educational accountability, with the MPT being the most recent teacher certification assessment in Ontario. Large scale teacher testing occurs when an education system is questioning the competency of their teachers (Ng, 2021). However, the question remains: can a teacher test measure teacher quality and competency? There are many assumptions about why large-scale assessment are the best way to ensure effective teachers. However, as the literature suggests, this is not always, if rarely, the case. Below, I highlight the complexity and differing perspectives of effective teaching, teacher qualification and testing as a form of educational accountability, the connection between teacher content knowledge and student achievement, and teacher's mathematical content knowledge.

Effective Teaching

When creating a teacher test, the concept of "effective teaching" needs to be defined. Hamre et al. (2013) describe effective teaching, broadly speaking, to include "teacher knowledge, teacher practices, teacher beliefs, student beliefs, student practices, and student knowledge" (Bell et al., 2012, as cited in Hamre et al., 2013, p. 463). However, Lee (2018) advocated for balance between teacher qualifications and effectiveness when evaluating teacher quality. Their study tried to better understand the "significant contribution that teachers have on

our students' educational pathways and how this accumulation of experience results in educational success" (Lee, 2018, p. 287). Additionally, Goldhaber (2007) highlights that most countries typically establish prerequisites for aspiring public-school educators to ensure a certain standard of teacher quality. Countries have different requirements; however, each set of requirements aims at ensuring students are taught by highly qualified teachers. High quality teaching can be defined in different ways, this is dependent on the different stakeholders and the different accountabilities, each group may have different priorities or definitions of what constitutes "effective teaching".

Research suggests that high quality teaching has an impact on student achievement. There are measurable correlations between teacher qualifications and student achievement (Dodeen et al., 2012; Etim at al., 2020; Lee & Lee, 2020). Lee and Lee (2020) found that "students who have been taught by multiple highly qualified teachers were more likely to earn higher level educational degrees" (p. 1). Etim and colleagues (2020) also explain that there has been some positive correlation between "teacher certification, experience and possession of advanced degree and student achievement" (p. 51). Their study, specific to North Carolina, gives a rationale to attributing student success to teacher qualification. Boyed, et al. (2008), reiterate that improved teacher qualifications, specifically for teachers placed in schools with high poverty levels, have made an impact on student achievement. Teacher's qualifications, including years of experiences level of education, effectiveness, and subject matter expertise can all impact student achievement and success (Lee, 2018). Lee (2018) explains that high-quality teachers can "significantly increase the probability that a secondary school student will not only have higher achievement but also obtain a bachelor's degree" (p. 374).

Teacher Qualification and Testing as a Form of Educational Accountability

Some researchers suggest that teachers' content knowledge impacts student knowledge and as such should be considered as part of teachers' qualifications. For instance, Kwak (2019), with a focus on science, found that more specialized courses be integrated into teacher education programs, requiring incoming teachers to be experts in the (science) subject they will be teaching. To become an expert, TCs can take more subject-specific courses during their program; however, those courses should be taken throughout the program to constantly engage with the content the TC plans to teach. Kwak (2019) suggests that teacher development should expand beyond teacher certification tests and that professional development of content needs to be part of the continual learning journey, not a "one-time cultivation" of knowledge as "the pedagogical content knowledge or content-specific pedagogy is an area to be developed throughout the teaching career" (p. 13).

Teacher Tests as an Option of Ensure Effective Teaching

Teacher tests are one form of social accountability, sometimes referred to as professional accountability (Milner, 2021). In most cases, teacher "testing has been presented as a way to evaluate teacher competency and improve the quality of education" (Portelli, 2005, p. 283). However, research suggests that there are issues when teacher testing is used to measure quality. Goldhaber and Hansen (2010) explain the conundrum with teacher testing, stating "teacher-testing policies are intended to ensure some measure of quality control over the teacher workforce without directly observing classroom performance; variation in test scores explains little of the variation in teacher quality" (p. 221). Bartels et al. (2019) also writes about the challenges surrounding teacher testing, which include finding the balance between authentic, interactive measures and the costs of developing, administering, and scoring such measures.

Teacher quality can be hard to measure, which is why subject matter teacher tests are put in place. However, subject matter teacher tests are not always an effective measure of teacher quality in those specific subjects. Goe (2007) explains that using standardised achievement tests to measure teacher quality can be challenging for several reasons:

- Standardized achievement tests were intended to measure student achievement and were not designed to measure teacher quality.
- It is difficult to sort out teacher effects (i.e., the contribution of teachers) from classroom effects (i.e., the contribution of peers, textbooks, materials, curriculum, classroom climate, and other factors).
- It is difficult to obtain linked student-teacher data that make it possible to connect specific teachers to student achievement test scores. (Goe, 2007, p. 2)

Alternative to Teacher Tests

The use of standardized teacher tests often raises concerns about bias in the test, specifically on "unobservable teacher characteristics, non-random sorting of students in classrooms and teachers among schools, and non-random attrition from the teacher labor market" (Goldhaber & Hansen, 2010 p. 23). The use of standardized tests of student achievement and thus of teacher competence can have negative consequences for students of minority groups, and similar consequences have been noticed in the case of teacher testing (Goldhaber & Hansen, 2010; Hamre et al., 2013; Ontario Teacher Candidates' Council v. The Queen, 2021). Bias in teacher testing has been linked to adverse impacts on members of minority groups, who often have lower test scores due to test bias (Hamre et al., 2013) and are discouraged from entering the field of education (Angrist & Guryan, 2004). For example, Goldhaber and Hansen (2010), explain that a licensure teacher test, in the United States, called the National Teacher

Examination, “was criticized for having a cultural bias in test items that disproportionately screened Black and other minority teachers from the teacher candidate pool” (p. 222). Bias in teacher testing needs to be considered, especially given the time, energy and money put into teacher testing (EQAO, 2019b). When implementing policy surrounding large-scale assessment, Portelli et al. (2005) explain that standardizations, the impact on equity, and conceptions of good teaching need to be a part of the conversation.

Traditional teacher testing (standardized testing) has not been proven effective in relation to teacher effectiveness, and many teachers have called for more authentic forms of assessment (Goldhaber, 2007, Bartels et al., 2019). However, since 1929 written tests have been used to evaluate teachers, despite the reality that teachers engage in far more "action-oriented" competencies in the classroom. These competencies, however, are difficult to evaluate via a written test (Bartels et al., 2019). Bartels et al. (2019) cite Whithead (1929), to explain that the “existence of (declarative) knowledge and the ability to use this knowledge for solving professional tasks in a written test does not automatically guarantee that this ability is available in real life situations” (p. 2026). Bartels et al. (2019) discuss many different approaches to measuring action-related competencies by using performance tests and found that there was a higher level of authenticity in performance tests versus written tests. There has been a call for observational assessment as an alternative form of teacher testing (Goldhaber, 2007).

Many teacher tests are implemented to ensure TCs are “ready” to teach (Brown, 2018; Herbert, 2015). However, teacher accountability does not necessarily need to be in the form of tests or test scores. Accountability could also be through portfolios or performance-based assessments (Darling-Hammond, 2020), which draw a mutual connection and benefit between the theory and practice of teaching. Although teacher tests can be used to check knowledge and

understanding surrounding the profession of teaching, traditional standardized teacher tests are not able to evaluate planning, instruction, and assessment (edTPA, 2021). In response to traditional teacher tests, Darling-Hammond (2020) calls for high quality teacher preparation programs instead of standardized testing to check teachers' understanding of core concepts in the curriculum.

The edTPA, is an example of a teacher, portfolio-based performance assessment that is used "to emphasize, measure and support the skills and knowledge that all teachers need from Day 1 in the classroom" (edTPA, 2021, para. 3). This is a current certification requirement in New York state. Portfolio-based assessments "can bring a more authentic form of accountability to the preparation process and help hone a practice that is more focused on learners and learning and that is based in a vision of teaching for greater equity" (Darling-Hammond, 2020 p. 65). However, Brown (2018) explains that it is not clear if the edTPA will improve teacher effectiveness. Even though a portfolio-based assessment may be more authentic (Darling-Hammond, 2020), Hébert (2015) suggests that edTPA can decontextualize TCs "from the relational nature" (p. 332) of an authentic teaching experience. Hébert (2015), says that even though the edTPA is not a standardized test, teacher education programs have been modified to reflect the edTPA, which can undermine authentic assessment.

The Annual Professional Performance Review (APPR) is an assessment that is used, in the United States, to evaluate teachers and principals based on two categories: "the Student Performance category and the Observation/School Visit category" (New York State Education Department, 2021). Using results from a teacher's APPR to determine the effectiveness of teachers' work created a high stakes environment for both teachers and their students. APPR was enacted in 2010 and required each teacher and principal to undergo a performance review, where

they would be rated either “highly effective,” “effective,” “developing,” or “ineffective.” (New York State United Teachers, 2024). The law was amended in 2019 to require APPRs to incorporate “multiple measures of effectiveness” (New York State Education Department, 2021). The students’ test scores were used “to evaluate teachers and then, to attribute their measured “effectiveness” to the teacher education programs that prepared them (Darling-Hammond, 2020, p. 62). Under the proposed regulations in 2014, during the Obama administration, “teacher education programs that performed poorly on value-added measures (VAM) of their graduates’ “effectiveness” would be unable to receive certain kinds of federal funds, including scholarships for teacher education students” (Darling-Hammond, 2020, p. 62). This change promoted a fear-based environment in which, with performance reviews in mind, teachers allotted the majority of their instruction time on test preparation (Kempf, 2016).

Teachers’ Mathematical Content Knowledge

Teachers’ mathematical content knowledge involves having a deep understanding of the subject matter required to teach mathematics. This depth of understanding is needed so teachers can clearly explain the concepts to their students. As Ball et al. (2009) explain: “Teachers need to do more than *simply know* mathematics. They need to be able to *use* mathematics in the work of teaching pupils” (p. 95). Hill and Ball (2009) refer to this as Mathematical Knowledge for Teaching (MKT). Developing MKT is not simply about being proficient in math, it also involves understanding how to teach mathematics effectively to others (Ball et al., 2009). Teacher educators play a crucial role in preparing future teachers to teach mathematics. Teaching mathematics requires specialized knowledge, which requires educators to not only be proficient in mathematics but also possess the ability to teach that knowledge in an engaging way (Jankvist et al., 2020). Teacher educators need to provide TCs with experiences that deepen their

understanding of the subject matter, and expand their pedagogical approaches required to teach mathematics effectively (Masingila et al., 2018). To understand the knowledges that teachers need to be effective mathematics teachers, I draw on the work of Ball et al. (2009). In their article *A Practice-Based Theory of Mathematical Knowledge for Teaching*, they use a multi-dimensional model to explain that mathematical knowledge is interconnected with the teaching of mathematics. Please see Figure 1 below:

Figure 1

Mathematical knowledge for teaching (Ball, Thames & Phelps, 2008)

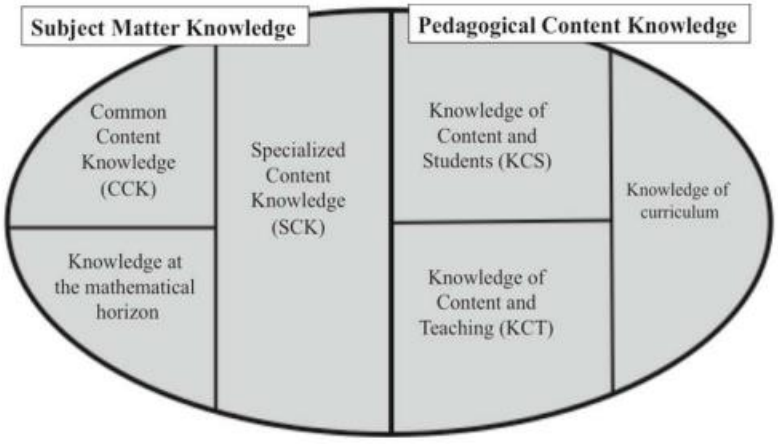


Figure 1 above illustrates the dual sides of knowledge which are essential in teaching—subject matter knowledge and pedagogical content knowledge. On the left side, emphasizing subject matter knowledge, the focus lies on the mathematical expertise necessary for teaching the subject. On the right side, representing pedagogical content knowledge, Ball et al. (2009) highlight the need for understanding the content and students, content and teaching, and a deep understanding of the curriculum. Ball et al. (2009), explain that mathematical knowledge is "needed to perform the recurrent tasks of teaching mathematics to pupils" (2009, p. 97). They further explain that an effective teacher needs to have a deep subject matter understanding and

pedagogical expertise. This will help to engage students meaningfully and help them develop a profound comprehension of mathematical concepts.

In Ma's 1989 study with elementary teachers from the United States and China, she found that although teachers in the United States may have been exposed to a higher level of mathematics in their own education than Chinese teachers, Chinese teachers had a more comprehensive understanding of the mathematics they were teaching (2020). Ma's study showed that there is a difference between exposure and understanding, although both are important. Reid and Reid (2017) also noted that "higher levels of math courses do not automatically equate to better math teaching" (p. 857). Chinese teachers developed a deep understanding of mathematics during their schooling whereas teachers from the United States had only developed a superficial understanding. Ma (2020) states that, "the real mathematical thinking going on in a classroom, in fact, depends heavily on the teacher's understanding of mathematics" (p. 158). Ma (2020) found that testing teachers' mathematical knowledge was not as effective as finding out their mathematical competencies through classroom observations. Through classroom observation, it was clear whether a teacher understood and could teach mathematics. Ma (2020) suggests that the mathematics taught in elementary and secondary school needs to improve, so that when TCs are preparing to be teachers, they can focus on learning to teach, rather than on learning the mathematics they are teaching. Ma (2020) concludes,

> Improving teachers' subject matter knowledge and improving students' mathematics education are thus interwoven and interdependent processes that must occur simultaneously. What is needed, then, is a teaching context in which it is possible for teachers to improve their knowledge of school mathematics as they work to improve their teaching of mathematics. (p. 153)

In essence, Ma (2020) argues that teacher training is not where TCs should be learning mathematics or be tested on their mathematical knowledge, as that knowledge should develop in their own schooling journey.

In another study, Dodeen et al. (2012) compared mathematics teachers' qualifications in Taiwanese and Saudi schools. They asked teachers to self-evaluate their preparedness for each domain of mathematics on the Trends in International Mathematics and Science Study (TIMSS) and found the Taiwanese teachers felt more prepared to teach each mathematical domain. Using data from the TIMSS questionnaire, the authors found that teachers in Taiwan were more prepared to teach mathematics, because they had a greater understanding of math content, which resulted in their students performing better. Reid and Reid (2017) echo that sentiment, explaining that a "more specialized understanding of math is required to understand the complexities behind children's mathematical thinking" (p. 855). According to Dodeen et al. (2012), to improve student test scores, teachers need to not only be good at mathematics themselves but also be able to teach mathematics. Reid and Reid (2017) explain that they believe that teacher education programs should require minimum math knowledge requirements to ensure the combination of teacher knowledge and the skills to teach mathematics. Reid and Reid (2017) go on to explain that the foundational mathematics competency knowledge of TCs is a skill that is:

> critical for the successful development of math knowledge for teaching capacities. Ultimately, this will raise the significance of teaching math for understanding and increase the abilities for all math educators to support effective math environments for students to flourish as mathematicians. (p. 868)

Being qualified to teach is more than knowing the content; many teacher tests tend to focus on one or the other.

Teachers' Content Knowledge and Student Achievement

In this last section I explain the connection between teacher content knowledge and student achievement. There is some evidence that teacher quality relates to student achievement (Boyed, et al., 2008; Etim at al., 2020; Lee & Lee, 2020). Student achievement is significantly influenced by the perceptions and relationships between students and teachers, which can impact student learning outcomes (Kearney & Garfield, 2019). When teachers demonstrate a genuine willingness to learn from their students and hold high opinions of their students, research indicates improved enhanced student outcomes (Kearney & Garfield, 2019). While teachers' professional competence of a subject contributes to student achievement, teachers' effectiveness and their enthusiasm for the subject matter also have a substantial impact on student engagement and achievement (Kearney & Garfield, 2019). A 2010 study by Yazzie-Mintz revealed that 35% of students attributed classroom boredom to a lack of interaction with their teachers, emphasizing the importance of teacher-student interaction and enthusiasm. Student readiness to learn is another crucial factor influencing student achievement, readiness is closely intertwined with "teacher perceptions of student readiness to learn and student perceptions of teacher effectiveness" (Kearney & Garfield, 2019, p. 9). Having high quality teacher-student relationships, as well as an effective and enthusiastic classroom atmosphere, are fundamental to encouraging student achievement.

Summary of Literature Review

I have organized the literature review into three sections. In the first section, through an examination of relevant literature, I explain the complexities and challenges associated with standardized testing such as the high-stakes nature of the tests, and the use of standardized test results being linked to educational accountability. In the second section I address the tensions

that can arise from the use of large-scale assessments for accountability purposes. These include unintended uses of large-scale assessment such as: teaching to the test, cheating and fabrication of test results, undermining teachers, and issues related to equity. In the final section of the literature review I focused on the complexities and diverse perspectives surrounding effective teaching, teacher qualifications, and testing for educational accountability. There were differing viewpoints on whether teacher tests serve as a reliable measure of quality teaching; some alternatives were presented, such as PD days or portfolios. I also discuss the relationship of teachers' mathematical content knowledge and student achievement. Finally, I raise concerns about the limitations and biases inherent in standardized teacher tests, proposing alternative forms of assessment for evaluating teacher effectiveness.

Chapter Three: Theoretical Framing and Conceptual Framework

Theoretical Framing

My research is guided by the theoretical framework of institutional complexity (Friedland & Alford, 1991). Institutional complexity, specifically related to the institution of education, helped to shape my understanding of the complex logics surrounding the MPT. Education is a complex institution made up of complex values, needs, and groups of people. Focusing on the Ontario education system, I have chosen to use institutional complexity as a lens to examine its internal, competing accountability systems surrounding the MPT. While researching the history of educational accountability and institutional complexity, three main articles, by Darling-Hammond (1989), Dulude and Milley (2021), and Pollock and Winton (2016), helped to inform the building blocks of my conceptual framework. In this chapter, I will give an overview of institutional complexity, demonstrate how it informed and helped develop my conceptual framework, and present my conceptual framework at the end of this chapter.

Institutional Complexity and Logics

Institutional complexity analyzes the major institutes of society which Friedland and Alford (1991) explain are the market, the state, the corporation, the professions, religion, and the family. I will be primarily focusing on the institutions that interact with the education system in Ontario and the professionals that make up that system, who were impacted by the creation, implementation, and cancellation of the MPT. Within the major institutions of society, there are competing logics that impact the different stakeholders involved. Dulude and Milley (2021), "develop a conceptual framework that unpacks the intersection of the institutional complexity triggered by multiple institutional logics and school leaders' sense-making about reform" (p. 84). Dulude and Milley (2021) took this idea of institutional logics and looked at the system of

education, in relation to school principles, and used and named different accountabilities in a specific education situation. For the scope of this study, I will not be looking at all the major institutes of society outlined by Friedland and Alford (1991).

Institutions are connected to certain logics that are often contradictory and become the bases of most political conflicts (Thornton & Ocasio, 1999). As cited in Bridwell-Mitchell & Sherer (2017), Thornton and Ocasio (1999) explain that institutional logics are "socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules" drawn from broader societal institutions, such as the institutions of "democracy, bureaucracy, the family, and markets" (p. 804). Gullberg and Svensson (2020) expand on Thornton and Ocasio's (1999) definition by defining institutional logics as "broad interpretative schemas dominating certain societal spheres, or institutional domains, logics embed and guide individual and organisational interests and worldviews" (p. 51). When many logics compete within an institution it can be challenging to pinpoint influence because "no scenario or field of study can be described as being guided by one single logic" (Gullberg & Svensson, 2020, p. 52). Gulberg and Svensson (2020) explain how institutional logics are influencing every level of stakeholder surrounding an institution. With many different institutions influencing the logics, there will rarely be an even distribution of resources (time, money, or energy) among the logics, this creates a "push and pull" between which logic is more dominant. The dominant logic is usually going to be influenced by power or money.

This power dynamic between institutional logics is something to keep in mind when researching institutional complexity because not every institution, logic, or stakeholder has the exact same amount of power. Alford and Friedland (1975) state that "groups have access to different types of power that affect the level and consequences of their members' participation.

Thus, the participation of different groups is unlikely to be analytically equivalent" (p. 472). If we think of the logics as ideas or priorities, we can assume that each logic is going to have a "pull" on the system, nudging it, in favour of one logic over another. Gullberg and Svensson (2020) explain that logics that seem more pressing are usually the logics that have an affect on the "core organisational operations" (p. 52). Through my literature review and document analysis I have been able to gain a deep understanding of the organisational operations surrounding the MPT, which has helped establish which accountabilities I decided to focus on for this study. The push and pull of the different accountabilities surrounding the MPT led me to examine the interconnectedness of educational accountabilities though a lens of institutional complexity.

Conceptual Framework

My study focuses on three groups of stakeholders, four systems, and seven accountabilities, which are connected to and surrounding the MPT. I will show how each is connected by explaining the complex relationships between each stakeholder, system, and accountability (Dulude & Milley, 2021). There is an assumption that educational problems (ex. low student math scores) can be pinpointed to one specific solution or accountability (ex. testing teachers' math competency), without taking into consideration the intricacies of a certain situation or problem. Using institutional complexity to view the relationships between stakeholders and systems while showcasing the complexity surrounding educational problems, will hopefully bring to light the different systems and accountabilities involved that interact and impact one another.

While creating my theoretical framework, linking institutional complexity to educational accountabilities, I found it most useful to reference Dulude and Milley (2021), Darling-Hammond (1989), and Pollock and Winton (2016). I started by reading Pollock and Winton's

(2016) article and found that they referenced several authors in their framework (Darling-Hammond, 1989; Firestone and Shipps 2007; Stone et al., 1989). From there I read the Darling-Hammond (1989) and Dulude and Milley (2021) articles which led to more supporting authors (Bridwell-Mitchell & Sherer, 2017; Diehl, 2019; Friedland & Alford, 1991; Thornton & Ocasio, 1999). From there I was able to see how the conceptualization of seven accountabilities have developed over time and helped create the "seven accountability framework" in Pollock and Winton's (2016) article. The seven accountabilities referenced by Pollock and Winton (2016) are administrative (bureaucratic), legal, political, professional, moral, market and performance accountabilities. These seven accountabilities focus on different accountability systems in education, and in my review of this work I found connections to accountability systems that are integral to my study (EQAO, Ontario's OME, the Government of Ontario, and the OCT).

Based on Dulude and Milley (2021) I have chosen to take the idea of different accountabilities and apply them to my study, which is situated in the context of the MPT. My study showcases all seven accountabilities, how they are highlighted, situated, and interact within the concept of institutional complexity. There is no single way to define and examine accountabilities because each accountability interacts with different stakeholders differently and can exhibit conflicting demands. As Diehl (2019) states "there has been a growing recognition that many organizations exist in fields characterized by institutional complexity, meaning that they are subject to competing demands from more than one institutional logic" (p. 1). There are many different approaches to analyzing accountabilities and stakeholders, however, institutional complexity was a way for me to explain the interconnectedness of the different educational accountabilities and stakeholders in my study. Within institutional complexity there are competing values, needs, and groups of people and these all generate different accountabilities

that are competing and contradictory. Below, I draw on the literature to help to describe the seven accountabilities that are presented in the literature.

Administrative accountability, also known as bureaucratic accountability, is defined by Darling-Hammond, (1989) and Pollock and Winton (2016) as the responsibility of a formal organization, that is usually organized in a bureaucratic manner, that relies on internal means of control. These organizations intend to ensure that public functions are being carried out and educational programs are delivered through a set procedure that teachers in the schools are expected to follow.

Legal accountability is defined by Darling-Hammond (1989) and Pollock and Winton, (2016) as ensuring that schools operate in accordance with the laws and regulations governing them, as well as entertaining complaints about violations of the educational laws put in place. Legal accountability focuses on the actions, in this case a school's actions, that operate within a system that keep things running smoothly—this could be in the form of an educational law that has been put in place to make sure that a certain goal is achieved.

Political accountability is defined by Darling-Hammond (1989) and Pollock and Winton (2016) as the accountability of elected officials of government, such as elected trustees, who answer to public demands. These can also be members of government who are elected, given the power to change policy and are answerable to the public for their decisions and who must stand for re-election at regular intervals.

Professional accountability is defined by Darling-Hammond (1989) and Pollock and Winton (2016) as a means to ensure that certain specialized knowledge and skills are being acquired while still meeting standards of entry into the profession. The professionals who are required to have specialized skills, such as teachers, are required to have specific skills to enter the

profession and then uphold professional standards of practice. This is done by ensuring that teaching and students' learning is placed at the center of professional work (Dulude & Milley, 2021).

Moral accountability is defined by Pollock and Winton (2016) and Stone et al. (1989) as the accountability that guarantees acceptable societal norms and behaviours are carried out in the education system. There is a certain level of personal commitment to the values that are important to the system that they work in. For example, educators strive to provide fair and equal education to all students (Firestone & Shipps, 2007).

Market accountability is defined by Darling-Hammond (1989), Dulude & Milley (2021) and Pollock & Winton (2016) as the assurance that there will be concentrated efforts to increase competition as a way to improve schools and encourage innovation. This can be seen specifically in the United States between the different types of schools available to students (charter, public, private). Teachers are also encouraged to outperform one another in teaching and learning to drive innovation. This is less prevalent in Canada because the education system is more centralized, however there is still school choice in Ontario, religious and secular (Catholic, public, private, and independent), and linguistic (French and English).

Performance based accountability is defined by Darling-Hammond (1989) and Pollock and Winton, (2016) as an accountability approach that can be used to rank students and schools to encourage change in education systems. The most common example of performance-based accountability is the use of large-scale assessments.

Justification

I chose to include all seven accountabilities presented in the literature: administrative/ bureaucratic, legal, political, professional, moral, market and performance. I explored the

connection that these seven accountabilities have within the institutional complexity framework. I wanted to see how these accountabilities directly interacted with the systems and stakeholders who were closely connected to the MPT. By examining the conflicting accountabilities in each system (e.g., EQAO, OME, Government of Ontario, OCT), I explored how educational accountability, tied to large-scale assessment and standardized testing, impacts the stakeholders involved (TCs, FEAs, and education policy makers).

Conceptual Model

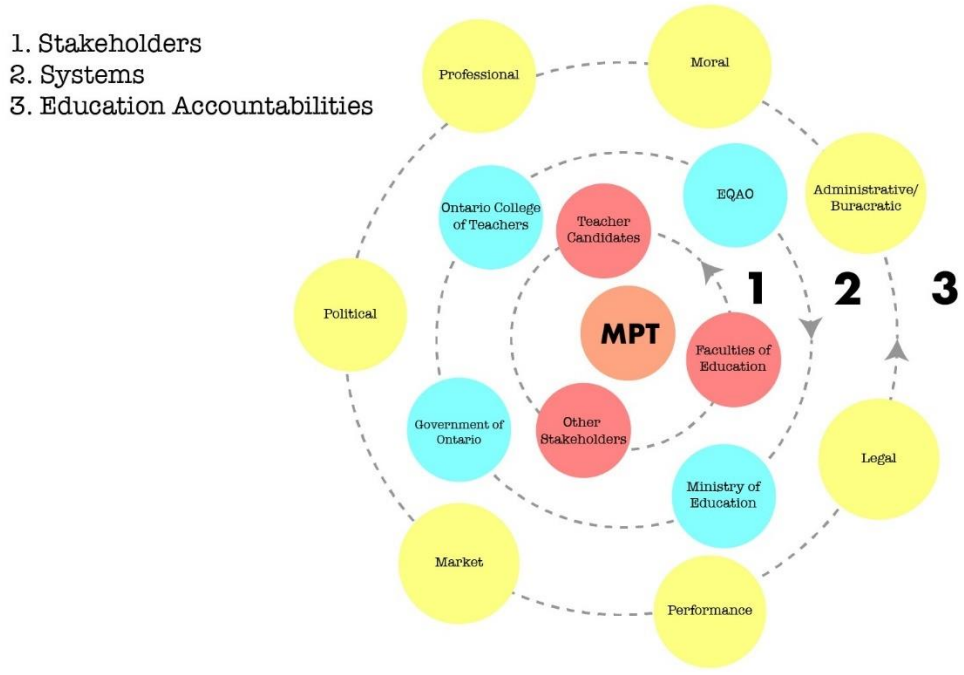
The conceptual model draws from the broader theoretical framing of institutional complexity, presented in the literature, while also focusing on educational accountabilities (Darling-Hammond, 1989; Dulude & Milley, 2021; Pollock and Winton, 2016), and incorporates the key stakeholders who are impacted by the MPT and are integral to this research project. The conceptual model, Figure 2, depicts different layers of Ontario's education system, suggesting that each ring interacts with the others. This model consists of three "rings' that interact with each other. Each ring does not stand alone but impacts the rings around it. I will start by describing the outermost ring and work my way into the center.

The outermost ring (3) includes the educational accountabilities, depicted by Pollock and Winton (2016), which are administrative (bureaucratic), legal, political, professional, moral, market and performance accountabilities. Each accountability is relevant to this research project, which is shown through institutional complexity, the element that connects each layer. Each of these accountabilities directly impacts the middle ring, the systems, and the inner ring, the stakeholders I am considering. I would like you to think of each ring on a spinner, the stakeholder groups can interact with any of the systems in the middle ring and the accountabilities in the outermost ring. Thinking of each ring on a spinner helps to show that each

system and stakeholder are not correlated specifically to the accountability it is closest to, showing how educational accountabilities are pluralistic in nature (Dulude & Milley, 2021) within Ontario's educational system. The middle ring (2) represents the systems that interact both with the educational accountabilities and the stakeholders. The systems represented include; EQAO, the OME, the MOE, and the OCT. The inner ring (1) represents the stakeholders in this research study; TCs, FEA, and education policy makers. I collected data from each of these stakeholder groups and linked data to the systems in the middle ring and the educational accountabilities in the outer ring. Lastly, the MPT is at the center of my diagram because this test is at the center of my study. The MPT impacts each of the stakeholders (inner ring - 1) and links each system (middle ring - 2) to the seven educational accountabilities (outer ring - 3). Having the test at the center can help explain the intricacies and consequences of implementing standardized tests as part of the teacher certification process. This model not only draws direct correlation between accountabilities, systems, and stakeholders, but also centers on perceptions and expectations of the accountability systems of Ontario's education system at large.

Figure 2

Conceptual Framework



Conceptual Framework Throughout the Study

The conceptual framework, illustrated in Figure 2 above, positions the MPT at the center of this study, while situating the seven accountabilities in the broader framing of institutional complexity. The data that I collected was organized by stakeholders (ring 1), and then analysed using the educational accountabilities (ring 3). Next, the analysed stakeholder data was organized by accountability, which was then organized and reanalysed by stage (creation, implementation, and cancellation). The findings were reported using the accountabilities (ring 3) to show and highlight the various systems (ring 2) and stakeholder perspectives (ring 1). Lastly, the discussion chapter embodies the framework, illustrating how each ring underlies each theme discussed. Chapter Six emphasises the interconnectedness of the three rings, showcasing how it is difficult to separate different education accountabilities surrounding the MPT.

Chapter Four: Methodology and Research Design

This is a mixed-methods case study about a teacher test in Ontario, Canada. This is one example of a teacher test, which is bound by the context of the creation, implementation, and ultimate cancelation of the MPT over a two-year period. I frame this mixed-methods case study with three stages (creation, implementation, and cancelation) to look at how and why things unfolded the way they did. Yin (2014) explains that case studies "contribute to our knowledge of individual, group, organizational, social, political, and related phenomena" (p. 37). Case studies help create understanding about a detailed and in-depth situation, and can help examine real-world situations (Bromley, 1986). My mixed-methods case study draws on the work of Creswell and Creswell (2018) and Gerring (2007) to present the reactions of multiple stakeholders and groups, over a set period of time. This in-depth contextual, multi-faceted analysis of the MPT examines the MPT from creation to cancellation in 2021. By telling this story I present the phenomenon of the MPT context in relation to other teacher certification tests. By studying the full arc of the rise and fall of a teacher test, I draw connections from each stage (creation, implementation, and cancellation) and make connections to the seven different educational accountabilities; this is done by gathering perspectives of many different stakeholders who were connected to the MPT.

The rationale for using mixed methods in this case study is based on the desire to collect a large number of perspectives; this can be accomplished with the use of multiple methods including the collection of both qualitative and quantitative data, through surveys, interviews, and document analysis. Multiple methods were used to gather data and to layer the analysis in this study to tell a robust story using multiple stakeholder perspectives. Multiple stakeholders' perspectives are important and should be included in educational research because "stakeholders

make decisions that influence education policy and practice, and thus have an impact on the research that attempts to model and understand it" (Shavelson & Towne, 2002 p. 86). When analyzing each stakeholder's perspective, the researcher gains access to their point of view. Pizmony-Levy and Woolsey (2017) explain, in their study on New Jersey teachers' attitudes towards accountability policies, that both quantitative and qualitative data were needed to gain a robust picture of teachers' attitudes towards large-scale assessment and accountability policies. Their research suggests that quantitative studies can include factors to help explain teachers' perspectives, and that qualitative data can help make sense of teachers' interpretation of large-scale assessments and accountability policies (Pizmony-Levy & Woolsey, 2017). In my study I am extending my reach to include not only (future) teacher perspectives but also the perspectives of many stakeholder groups. The combination of a variety of types of data and the inclusion of a variety of types of stakeholders can help gather multiple perspectives and can therefore explore different perceptions and responses to assessment and accountability policies (Copp, 2019; Finnigan & Gross, 2016).

Research Design

This study uses a congruent/convergent mixed methods design based on Creswell & Plano Clark's (2018) "Flowchart for Procedures in Implementing a Convergent Mixed Methods Design" (p. 105). Creswell and Plano Clark (2018) explain that "the convergent design occurs when the researcher intends to bring together the results of the quantitative and the qualitative data analysis so they can be compared or combined" (p. 100). Specifically, I use a teacher candidate survey to gather both qualitative and quantitative data, a FEA survey and interviews to gather qualitative data to understand the perspectives of Faculty of Education personnel, interviews with representatives from other stakeholder groups to gain their perspectives, and

document analysis of media and legislative documents to understand political and public perspectives and legal actions. Through phases of analysis, I combined results from the TC survey, FEA survey, and interviews, using both qualitative and quantitative data and multiple methods to gain a better understanding of each stakeholder's perspective connected to the creation (stage 1), implementation (stage 2) and, cancellation (stage 3) of the MPT mixed-methods case study. In each of the five phases of the research design, explained below, I organize my data sources in ways that examine, analyze, and address each mixed-methods case study stage from each stakeholder perspective. See Table 1 below for a summary of the phases of the research design.

Table 1

Summary of Phases of Research Design and Data Sources

Phases of Research Design

Phase	Tasks	Analysis Tools
Phase I – Document Analysis Across Stages	- Gathered Documents for Analysis - Submitted Research Ethics	- Document Extraction Tool
Phase II – Data Collection Across Stages	- Sent out Teacher Candidate Survey - Sent out Faculty of Education Administrator Survey - Conducted Interviews	
Phase III – Data Analysis of individual stakeholder perspectives	- Analysis of Teacher Candidate Survey - Analysis of Faculty of Education Administrator Survey - Analysis of Interviews	- Teacher Candidate Survey Matrix - Faculty of Education Administration Survey Matrix - Interview Matrix
Phase IV – Preliminary Findings by Accountability	- Organized the data analysis by stakeholder. - Combined the data by accountability.	- Phase IV Chart - Alignment of Accountabilities and Stages.
Phase V – Interpreting Findings across Stages	- Reorganized data analysis by stage.	- Phase V Chart - Model of findings within and across

Phase I – Document Analysis Across Stages

In Phase I, I gathered and analysed a selection of documents pertaining to the creation, implementation, and cancellation of the MPT. I completed a direct content analysis (Hsieh & Shannon, 2005) to gain a comprehensive understanding of the case as presented in documents related to three stages (creation, implementation, and cancellation) of the MPT. This analysis helped gain the perspectives of certain stakeholders and accountabilities, while also creating a base understanding of the MPT in each stage. These documents also informed the development of the surveys in Phase II.

Inclusion and Exclusion Criteria

The documents that I choose to include in Phase I are specifically connected to one of the three stages of my study, creation, implementation, or cancellation, encompassing the years 2016 to 2022. The MPT was a highly visible test that generated a lot of media attention. From the onset there was a lot of "buzz" around the creation of the MPT; this took place mostly in mainstream media outlets such as news articles. There were also publicly available legislative documents, as well as publicly available policy documents released by stakeholders, which were available on their websites. Table 2 below, is a summary of the publicly available documents surrounding the MPT. A full list of the publicly available documents used in this study can be found in Appendix A. I acknowledge that many other documents could have been consulted, especially on the lead up to the creation of the MPT. However, those selected for analysis enabled me to gain a deeper understanding of the perspectives that I was not able to gain through the surveys and interviews conducted in Phase II.

Table 2

Summary of Documents Collected Over the Three Stages of the MPT

Documents	**Stage**		
	Creation	**Implementation**	**Cancellation**
Hansard Transcripts	33	10	
Ontario Teacher Candidates' Council v. The Queen, 2021 ONSC 7386			1
News Articles	11	17	5
Policy Documents	8	10	4
Total: 99	52	37	10

Document Analysis

In Phase I, I focused on understanding the three stages of the MPT: creation, implementation, and cancellation. To do this, I used document analysis to gain background information, drawing on a variety of sources, such as news media articles, legislative documents, and stakeholder announcements (Cardno, 2018). To guide my analysis, I developed a framework of questions based on the work of Cardno (2018) and White (2022). The questions I developed were:

- Where was the document produced and when?
- Where was it located?
- Was it easy or difficult to access?
- Why was the document produced?
- Who wrote the document?
- What is their position, and do they have a bias?
- Who was it written for?

To see the full extraction tool that I developed, please see Appendix B. Along with the extraction tool, I also developed a coding system, using an accountability chart (see Table 3

below). The chart below was informed by the literature, to ensure that each accountability could be identified in the selected documents. The need for a set of key words and phrases was to make sure that each accountability could be clearly identified in the selected documents. To organize the documents, I used NVivo, categorizing them into Hansard Transcripts, policy documents, and news articles. I then further subdivided them into creation, implementation, and cancellation sections. After the documents were organized, I started the manual coding process of each document. The codes that I used can be found in Table 3 below. These codes were developed using my conceptual and theoretical framework. Each accountability is associated with concepts and key words. I chose to include not only the name of the accountability, but also the concepts and key words, because the accountabilities are not always obvious in how they present.

Table 3

Summary of Accountability Chart with Associated Concepts / Key Words

Accountability	**Concepts associated / Key Words**
Administrative	Formal organization, bureaucratic, procedure, public functions, educational programs
Legal	Laws, regulations, violations, actions, goal is achieved
Political	Public demands, elected officials, government
Professional	Specialized knowledge, skills, professional standards, teacher qualifications
Moral	Societal norms and behaviours, equity, personal commitment to values
Market	Competition, innovation, school choice
Performance	Rank, performance-based, large-scale assessments.

Research Ethics

Ethics approval was required for data collection in Phase II of my study. The TC survey, FEA survey, and interviews each involved human subjects. I worked closely with my supervisor while I prepared my ethics submission. After my proposal defense, I submitted my ethics application in early April 2022. There was one crucial alteration involving the TC survey's recruitment process. Initially I planned to distribute the TC survey through Faculties of

Education Deans and Directors, which they would forward to their students. However, upon receiving feedback by the uOttawa REB, I learned that I needed to apply to 13 separate university ethics boards, which was deemed unfeasible due to time constraints (See Appendix C). I resubmitted my ethics stating that I would be sending the survey out through a public Facebook group called "Rethink the Teacher Candidate Math Legislation", which has almost 5000 Facebook members who are mainly teacher candidates. This was a group that was started by Bella Lewkowicz, who is a co-founder of the OTCC and a main contributor to the cancellation of the MPT. I recognize that this may have created a bias in my sample, and I address this bias by surveying this group in my limitations section. After the minor changes were approved, I obtained research ethics approval from the University of Ottawa Research Ethics Board (See Appendix D). Receiving approval in June 2022 gave me the summer to create my surveys in accordance with my conceptual framework. I started my recruitment for Phase II in September 2022.

After sending out the administrative survey, I did get one request for further REB clearance from a Faculty of Education dean's office, in September 2022. They said that they could not complete the survey without clearance from their REB. I was able to make a connection with their REB and got clearance within the week.

Phase II – Data Collection Across Stages

The data collection phase included two surveys, one for the TCs, and one for the Deans of Faculties of Education and Directors of Teacher Education Programs, with items on both surveys pertaining to each of the three mixed-methods case study stages. The other main data came from semi-structured interviews with other stakeholders who were connected in some way to the MPT. All interviews were audio-recorded and transcribed. Through different methods of

data collection and using Likert scales, open-ended questions, document analysis, and interviews tailored to the individual participant, I layered all these multiple methods together to be able to provide a robust picture of the situation. In Table 4 below I provide a list of the data sources I used and show how the data sources relate to the three stages; for a detailed list of Data Sources for Phase I see Appendix A and for Phase II see Appendix E.

Table 4

Summary of Data Sources

Data Sources	**Number of Participants**	**Stage**		
		Creation	Implementation	Cancellation
TC Survey	349 started the survey. 260 finished the survey.	X	X	X
Faculty of Education Administrative Survey	10	X	X	X
Stakeholder Interviews	10	X	X	X

Teacher Candidate Survey

The TC survey was comprised of 24 questions, which were aligned with, and informed by the seven accountabilities, and the three stages in my mixed-methods case study. The survey includes demographics, multiple choice questions, one set of Likert scale questions, and open-ended questions. Some of responses collected provide quantifiable indicators of perspectives and backgrounds of the TCs on each of the three stages (Creswell & Creswell, 2018). Other questions were open ended, which then I coded qualitatively.

Inclusion and Exclusion Criteria. The target population for the TC survey was comprised of TCs who were enrolled in an ITC program from 2018-2022. This specific timeframe was chosen to gather data from individuals who may have experienced any interaction or engagement with the MPT. Although participants were required to indicate whether they had

taken the MPT in the survey, even those who did not take the MPT, but were perhaps preparing for it or anticipating it, were included in the study. This decision was made because some participants might have been scheduled to take the MPT at the time of the cancellation, and their perspective would add to the study. Approximately 66% of participants did take the MPT.

Recruitment Strategies. In September 2022, a post was published on the public Facebook group "Rethinking the Teacher Candidate Math Legislation". As mentioned in my ethics section, I was unable to contact TCs through the Faculties of Education, which resulted in posting the survey on a public Facebook page, with the help of Bella Lewkowicz. The group has 4,373 followers and is open to anyone who wanted more information about the MPT; most members were current TCs at the time of the implementation of the MPT. To see the Facebook post from September 14, 2022, that Bella Lewkowicz posted, see Appendix F. After the post was published on Facebook, the results started coming in rather quickly.

Sample Size. A total of 349 TCs clicked on the survey link from the Facebook post, of which 260 completed all 24 survey questions. I did not have a specific target number of participants to recruit; instead, the goal was to collect enough responses to gain a general understanding of TC perceptions and perspectives on the MPT.

Participants. The data from the survey reflected the demographics of the 260 participants who completed the TC survey. There were 15 Ontario Universities with Teacher Education Programs represented in the survey. Of the TCs who completed the survey, 64% of participants had completed a B.Ed. at the time of taking the survey, while 36% of the participants were in the midst of their Teacher Education program. Fifty three percent of TCs were certified to teach Junior/Intermediate or Intermediate/Senior students; of those participants, 18% reported

having math as a teachable. The majority of respondents (57%) last took mathematics or statistics in high school.

Data Collection. When creating the survey questions, I first came up with questions that seemed related to the MPT. These were questions that were of interest to me or ideas that felt important and connected to the MPT. Through talking with my committee and supervisor I found that I needed to make sure that the questions aligned with the three stages of the study and with the seven accountabilities that are the basis of my three research questions (See Appendix G for the TC survey questions connections to literature). Through many revisions, incorporating information from my document analysis, as well as checking X-formerly-Twitter to see which pressing issues emerged in the media, I was able to create questions that not only addressed the accountabilities but also fell under the three stages (creation, implementation and cancellation) (See Appendix H for the TC survey matrix). The accountabilities are made clear in the matrix but may not be obvious in each statement or question. I made sure that each question/statement relates to at least one stage and one accountability. I am assured that each survey question/statement directly relates to and helps me answer my research questions. I then used X-formerly-Twitter to see some of the reactions (positive and negative) from TCs at each stage of the MPT. After the survey was created, I asked colleagues in my cohort and my supervisor to test the survey for glitches and any major errors in either clarity or function. After that I asked Bella Lewkowicz to test the survey for content and to see if those questions made sense for the audience. The survey was open for one-month, mid-September to mid-October 2022 and then the results were downloaded and stored in a password-protected file on my computer (See Appendix I for TC Survey Questions).

Faculty of Education Administrative Survey

The FEA survey composed of 15 questions, one of them being an invitation to set up a follow up semi-structured interview to discuss /follow up on the survey results.

Inclusion and Exclusion Criteria. The target population was Administrators (Deans and Directors of Teacher Education Programs) who held those positions at a Faculty of Education in Ontario from 2018-2022. The FEA were interacting with the TCs and the MPT during the three stages of the MPT.

Recruitment Strategies. I used publicly available information to generate a list of 31 names. I found this information on the Ontario Association of Deans of Education website as well as the official University Faculties of Education websites. After compiling a list of e-mail addresses, I sent out a recruitment e-mail to 31 participants. Please see Appendix J for the recruitment e-mail.

Sample Size. This study initially aimed to recruit a purposeful sample of 10-15 Deans and/ or Directors of teacher education. Recognizing that people in these positions are very busy I did not expect to have more than 15 participants. A total of 10 administrators responded to the recruitment e-mail and filled out the survey. Of those 10, four administrators volunteered to participate in the follow up interview. See Appendix K for follow up interview e-mail to administrators and see Appendix L for interview consent form. In the end, one administrator had to decline the interview invitation because they felt that in an interview, even with their identity hidden, it would have been too easy to identify them through any comments they made. This was due to the participant's specific role at the time of the MPT.

Participants. Table 5 summarizes the 10 participants who filled out the FEA Survey, indicating the positions that they held at the time they completed the survey. The identifier

column is used to identify each of the FEA participants who responded to the survey. These identifiers will be used to identify each FEA who is quoted in the Findings chapter (Chapter Five). There was one participant who was not in my original target population, a professor of Mathematics Education courses. Their dean suggested that I speak with them, and I thought their perspective would add to the study. At the time of the survey, all participants had been in their position from one to eight years and had between 65 and 1500 students in their ITE programs.

Table 5

Summary of Faculty of Education Administrative Participants by Position at Faculty of Education.

Position	Number	Identifier
Dean of Faculty of Education	6	A1, A2, A3, A4, A5, A6
Associate Dean / Vice Dean	1	A7
Director / Chair of Teacher Education	1	A8
Assistant Director Teacher Education	1	A9
Professor of Mathematics Education Courses	1	A10

Instrument Design Data Collection. Similar to the TC survey, when creating the FEA survey questions, I made sure that the questions aligned with the three stages of the study and the seven accountabilities that are the basis of my research questions. This survey aimed to gain the perspectives of the FEAs who interacted with the TCs and the MPT. Through interviewing the FEAs I aimed to gain an insider perspective of how, if at all, the MPT impacted their ITE programs. The survey was made up of five demographic questions and 10 open-ended questions, three questions for each stage of the MPT and one question to add any additional thoughts (See Appendix M for FEA Survey Questions). After the survey was created, colleagues in my cohort and my supervisor tested the survey for glitches and any major errors in either clarity or function.

The survey was open for one-month, mid-September to mid-October 2022, then the results were downloaded and stored in a password-protected file on my computer.

Interviews

The interviews with other stakeholders, connected to the MPT, were conducted over a six-month period, from July 11th, 2022, to November 18th, 2022, which allowed enough time for each participant to schedule a time that worked best for them. This group of participants encompassed a wide range of occupations within and related to education, and I was grateful for any time I was able to speak with them.

Inclusion and Exclusion Criteria. The target population included individuals who were connected to the MPT, which included politicians, people connected to the legal case, professors at Faculties of Education, as well as representatives from: People for Education, OTCC, OTF, and OCT (See full list of interview participants in Table 6). I explain more in my recruitment strategy, but, basically, I came up with an initial list of names of people to contact, while also taking suggestions from interviewees on whom I should interview next.

Recruitment Strategies. I initially met with Bella Lewkowicz, for an informal conversation and she helped me develop a list of names of those who were connected to the legal case of the MPT. Additionally, I also received suggestions of people to interview from my committee members. I found their contact information on publicly available websites. I then sent out an invitation to participate in an interview and offered possible dates to meet. Each participant was e-mailed individually and asked to indicate a time that was most convenient for them to have an interview. Please see Appendix N for the stakeholder recruitment e-mail. After a date and time were established though a doddle poll, I sent them a zoom link with the preferred time as well as a consent form to be signed and returned before the start of the interview (See

Appendix L). I sent out 15 e-mails in total. The e-mails were sent over a six-month period, due to the fact that during my interviews, participants recommended additional people to interview. Over the recruitment period, my name was passed on by my participants or e-mail addresses were given to me by participants. These were contacts and connections I would not have been able to find on publicly available websites.

Sample Size. I received many responses to my e-mails, however, quite a few people responded that they were unable to speak to me. For instance, some had a conflict of interest, had signed a non-disclosure agreement, or were directly, or indirectly involved in a past or upcoming court case regarding the MPT. Initially I found this discouraging as it did not allow me to gather as many participants' perspectives as I would have liked; however, over the six-month data collection period I found that it showed that my study was relevant and timely. I was able to have 10 interviews ranging from 23 to 55 minutes in length (See Table 6 below). Three of the interviews came from participants in the FEA survey.

Participants. Table 6 is a list of the participants who I interviewed, along with the length of each interview. The identifier column is used to identify each of the Stakeholder participants who I interviewed. These identifiers will be used to identify each Stakeholder who is being quoted in the Findings chapter (Chapter Five). There were three FEAs that were willing to participate in a follow up interview after completing the FEA survey, I use the same identifier for them that was used in the FEA survey identifier in Table 5. All but one of the participants wished to stay anonymous. I have given a general job title to each participant without revealing their identity. This shows the range of participants I interviewed, while still respecting their anonymity. Each participant was given the chance to review their transcript after the interview.

Table 6

Summary of Interview Participants and Duration of Interview.

Interview Participants	Length of Interview	Identifier
Professor at a Faculty of Education	28 minutes	A5
Representative of People for Education	35 minutes	S1
Representative of OTCC Co-Founder (Bella Lewkowicz)	55 minutes	S2
Representative of OTCC	51 minutes	S3
Chair of the Undergraduate Program at a Faculty of Education	28 minutes	A8
Representative of Ontario Teachers' Federation (OTF)	50 minutes	S4
Professor at a Faculty of Education	46 minutes	S5
Member of Provincial Parliament	23 minutes	S6
Représentant de l'Association des enseignantes et des enseignants franco-ontariens [Representative of the Association of Franco-Ontarian Teachers]	27 minutes	S7
Assistant Professor at a Faculty of Education	30 minutes	A9

Data Collection. Preparing for the first FEA interview, I was able to look at the FEA survey responses and develop follow up questions to ask the participants who agreed to an interview (See Appendix O for examples of interview questions). For the rest of my participants, I expanded on my FEA interview questions and adapted the questions depending on the participant. I wanted to ask questions that were tailored to their specific involvement in the MPT. The questions were all open ended and allowed the participant to speak to the specifics of the MPT that they knew about. Similar to the survey questions, the questions followed a flow of the three stages of the MPT, creation, implementation, and cancellation.

Phase III – Data Analysis of Individual Stakeholder Perspectives

In Phase III I organized the data collected in phase I and phase II by stakeholder and stage (See Table 7 below). By organizing the data by stakeholder (horizontally on the diagram), I was able to analyze the individual stakeholders' perspectives at each stage through the lens of my conceptual framework. The analysis done in this phase was organized by stakeholder, type of data, and the seven accountabilities. For instance, firstly for the TCs, I used evidence from the document analysis, statements made from the OTCC and news articles, and the TC survey. Secondly, for the administrators I used evidence from the document analysis, statements made by stakeholder groups and news articles, and the FEA survey. Lastly, for the other stakeholders I used evidence from the document analysis, statements made by stakeholder groups, Hansard transcript, policy documents and news articles, and semi-structured interviews. By using different types of data for each stakeholder, (document analysis, surveys, and interviews), this allowed me to triangulate the sources (Jick, 1979). This phase helps to provide a description of each stakeholder groups' perspectives and the respective accountabilities that come into play for each group across the three stages of the MPT.

Table 7

Phase III – Data Analysis of Individual Stakeholder Perspective

Stakeholders	**Data**	**Conceptual Framework**	**Stages**		
			Creation (Stage 1)	Implementation (Stage 2)	Cancellation (Stage 3)
Teacher Candidates	Document Analysis	Seven Educational Accountabilities	Administrative	Administrative	Administrative
	TC Survey		Legal	Legal	Legal
			Political	Political	Political
			Professional	Professional	Professional
			Moral	Moral	Moral

			Market	Market	Market
			Performance	Performance	Performance
Faculties of Education Administration	Document Analysis	Seven Educational Accountability	Administrative	Administrative	Administrative
	Administrative Survey		Legal	Legal	Legal
	Semi-Structured Interviews		Political	Political	Political
			Professional	Professional	Professional
			Moral	Moral	Moral
			Market	Market	Market
			Performance	Performance	Performance
Key Stakeholders	Document Analysis	Seven Educational Accountability	Administrative	Administrative	Administrative
	Semi-Structured Interviews		Legal	Legal	Legal
			Political	Political	Political
			Professional	Professional	Professional
			Moral	Moral	Moral
			Market	Market	Market
			Performance	Performance	Performance

Analysis of Teacher Candidate Survey

After the survey responses were collected, I used the matrix to organize the responses under each accountability. The short answer questions were fairly straightforward to categorize under each accountability. The example I have in Appendix P looks at question 12, which exclusively looks at performance accountability in the implementation (stage 2). However, the longer answers were analysed by using qualitative analysis methods that included coding responses with multiple codes because the responses often included more than one accountability. The example I have in Figure 3 below looks at question 16, which was about the cancellation (stage 3) of the MPT.

Figure 3

Long Answer Coding Example for TC Survey

Math Proficiency Test Teacher Candidate Questionnaire

Q16 What was your reaction when the MPT was cancelled?

Answered: 255 Skipped: 94

#	RESPONSES	ACCOUNTABILITY
1	Relief. The test was poorly conceived and felt like more a public statement and blaming of teachers than a solution to problems. I'm all for investments in education and pre-service teachers. But it wasn't likely to result in a measurable improvement in the next few years. Given the time it takes for the average graduate to have their own full time classroom, even if studying for the MPT magically gave them real, applicable, and relevant skills to teach math to a diverse group of learners, it would be years before they would be the ones writing the lesson plans and supporting their own students. Supply teachers who are only in for a day or two at a time aren't as likely as the permanent teachers (who were not tested) to create lasting change in a student's math ability.	Moral, Professional, and Market
2	Glad- I would rather take math classes to help improve my math skills than a test that doesn't indicate my math level.	Moral, Professional, and Performance
3	I was thrilled!	Moral
4	Relieved	Moral
5	While I had already successfully completed the MPT, I was glad to see it cancelled, as I know it was causing stress for many incoming pre-service teachers. Even after passing the MPT, I did not feel any more qualified to teach a Math class, and I cannot imagine that any other non-Math teacher did either.	Moral, Professional, and Performance
6	I would like to see a better solution implemented.	Administrative
7	Disappointed	Moral
8	Happy for future teachers.	Moral and Market
9	Despite having already taken and passed it I felt relief. Relief because I thought no one after me would ever have to go through the amount of stress that I did trying to pursue their dream.	Moral and Market

I coded the responses by accountability, as you can see on the right-hand column. Once every answer was coded, I organized the responses by accountability. At this point I had my supervisor review my work; this helped make sure that I was consistent in my coding. After the coding was checked, I then started analyzing for themes within each accountability.

Analysis of Faculty of Education Administrative Survey

When creating the questions for the FEA survey, I linked each question to one of the three stages in my mixed-methods case study (See Appendix M for the FEA survey). When I began the analysis of this survey, I read each response and put the responses under each accountability, using the accountably framework with key words (See Table 8 for Accountability framework with key words). After meeting with my supervisor, she suggested that instead of

chunking the responses by paragraph, I should break down the response sentence by sentence. This helped keep the already overlapping accountabilities separate and aided in my analysis. By pulling out each part of the response by item and categorizing the item under each accountability, this allowed for a more detailed analysis of the responses. There were many different accountabilities intertwined in the responses, so by breaking each response down, I was able to isolate sections that related to the seven accountabilities. I found that the survey was an anonymous space for the administrators to elaborate about the MPT, which generated many rich responses to the survey questions. Once the responses were coded alongside the seven accountabilities, I grouped the response segments by code. Please see Table 8 which focuses on question 5 as an example.

Table 8

Example of Coded Responses from Item on Faculty of Education Administrative Survey

	Question: 5
Accountability	Do you think teacher testing is beneficial? Why or why not?
Administrative	
Legal	
Political	No, governments should trust Faculties of Education to graduate students who are ready to enter the profession (A5, FEA Survey, 2022). Beneficial for whom? I don't think it is very beneficial for teacher candidates in general, although it may have encouraged some to review their mathematics knowledge. It may have been beneficial for the provincial government in some way (A2, FEA Survey, 2022). If by teacher testing you mean the MPT, then no. It was a purely political exercise. We already have mechanisms to indicate whether teachers have what they need to come into teaching, and the test created was a joke (A7, FEA Survey, 2022).

Professional	There are some benefits to assessing knowledge and skills of teachers over time. There is a need to have some assurance of basic professional knowledge and skills (A4, FEA Survey, 2022). No. The research on the effects/affect of teacher testing is pretty clear: It is generally not correlated with student and classroom outcomes (A10, FEA Survey, 2022). No. Tests have limited value in judging professional knowledge or behaviour. One can say, remember, and do the procedures and still not be a great teacher. Teaching is about relationship (A1, FEA Survey, 2022).
Moral	Beyond the empirical evidence, I suspect that teacher testing probably has a negative effect on education as a whole - it likely raises stress amongst teachers, erodes trust about and within the profession (both within system and publicly), and conveys the message that testing is the most effective way of assessing knowledge and professional practice (A10, FEA Survey, 2022). Testing often serves to benefit those with access to resources, especially those not experiencing time scarcity…Traditional testing often disadvantages neurodiverse individuals. Testing also often locates the source of any difference or deficiency within the locus of the individual teacher rather than the systemic design which reproduces such differences and constructs them as deficiency (A9, FEA Survey, 2022).
Market	
Performance	Testing programs within programs of education, for diagnostic and supportive purposes, are fine (A6, FEA Survey, 2022). No. Not at all. Standardized tests are too narrow in format and score to capture all that is required to be a teacher. Preparing for a test is exactly what we do not want our students to do - we want them to have a growth mindset. This type of test assessed superficial knowledge at best and wastes a considerable amount of time (A3, FEA Survey, 2022). … Teacher testing can include testing before entry to a program, during initial teacher education, during the certification process, or ongoing for renewal of a teaching license. … I do agree with this statement to a degree but am also cognizant of the fact that testing has and can be used to discriminate and limit opportunities for the makeup of the teaching workforce in ways that are inequitable. Testing can be a cost-effective measure for filtering the teaching workforce but often these are imprecise measures that do not take into account the potentially lost value across other indicators. Again teacher testing can be beneficial IF it is used to identify areas for growth and timely intervention or

	uncovering hidden learning difficulties (diagnostic teacher testing) … Ironically, teacher testing on occasion may be the cause of the same issue it is trying to address (A9, FEA Survey, 2022). In some ways. We use one with our PJ students, to see their incoming math ability (A9, FEA Survey, 2022).

Analysis of Interviews

The interview questions were derived from the FEA survey and adapted for each participant. I recorded the interview on zoom, used the transcription feature on Zoom and downloaded the transcription to a password protected folder on my computer. I reviewed the transcript, while playing the audio. This step was to ensure the correct words were transcribed, and I could make any adjustments to the transcripts, if there were errors in the Zoom transcription. I then reread the transcripts and highlighted each sentence, or group of sentences, that pertained to each accountability. See the examples below of how portions of different transcripts were coded by accountability.

Table 9

Example of Coded Transcript

Examples of Coded Transcript		
Stage	**Quote**	**Accountability**
Creation	While they were developing the test, we spoke about the notion of assessing complex skill sets by an online multiple-choice test (S3, Stakeholder Interview, 2022).	- Performance
Implementation	There is a certain number of Teacher Candidates that you need each year to graduate. There is the pressure from outside the university, and from inside the university to have certain numbers to make programs economically feasible (A9, Stakeholder Interview, 2022).	- Administrative - Market
Cancellation	If we had way richer coursework, including appropriate assessments along the way, consistently at every institution in Ontario, with faculty that we're buying into it not trying to	- Administrative - Professional

	avoid it at all costs, by sort of just passing students through. If we actually had that, then maybe we wouldn't need a test (A5, Stakeholder Interview, 2022).	

My first readthrough of each interview was to refamiliarize myself with the content. The second readthrough was used to code portions of each interview by accountability, and the third readthrough was to take each coded section and put it into a matrix which organized each interview by stage. As you can see in Table 9 above, the quotes from interviewees are organized by stage and then coded by accountability. I chose to use these examples to showcase the complexity of certain quotes, and how they could fit under more than one accountability. For example, the implementation quote above is coded under administrative and market accountability. The quote: "There is a certain number of Teacher Candidates that you need each year to graduate. There is the pressure from outside the university, and from inside the university to have certain numbers to make programs economically feasible" (A9, Stakeholder Interview, 2022), is coded under administrative and market accountability. I coded it this way because it is connected to the supply and demand of a university to accept an adequate number of TCs, and a market pressure to produce a certain number of teachers to go into the workforce. It was difficult to extract the two accountabilities, however I believe both accountabilities are present in the quote. After organizing and separating the data into seven different accountabilities, I used the definitions of each accountability (see Table 3) to help organize and analyse the data which helped me come up with the themes under each accountability under each stage.

Phase IV – Preliminary Findings by Accountability

After conducting a preliminary analysis of the documents, surveys, and interviews, I proceeded to organize the coded data based on stakeholder, accountability, and stage. This involved examining each stakeholder's perspective within each educational accountability

separately, which resulted in twenty-one boxes for each stage. Below in Table 10 I show the organizational structure of my analysis. Each of the seven accountabilities is present under each source of data and under each stage.

Table 10

Phase IV - Alignment of Accountabilities and Stages.

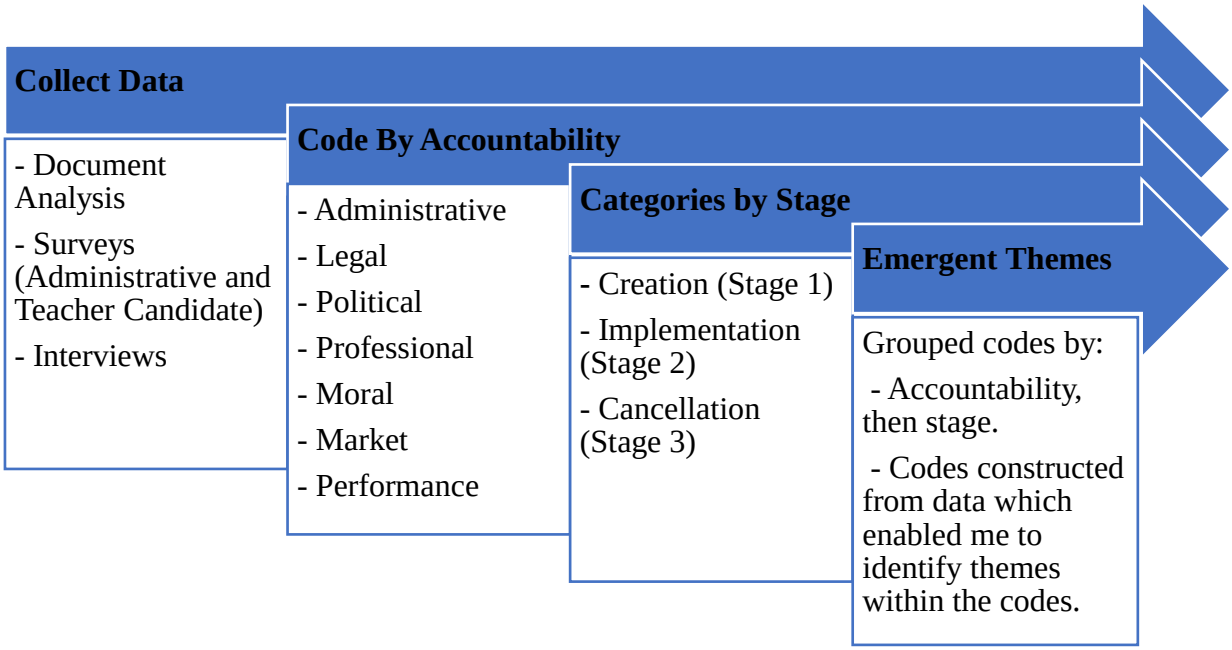
Phase IV – Alignment of Accountabilities and Stages.				
Stakeholders	**Conceptual Framework**	**Stages**		
		Creation (Stage 1)	Implementation (Stage 2)	Cancellation (Stage 3)
Teacher Candidates	Seven Educational Accountabilities	Administrative	Administrative	Administrative
		Legal	Legal	Legal
		Political	Political	Political
		Professional	Professional	Professional
		Moral	Moral	Moral
		Market	Market	Market
		Performance	Performance	Performance
Faculties of Education Administration	Seven Educational Accountability	Administrative	Administrative	Administrative
		Legal	Legal	Legal
		Political	Political	Political
		Professional	Professional	Professional
		Moral	Moral	Moral
		Market	Market	Market
		Performance	Performance	Performance
Key Stakeholders	Seven Educational Accountability	Administrative	Administrative	Administrative
		Legal	Legal	Legal
		Political	Political	Political
		Professional	Professional	Professional
		Moral	Moral	Moral
		Market	Market	Market
		Performance	Performance	Performance

By organizing the data in into twenty-one boxes per stage it allowed me to see each stakeholder's interaction with each accountability, within each stage. I chose to write up each accountability, encompassing the three stages, to limit repetition within each accountability. This helped me understand how different stakeholders interacted with each other within each stage

and accountability. After the data was collected, organized and coded by accountability, and categorized by stage, I focused on each of the 21 boxes to analyze for themes within each accountability and within each stage (see Figure 4 below). There were some themes that emerged under multiple accountabilities, which resulted in some overlap in reporting of the themes that arose across the three stages, which are presented in the Findings Chapter (Chapter Five).

Figure 4

Diagram of Data Collection, Code by Accountability, Categories by Stage and Emergent Themes



After the data was coded by accountability, I was able to write up themes for each accountability under each stage. During this phase, I collaborated closely with my supervisor to ensure that I accurately represented the diverse and mixed data sources collected (documents, surveys, and interviews). Below, in Figure 5, is an example of how I took the data from the documents, surveys, and interviews and organized the codes into themes. I give an example of

administrative accountability under the implementation phase to illustrate what I did for each accountability under each stage.

Figure 5

Example of Administrative Accountability Under the Implementation Stage

Using Figure 5 as an example, below are the themes that emerged for administrative accountability under the implementation phase.

1. The procedural aspects of the MPT were not communicated properly to the TCs.
2. Teacher Education Programs felt the effects of the implementation of the MPT, which impacted their programs.
3. The implementation of the MPT strained relationships between stakeholders.

I continued to do this step for each accountability under each stage. In the first part of the Findings Chapter (Chapter Five), I wrote themes for each accountability and how it presented within each stage of the study.

Phase V – Interpreting Findings Across Stages

After the data was analysed by stakeholder perspective and accountability, written up under each accountability in the first part of the Findings Chapter (Chapter Five), I started answering each individual research question by stage (See Table 11 below). I wanted to see how

the different educational accountabilities and connected stakeholders interacted in each of the creation, implementation, and cancellation stages as outlined by my research questions:

1. How have different educational accountabilities and connected stakeholders interacted with the creation of the MPT?
2. How have different educational accountabilities and connected stakeholders interacted with the implementation of the MPT?
3. How have different educational accountabilities and connected stakeholders interacted with the cancellation of the MPT?

After completing the first part of the Findings Chapter (Chapter Five), which was organized by accountabilities, within which I spoke about the 3 stages, I organized the accountabilities by stage. That is, I looked at the seven accountability findings within each stage. I then highlighted themes under each accountability and stage. These themes were reviewed with my supervisor, and through this process, I extracted and grouped similar themes to focus on my research questions and interpret findings across the stages. The main themes are reported in the second part of the Finding Chapter (Chapter Five). After the findings were written up by accountability I went back over my findings and regrouped the findings into stages. In other words, I would look across the themes for each accountability within that stage. When I grouped the findings by stage, I was able to identify themes withing each stage, that cut across accountabilities. By taking a holistic view, I observed how stakeholders' perceptions of the MPT align and differ within and across stages (Creswell & Plano Clark, 2018).

Table 11

Phase V - Model of Findings Within and Across Stages with Research Questions

Phase IV – Alignment of Accountabilities and Stages.		
Stakeholders	**Conceptual Framework**	**Stages**

		Creation (Stage 1)	Implementation (Stage 2)	Cancellation (Stage 3)
Teacher Candidates	Seven Educational Accountabilities	Administrative	Administrative	Administrative
		Legal	Legal	Legal
		Political	Political	Political
		Professional	Professional	Professional
		Moral	Moral	Moral
		Market	Market	Market
		Performance	Performance	Performance
Faculties of Education Administration	Seven Educational Accountability	Administrative	Administrative	Administrative
		Legal	Legal	Legal
		Political	Political	Political
		Professional	Professional	Professional
		Moral	Moral	Moral
		Market	Market	Market
		Performance	Performance	Performance
Key Stakeholders	Seven Educational Accountability	Administrative	Administrative	Administrative
		Legal	Legal	Legal
		Political	Political	Political
		Professional	Professional	Professional
		Moral	Moral	Moral
		Market	Market	Market
		Performance	Performance	Performance

Summary Research Design

My research investigates how different stakeholders interact with seven educational accountabilities across three stages, creation, implementation, and cancellation. This chapter provided a detailed account of the research design across the five phases. In Phase I, II and III, the elements include details on data collection and organization and preliminary analysis of the data including: inclusion and exclusion criteria, recruitment strategies, sample size, and participants. As I designed my research, I was aware of my bias while analysing and interpreting the data and had my supervisor check over the analysed data, to ensure that I was not only presenting the points that I resonated with. In the previous chapter, I presented my theoretical and conceptual framework, which showcases the different educational accountability and how they interact with different stakeholders and the MPT. My research design included qualitative

and quantitative techniques and multiple types of data to unpack the complexity surrounding each accountability within each stage. This was done by collecting a large amount of data by many different stakeholders who were connected to the MPT. The following chapter will provide the key findings from my analyses (Phases IV and V) of the data collected in Phase I, Phase III, and Phase III.

Chapter Five: Findings

This chapter is organized into two parts. In the first section of this chapter, I present the findings that emerged from the analysis in Phase IV of my research design. I highlight each of the seven accountabilities, which are referenced in my conceptual and theoretical framework. The first section is organized around these seven accountabilities and the themes that have emerged from my data. The reporting of findings includes the mixing of qualitative and quantitative data across sources to report mixed evidence. In the second section of this chapter, I present the findings that emerged from the analysis in Phase V of my research design and summarize these findings to address my research questions. I discuss the major themes within each of the three stages (creation, implementation, and cancellation). In this way I examine the ways in which the accountabilities and stakeholders interacted within each stage and present the themes that emerged when looking at those interactions.

Findings Organized by Accountability

Below I am reporting on my analysis from Phase IV and discuss my findings organized by accountabilities. Within each accountability section I discuss how this accountability played out within each of the three stages of creation, implementation, and cancellation. I demonstrate how each accountability revealed itself across each stage of my study: creation, implementation, and cancellation. This structure allows for a comprehensive exploration of different stakeholder perspectives within each accountability and at various stages.

Administrative Accountability

Administrative accountability, also known as bureaucratic accountability, is defined by Darling-Hammond (1989), and Pollock and Winton (2016) as the responsibility of a formal organization, that is usually organized in a bureaucratic manner, that relies on internal means of

control. These organizations intend to ensure that public functions are being carried out and educational programs are delivered through a set procedure that teachers in the schools are expected to follow.

Creation. The MPT was introduced when teacher candidates (TC) were in the middle of the teacher education program, and it applied to those who were already enrolled as well as future TCs. In other words, the certification requirements were changed when students were already on the path to complete the certification requirements. When the MPT was created it raised concerns that a major bureaucratic decision could be imposed on a group of TCs who were already partway through their two-year teacher education program. The OTCC clearly stated this issue in their position letter:

> The majority of TCs graduating from Ontario Faculties of Education in the spring of 2020 began their ITE programs in September of 2018. When they entered the program, the MPT was not a requirement to obtain certification with the OTC. Prior to the MPT requirement, TCs graduated from ITE programs with a recommendation to the OTC from their respective Faculties of Education for certificates of qualification. (Vandersel, 2020)

In other words, when these TCs entered their ITE program there was one set of expectations and requirements for certification and then those expectations and requirements shifted with the announcement of the MPT. This caused particular problems not only for the TCs, but also the Faculties of Education.

TCs felt under a time crunch to not only complete the requirements of the program but to find time to prepare for and take the MPT before certification. TCs reported that not only was there no forewarning, but many TCs faced time constraints in having to take the test before becoming certified. One TC explained that “They introduced it [the MPT] during my second

year of my B.Ed., so it was extremely rushed and stressful for students in my year to try and get this done before our careers start" (TC Survey, 2022). Even those TCs who felt confident in their mathematics skills were frustrated by the change in certification requirements mid-degree.

When the new certification requirements were announced, requiring the passing of the MPT, many of the TCs felt that the certification requirements were unclear, causing confusion. When surveyed, 74% of TC did not think that the relationship of the MPT to teacher certification was clearly communicated (TC Survey, 2022). Many TCs were surprised that the certification requirements could change in the middle of their ITE program. It would seem to make more sense if a new process or requirement for certification is required, then it would be implemented with the next incoming group of TCs. However, the MPT was created and required by all TCs who were currently enrolled in a B.Ed. program.

Analysis of the qualitative surveys and interviews, and the quantitative TC survey, showed that when the MPT was introduced, tensions also arose between the MOE, the OCT, and the Faculties of Education at Ontario Universities. When the MOE announced the creation of the MPT in 2019 the OCT released a statement stating: "Council [of the OCT] firmly believes that the College should not develop, fund, or implement the test proposed in Bill 48. However, the College should have the regulatory authority to impose it as a condition of certification and the authority to deem equivalence" (Ontario College of Teachers, February 25, 2019a). Within that statement we can see that, initially, there was opposition to the MPT, however, the College also reserved the right to require the test for certification or come up with an equivalent to the MPT.

During the creation of the MPT, educational experts were in communication with the MOE. There were two sides being presented, one side encouraging the creation of an MPT, and another side advocating the opposite. One Faculty of Education professor stated that a group of

math educators “have been advocating for many, many years in informal documents, for increased standards, both coursework, and some sort of minimal competency requirement, but focused on the kinds of math understandings that teachers need” (A5, Professor Interview, 2022). When I asked for clarification if the MPT was the sort of competency requirement they were speaking about, their response was “I think we do [need a MPT], because it's the only way that's going to really require people to invest at all, students and faculty and institutions, and professional development and you know, the whole milieu” (A5, Professor Interview, 2022). Other educational experts had a different opinion about the effectiveness of such a test and shared those concerns with the MOE. For instance, one Dean of Education wrote: “I was on the OADE [Ontario Association of Deans of Education] executive, and we had presented a great deal of evidence to the ministry about the ineffectiveness about such assessments and it was ignored” (A1, FEA Survey, 2022). The MOE and Faculties of Education both seemed to be calling for ensuring math competency in TCs but the way to ensure that math competency looked very different. The MOE supported the MPT whereas some representatives from Faculties of Education wanted to implement more mathematics courses in Teacher Education Programs.

Many different players became involved at this point, such as the MOE, OCT, and EQAO. Once the MPT was mandated by the Ministry of Education, OCT had to comply with new certification requirements. EQAO was involved because they were mandated to create the test. Once the test was created it became a certification requirement virtually overnight. The rushed nature of the creation of the MPT made it difficult for Faculties of Education to keep their students up to date, especially because it was not formally part of the ITE program (FEA Survey, 2022).

Within the Faculties of Education there was dissonance around the faculties' involvement in preparing students for the MPT. One Dean of Education wrote: "I don't believe that it is the responsibility of a teacher education program to prepare teacher candidates for the test unless the test directly reflects the expectations of the Ontario College of Teachers for teacher preparation" (A4, FEA Survey, 2022). Each Faculty did what they could in terms of additional workshops and mathematics review courses (FEA Survey, 2022), however, providing support to the TCs caused administrative problems during the implementation phase.

Implementation. Several themes related to administrative accountability emerged when analyzing the data focused on the implementation of the MPT. The main themes were: procedural aspects of the MPT were not communicated properly to the TCs; Teacher Education Programs felt the effects of the implementation of the MPT, which impacted their programs; and lastly, the implementation of the MPT strained relationships between stakeholders.

Data suggests that procedural aspects of the MPT were not communicated properly to the TCs, by the MOE, OCT or EQAO. When surveyed, 78% of TCs did not think that the procedures, such as registration, access, and location were clearly communicated. This sentiment was echoed throughout the TC survey. For instance, a TC, who was a member of the student council for a Faculty of Education, reported in the survey: "The directions and requirements were constantly changing, and the shifting messaging, coupled with unclear communication, added anxiety to the entire process… many students were coming to us for answers that neither we nor the administration had" (TC Survey, 2022). Additionally, many TCs found that there were not enough test spaces available for the number of TCs trying to fulfill this certification requirement (TC Survey, 2022). For instance, one TC said they had to travel from Ottawa to Toronto to take the test in 2019, because there were no open spots available in Ottawa

(TC Survey, 2022). According to a CTV article, TCs were only given 4 days to sign up for the MPT and there were only 6000 spaces for over 6,700 TCs (Campbell, 2021). TCs then turned to their Faculties of Education for answers during the implementation of the MPT, even though the Faculties of Education were not the party responsible for providing a location to administer the test. Faculties of Education were not used as test sites. As one Faculty of Education Associate Dean / Vice Dean explained, when the MOE was looking for testing sites the Faculties of Education spent "hours upon hours of time trying to communicate with the bureaucracy that we did not have 'computer labs' anymore, and that our hardware was not compatible with their proposed software" (A7, FEA Survey, 2022).

Teacher Education Programs felt the effects of the implementation of the MPT, which impacted their programs. As mentioned above, the procedures of the MPT were not communicated properly by those implementing the MPT, and the ITE programs were left to answer questions about procedures from TCs, and in some cases, also felt the responsibility of preparing their students. For instance, one Chair of a Teacher Education program said that they "worked very hard, and repeated the message over and over, that this was a Ministry requirement, that it had nothing to do with our program. It was wise to distance ourselves from it (and you have to feel bad for the organizations like EQAO and OCT that had responsibility for parts of this forced on them)" (A8, FEA Survey, 2022). The disconnect between certification and degree requirements put the Faculties of Education in an awkward position trying to support their students, while also knowing that this certification requirement had nothing to do with their program degree requirements. Although the requirement of the MPT was not tied to TCs graduating from ITE programs, Faculty of Education representatives stated that the MPT was taking up a lot of time, space, and energy, and in some cases, prep courses were set up at the

Faculties of Education, in addition to the required courses related to mathematics teaching. For example, one Dean of Education explained: "We were able to support teacher candidates…by offering workshops and other opportunities to review relevant mathematics. In addition, many teacher candidates organised their own forms of revision. There was also an administrative impact since the program and Faculty leadership had to manage teacher candidates' concerns and anxiety" (A2, FEA Survey, 2022).

With these administrative issues came strained relationships between stakeholders. The TCs suggested that the Ministry of Education seemed to be unreachable to the TCs. The OTCC had reached out to the MOE and EQAO many times and did not receive a response (Campbell, 2021). Bella Lewkowicz (S2, Stakeholder Interview, 2022), the co-founder of the OTCC, said that at one point she realized:

> [N]o matter how much the OTF tried to get a meeting with the Minister of Education, no matter how hard we [the OTCC] tried to get a meeting with the Minister of Education, no matter how hard the education critic for the official opposition, no matter how much merit, [they] tried to get a meeting with Minister Lecce in order to even talk about it, to just talk about it, not even to like, discuss whether it should be struck down or not, just talk about the implementation, we were stonewalled the entire way. And so, at that point, you just kind of like you've banged on all the doors, you've tried to break all the windows, and you cannot get through, like if the Minister of Education was completely unreachable.

Partway through the implementation of the MPT, when TC stress levels were already high regarding the MPT, the COVID-19 pandemic began. As with the rest of the world, all stakeholders involved in the MPT had to improvise and accommodate to the shift to online

teaching, learning, and working. In April 2020 the OCT put out a statement saying that TCs now had until December 31, 2021, to complete the MPT due to the global pandemic (Ontario College of Teachers, 2020). With the change in the required completion date, TCs could graduate and start teaching without having passed the MPT. Shortly after the announcement The OCT said: "The Ministry of Education will work with the Education Quality and Accountability Office (EQAO) on options to administer the test online. Test centres will continue to offer in-person testing once public health officials advise that it is safe to do so" (Ontario College of Teachers, 2020). As we know now, the return to in person testing did not occur before the test was cancelled.

Cancellation. Two themes related to administrative accountability emerged from the data surrounding the sudden cancellation of the MPT. Those themes were: with the cancellation of the MPT, the change in certification requirement by the OCT came with mixed reviews from the teacher candidates; and the cancellation of the MPT relieved some of the workload of the Faculties.

In December 2021 the MPT was officially cancelled. The OTF put out a statement explaining that certification can be granted if all other teacher certification requirements have been met, the MPT was no longer a requirement (Ontario Teachers' Federation, 2021). This came as a relief to many TCs, specifically those who had not passed the test yet and were going to have their temporary OCT certification revoked (TC Survey, 2022). In early 2022, EQAO put out their own statement saying, "at this time the requirement to successfully complete the MPT for certification with the Ontario College of Teachers is no longer in effect". According to the data from the TCs this announcement relieved some of the pressure for TCs around certification,

however, some TCs continued to feel worried that the decision to cancel the MPT would be overturned (TC Survey, 2022). As one TC explained, they felt:

> Relief that those whom the test effected in an inequitable manner could continue with their certification equitably. Happy that the looming test had urged me to review and restore my math knowledge without impeding on my ability to move forward teaching math in divisions below the test's content area. Relieved for the teaching profession which was already suffering from teacher shortages and required new teachers to enter the field (TC Survey, 2022).

The cancellation of the MPT relieved some of the workload of the FEA, even though the cancellation did not impact their ITE programs. Many Faculties of Education reported that they stopped the MPT training sessions and resumed what they were doing before the MPT was implemented, which was focusing on learning, rather than test preparation (FEA Survey, 2022). For instance, one Chair of a Teacher Education program said, "we removed the elective we'd used to support students worried about preparing for the exam" (A8, FEA Survey, 2022). Overall, there was a sense of relief, and it took the stress and pressure away from the support staff and FEA who had been fielding endless questions about the process.

Legal Accountability

Legal accountability is defined by Darling-Hammond (1989) and Pollock and Winton, (2016) as ensuring that schools operate in accordance with the laws and regulations governing them, as well as entertaining complaints about violations of the educational laws put in place. Legal accountability focuses on the actions, in this case a school's actions, that operate within a system that keep things running smoothly—this could be in the form of an educational law that has been put in place to make sure that a certain goal is achieved.

Creation. The decision to create the MPT was legally achieved by proposing the "Safe and Supportive Classrooms Act" which included the MPT as one of its components. Below is a condensed timeline of comments, in the Legislative Assembly of Canada, that contributed to the creation of the MPT.

Document analysis revealed that in 2017, questions surrounding accountability and teacher education started to unfold in Ontario's Legislative Assembly. Then in 2018 there was growing concern expressed by Premier Doug Ford, in the legislature, over student achievement and math scores (Levac, 2017; Levac, 2018). Later in 2018, the "Safe and Supportive Classrooms Act" was proposed. Part of the Act proposed that all new teachers who were seeking certification with the OCT must "pass a math test before you get a licence to teach" (Arnott, 2018c, p. 2372). This is the first official mention of the MPT. In November 2018 the rationale for a MPT was being made. The MPT was being presented as a way to increase student math scores, and "those who teach math need a more solid understanding of the field themselves, so Bill 48 requires new teachers pass a math test before you get a licence to teach" (Arnott, 2018d, p. 2372). The argument was being made that requiring a content knowledge test in math would ensure that teachers were "even better prepared to teach the fundamentals of mathematics" (Arnott, 2018d, p. 2381).

In February 2019 the discussion around Bill 48 became a focus in the Legislative Assembly, and opposing views were heard. Kitchener Center New Democratic Party (NDP) Member of Provincial Parliament (MPP) Ms. Laura Mae Lindo emphasized the importance of channeling resources into the education system. She questioned if a math test was going to help solve the problem of under resourcing the education system (Arnott, 2019a, p. 3011). Toronto-St. Paul's NDP MPP Ms. Jill Andrew also questioned the aims of Bill 48. "Bill 48 is requiring

teachers to take a math proficiency test at the beginning of their career, while simultaneously cancelling math supports for teachers. It just doesn't make sense" (Arnott 2019a, p. 3016). Flamborough-Glanbrook Progressive Conservative (PC) MPP Ms. Donna Skelly spoke in favour of Bill 48 and articulated the need for teacher proficiency in mathematics to ensure student success. She is quoted saying:

> I want to make it clear that our government is not putting the blame for these low performances solely on teachers, but as I said earlier, if a teacher feels that they are not comfortable in the basics of mathematics, then they are likely to be somewhat hesitant in teaching math to the students. By putting math proficiency tests in place, as Bill 48 does, students and parents can be assured that their teachers have the skill set and the knowledge required to help their children succeed. There are other provisions in the Safe and Supportive Classrooms Act that I would like to highlight briefly. First, passing Bill 48 will allow our government to respond in an appropriate manner to a governance review that has been under way since last spring by the Ontario College of Teachers. This is important to ensure that the College of Teachers is more accountable to Ontarians, especially to parents who want to make sure their children are being taught by the best in their field. (Arnott, 2019a, p. 3013)

On February 20, 2019, Kitchener South – Hespeler PC MPP Mrs. Amy Fee added her perspective, emphasizing the government's commitment to support Ontario teachers. She explained that "we will ensure they [teachers] have the skills that they need to best support our students in math" (Arnott, 2019b, p. 3063). However, the next day the Leader of the Ontario NDP Ms. Marit Stiles critiqued Bill 48's all-encompassing nature. She voiced concerns that the bill covered an array of education issues and pointed out the deliberate strategic move of

combining child protection measures with the math test requirement. She explained that the problem is that Bill 48 “doesn’t allow us to separate those issues and give them the consideration that they’re due (Arnott, 2019c, p. 3113).

On March 20, 2019, Premier Doug Ford, in his address, reaffirmed the government's commitment to strengthen math education. He referenced the concerning low math scores among grade 6 students, underlining the critical need for teacher proficiency (Arnott, 2019d, p. 3659). Later that same day, Eglinton – Lawrence PC MPP Mrs. Robin Martin elaborated on the MPT's objective, claiming that the MPT was “about ensuring that all new teachers entering the classrooms have a strong foundation in math, and… that they have confidence in the skills that they will have to teach in the classroom. Parents can have confidence in knowing that our government is working to help to ensure that Ontario teachers have the foundational skills to teach math” (Arnott, 2019e, p. 3681).

On April 3, 2019, Bill 48, the Safe and Supportive Classrooms Act, 2019 was updated and passed. Bill 48 “included a variety of educational Acts related to education such as, make important amendments to, the Early Childhood Educators Act, the Teaching Profession Act and the Education Act 7 Subsection 18 (1)” (Bill 48, 2019, p. 6). Part of Bill 48 specifically focused on teacher qualifications in mathematics; it states that a person who applies for certification to become a teacher must successfully complete “any prescribed examinations relating to proficiency in mathematics that are required for the issuance of the certificate” (Bill 48, 2019, p. 6).

Even after Bill 48 was passed there were still questions about how requiring the MPT for new teachers was connected to safe and supportive schools (Arnott, 2019f). However, Education Minister Stephen Lecce, confirmed the creation of the MPT by pointing out that starting “spring

of 2020, our new teachers will be required to pass a math proficiency test before they enter a classroom in a professional capacity. This will ensure teachers are confident and capable in teaching math" (Tabuns, 2019, p. 78).

Implementation. There was no new legislation during the implementation phase of this mixed-methods case study, which resulted in few legal issues coming up. In the TC survey there was a sense that the test was being legally "forced upon" them. For instance, one TC said, "I believe it was unfair and forced upon us" and another said, "they told us we had to do it, and that was it" (TC Survey, 2022).

Cancellation. The legal court challenge of Bill 48 involved a judicial review of the MPT, during which "the Council challenged the requirement that teacher applicants pass the MPT as infringing section 15 of the *Canadian Charter of Rights and Freedoms"* (Hughes, 2022). The evidence presented in the court case showcased that "significant disparities in success rates of standardized testing based on race, including statistical evidence of racial disparities with respect to the MPT specifically" (Ontario Teacher Candidates' Council v. The Queen, 2021, p. 2).

On December 17, 2021, the news broke that "the Ontario Divisional Court has ruled that the OCT shall grant certification to teacher candidates who have not yet passed the Math Proficiency Test but who have otherwise met all other teacher certification requirements. The Divisional Court found that the Math Proficiency Test had an adverse impact on entry to the teaching profession for racialized teacher candidates and other reasonable alternatives should have been implemented" (Ontario Teachers' Federation, 2021). Below is the official court ruling:

> The application for judicial review is granted. The following relief is ordered:(a) The Mathematics Proficiency Test violates s. 15(1) of the Charter, is not justified under s. 1, and is unconstitutional; (b) O. Reg. 271/19, Proficiency in Mathematics, as amended,

> under the Ontario College of Teachers Act, 1996, S.O. 1996, c.12 is unconstitutional and of no force and effect; (c) Paragraph s. 18(1)(c) of the Ontario College of Teachers Act, 1996, S.O. 1996, c.12 is unconstitutional and of no force or effect; (d) The Ontario College of Teachers shall grant certification to teacher candidates who have not passed the Mathematics Proficiency Test (or shall grant full certification in the case of teacher candidates whose certification is conditional on passing the Mathematics Proficiency Test) but who have otherwise met all other certification requirements; and (e) The Respondent shall pay the Applicants $90,000 in costs of the application. (Ontario Teacher Candidates' Council v. The Queen, 2021, p. 33)

The OCTT was organized by a group of TCs who were against the injustice of the MPT. Bella Lewkowicz, a co-founder of the OTCC, claimed that there was little support from the Faculties of Education to challenge the MPT, so she and a group of TCs took it upon themselves to fight against the MPT. For instance, an Associate Dean / Vice Dean praised the OTCC for being driven and was proud of the TCs for seeing through "political rhetoric and knowing their rights" (A7, FEA Survey, 2022). Similarly, in the FEA survey, a Faculty of Education Dean said that the students were the driving force in the court case against the MPT, when no other form of advocacy had any effect (A2, FEA Survey, 2022). Another example comes from an OTF Representative, who said: "we did work very closely with them [OTCC], and try to support them, although they really led it, they, you know, they went to Faculties of Education to ask for support. They have nothing from the Faculties I'm afraid to say" (S4, Stakeholder Interview, 2022).

As mentioned in the administrative accountability section, the MPT was not mandated by the Faculties of Education, but as part of certification requirements through the OCT. Most FEAs

praised the OTCC for creating a legal challenge to the MPT. For instance, one Assistant Director of Teacher Education said "I was happy to see the Law being used by teacher candidates to overturn what I saw as an unethical, biased, irresponsible, and ultimately harmful addition to the teacher preparation and certification landscape in Ontario. I contributed to the legal fund for the OTCC to help them meet costs and reached out to their leadership to express gratitude for and solidarity with their efforts" (A9, FEA Survey, 2022). Other FEAs were simply happy to see the test go away, and that the decision of the cancellation was, as one administrator put it, "based on evidence-based reasoning" (A10, FEA Survey, 2022).

With the cancellation of the MPT, 87% of TCs were pleased with this news, however, there was concern that it would not be cancelled forever (TC Survey, 2022). For instance, one TC stated: "I was happy to hear that I didn't have this extra stress anymore, however I continue to feel worried that it will overturn, and I will be required to take it at the very end of my program, or that my certification will be withheld" (TC Survey, 2022).

Although 87% of TCs were pleased with the cancellation of the test, there were a few TCs who wrote in their responses to open-ended questions that they felt that the money spent on the court case could have been put to better use. There were other ways that some TCs felt the $90,000 legal fees could have been spent. For instance, one TC said "The amount of effort and money that has gone into fighting this in court could have been better used towards making PD sessions and hiring other educators to help candidates better prepare for the test. This felt like a waste of resources and court time" (TC survey, 2022). Instead of using the money to fight the MPT, comments from TCs on their survey indicated that some TCs felt that the money could have been used to provide teachers with more math resources and PD sessions (TC Survey, 2022).

Political Accountability

Political accountability is defined by Darling-Hammond (1989) and Pollock and Winton (2016) as the accountability of elected officials of government, such as elected trustees, who answer to public demands. These can also be members of government who are elected, given the power to change policy and are answerable to the public for their decisions and who must stand for re-election at regular intervals.

Creation. In 2018 the Ontario Conservative government politicians responded to low EQAO scores, which they considered a crisis, by implementing a variety of initiatives, such as: a new mathematics curriculum, changes to the EQAO assessment, the MPT (Alphonso, 2019; CBC, 2018). From 2016 to 2019, the Ontario Conservative government emphasized that low student mathematics test scores indicated an issue with teachers, their knowledge, and teacher education (Alphonso, 2018). Thus, in 2019 Premier Doug Ford called "for mandatory annual math testing for all teachers, including new hires and those currently employed across the province's school boards" (Jeffords, 2019). The creation of the MPT, which the government framed as a crisis solution, took on teacher certification and teacher preparation as part of their political accountability. Many perceived this emphasis on teacher testing as looking for a simple and ineffective solution to a complex problem and many perceived this as shifting responsibility, and possibly blame, onto teachers. Considering Doug Ford's and the government's concerns about student mathematics performance, various alternative political actions could have been taken.

The data from the interviews, FEA survey, and TC survey indicated that many stakeholders thought that the creation of the MPT was the wrong political move by the government. In the written responses of both the TC and FEA survey, there were several reasons to support this perspective, such as: the government not dealing with the complexity of the

situation, the government taking on responsibilities for which other stakeholders were responsible, politicians focusing on teacher qualifications as a way to discredit teachers, and some saw the move as the government discrediting public education to move to privatizing education.

Many stakeholders expressed concern about ignoring the complexity of the situation and not seeking alternative, varied, and more effective solutions. When the TCs were surveyed, the majority of participants agreed that more PD sessions on mathematical literacy during the B.Ed. program would better support pre-service teachers in developing the foundational mathematics knowledge needed to support teaching and learning. Many TCs thought that the government's approach to the creation of the MPT was as an example of a test being deployed as a simplistic attempt at a solution to a complicated situation. As one TC put it:

> [T]he MPT was a lazy solution concocted by lazy government officials who have no idea what they are doing, nor talking about (i.e., Doug Ford and Stephen Lecce). Any complex and multifaceted problem in education (or any other aspect of society for that matter) cannot be solved by writing some test or examination. That is a myopic and dangerous approach to take, especially for elected officials who claim to "represent" other peoples' interests (TC Survey, 2022).

Additionally, FEAs expressed in the survey that the MPT may have seemed like a simplistic solution but it was quickly recognized to be an ineffective tool. As one Associate Dean / Vice Dean of Education stated, there was "disappointment that we would be subjected to a tool that was created for optics politically; a teacher test is not supported in the literature; we have gone down this road before with other political parties, and it is demoralizing and time consuming - and does not achieve what they say that are interested in" (A7, FEA Survey, 2022).

There were concerns that the creation of the MPT shifted areas where OCT and Faculties of Education were accountable into political hands. For instance, in response to Bill 48, The Safe and Supportive Classroom Act (2018), which included the instantiation of the MPT, the OCT Submission to The Standing Committee on Social Policy made the statement:

> Bill 48 outlines the government's intention to require College registrants to pass a math content test before they can be certified to teach. We prefer to work closely with government representatives to establish measures that continue to promote the high standards for entry into the teaching profession and enhance teacher competency in every aspect of the Ontario curriculum. (Salvatori & Lewko, 2019)

When the government mandated the MPT as a certification requirement it called into question the certification process for teachers in Ontario. Furthermore, on April 5, 2019, the OCT put out a statement to continue to emphasize their role in teacher quality, including in mathematics:

> The College supports the government's efforts to enhance math instruction. We are committed to ensuring that teachers receive initial and ongoing teacher education to prepare them to support students in all areas including math. Council[1] firmly believes that the College should not develop, fund, or implement the test. However, the College should have the regulatory authority to impose it as a condition of certification and the authority to deem equivalence. The College looks forward to working with the government to

[1] The College Council is a "12-person Council, comprised of six Ontario Certified Teachers and six members of the public, governs the College. Council is responsible for setting the strategic objectives of the College in order to achieve its statutory mandate. College Council, statutory committees, regulatory committees, and rosters of panellists were established through a competency-based selection process" (Ontario College of Teachers, 2021c).

establish mechanisms to further enhance teacher competency in mathematics. (Ontario College of Teachers, 2019b)

However, 71.54% of TCs said they disagreed or strongly disagreed that the MPT would make the teacher certification process more rigorous. At Faculties of Education, administrators felt like the teacher education programs' rigor was being questioned. TCs also saw this as calling teacher education programs into question. As one TC stated "It was an attack on teachers as a political move. The teacher program is already quite rigorous, as it requires 6 years of university [to become a teacher]" (TC Survey, 2022). In the survey responses of Deans of Faculties of Education and Directors of Teacher Education programs, there was a sense that the MPT was a political exercise in accountability. When asked if the MPT should be part of the certification process one member of Associate Dean / Vice Dean of Education said that "We already have mechanisms to indicate whether teachers have what they need to come into teaching, and the test created was a joke" (A7, FEA Survey, 2022). Another Dean felt that the "government should trust Faculties of Education to graduate students who are ready to enter the profession" (A5, FEA Survey, 2022), a sentiment that was held by many, particularly TCs and FEAs.

Deans of Education and TCs saw the MPT as a political move used to discredit teachers, as well as teacher education programs (A3, FEA Survey, 2022; TC Survey, 2022). From the TC perspective it seemed like TCs were easy targets to blame for low math scores and this sentiment was echoed in comments throughout the TC survey. As one TC put it: "this is a political move and teacher[s] are used as scapegoats to balance the budget at the expense of children's education" (TC Survey, 2022). TCs described the test as disrespectful to hardworking teachers and "just a political move by a government that wants to dismantle public education" (TC Survey, 2022). Another TC suggested that the "MPT was designed as a political tool with the

intent of diminishing the public's perception of teachers and label us as incompetent as a way to push an agenda towards privatization" (TC Survey, 2022).

Implementation. When the MPT was implemented, TCs spoke about how the political agenda became more apparent, which did not line up with what FEAs thought was best for TCs or students. As described in the TC survey, 90% of TCs felt that the implementation of the MPT was about politics and had very little to do with teacher efficacy or student improvement (TC Survey, 2022). For instance, one TC said "The MPT is simply a political attack on teachers. The government would like to create the illusion that the MPT is to ensure new teachers undergo a rigorous process - but in reality, it is just tedious and does not quantify nor qualify what it actually means to be a good educator" (TC Survey, 2022). The implementation of the MPT was not viewed as an accountability measure that would benefit newly certified teachers, but in fact punished them (TC Survey, 2022).

Some examples of how political accountability was used during the implementation of the MPT, was expressed by the TCs and Professors of Faculties of Education. For example, one TC expressed that the government should "force B.Ed. programs to have some accountability in how they run their programs. As it stands, the 2-year program model largely wastes student's time with repetitive subject matter and more attention and rigor should be paid to how we engage in these courses" (TC Survey, 2022). TCs, FEAs, and other stakeholders thought the government overstepped and should let B.Ed. programs and OCT look after teacher qualifications. For instance, one Chair of a Teacher Education program said they "wished that the government would learn to back off of crappy policies, learn to back down, learn to consult, etc. - but one gets the impression they're afraid to" (A8, FEA Survey, 2022). Some TCs supported their Faculties of Education and the B.Ed. programs; one TC put it as plainly as: "Policies like this are

symptomatic of governments not trusting universities to carry out their roles properly. It is really a form of managerial accountability which disrespects the work of Faculties of Education". A Representative from OTF stated: "I think that any requirement that a government would have, or any concern that a government might have about whether or not teacher candidates are receiving education in a particular area should be dealt with within the program of the initial teacher education program, and not as a certification requirement" (S4, Stakeholder Interview, 2022).

Outside of the Faculties of Education, the Minister of Education, Steven Lecce, stated that "the motivation for this government to do this [implement the MPT] is predicated on the belief that measuring success is the only way we can understand that the investments we're making are yielding the results we want for our children. I want to see greater competency, understanding and application of math in the lives of our young people. I want to see our math results rise over time" (Alphonso, August 29, 2019). Contradictorily, the President of the OTF, Parker Robinson, felt that it should not have been implemented during the COVID-19 pandemic, in an OTF statement he wrote "the OTF once again urges Minister Lecce to step back from the MPT. We cannot see how placing this additional burden on beginning teachers will serve the best interests of Ontario's students" (Robinson, 2021).

The MPT consisted of two sections, a mathematics section and pedagogy section, and to pass the MPT a TC needed to have a minimum of 70% in each section (MPT.ca). Measuring teacher success on a mathematics and pedagogy test caused many, including Professors, a representative of People for Education, a representative of OTF, and the media to question why the MPT was the tool the government chose. The Faculties of Education did not feel that the MPT was the best way to test teachers' mathematical knowledge and wished they were consulted (A3, FEA Survey, 2022). Similar sentiments were echoed in the FEA survey, with one Professor

of Mathematics Education Courses expressing: “The MPT was an easy election promise to keep, but worthless in terms of improving teacher education. Its political hack based on fabricated evidence and does nothing to address the improvement of mathematics education” (A10, FEA Survey, 2022). Paul (2020) reported in *School Magazine – Education Action Toronto*, that the MPT is “another example of a government looking for problems which they try to solve using the wrong tools. Since he was elected, Doug Ford said over and over, teaching of mathematics is broken in the province” (Paul, 2020). The seemingly political nature of the MPT left TCs feeling attacked or punished for choosing to go into the teaching profession.

Cancellation. After the MPT was taken to court, declared discriminatory, and then cancelled, there were stakeholders who felt like the government was not taking responsibility for the consequences caused by the MPT. Written responses from the TC survey included the sentiment that it was a waste of public resources to take the MPT to court in the first place and the MPT should have stayed in place (TC Survey, 2022). For instance, one TC felt that “the government should have to repay all legal fees. Teachers raised a lot of money to take down this test to protect education and fellow teachers from ungrounded scapegoating and gate keeping of the profession. At the very least the government should have to pay for that” (TC Survey). TCs overwhelmingly felt the government did not do a good job of consulting all stakeholders before implementing the MPT and should now “be further held accountable for the damage caused to many” (TC Survey, 2022). The main suggestion that kept coming up in the data was for the government to reallocate the money spent on the MPT on alternatives such as additional PD days (TC, Survey, 2022).

Professional Accountability

Professional accountability is defined by Darling-Hammond (1989) and Pollock and Winton (2016) as a means to ensure that certain specialized knowledge and skills are being acquired while still meeting standards of entry into the profession. The professionals who are required to have specialized skills, such as teachers, are required to have specific skills to enter the profession and then uphold professional standards of practice. This is done by ensuring that teaching and students' learning is placed at the center of professional work (Dulude & Milley, 2021).

The OCT has a set of professional standards that all Ontario teachers must abide by. The Standards of Practice of the Teaching Profession are a commitment to students and student learning, ongoing professional learning, professional practice, leadership in learning communities, and professional knowledge (Ontario College of Teachers, 2024). These standards articulate the goals and aspirations of the profession (OCT, 2024).

Creation. The creation of the MPT generated an atmosphere in which TC and FEAs perceived that the government was targeting the teaching profession. This government focus on the profession of teaching also contributed to a growing sense of distrust in the profession by the general public. For instance, a representative from OTF explained that "we had a problem with the creation of the test from the point of view that the level was incorrect and not appropriate, the timing we thought was incorrect and not appropriate. And also, the fact that it was then tied to certification as opposed to success in the program" (S4, Stakeholder Interview, 2022). TCs started to perceive the MPT as an obstacle to entering a profession they had aspired to join.

There were many questions about why the student math scores should be linked to assessing teacher professionalism. TCs felt that the government was targeting the teaching

profession by linking low student math scores to teachers' knowledge of mathematics. The MPT was created as a measure to enhance professional accountability, however politicians were seen as scrutinizing and attaching conditions to teacher professionalism. On March 27, 2020, Huron – Bruce PC MPP Lisa M. Thompson said "our government has also introduced legislation that will require new teachers to pass a math content knowledge test before registering with the OCT. Our goal here is to ensure that teachers are confident and capable in teaching math, regardless of their primary teaching discipline or the grade level they teach" (Arnott, 2019g, p. 3885). This goal of the MPT stated in the legislation caused other MPPs to voice their views and in some cases their opposition. In my interview with one MPP they stated: "I thought it was unnecessary when it was brought in, because it's not the problem that we have with maths scores. And, somehow the government position[s] all teachers who graduate to take a math test, and therefore our math scores should improve? I didn't see the correlation of that. What is it? Prove it? No one has proved it" (MPP Interview, 2022). Similar frustrations were felt by TCs who were in teacher education programs at the time of the creation of the MPT. For instance, one TC said, "It was an insult to the professionalism of teachers, a drain on public resources, and an absolutely pointless exercise of arbitrary power over public service workers, all meant to pave the way towards decreased public trust in educators and eventually, privatized education in Ontario" (TC Survey, 2022).

The creation of the MPT did not help with the public perception of teachers and many TCs felt frustrated and hurt by the "distrust of my professionalism and training" (TC Survey, 2022). This distrust was not something that started during the creation of the MPT, in fact a representative from People for Education explained that "there has been a lot of attention paid to math scores in Ontario, as seen in [the] EQAO testing, and there's been a lot of public

attention paid to the "problem with math". And it has been quite political and quite simplistic as many conversations about education end up being" (S1, Stakeholder Interview, 2022). One TC explained that if teachers were seen as experts in their field, then maybe the public perception of the teaching profession would change (S3, Stakeholder Interview, 2022). As well as feelings of disrespect and distrust many TCs felt that it was hypocritical for the government to mandate a standardized assessment. For instance, one TC explained that they felt like "the MPT was a way to attack potential educators and allow people who are not in the education system to decide who is a good teacher or not, based on a standardized test that does not [prove] effective teaching" (TC Survey, 2022). Similarly, the OTF put out a position paper that stated: "The introduction of a standardized test in a sector that is anything but standardized is a disservice to the teaching profession and to all educators who hold student success as their ultimate priority" (2019). In their interview, a member of OTF supported the position paper by echoing those sentiments, explaining how ridiculous it would be to let a single subject test be the determinate to becoming a teacher (S4, Stakeholder Interview, 2022).

With the creation of the MPT TCs commented that it was going to stop them from pursuing a profession that they had wanted to join for years. For instance, one TC expressed how she had always wanted to be a teacher, ever since she was a little girl. She felt that the MPT was "putting like a huge strain on a bunch of people who are trying to get into this profession, who are trying to deal with their student loans, who are trying to, who have always wanted to be teachers" (TC Interview, 2022).

Implementation. With the implementation of the MPT there was an indication that the teaching profession would be held accountable for low student math scores. On March 5th, 2020, Doug Ford said "We're turning the corner with education. Again, rather than having our

students with the lowest math scores in the country—50% of them are failing; one third of the teachers couldn't pass the same math test. We're finally turning the corner. We're holding the unions accountable for the first time in 50 years" (Arnott, 2020a, p. 7481). The form that the accountability took was implementing the MPT.

While many who took the FEA survey were concerned about the MPT, two Deans at Faculties of Education expressed the need for higher professional standards regarding specialized knowledge and skills, particularly related to mathematics. For instance, one Dean explained that "there are some benefits to assessing knowledge and skills of teachers over time. There is a need to have some assurance of basic professional knowledge and skills (A4, FEA Survey, 2022). Similarly, another Dean wrote: "Teacher education programs have some responsibility to support growth in teacher candidates' mathematical knowledge and understanding, regardless of the existence of an MPT or not" (A2, FEA Survey, 2022).

Although for most TCs, the MPT took them by surprise, some TCs were not surprised by having an entry test into the profession, claiming that "there are plenty of professions that require the person to have some sort of certification test" (TC Survey, 2022), and "math is an important critical thinking and problem-solving task" (TC Survey, 2022). Math being seen as a critical subject was further reflected in the TC survey when a majority of the TCs surveyed (62%) felt that all teachers should have a basic understanding of mathematics. However, they did not think that the MPT was the best way to achieve mathematical understanding.

A critique that emerged from the data was whether a standardized test is the most appropriate means to assess professionalism in teaching. An OTF position paper stated that "Investment in professional development, modern classroom resources and supports for growing

success in mathematics are key elements to success. The introduction of a standardized test in a sector that is anything but standardized is a disservice to the teaching profession and to all educators who hold student success as their ultimate priority" (Ontario Teachers' Federation, 2019). A Professor of Mathematics Education also questioned the correlation between teacher testing and student and classroom outcomes. They said, "Beyond the empirical evidence, I suspect that teacher testing probably has a negative effect on education as a whole - it likely raises stress amongst teachers, erodes trust about and within the profession (both within system and publicly), and conveys the message that testing is the most effective way of assessing knowledge and professional practice" (A10, FEA Survey, 2022).

Cancellation. On April 14, 2020, in the Legislative Assembly of Ontario, Mr. Chris Glover, NDP MPP for Spadina - Fort York, declared that the MPT needed to be cancelled. He explained that the MPT was "holding up the licensing of teachers who should be able to start work in September in our schools or online— however we're delivering it. But we need to cancel that math proficiency test so that they can begin teaching as soon as possible" (Arnott, 2020b, p. 7785). This call for cancellation was due to the increasing teacher shortage in Ontario and the need for qualified professionals to enter the classroom. When the MPT was officially cancelled on December 21, 2021, there was relief from the TCs, along with reflection and questioning professional standards surrounding the teacher certification practices in Ontario. With the cancellation of the MPT TCs felt that there was a call for a renewed respect for the profession of teaching. This was because most TCs felt the MPT diminished "the public's perception of teachers and label[ed] us as incompetent" (TC Survey, 2022), while others felt the MPT "villainized" teachers to the general public (TC Survey, 2022).

The cancellation of the MPT was related to the court challenge centered around fairness and equity for individuals wanting to join the teaching profession. For some TCs and FEAs, the MPT was viewed as a barrier to certain groups of students (FEA Survey, 2022). For instance, a TC explained that "the test was an access barrier, which consequently affects marginalized and racialized people greater than the general population. I also feel the test should be cancelled to support the overall confidence the public has in teachers. The test sent the wrong message about teachers and challenged both our intellectual and teaching ability" (TC Survey, 2022). Alternatively, some stakeholders felt like the MPT identified students in need of additional math support before pursuing a teaching career. For instance, one Professor of Education questioned the cancellation of the MPT, explaining that if TCs are not ready to enter the teaching profession, then they need to be supported, not excused from developing their math capacity (A5, Stakeholder Interview, 2022). An Assistant Director of a Teacher Education program explained that they "cannot support any version of the MPT that is intended for initial certification at present but may be able to support a version that is intended to help teacher candidates grow their mathematical knowledge" (A9, FEA Survey, 2022). The FEA survey showed that there was support for improving foundational mathematical knowledge, but not in the form of a mandated test.

Ultimately, with the cancellation of the MPT, TCs felt like their voices were heard and that their professionalism was taken seriously (TC Survey, 2022). The OTF President Chris Cowley applauded "the efforts of the Ontario Teacher Candidates' Council (OTCC) for pursuing this successful legal challenge. There is no research to suggest that a standardized test would improve student outcomes or enhance teacher pedagogy. Ontario has some of the best educated

teachers in the world and this decision reinforces their professionalism," (Ontario Teachers' Federation, 2021).

Moral Accountability

Moral accountability is defined by Pollock and Winton (2016) and Stone et al. (1989) as the accountability that guarantees acceptable societal norms and behaviours are carried out in the education system. There is a certain level of personal commitment to the values that are important to the system that they work in. For example, educators strive to provide fair and equal education to all students (Firestone & Shipps, 2007).

Creation. The OCT Ethical Standards for the teaching profession aim to represent a vision of professional practice, which includes care, trust, respect, and integrity (Ontario College of Teachers, 2024). During the creation of the MPT there were two events that happened which were deemed unfair. The first was changing the requirements for certification and the second was challenging the preparedness of TCs.

When TCs were accepted into the B.Ed. program there were certain requirements that were stated for the certification process. When the MPT was added to the certification requirements TCs, FEAs, teacher federations, and others took issue and spoke out about how that seemed unfair. For instance, one Assistant Director of Teacher Education spoke about how they "thought the MPT to be discriminatory by design (and not in a good way) and wondered why there were no content knowledge tests for English or Social Studies for example which would probably raise concerns" (A9, FEA Survey, 2022). Additional concerns were raised when it was unclear whether teachers with exceptionalities would receive modifications or accommodations (TC Survey, 2022).

In 2018, when the MPT was being discussed as a solution to low student math scores, the Elementary Teachers Federation of Ontario (ETFO) put out a statement explaining that the government was not creating an environment that supported fair and equal education for all. The quote states:

> Testing doesn't grow confidence, competency or proficiency. We need to ensure that our school boards and educators have the proper resources needed to deliver curriculum effectively. This government has yet to address the fact that the education funding formula is short-changing students, schools and educators in terms of support and resources, something that has been heard repeatedly in response to the public consultations. (Elementary Teachers' Federation of Ontario, 2018)

Certain stakeholders, such as the Representative of People for Education, TCs, and FEAs felt like the MPT was invalid, and that an invalid test was being used to show that the government was doing something in regard to low student mathematics scores. For instance, one professor at a Faculty of Education said, "I don't think ANYONE should be responsible for preparing teachers to take an invalid test; rather such tests and the purveyors need to be called out and held to account for imposing on teachers and teacher educators and exacerbating issues affecting teacher well-being in relation to mathematics" (A9, FEA Survey, 2022). This is just one example of questioning the validity of the test and questioning the fairness of preparing students for a high-stakes standardized test.

Implementation. When the MPT was implemented, there were more instances of perceived unfairness surrounding the MPT. Firstly, the government was expressing a lack of trust with the teacher education programs (The Canadian Press, 2018), secondly, there was a lack

of diversity within the passing test takers and thirdly, there were numerous accessibility issues for TCs writing the MPT.

The implementation of the MPT "made the public question the ability of teachers" (TC Survey, 2022). There was underlying distrust created by suggesting that teacher candidates were not prepared in math, which caused stress and anxiety inside and outside of the Faculties of Education (TC Survey, 2022). However, with negative press perpetuating unfounded evidence surrounding teachers' math competency, an MPP who was interviewed said "I'm confident about Ontario, [we] have a brilliant system…that's why it's very sad, the crisis we're in right now because our system of education is brilliant, and we shouldn't be devaluing it. [Our education system] should be an important thing for society, and we should be helping people to see that value" (S6, Stakeholder Interview, 2022).

Even though faculty members felt that they were doing everything they could to support and prepare their TCs for the MPT, there was still frustration on the part of the Faculties of Education because they were the ones who had to support the TCs for something that they should not have been responsible for (FEA Survey, 2022). Many representatives from stakeholder groups including TCs, FEAs, an MPP, and OTF, questioned the ethics of creating a situation which caused anxiety, due to what they saw as an invalid assessment. For example, one professor of Mathematics Education, was frustrated because they felt like the MPT was heightening anxiety surrounding mathematics (A10, FEA Survey, 2022). The ethical question was then raised: why would there be a test that raises mathematical anxiety in TCs when it is not clear if it is going to improve student achievement? The implementation of the MPT was stressful due to the high-stakes nature of the test, which felt counter intuitive and did not instill a "love of learning" within the TCs, "it just felt like another hoop to jump through"

(TC Survey, 2022). During an interview with CTV in 2021 a TC explained that she is “a fan of math, I'm not a fan of how this whole thing has been implemented. It's been primarily a nightmare and it's kept me up a lot at night” (Campbell, 2021).

Implementing the MPT also raised the question of the inherent bias of standardized testing, disadvantaging some TCs more than others. As previously mentioned, the notion of measuring teacher success through large-scale standardized assessments faced opposition due to concerns about its validity and fairness. For example, a Teacher Education Program Assistant Director said “Traditional testing often disadvantages neurodiverse individuals. Testing also often locates the source of any difference or deficiency within the locus of the individual teacher rather than the systemic design which reproduces such differences and constructs them as deficiency” (A9, FEA Survey, 2022). The MPT not only disadvantaged neurodiverse TCs but also disadvantaged racialized TCs and/or French speakers. The test implementation was also called inequitable by the TCs for a few reasons, for instance, the test centres were not close to the test takers, and some TCs had limited access to the test centres (TC Survey, 2022). It was considered unfair for French test takers because of the lack of available test slots as well as poor translation of test items (TC Survey, 2022). Also, when the MPT moved online there was not always equal access to reliable internet. One TC explained:

> The fact that [MPT] was online made it completely unfair already. Internet access (or technology for that matter) is not as easy as one might think in Ontario. Even as someone whoattended a B.Ed. program in Hamilton, I had a classmate whose computer (note: the school’s computer in the computer lab, as recommended by the test) bugged down on them during the test. This classmate of mine could not do anything about it and had to be marked as “failed” the test - all because their

> computer failed them. We had all studied, worked hard, and placed a large amount of added stress to this and for them to simply receive a fail for something that was not even their fault was ridiculous. (TC Survey, 2022)

Cancellation. With the cancellation of the MPT the concerns that the test was not fair were validated. By having the court ruling state: "The Mathematics Proficiency Test violates s. 15(1) of the Charter, is not justified under s. 1, and is unconstitutional" confirmed that the test was not fair. The Court stated: "The evidence points to significant disparities in success rates of standardized testing based on race, including statistical evidence of racial disparities with respect to the MPT specifically" (Ontario Teacher Candidates' Council v. The Queen, p. 2). With the news of the cancellation 86% of TCs were pleased that the MPT was cancelled (TC Survey, 2022). There was relief that the test was not required for certification (TC Survey, 2022) and also relief that the judicial system was able to see that the test was discriminatory for minority TC's (FEA Survey, 2022).

With the official court ruling that the MPT was unconstitutional many education professors felt that they were able to agree with the ruling, since it became official. As one Professor of Mathematics Education stated "Recognition that the test was creating more harm than good (e.g., contributing to further racial and social inequities amongst teachers, contributing to lower number of teacher applicants). It was also acknowledged that testing teachers' math skills has little relation to mathematics teaching" (A10, FEA Survey, 2022). As another example, a Chair of a Teacher Education program spoke about how:

> It will mean more of our minority students actually become teachers (essentially the thrust of the court case I believe) - which is a good thing for all those kids out there who need to see Indigenous teachers and Black teachers and other teachers of colour. We want

them all to be strong teachers - including good at math - but a terminal exam is not the way to get there. (A8, FEA Survey, 2022)

The OTCC was praised for taking the lead on taking the MPT to court. This group was able to represent the majority of TCs' feelings concerning the MPT. When the TCs were surveyed and asked if they felt like the MPT was unbiased 79% disagreed or strongly disagreed with the statement. Yet, many TCs were surprised with the verdict. The OTCC Representative said:

> This test was such an upheaval in such a terrible situation for like a year and a half. It was an ending that I wanted, because I was mentally prepared for us to lose the court case. And I had mentally prepared to not let myself get bitter about it. Because that was a risk. Right? That maybe the judge wouldn't see your side, or the fact that it's clearly discriminatory and clearly not bilingual friendly or Francophone friendly. And I was just mentally prepared because injustice happens all the time. As we all know, we just need to look on the news. There's injustice constantly. So, to get the answer that I wanted was just, was just, so nice. (S3, Stakeholder Interview, 2022)

Overall, most TCs were glad that the test was cancelled, however many felt that the amount of time they spent preparing for the test was unfair. One TC said: "I wrote the test confidently and the news passed that it was cancelled the very next day. So I was happy, but also frustrated again as I had spent countless hours and many nights studying for an exam that was cancelled the nextday. Colossal waste of time" (TC Survey, 2022). For those that did take and pass the test, they felt that they should have been given credit for it. For instance, one TC said, "I had already passed, so I was happy for people who didn't have to do it, but I

felt like I wastedmy time doing something that I'm not getting credit for it" (TC Survey, 2022).

Despite some mixed reviews in the media, the court's ruling on the cancellation of the MPT was not about prioritizing race over competence (Denley, 2021). Rather, the court emphasized that the negative impact on equity rights outweighed the positive effect of encouraging TCs and Faculties of Education to improve math skills through the MPT. The court suggested alternative methods, such as introducing math course requirements for B.Ed. program admissions or within the programs themselves, as more equitable and effective ways to enhance student achievement in math (Denley, 2021, p. 31).

Market Accountability

Market accountability is defined by Darling-Hammond (1989), Dulude & Milley (2021), and Pollock & Winton (2016) as the assurance that there will be concentrated efforts to increase competition as a way to improve schools and encourage innovation. This can be seen specifically in the United States with different types of schools available to students (charter, public, private). This is less prevalent in Canada because the education system is more centralized, however there is still school choice in Ontario, religious and secular (Catholic, public, private, and independent), and linguistic (French and English).

Creation. As previously mentioned, when TCs applied and were accepted into their teacher education programs in 2018-2019 they did not foresee the MPT becoming part of their certification process. The change in certification was in effect changing the "goods" that were being sold by the province, which was a path to teacher certification. Many TCs felt blindsided by the new requirement and viewed it as a roadblock to becoming a teacher. As one TC explained, they were "blindsided as it only became a requirement after I had already completed

part of my degree. I also felt that it was another barrier being put in my path and other individuals like me who do not have certain privileges and have had to fight to get to where we are" (TC Survey, 2022). For some TCs it was more than a roadblock, many TCs said that they would have considered another profession all together if they knew about the MPT before applying to the B.Ed. programs (TC Survey, 2022). For example, one TC said: "The MPT was thought of AFTER I accepted my offer to teachers college. If I had known it was going to be mandatory, I would have tried to find other outlets to best study before deciding to go into teaching" (TC Survey, 2022). Bella Lewkowicz told *School* that there is not much choice for TCs, "You can't become a teacher without passing Doug Ford's Math Proficiency Test (MPT); you can't prepare for it because there's so little information available and it's been sprung on aspiring teachers mid-way through their teacher education programs" (Paul, 2020). Not only were TCs mentioning leaving the program but it was also felt by FEAs. One Professor of Education explained that when the MPT was announced as a certification requirement, there were some TCs who were considering dropping out of the B.Ed. (S5, Stakeholder Interview, 2022). They further explained that the TCs were accepted into the B.Ed. program with no expectation of having to pass the MPT, and that it was wrong for the government to implement the MPT in the middle of their ITE program (S5, Stakeholder Interview, 2022).

Before the MPT was created the already enrolled TCs had put a lot of time into their B.Ed. program and had already been taking courses to prepare them to teach math. As one TC explained, they felt "shocked at the idea that the courses we had taken (including math courses) were beingchallenged and that there was a large roadblock for all teachers who had spent two years working toward their bachelor of Ed" (TC Survey, 2022). Professors and

TCs were not the only groups who were frustrated by the creation of the MPT, in 2019, the OTF put out a statement saying:

> The existence of the MPT, mandated for new teachers and voluntary for tenured, creates an unlevel playing field for hiring. The risk of unilateral application of a passed MPT for all teaching positions effectively eliminates teachers who do not specialize in mathematics. This also creates a culture of competition between new teachers and tenured teachers who elect not to take the MPT, as is their right under the regulation. We are concerned that the MPT could end up being a tool that is misused in the hiring process and a pressure tactic for those who are already employed. (Ontario Teachers' Federation, 2019)

There was a lot of frustration for those who were not seeking to be certified in math but still had to take a math test (TC Survey, 2022). One TC explained that: "I was extremely upset because I know I'll never be a math teacher and to make this test a barrier was quite upsetting" (TC Survey, 2022). TCs were frustrated that all TCs had to take the MPT, not just those who teach math. For instance, secondary teachers teach specific subjects.

Implementation. At the time of the implementation of the MPT, there was a teacher shortage and school districts were having difficulties finding substitute teachers to fill open positions. Requiring an additional teacher certification at this time potentially decreased the number of certified teachers eligible to teach. This was exacerbated during the pandemic as many teachers were leaving the profession. In an OTF statement the president, Parker Robinson, wrote: "What is most insulting about the announcement by Minister Lecce [about the MPT] is his insistence that there is a teacher shortage in this province while, at the same time, creating a potential new barrier to alleviating that shortage" (Robinson, 2021). TCs also expressed concern

about the impact of the MPT on the ongoing teacher shortage. As one TC said “I think it was ridiculous that it was a requirement for certification, especially during a teacher shortage” (TC Survey, 2022).

With a perceived lack of respect for teachers in the public eye generated by some politicians, as well as the implementation of the MPT, members of parliament and teacher federation leaders were worried that people might be deterred from entering the teaching profession, increasing the shortage of teachers. The Member of Parliament who was interviewed said: “you could be deterring brilliant teachers who don't want to do a math test. And that could be hurting our education system in the long run” (S6, MPP Interview, 2022). In January 2020 the OCTT expressed that the MPT was in fact deterring TCs from entering the profession. In a position paper the OTCC released they said that it:

> consistently receives communications from individuals who were considering a future career as educators, but have been deterred due to the imposition of the MPT. This has potentially enormous ramifications to the education system in Ontario as many of these individuals may have been able to fill the desperate need for French teachers in this province. Furthermore, many current TCs have indicated that they will choose to leave the province to pursue their careers. (Vandersel, 2020)

When the COVID pandemic caused the implementation of the MPT to be postponed several times, TCs worried about obtaining their teaching license in time for the start of the school year in which they complete their training (TC Survey, 2022). One TC expressed that the MPT was “poorly implemented causing mass uncertainty over whether teachers would be certified when teachers were needed the most- during COVID” (TC Survey, 2022). The OCT made several statements to explain that: “The Ministry of Education has recently extended

the current deadline to fulfill the MPT condition from August 31, 2021, to December 31, 2021, for applicants who have completed an Ontario teacher education program" (Ontario College of Teachers 2021a). After putting a lot of time, energy, and money into becoming a teacher, some TCs were worried about not receiving their teaching licence in time to teach.

Analysis of the data suggested that the MPT implementation was seen to be wasting resources within Faculties of Education. For example, one Dean wrote about how there was considerable time used in "assisting teacher candidates to be successful with workshops and resources" to prepare for the MPT (A4, FEA Survey, 2022). Another Dean said that they "wasted considerable time and effort addressing the MPT and the numerous issues that it created. Bottom line - it created an anxious, negative atmosphere for learning. I could go on and on - I can't get back the wasted time on administration and dealing with the numerous problems created" (A3, FEA Survey, 2022). Faculties of Education were also adapting to online teaching and learning due to the pandemic and the MPT caused additional stress, specifically for math educators. For instance, one Assistant Director of a Teacher Education program said:

> ALL math methods instructors were required to devote additional uncompensated time outside of scheduled teaching hours and contracts to assisting students either by answering questions about the MPT or providing drop-in assistance or small session tutoring. This also occurred during remote teaching. This additional burden led to burnout, fatigue and disenchantment. Such workload additions were on top of normal workload expectations with respect to teaching, service and research for faculty members and instructors. Since the MPT we have had a high turnover of instructors (this may simply be a correlation but is related to burnout related to pandemic teaching). (A9, FEA Survey, 2022)

When preparing for the MPT, many TCs felt that it was not only time being wasted but also money. One TC explained that they "spent hundreds of dollars by hiring a tutor and purchasing resources as well as lost hundreds of dollars because those hours could have been spent working" (TC Survey, 2022). Some TCs invested in private tutoring, while others felt defeated and were reconsidering becoming teachers (TC Survey, 2022).

Cancellation. With the announcement of the cancellation of the MPT there were mixed reactions from the TCs, and some were focused on marketability. Although 87% TCs were ecstatic when the MPT was cancelled, for those that did take and pass the test they wished that the MPT could have gone on their transcripts. Some TCs felt that having the MPT on their transcripts would have made them more "hireable" and given them a "leg up" when applying for teaching jobs. One TC explained that they:

> had already taken it [before the cancellation] and I was proud of my high score because I spent lots of time studying and re-learning high school math concepts. However, I will likely never have to teach those topics in my career. It was bittersweet as I had already paid for tutoring and passed it when it was cancelled. I wish it had remained on the OCT page so I could have some record or benefitto having gone through it. (TC Survey, 2022)

Some felt like the news was too late "I already panicked and wrote the test. I had months of studying behind me before it was even a chance that it could be dropped. My future career (at the time) relied on this. If I waited, I could be without a job. That was not a risk that I was willing to take" (TC Survey, 2022).

For those TCs who had not taken the MPT before the cancellation, they were pleased with the announcement and felt like they could start their careers sooner. Some TCs felt that

their energy could now be used to prepare to enter the teaching field without the added stress of preparing for the MPT (TC Survey, 2022). Other TCs were just pleased that they could get a job right away without having to pass the MPT.

Performance Accountability

Performance based accountability is defined by Darling-Hammond (1989) and Pollock and Winton, (2016) as an accountability approach that can be used to rank student and school performance to encourage change in education systems. The most common example of performance-based accountability is the use of large-scale assessments.

Creation. The creation of the MPT was closely intertwined with accountability for student performance, specifically because of the concern about low math scores reported in the grade 6 EQAO mathematics assessment. This concern gained significant traction through the statements of Premier Doug Ford in 2018, in the Legislative Assembly of Ontario. He is quoted saying:

> We're going to focus on math scores. We're going to focus on math and science, which we should be focusing on. Again, when half our students are failing math, we have an issue. When the grade 6 students are the lowest in all of Canada—we are the lowest in all of Canada under the old curriculum. We're going to fix the old curriculum. We're going to make our students the top in the country. (Arnott, 2018a, p. 730)

The concern was also picked up by mainstream media reports in 2019, "the Education Quality and Accountability Office, which administers standardized assessments in the province, said math test scores among public elementary students in Ontario have been falling over the last five years" (Jeffords, 2019). With the mounting pressure to improve student performance on EQAO assessments, the government mandated the MPT. In 2019 EQAO put out a statement

explaining that: “the Ontario government requires all teacher applicants to demonstrate their mathematics proficiency through the successful completion of a mathematics proficiency test” (EQAO, 2019a). In retrospect, the creation of the MPT can be situated within a narrative that firmly links student performance, diminished student EQAO scores, with the performance of educators. The implied association between teacher competence and student outcomes prompted the creation of the MPT as a strategic initiative to address the perceived deficit in teachers' mathematical proficiency.

Teacher Federations expressed concerns through public statements about standardized testing, indicating dissatisfaction with testing effectiveness. There were questions about the accuracy of using standardized tests as a metric to gauge teacher performance. Both the OTF and ETFO spoke out early about their stance on this form of accountability measure. In 2019 the OTF stated that:

> there is no evidence to suggest that it is possible to create a valid or reliable online, multiple-choice test that can adequately assess the diverse pedagogical approaches to learning that vary day to day, student to student, subject to subject. Any shortcomings in the testing instrument will certainly be open to challenge, especially since the MPT is a high-stakes assessment and will undoubtedly affect the long term livelihood of teachers. (Ontario Teachers’ Federation, 2019)

And in 2018 the ETFO said, “Testing doesn’t grow confidence, competency or proficiency” (Elementary Teachers’ Federation of Ontario, 2018). These sentiments were corroborated by many. For example, a Dean at a Faculty of Education stated that “Standardized tests are too narrow in format and score to capture all that is required to be a teacher. Preparing for a test is exactly what we do not want our students to do - we want them to have a growth mindset. This

type of test assessed superficial knowledge at best and wastes a considerable amount of time" (A3, FEA Survey, 2022). Similarly, a Chair of a Teacher Education program expressed concern "it gave the sense that teacher expertise could be tested and given a score, I was worried it would not be connected to supports to improve teacher efficacy" (A8, FEA Survey, 2022).

TCs, in particular, did not feel that standardized testing was an accurate way to assess teacher performance (TC Survey, 2022). TCs expressed that there should have never been a test that determined if you were able to become certified (TC Survey, 2022). However, this was not the only view expressed, FEA survey participants were divided on their views of teacher testing and had several qualifiers. For instance, one Dean of Education felt that "testing programs within programs of education, for diagnostic and supportive purposes, are fine" (A6, FEA Survey, 2022). An Assistant Director Teacher Education felt that teacher testing could be beneficial but only "IF it is used to identify areas for growth and timely intervention or uncovering hidden learning difficulties (diagnostic teacher testing)" (A9, FEA Survey, 2022).

Implementation. The most common form of performance-based accountability is the use of large-scale standardized assessments, a form that is often questioned as being narrow in scope. For instance, one TC explained that they "found it staggeringly hypocritical to implement standardized testing in a field that has studied and widely renounced standardized testing as being ineffective" as a performance measure (TC Survey, 2022). Alternatives were suggested such as by a Professor of Education who explained that during the court case they "showed that doing a content course for those who need it is so much more humane so much more equitable so much more inclusive way better than a high-stakes test" (S5, Stakeholder Interview, 2022). Interestingly, using standardized testing is not a new way to "prove" something. A representative

from People for Education spoke of the overuse of standardized testing and the assumptions that are made from the test results:

> We use standardized tests to judge the education system, we love that… there's a kind of: up [equals] good, and down [equals] bad graph, the end, I've got the whole picture. So, we assume in our way of measuring and comfortability, that it's a good proxy measure for all of education, that math, reading, and writing scores are a great way to measure the effectiveness of the education system. (S1, Stakeholder Interview, 2022)

As mentioned in the creation section, standardized assessment is not always a favoured way to show proficiency. TCs suggested alternative ways to demonstrate and enhance proficiency, including additional courses within B.Ed. programs and more PD days (TC Survey, 2022). When asked "What learning opportunities best prepare you for the MPT?" 42% of the TCs surveyed said that "required mathematics course during the B.Ed. Program", and 40% said "optional professional development workshops" helped (TC Survey, 2022).

The sentiment was expressed by a few that the MPT aligned with the common practice of professional exams for professional body registration (FEA and TC Survey, 2022). For instance, one TC explained that they felt it was good for the MPT to be implemented because "professional exams for professional body registration are extremely common" (TC Survey, 2022). One university was referenced throughout the data because of their own Math test that TCs must take when they enter their Teacher Education Program. A TC explained that "Lakehead University has a math test that B.Ed. students take their first week. If you don't score 75% or higher you are required to take a year long math course in preparation to take the test again" (TC Survey, 2022).

When the MPT was implemented 83% of TCs disagreed or strongly disagreed that the content on the MPT appropriately measured their pedagogical knowledge. For instance, one TC said: "I was severely disappointed again when I completed the actual test. Answering multiple choice questions does not measure proficiency in math or being able to teach it. There should be spaces for word problems and spaces for short answer questions and drawings to show how you would teach a concept". Administrators also felt that the Pedagogy section was focused on knowing details of Ministry of Education documents rather than a teacher's ability to teach math or understand sound pedagogical approaches (FEA Survey, 2022). Similarly, a Professor of Education explained that their students who passed the MPT learned no mathematics or pedagogy, and in fact solely memorized math strategies and policy documents (FEA Survey, 2022). The intended use of the MPT was to measure teacher math competency, however it was not a good performance indicator as to if the TC was going to be an effective teacher in general.

Cancellation. The MPT, a high-stakes, large-scale assessment, in theory was to be used to check TC's mathematical knowledge, with the assumption that TCs who are proficient at a math test would be good math teachers. However, it led to documentation of some problematic results regarding racialized TCs, specifically concerns of discrimination. However, with the cancellation of the MPT in December 2021, some felt that the MPT should have been discontinued for other problematic reasons, as well as concerns of discrimination. One of the other reasons was the concern with performance-based accountability. For instance, one TC wrote about seven different reasons the MPT should have been cancelled:

> This reasoning was sufficient, although I felt like it should be cancelled because: (1) a proficiency test, especially with no other supports, increases teacher math anxiety, which will be modelled for and passed down to students; (2) it goes against current

> pedagogical consensus, which states that large-scale standardized testing is inaccurate, and encourages learning-to-the-test (and thereby discourages learning for all the facets of genuine mastery that the test ignores); (3) if scores are to be published, it introduces an inequitable measure to teacher hiring; (4) pedagogy is a qualitative skill and cannot be measured with a multiple- choice test; (5) increases cost- and class-based barriers to teaching; (6) supports offered are incredibly lacking; and (7) it prioritizes rote math education, and thereby moves the province away from education of mathematical thinking skills. (TC Survey, 2022)

These seven themes came up repeatedly in the TC Survey results, showcasing how the MPT was not a strong indicator of performance or skill level.

From the creation to the cancellation there was pushback against the MPT because it appeared to blur the line between subject proficiency (e.g., in math) and effectiveness as a teacher in that subject. This caused tension between stakeholders. As previously mentioned, stakeholders including TCs, FEAs, members of the teacher federations, and the representative from People for Education all felt that a test score would not be able to predict your performance as a teacher. However, there were sentiments expressed in the media and held by the government at the time that felt that a proficiency test would be able to show proficiency in math and effective teaching. For instance, in a National Post news article Denley (2021) suggested that the cancellation of the MPT "means that teachers will no longer have to demonstrate any mastery of math. That's great for the minority of teachers who couldn't pass the test, but what about students who need better math teaching"? However, this sentiment did not represent how the majority of the TCs and FEAs felt about the cancellation of the MPT.

Findings Organized by Stages: Addressing the Research Questions

In the above section I discussed my findings organized by accountabilities, and within each accountability I discussed the themes that arose related to that accountability in each of three stages of creation, implementation, and cancellation. There was a great deal of overlap in some of the themes that arose across the accountabilities. In order to summarize these findings and to address my research questions, I now discuss the major themes in my findings within each of the three stages (creation, implementation, and cancellation). In this way I can examine the ways in which the accountabilities and stakeholders interacted within each stage and present the themes that emerged when looking at those interactions. I collected data using multiple methods (i.e., document analysis, two surveys and 10 semi-structured interviews) and analyzed and wove together findings to answer the following research questions:

1. How have different educational accountabilities and connected stakeholders interacted with the creation of the MPT?
2. How have different educational accountabilities and connected stakeholders interacted with the implementation of the MPT?
3. How have different educational accountabilities and connected stakeholders interacted with the cancellation of the MPT?

Research Question 1

In order to address the first research question, I examined the findings in the creation sections under each of the seven accountabilities and then reanalyzed the data to pull out main themes related to the creation of the MPT. Below I highlight the recurring themes that stood out in connection to research question one: How have different educational accountabilities and connected stakeholders interacted with the creation of the MPT?

Drawing from an analysis and interpretation of my findings chapter, looking specifically across the findings of each accountability just within the creation stage, four themes emerged related to the creation of the MPT. These themes were: the impact of changing certification requirements, questioning the preparedness of TCs and Teacher Education programs, claiming low student math scores as a reflection on TCs mathematical knowledge, and the MPT as a barrier to entering the teaching profession. Below I discuss each theme and highlight how the different educational accountabilities and stakeholders played a role within each theme.

The Impact of Changing Certification Requirements. The creation of the MPT changed the certification requirements for TCs to become teachers in Ontario, Canada. This had a strong impact on TCs, and this theme came up in three different educational accountabilities: administrative, moral, and market.

The changes in certification requirements impacted TCs who had already entered the program. The initial expectations for teacher certification were set when these candidates entered their ITE program. Tensions arose when the certification requirements changed to include the MPT while students were already on their path toward completing them. When the certification requirements were being altered, these changes raised moral and market considerations connected to fairness. Many TCs did not think it was fair to change the requirements when they were part-way through the program. Some suggested that they may not have entered to prepare for the teaching profession if they knew that this was going to be an additional requirement. In terms of market accountability, the change in certification requirements effectively altered the "goods" offered by the province, which in this context was the path to teacher certification. This market-oriented perspective highlighted how the shift in certification requirements impacted potential teachers.

Questioning the preparedness of Teacher Candidates and Teacher Education Programs. The creation of the MPT questioned the preparedness of the TCs as well as implicitly questioning the teacher education programs in the province. This theme was connected to three different accountabilities: administrative, legal, and political.

When the MPT was introduced, tensions arose between the MOE, the OCT, and the Faculties of Education at Ontario Universities. The strain became apparent when politicians took over prescribing certification requirements rather than leaving that responsibility as the jurisdiction of the OCT and Faculty of Education programs. The political action of the government's mandate of the MPT as a certification requirement raised doubts about the overall teacher certification process in Ontario. This perception framed the test as a tool to undermine the credibility and value of educators and their educational training programs. The conflicting views around the necessity of the MPT were showcased in the Legislative Assembly of Ontario, where there were ongoing discussions and debates about whether the MPT would help TCs be more prepared to teach mathematics. Some MPPs thought it would help ensure better teaching of mathematics, while others called, instead, for PD resources to support TCs in different ways. Other stakeholders, including Faculties of Education and TCs, felt that if the MPT was created it would also question the rigor of teacher education programs in Ontario.

Student Math Scores as a Reflection of Teacher Candidates' Mathematical Knowledge. The creation of the MPT rested on the assumption that there was a strong link between teachers' mathematics knowledge and student achievement, and this had implications when considering political, legal, professional, performance, and moral accountabilities.

The purported linking of teacher knowledge and student scores on mathematics achievement in Ontario was brought forth by several statements of politicians. It was through the

Premier's, Doug Ford's, statements, and the legislation that led to the creation of the MPT as a way of addressing what was seen as a decline in student achievement, that declining achievement was seen as an unsubstantiated claim of teachers' poor mathematics knowledge. As previously discussed, many stakeholders disagreed with the strong emphasis on this link and felt like the government was looking for a simple and ineffective solution to a complex problem and many perceived this as shifting responsibility, and possibly blame, onto teachers. Several stakeholders thought that the government was ignoring the complexity of the situation and not seeking alternative, varied, and more effective solutions.

The creation of the MPT was seen by TCs as having an impact on teacher professionalism as they saw it as undermining the public perception of teachers, reflecting distrust in their professionalism and training (TC Survey, 2022). The preparation, certification and performance of teachers was generally the purview of the OCT and Faculties of Education, and these stakeholders also felt undermined and a sense of public distrust. Furthermore, the implications of seeing teacher knowledge of mathematics as a simple cause of student achievement was seen as an unfair judgment of the profession, creating moral issues.

The MPT was a Barrier to Entering the Teaching Profession. The creation of the MPT was perceived as a barrier to entering the teaching profession. This theme came up in four accountabilities: administrative, professional, market, and performance.

The quick creation and announcement of the MPT led to unclear certification requirements and contributed to the confusion that many of the TCs felt surrounding certification requirements. For those TCs who were already enrolled in a teacher education program, they felt that they had already invested substantial time into their B.Ed. degrees, prior to the creation of the MPT. Professionally, these quick changes in certification requirements felt like another

barrier to entering the teaching profession. Many TCs felt that the MPT would inhibit them from pursuing a profession they had aspired to. Additionally, TCs had reservations about the accuracy of the MPT, specifically with it being a standardized test that claimed to gauge teacher proficiency and predict student performance. A few members of Faculties of Education, conceded that if the MPT was utilized for diagnostic purposes, its use might be acceptable, however the high-stakes nature of the MPT was met with disapproval from numerous stakeholders.

Research Question 2

In order to address the second research question, I examined the findings in the implementation sections under each of the seven accountabilities and then reanalyzed the data to pull out main themes related to the implementation of the MPT. Below I highlight recurring themes that stood out across accountabilities in connection to the implementation stage and hence respond to research question two: How have different educational accountabilities and connected stakeholders interacted with the implementation of the MPT?

Drawing from my findings, two major themes emerged under the implementation of the MPT, which was from 2020-2021. The themes were: The fast implementation of the MPT led to consequences such as chaos, confusion, and stress among stakeholders; and the nature of the MPT became apparent during the implementation and caused concern. Below I display how the different educational accountabilities present under each theme.

The Fast Implementation of the MPT led to Consequences such as Chaos, Confusion, and Stress Among Stakeholders. The fast implementation of the MPT resulted in chaos, confusion, and stress for many stakeholders, including the TCs and the FEA. This manifested in several ways, including challenges with test administration, the efforts of Faculties

of Education to provide support to TCs and consequently, TCs having to self-organize. This theme came up in six accountabilities: administrative, legal, moral, political, professional, moral, and market.

Challenges with Administration of the MPT. During the implementation of the MPT, numerous procedural aspects were inadequately communicated to the TCs and executed poorly. An example of this was the limited number of testing centres and testing slots provided for pre-service teachers to take the MPT, as well as the accessibility to those locations. Many TCs had to drive several hours to take the MPT and had difficulty securing their testing spots. For example, one TC had to travel from Ottawa to Toronto to take the test in 2019, because there were no open spots available in Ottawa (TC Survey, 2022). According to a CTV article, TCs were only given 4 days to sign up for the MPT and there were only 6000 spaces for over 6,700 TCs (Campbell, 2021). TCs turned to their Faculties of Education for answers during the implementation of the MPT. However, the Faculties of Education were not the party responsible for providing a location to administer the test, or for other logistics. As mentioned under administrative accountability, one educational leader at a Faculty of Education said that when the MOE was looking for testing sites the Faculties of Education spent a considerable about of time communicating that they did not have the resources to facilitate the writing of the MPT (FEA Survey, 2022). Additionally, the TCs had a relatively short timeframe to take the MPT to be certified for the following school year. This was especially stressful for those who were part way through their B.Ed. On top of this, the date that the MPT needed to be completed was also continually changing because of the COVID-19 pandemic.

Immediate Efforts of Faculties of Education to Provide Support to TC. Teacher Education Programs felt the effects of the implementation of the MPT, which impacted their

programs. Although the MPT was not a requirement for TCs to graduate from Initial Teacher Education (ITE) programs, the MPT demanded considerable resources, including time, space, and energy. The procedures of the MPT were not communicated properly from those implementing the MPT, and the ITE programs were left to answer questions about procedures from TCs, and in some cases, also felt the responsibility of preparing their students. As mentioned under administrative accountability, one member of a Faculty of Education said that they repeatedly explained to the TCs that the MPT was a Ministry of Education requirement, and was not connected, or a requirement in their ITE programs (FEA Survey, 2022). The disconnect between certification and degree requirements put the Faculties of Education in an awkward position trying to support their students, while also knowing that this certification requirement was outside their program degree requirements.

ITE programs were burdened with the feeling of responsibility to support the TCs for something that they were not responsible for (FEA Survey, 2022). Legally, the Faculties of Education were not able to push back against the MPT because, as mentioned in the administrative accountability section, the MPT was not mandated by the Faculties of Education, but as part of certification requirements through the OCT. Although the requirement of the MPT was not tied to TCs graduating from ITE programs, the MPT was taking up a lot of time, space, and energy in the Faculties of Education. In some cases, Faculties of Education organized preparatory courses to address the demands of preparing for the test. As mentioned under administrative accountability, one educational leader said that they offered opportunities, such as workshops to review mathematics. These workshops were intended to be used for review as well as helping TCs manage anxiety and concerns surrounding the MPT (FEA Survey, 2022).

TCs Self-Organized. TCs felt that the MPT was being imposed upon them without warning, and they were not getting the information they needed about the logistics of the MPT implementation from the Ministry of Education, EQAO or their Faculties of Education, they decided to self-organize. A group of TCs started the OTCC as well as a successful Facebook page in November 2019. The Facebook group called "Rethink the Teacher Candidate Math Legislation", had almost 5000 Facebook members who are mainly teacher candidates. Through this Facebook group TCs were able to share up to date information such as study materials, resources, and any information about new test dates etc. The group was started by Bella Lewkowicz, a co-founder of the OTCC and a main contributor to the cancellation of the MPT. Bella Lewkowicz claimed that there was little support from the Faculties of Education to challenge the MPT, so she and a group of TCs took it upon themselves to fight against the MPT.

Many Faculty of Education administrators praised the OTCC for being driven and were proud of the TCs for knowing their rights (FEA Survey, 2022). For instance, in the FEA survey, a Faculty of Education Dean said that the students were the driving force in the court case against the MPT, when no other form of advocacy had any effect. Another example comes from an OTF Representative, who explained that they went to the Faculties of Education for support, but ended up working closely with OTCC as they were the ones that lead the charge (S4, Stakeholder Interview, 2022). When surveyed, 78% of TCs did not think that the procedures, such as registration, access, and location were clearly communicated. This sentiment was echoed throughout the TC survey. For instance, a TC, who was a member of the student council for a Faculty of Education, reported in the survey: "The directions and requirements were constantly changing, and the shifting messaging, coupled with unclear communication, added anxiety to the

entire process… many students were coming to [the student council] for answers that neither we nor the administration had" (TC Survey, 2022).

The Nature of the MPT Became Apparent During the Implementation of the MPT. During the implementation stage the stakeholders got a first glimpse of the MPT, which is when the nature of the MPT became apparent. This theme came up in four accountabilities: administrative, moral, professional, and performance. The MPT was a large-scale computer-based assessment for prospective teachers created by EQAO that focused on two key components: math content and pedagogy (Mathematics Proficiency Test, 2021a). To pass, TCs had to obtain a score of 70% on both mathematics and pedagogy sections of the MPT. The math section was drawn from the Ontario mathematics curriculum from Grade 3 through Grade 9 and the pedagogy section focused on understanding Ontario education documents and policies, rather than effective teaching practices, an important focus of teacher education in Ontario (Mathematics Proficiency Test, 2021b). Many Professors of Education felt that the pedagogy section primarily focused on memorization of Ministry of Education documents, there was not a clear connection to a teacher's mathematics teaching abilities.

The use of a standardized test for gauging teacher effectiveness contradicted prevailing notions and research regarding assessment and accountability. The MPT did not represent the assessment and evaluation methods emphasized in TCs' ITE programs. For instance, there was a sense of hypocrisy as one TC explained that in their teacher education program, the use of standardized testing was explained as an ineffective performance measure (TC Survey, 2022). The MPT also faced scrutiny regarding its validity and fairness, specifically when the TCs started getting their marks back for the test.

The numerous accessibility issues during implementing the MPT called into question the inherent bias of standardized testing, as some TCs were disadvantaged more than others. When scores on the MPT were available, the lack of diversity among passing test takers was apparent. The MPT not only disadvantaged neurodiverse TCs but also disadvantaged racialized TC's and/or French speakers. It was considered unfair for French test takers because of the lack of available test slots as well as poor translation of test items (TC Survey, 2022). The test implementation was also called inequitable by the TCs as the test centres were often far from the test takers, with some TCs having limited access to the test centres (TC Survey, 2022). Furthermore, when the MPT moved online there was not always equal access to reliable internet.

Research Question 3

In order to address the third research question, I examined the findings in the cancellation sections under each of the seven accountabilities and then reanalyzed the data to pull out main themes related to the cancellation of the MPT. Below I highlight a recurring theme and sub-themes in connection to the cancellation stage and hence respond to research question three: How have different educational accountabilities and connected stakeholders interacted with the cancellation of the MPT?

Drawing from my findings, a major theme emerged under the cancellation phase of the MPT. The major theme was the cancellation of the MPT was seen by many as a validation of their concerns; those concerns were equity and fairness, certification requirements, and teacher professionalism. Below I display how the different educational accountabilities present under each theme.

The Cancellation of The MPT Was Seen by Many as a Validation of Their Concerns. Below I display how the cancellation of the MPT was seen by many of a validation of

their concerns. This theme is related to all seven educational accountabilities: administrative, legal, political, professional, moral, market and performance.

Equity and Fairness. The cancellation of the MPT was driven by professional concerns regarding equity in teacher certification; the MPT was perceived to pose a barrier for certain groups of students. The decision to cancel the MPT validated existing concerns about its fairness, especially with an official court ruling deeming the test unconstitutional. This ruling was supported by many professors of Education, who agreed with the court's decision. The verdict highlighted the negative impact on equity rights, which outweighed any positive effects the MPT might have had in encouraging TCs, and Faculties of Education, to improve math skills. The MPT, operating as a high-stakes, large-scale assessment, revealed problematic outcomes, particularly concerning racialized TCs. These concerns centered around discrimination within the test's results, indicating disparities among different student groups.

Certification Requirements. The cancellation of the MPT alleviated substantial performance and administrative pressure to take the MPT before applying for certification. At the time there was a growing teacher shortage in Ontario, which generated a need for qualified professionals to enter the classroom. Upon the news of the MPT's cancellation, most TCs were pleased, seeing it as positive news. Some felt relieved, particularly those facing the possibility of having their temporary OCT certification revoked due to failing the test (TC Survey, 2022). Some TCs viewed the MPT as a barrier to entering the teaching profession and were satisfied with its cancellation due to the numerous certification requirements they already faced (TC Survey, 2022).

However, there remained mixed sentiments among TCs. While many celebrated the end of the MPT, those who had successfully passed the test wished for recognition of their

achievement on their official transcripts. This reaction highlights that despite the widespread acknowledgment that the MPT did not adequately demonstrate teacher competency, TCs still sought recognition for their efforts. Some TCs felt that their energy could now be used in preparation to enter the teaching field without the added stress of preparing for the MPT (TC Survey, 2022). With the current teacher shortages, other TCs were just pleased that they could get a job and enter the teaching field right away without the additional barrier of having to pass the MPT (TC Survey, 2022).

The cancellation of the MPT also relieved some of the workload of the administration at the Faculties of Education, even though the MPT was not connected to their Teacher Education programs. For example, there was a sense of relief, and it took the stress and pressure away from the staff and administration who had been fielding endless questions about the process (FEA Survey, 2022) and the pressure to provide workshops and resources for test preparation. Faculties of Education resumed what they were doing before the MPT was implemented, which was focusing on learning, rather than test preparation (FEA Survey, 2022).

Teacher Professionalism. Ultimately, with the cancellation of the MPT, the TCs felt like their voices were heard and that their professionalism was taken seriously (TC Survey, 2022). From the creation to the cancellation there was pushback against the MPT because professionally it appeared to blur the line between subject proficiency, in this case mathematics, and the effectiveness of an individual as a teacher within that subject. This challenge to the test emphasized that effective teaching goes beyond subject-specific knowledge.

Even with the negative public perception of teacher' poor math skills, created by politicians and the media, the cancellation of the MPT called for a renewed respect for the profession of teaching. Overall, the MPT "sent the wrong message about teachers and challenged

both our intellectual and teaching ability" (TC Survey, 2022). With the cancellation of the MPT there were still conflicting views about if the test was cancelled for the "right" reasons.

Chapter Six: Discussion

I conducted a five-phase mixed methods case study to identify, analyze, characterize, and examine the creation, implementation, and cancellation of the MPT in Ontario, Canada. This study makes connections between how different educational accountabilities and connected stakeholders interacted within the different stages of creation, implementation, and the cancellation of the MPT. I chose a multi-phase approach, to gain a better understanding of the current context surrounding the creation, implementation, and cancellation of the MPT. Data from this study was collected and analysed though a five-phase process. Phase I involved a document analysis across stages, which included the use of a document extraction tool. Phase II involved collecting data across stages, which included a survey for the TCs, a survey for the Faculties of Education, and interviews. The data collection done in Phase II occurred in the fall of 2022. Phase III included analysing the data of individual stakeholder perspective, which included three survey matrixes for the surveys and interviews conducted in Phase II. Phase IV included aligning the findings by accountabilities. I organized the data by stakeholder and then combined the data by accountability. Phase V included reorganizing the data by stage, which lead to interpreting the findings across the three stages of my study.

Each stage of my study was designed to examine how different educational accountabilities and stakeholders engaged with the MPT. Through an in-depth analysis of my data, while relying heavily on my conceptual framework, I was able to answer my three research questions, as outlined in Chapter 5. Through the analysis process, I uncovered the complexity surrounding an educational problem, low student math scores, while also observing the complexity of implementing a teacher certification exam. When analyzing the three stages, creation, implementation, and cancellation, I was able to see how different systems, and

stakeholders interacted within seven educational accountabilities. After collecting many different stakeholder perspectives, I observed many intersecting ideas that connect to the existing literature. Three main ideas that relate back to the literature outlined in Chapter 2 are related to standardized testing, effective teaching, and institutional complexity, which I discuss in the next section as I situate my study results. The discussion chapter concludes by explaining the complexity of my methodology and conceptual framework.

Situating the Study

Each stage of my study was designed to examine how different educational accountabilities and stakeholders engaged with the MPT. Through an in-depth analysis of my data, while relying heavily on my conceptual framework, I was able to answer my three research questions at the end of Chapter Five. Through the analysis process, I uncovered the complexity surrounding an educational problem, low student math scores, while also observing the complexity of implementing a teacher certification exam. When analyzing the three stages, creation, implementation, and cancellation, I was able to see how different systems, and stakeholders interacted within seven educational accountabilities. After collecting numerous different stakeholder perspectives, I observed many intersecting ideas that connect to the existing literature. Three main ideas that relate back to the literature outlined in Chapter Two are related to standardized testing, effective teaching, and institutional complexity.

Standardized Testing

Standardized testing has long been debated for its effectiveness in accurately measuring student achievement and teacher performance (Earl & Torrance, 2000; Nagy, 2000). Often, these assessments serve multiple purposes beyond their intended use, which can skew the data and lead to negative consequences for teachers and students (Koretz, 2017). Koch and Deluca (2012)

highlight the concept of multiple uses which refers “to situations where the results from a single administration of an assessment are used for more than one purpose” (p. 101). When the data is employed for multiple purposes, beyond its original use, it can raise concerns about the validity of the assessment. For instance, when a standardized test evaluates both a province's overall performance in a subject and individual teacher effectiveness, the results of the assessment can be interpreted differently. This can skew the data and the conclusions that are drawn from the test results.

The MPT provides an example of how the results of a high-stakes standardized test can have unintended consequences when the results are used for multiple purposes. The MPT was created in response to low student mathematics scores. The reasoning was that if TCs were required to take a mathematics test to demonstrate or prove mathematics competency, then the students would be taught by more skilled, effective, and highly qualified mathematics teachers. Requiring preservice teachers to take a mathematics test in order to combat low student math scores shifted the purpose of the standardized test. This shift in purpose resulted in the Faculties of Education creating preparatory courses focused solely on passing the MPT. Instead of investing in comprehensive mathematics courses or professional development opportunities related to improving student mathematics skills, resources were diverted to preparing for the MPT. This resulted in prioritizing the MPT over other professional development essential for effective teaching.

Effective Teaching

Effective teaching can be defined in different ways, this is dependent on the different stakeholders and the different accountabilities, each group may have different priorities or definitions of what constitutes “effective teaching”. In the case of the MPT effective teaching

was connected to teacher mathematical competency. Despite extensive research on the attributes of high-quality teaching and its profound impact on student outcomes, I was unable to find literature directly linking teacher certification tests to effective teaching. However, there is literature to support the need for highly qualified teachers (Dodeen et al., 2012; Etim at al., 2020; Lee & Lee, 2020). Teacher's qualifications, including years of experience, level of education, effectiveness, and subject matter expertise can all impact student achievement and success (Lee, 2018). Lee (2018) explains that high-quality teachers can "significantly increase the probability that a secondary school student will not only have higher achievement but also obtain a bachelor's degree" (p. 374).

The literature does highlight the multifaceted nature of effective teaching, emphasizing that it cannot be adequately captured solely through performance on standardized tests (Bartels et al., 2019; Goe, 2007). Goldhaber and Hansen (2010) explain the conundrum with teacher testing, stating "teacher-testing policies are intended to ensure some measure of quality control over the teacher workforce without directly observing classroom performance; variation in test scores explains little of the variation in teacher quality" (p. 221). Teacher quality can be hard to measure, which is why subject matter teacher tests are put in place. However, there are factors such as teacher qualifications, experience, and instructional methods which can significantly influence student achievement (Dodeen et al., 2012; Etim at al., 2020; Lee & Lee, 2020). Therefore, relying solely on standardized testing such as the MPT, as a measure of teacher effectiveness, overlooks the nuanced aspects of teaching and learning which can be hard to quantify.

Institutional Complexity

Institutional complexity analyzes the major institutions of society which Friedland and Alford (1991) explain are the market, the state, the corporation, the professions, religion, and the family. In this study I focused on the institutions that interact with the education system in Ontario and the professionals that make up that system, who were impacted by the creation, implementation, and cancellation of the MPT.

Institutional logics are "socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules drawn from broader societal institutions, such as the institutions of democracy, bureaucracy, the family, and markets" (Bridwell-Mitchell & Sherer, 2017, p. 804). When many logics compete within an institution it can be challenging to pinpoint influence because "no scenario or field of study can be described as being guided by one single logic" (Gullberg & Svensson, 2020, p. 52). Gulberg and Svensson (2020) explain how institutional logics are influencing every level of stakeholder surrounding an institution. With many different institutions influencing the logics, there will rarely be an even distribution of resources (time, money, or energy) among the logics, this creates a "push and pull" between which logic is more dominant. The dominant logic is usually going to be influenced by power or money, which can cause tension between "overlapping external accountability demands from state governments, districts, school boards, school councils and communities… and taken-for-granted logics of school organizations (e.g. school characteristics, student population, teachers)" (Dulude & Milley, 2021 p. 85).

The MPT delved into the power dynamic between educational accountabilities. It was showcased through the different data sources that not every institution, logic, or stakeholder has the exact same amount of power, which added to the complexity. Alford and Friedland (1975)

state that “groups have access to different types of power that affect the level and consequences of their members' participation. Thus, the participation of different groups is unlikely to be analytically equivalent” (p. 472). If we think of the accountabilities as ideas or priorities, we can assume that each is going to have a “pull” on the system, nudging it, in favour of one logic over another. Through my literature review, document analysis, and analysis of data I was able to gain a deep understanding of the different educational accountabilities surrounding the MPT, which showcased how there are many logics competing for priority in the Ontario education system.

Complexity of Methodology

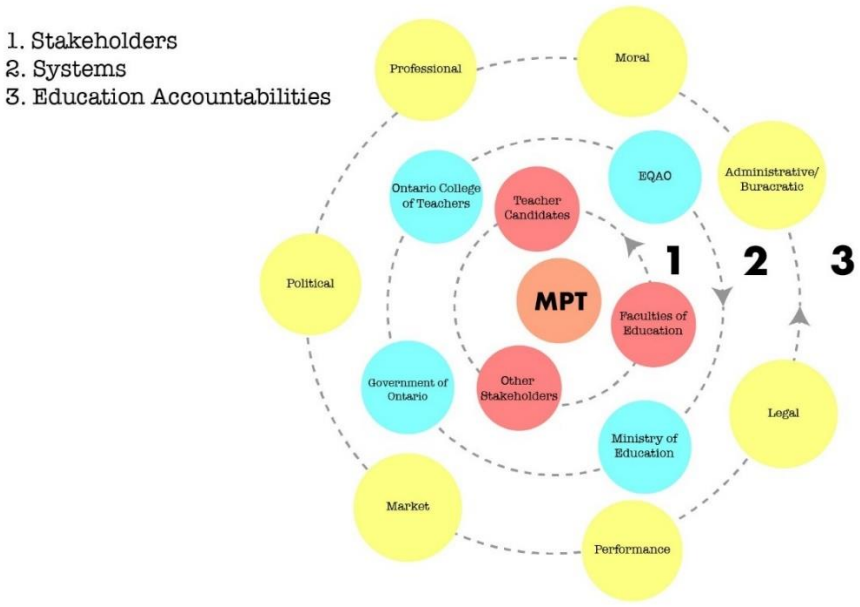
This study is an example of analyzing complex educational decisions, such as implementing a large-scale assessment, through the theoretical lens of institutional complexity and different educational accountabilities. My conceptual framework focuses on seven educational accountabilities, which contributes to a deeper understanding of the interconnectedness and complexity surrounding educational issues, in my case the use of large-scale standardized assessments as a measure of teacher proficiency. The educational context in Ontario remains complex but has evolved over the past five years. This conceptual framework could be applied to future research studies, specifically around situations involving multiple stakeholders.

Using multiple data collection methods to reach as many stakeholders connected to the MPT helped strengthen the study by providing diverse perspectives. However, this posed challenges in organizing and analyzing the data. To address this, I organized my data to explore each stage of the mixed-methods case study from various stakeholder viewpoints. I combined the document analysis, quantitative survey, qualitative survey, and interviews to gain a better understanding of each stakeholder’s perspective connected to the creation (stage 1), implementation (stage 2) and, cancellation (stage 3) of the MPT mixed-methods case study. In each of the five phases of the

research design, I organize my data sources in ways that examine, analyze, and address each mixed-methods case study stage from each stakeholder perspective. Addressing each mixed-methods case study stage from each stakeholder perspective was a challenge due to the rigor of the study, the findings section proved time-consuming due to the amount of data collected. Additionally, the complexity arose from the diverse perspectives of stakeholders, which did not neatly align with the seven accountability categories for each stage. Combining the many stakeholder perspectives by accountability proved challenging, however my conceptual framework helped make the different perspectives clearer. Below I have included my conceptual model, Figure 6, which depicts different layers of Ontario's education system, suggesting that each ring interacts with the others. This model consists of three "rings' that interact with each other. Each ring does not stand alone but impacts the rings around it. This model not only helped to draw direct correlation between accountabilities, systems, and stakeholders, but also helped to centre on perceptions and expectations of the accountability systems of Ontario's education system at large. This visual representation helped me make sense of a complex situation and address the question, which I thought about a lot throughout this study: How can we make sense of something that does not fit neatly into predefined boxes?

Figure 6

Conceptual Framework



Summary

In this discussion chapter, I reviewed the connections between my research and existing research literature, specifically focusing on standardized testing, effective teaching, and institutional complexity. My study adds to the research literature connected to each of the three areas explained above. I then explained the complexity of my methodology, and how the use of my conceptual framework could be applied and used in relevant contexts. Lastly, the timing of this study is important because tests, like the MPT, are not going away.

Chapter Seven: Conclusion

This chapter begins with a summary of this doctoral study, followed by a discussion of the contributions of this research. I then present an epilogue on the MPT, including three situations within the Ontario and broader educational context that serve as a backdrop to reinstating the MPT. Finally, this chapter concludes with my reflections on this study and some final concluding remarks.

Summary of Study

This thesis examines the evolution of the Math Proficiency Test (MPT), a large-scale teacher certification test in Ontario Canada that was initiated in 2019, cancelled due to a court challenge in 2021, and appealed in a higher court challenge in November 2023. The data for this research project was collected before the latest appeal, and looked at the creation, implementation, and the cancellation of the MPT from 2016 - 2021.

This study addresses the following three major questions:

1. How have different educational accountabilities and connected stakeholders interacted with the creation of the MPT?
2. How have different educational accountabilities and connected stakeholders interacted with the implementation of the MPT?
3. How have different educational accountabilities and connected stakeholders interacted with the cancellation of the MPT?

For this study I used a theoretical framework that aligns with institutional complexity (Alford & Friedland,1975; Bridwell-Mitchell & Sherer, 2017; Gullberg & Svensson, 2020; Thornton & Ocasio,1999), which helped develop my conceptual framework around seven educational accountabilities (Darling-Hammond, 1989; Dulude & Milley, 2021; Firestone and

Shipps 2007; Pollock &Winton, 2016; Stone et al., 1989). Participants in this study included TCs, Deans of Faculties of Education and Directors of Teacher Education Programs at Ontario Universities, and other stakeholders connected to education in Ontario. This study uses a congruent/convergent mixed methods design based on Creswell & Plano Clark's (2018) "Flowchart for Procedures in Implementing a Convergent Mixed Methods Design" (p. 105).

In addressing my first research question: How have different educational accountabilities and connected stakeholders interacted with the creation of the MPT? I drew on the analysis and interpretations of my findings, which looked across the findings of each accountability within the creation stage. Four major themes emerged related to the creation of the MPT. These themes were: the impact of changing certification requirements, questioning the preparedness of TCs and Teacher Education programs, claiming low student math scores as a reflection on TCs mathematical knowledge, and the MPT as a barrier to entering the teaching profession. The impact of changing certification requirements disrupted TCs who were already partway through their ITE. These changes raised moral and market concerns about fairness concerning altering the path to certification, especially because some TCs were questioning their career choice. The creation of the MPT questioned the preparedness of TCs and Teacher Education programs which caused tensions between the MOE, the OCT, and the Faculties of Education at Ontario Universities. This theme was connected to three accountabilities: administrative, legal, and political. The claim that low student math scores was a reflection on TCs mathematical knowledge was presented by many politicians at the time. There was no consensus over this view, and several stakeholders thought that the government was ignoring the complexity of the situation and not seeking alternative, varied, and more effective solutions. Lastly, the MPT was seen as a barrier to entering the teaching profession, especially because of the high-stakes

performative nature of the test. The MPT was created, in part, as a political response to low student EQAO math scores. During the creation of the MPT, TC's and Teacher Education programs were strongly impacted, as adaptations were made to the then current teacher certification process. Analysis of this change to certification when the MPT was created revealed overlapping tensions between professional, administrative, market, and political accountabilities. These accountabilities interacted throughout the MPT creation stage and created challenges faced by stakeholders connected to the Ontario education system.

In addressing the second research question: How have different educational accountabilities and connected stakeholders interacted with the implementation of the MPT? I drew on the analysis and interpretations of my findings, which looked across the findings of each accountability within the implementation stage. Two major themes emerged under the implementation of the MPT, which was from 2020-2021. The themes were: The fast implementation of the MPT led to consequences such as chaos, confusion, and stress among stakeholders; and the nature of the MPT became apparent during the implementation and caused concern. The fast implementation of the MPT resulted in chaos, confusion, and stress for many stakeholders, including the TCs and the FEA. This manifested in several ways, including challenges with test administration due to the disorganized and fragmented roll out, the efforts of Faculties of Education to provide support to TCs and consequently, TCs having to self-organize. This theme engaged with six accountabilities: administrative, legal, moral, political, professional, moral, and market. The nature of the MPT became apparent during the implementation and caused concern. The concern came from the realization that the MPT was testing a narrow band of mathematics content as well as assessing pedagogy; TCs were expected to know details of the Ministry of Education policy documents. Additionally, the numerous accessibility issues during

implementing the MPT called into question the inherent bias of standardized testing, as some TCs were disadvantaged more than others. The MPT was used as a form of performance accountability and was seen in this stage by some as a measure for high quality teaching. However, there was pushback from various stakeholders who challenged the idea that performance on a single test on a narrow band of mathematical content could accurately measure teacher effectiveness. This theme came up in four accountabilities: administrative, moral, professional, and performance.

In addressing my third research question: How have different educational accountabilities and connected stakeholders interacted with the cancellation of the MPT? I drew on the analysis and interpretations of my findings, which looked across the findings of each accountability within the cancellation stage. Drawing from my findings, a major theme emerged under the cancellation phase of the MPT. The major theme was the cancellation of the MPT was seen by many as a validation of their concerns; those concerns were equity and fairness, certification requirements, and teacher professionalism. This theme is related to all seven educational accountabilities: administrative, legal, political, professional, moral, market and performance. The first concern was equity and fairness; the cancellation of the MPT was driven by professional concerns regarding equity in teacher certification. Additionally, the MPT was perceived to pose a barrier to certification for certain groups of students, this presented through moral accountability. The second concern was certification requirements, the cancellation of the MPT alleviated substantial performance and administrative pressure to take the MPT before applying for certification. A third concern was teacher professionalism; with the cancellations of the MPT, the TCs felt that their voices were heard and that their professionalism was taken seriously (TC Survey, 2022). Opinions were divided among stakeholders, with some supporting

the cancellation of the MPT, while others raised questions about effective strategies to ensure mathematical proficiency for TCs. This is a discussion that is ongoing to this day.

Contributions of this Research

The significance of this research builds on decades of research conducted on large-scale assessments (e.g., Earl & Torrance, 2000; Hargreaves, 2020; Kempf, 2016; Koretz, 2017; Nagy, 2000; Sahlberg, 2010; William, 2010). The results from large-scale assessments are often used for purposes in which they were not designed (Koch & Deluca, 2012; Nichols & Williams, 2009) which can severely undermine teachers in their own classrooms. Kempf (2016) writes about the "painful gap between blanket calls for accountability and educational improvement" (p. 26), especially when educational improvement has become synonymous with high, large-scale assessment, test scores. This research is unique because of its current relevance to the Canadian context. The MPT was the first large-scale assessment, in Ontario, to be required for teacher certification since 2005. The MPT is unique because of the very quick timeframe from creation to cancelation, therefore there have been very few studies conducted about the MPT. I am among the first to document the impacts of the MPT, an important case to document that can be added to the ever-growing research literature on large-scale assessment related to teacher certification. Lastly, the design and use of my conceptual framework (see Figure 6 above) is a contribution that I see being used in future studies. Each ring of my conceptual framework is on a spinner, which helps to show that each system and stakeholder are not correlated specifically to the accountability it is closest to, showing how educational accountabilities are pluralistic in nature (Dulude & Milley, 2021). This model could be applied to any number of complex educational situations in the future.

Limitations

This case study was conducted during the ever-changing landscape of the MPT, which consisted of the creation, implementation, cancellation, appeal and impending reimplementation. For this reason, it was difficult to capture everyone's voice who was impacted by the MPT. However, though an extensive data collection, from a large range of participants, I was able to capture the perspectives and reactions, in real-time, of most of those directly impacted by the MPT. However, there were some limitations regarding the collection of data, including the limited participation of certain key stakeholders connected to the MPT, the bias that might be prevalent due to the reliance on a public Facebook group to gather TCs' perspectives, and the limits of representation of the general public's viewpoint on the MPT.

Many stakeholders' perspectives were collected in the Fall of 2022, however as I mentioned in Chapter 4, there were certain key stakeholders who I could not interview for various reasons. Some could not accept my invitation to be a participant as they might have had a conflict of interest, had signed a non-disclosure agreement, or were directly, or indirectly involved in a past or upcoming court case regarding the MPT. Initially I found this discouraging as it did not allow me to gather as many participants' perspectives as I would have liked; however, over the six-month data collection period I found that it showed that my study was relevant and timely. Nonetheless, I was able to conduct 10 interviews ranging from 23 to 55 minutes in length with participants from various stakeholder groups and demonstrating different perspectives.

I was able to gather a large number of teacher candidate survey responses though the use of a public Facebook group called "Rethink the Teacher Candidate Math Legislation", which has almost 5000 Facebook members who are mainly TCs. This was a group that was started by Bella Lewkowicz, who is a co-founder of the OTCC and a main contributor to the cancellation of the

MPT. I recognize that this may have created a bias in my sample as one might expect that all would be against the MPT; however, even though I used this group, I found a large range of perspectives in the survey results, including those who thought the MPT was a good idea.

Another perspective which was gathered indirectly though this case study was the public perspective. Due to the scope and timeframe of this study I was not able to include the general public's viewpoint through the form of a survey or interview. However, I did get a sense of the public voice through the analysis of media, mainly in the form of news articles, as well as through an interview with a representative from People for Education, an independent, non-partisan group interested in public education. I was also able to gain government voices through the document analysis of the Hansard Transcripts, as well as through an interview with an MPP.

Epilogue

At the time of writing this dissertation, Ontario's top court was set to hear the governments' appeal of the MPT (Denette, 2022). In early 2022 government lawyers were granted the right to appeal the decision about the MPT. During the writing of this thesis, the appeal was pending, with no court date set at the time of this study; however, it was still causing stakeholders to question the government's motives behind the MPT and in particular, TCs were frustrated not knowing what might happen. In the appeal, the government "argued the Divisional Court made legal errors, including using too low of a threshold to determine discrimination, given that there was only one round of the new test administered to teacher candidates" (The Canadian Press, 2022) and there was only "preliminary and incomplete data" available in the original court case (Jones, 2023). It was suggested that although White TCs "initially passed the multiple choice test at a higher rate than racialized ones, a fuller picture had emerged by the end of 2021" (Rushowy, 2023). The government argued that since there was no

limit on how many times the MPT can be taken, racialized TCs were not barred from entering the profession, they simply had to pass the test. In the appeal court, the government claimed there was limited data collected for the initial court case, and the ultimate success rate for racialized teacher candidates was 93% compared to 97% for White TCs (Ontario Teacher Candidates' Council v. Ontario (Education), 2023). On November 28, 2023, Ontario's top court won the appeal case, and "upheld the validity" of the MPT (Jones, 2023). Consequently, later that day, the OCT put out a statement that the MPT "will be reinstated as a requirement for certification with the Ontario College of Teachers" (Ontario College of Teachers, 2023). The MPT was back!

The Ontario Regulatory Registry (2024) is calling for an update of the MPT requirements and the MPT is proposed to be implemented by the beginning of the 2025 calendar year. The government is still standing by the notion that the MPT will make TCs better prepared to teach mathematics. However, five years have passed since the creation of the MPT, and new educational issues and situations have arisen in Ontario's education system, such as a severe teacher shortage (Jones, 2024) and new EQAO and Programme for International Student Assessment (PISA) scores. Other issues have persisted over the past five years, such as a government call to go "back to basics" and governmental beliefs about using teacher tests to improve teacher proficiency in mathematics. These situations are described below and are only a few of the situations within the Ontario and broader educational context that serve as a backdrop to reinstating the MPT. This situation remains complex and the reader may want to consider how these situations may interact with educational accountabilities and stakeholder groups as the MPT is back on the table.

1. New EQAO results came out from the 2022-2023 school year and showed “encouraging growth in mathematics achievement, while literacy skills acquired by students remain stable across Ontario” (EQAO, 2023). Additionally scores from the most recent (2022) PISA assessment showed that “students in Canada scored higher than the OECD average in mathematics, reading and science” (Organisation for Economic Co-operation and Development, 2023). Does the government still see a need for a MPT? Is it true that Ontario students do poorly in math? What accountabilities are at play here?
2. The government continues the call for teaching to go “back to basics”, particularly in mathematics (Crawley). This is a catch phrase that was used during the creation stage of the MPT (Abedi & Patton, 2018). Most recently, the government is in the development stage of a back-to-basics kindergarten curriculum, which “will focus on literacy and math skills for the province’s youngest learners” (Ontario, 2024). Why is there still a call to “fix” mathematical instruction? Which accountabilities are at play here?
3. There is still a severe teacher shortage in Ontario and several options are on the table (Casaletto, 2024). The government could bring change to the two-year teacher education program, which was introduced in 2015 to control the over abundance of teachers. They may consider going back to a one-year teacher education program in order to attract more potential teachers and produce more teachers in a shorter period (Rushowy, 2024). In order for there to be more substitute teachers available to help with the teacher shortage, the OTF reluctantly agreed to extend the number of workdays for retired teachers from 50 to 95 during the COVID-19 pandemic as they often serve as substitute teachers. However, this was supposed to be a short-term solution. The OTF is calling for the government to come up with more sustainable solutions to address staff shortages instead

of relying on temporary fixes (The Canadian Press, 2024). Given the shortage of teachers, will the MPT affect even more people wanting to go into the profession? Which accountabilities are at play here?

These three examples are just a few of the situations surfacing in the current educational context that need to be considered as a backdrop to the reinstatement of the MPT. I see many different stakeholders and accountabilities interacting and more research needs to be done to analyze the situation. Without having done an analysis of the current context, the main tensions I see arising are related to political, professional, market and performance accountabilities. The situation surrounding the MPT remains complex with many of the same stakeholders and accountabilities interacting. As we enter a new phase, with the MPT being back on the table as a teacher certification requirement, the story is not over.

Concluding Comments

Navigating the ever-changing landscape of the MPT added richness to this thesis because I was right in the midst of the issue and saw each stage unfold in real time. With the status of the MPT in constant flux I was able to see the reaction of stakeholders in the moment, sensing all the different emotional reactions to each new stage of the MPT. I was able to collect a large amount of data about the MPT because there was a steady stream of news articles, documents, and reactions to changes. The initial draft of my proposal was completed before the MPT was cancelled, to which I adapted my study to include the cancellation. My conceptual framework helped me to adapt to the changing scenario and to focus on the seven accountabilities in the three stages of this study. The recent government appeal, however, occurred as my study neared completion, having gathered and analyzed all of my data, and hence is not directly included in my study. Even though the situation surrounding the MPT was everchanging, which made

certain aspects of the study challenging to write up, it became clear that in the end it was actually a strength of this study.

The past five years have been a whirlwind in trying to keep up and make sense of the creation, implementation, cancellation, appeal, and reimplementation of the MPT. This has been a unique experience! However, teacher certifications exams are not uncommon, and I think they will continue to serve as gatekeepers to the profession of teaching. Having a theoretical framework that can identify the tensions surrounding the MPT helped me disentangle the different perspectives of stakeholders, while also paying attention to the different systems and accountabilities involved. I believe that actively engaging in discussions around assessment sheds light on the underlying complexities and motivations involved in the development of teacher certification tests, and assessments more generally.

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Appendix A

Phase 1 - Publicly Available Documents

Phase I – Document Analysis			
	Creation	Implementation	Cancelation
Document Analysis			
Ontario Teacher Candidate Council	Position Letter - January 2020 (otcc.ca)	March 31, 2020 - Statement (otcc.ca)	
Ontario Teachers' Federation	db34b1_f626e52cbd94405e984a1a50c217200d.pdf (otcc.ca)	Despite-objections-Minister-Lecce-goes-ahead-with-Math-Proficiency-Test-for-beginning-teachers.pdf (otffeo.on.ca)	Ontario Court declares that the Ontario Math Proficiency Test is Unconstitutional | Ontario Teachers' Federation (otffeo.on.ca)
EQAO	Literature Review of the Empirical Evidence on the Connection Between Compulsory Teacher Competency Testing and Student Outcomes (peopleforeducation.ca) Business Plan 2020–2023 - EQAO	Mandate Letter - EQAO 2020–2021 Annual Report - EQAO	Math Proficiency Test - EQAO
Elementary Teachers' Federation of Ontario	Elementary Teachers' Federation of Ontario - Ontario government must wait for public consultation results before prescribing solutions for math o (etfo.ca)		
Legislative Assembly of Ontario	L046 - Mon 12 Nov 2018 / Lun 12 nov 2018 (ola.org) L047 - Tue 13 Nov 2018 / Mar 13 nov 2018 (ola.org) L050 - Mon 19 Nov 2018 / Lun 19 nov 2018 (ola.org) L066 - Tue 19 Feb 2019 / Mar 19 fév 2019 (ola.org)	L142 - Tue 18 Feb 2020 / Mar 18 fév 2020 (ola.org) Votes & Proceedings (ola.org) L159 - Tue 14 Apr 2020 / Mar 14 avr 2020 (ola.org) E037 - Tue 8 Jun 2021 / Mar 8 jun 2021 (ola.org)	

	SP008 - Mon 25 Feb 2019 / Lun 25 fév 2019 (ola.org) SP009 - Tue 26 Feb 2019 / Mar 26 fév 2019 (ola.org) SP010 - Mon 4 Mar 2019 / Lun 4 mar 2019 (ola.org) L075 - Wed 6 Mar 2019 / Mer 6 mar 2019 (ola.org) L078 - Tue 19 Mar 2019 / Mar 19 mar 2019 (ola.org) L079 - Wed 20 Mar 2019 / Mer 20 mar 2019 (ola.org) L086 - Tue 2 Apr 2019 / Mar 2 avr 2019 (ola.org) F016 - Wed 8 May 2019 / Mer 8 mai 2019 (ola.org) E006 - Wed 30 Oct 2019 / Mer 30 oct 2019 (ola.org) Votes & Proceedings (ola.org) L125 - Thu 7 Nov 2019 / Jeu 7 nov 2019 (ola.org) Votes & Proceedings (ola.org) L140 - Wed 11 Dec 2019 / Mer 11 déc 2019 (ola.org) Votes & Proceedings (ola.org)		
The Ontario mathematics proficiency test (MPT) assessment blueprint.	MPT_Assessment_Blueprint_EN_20191127b.pdf (mathproficiencytest.ca)		
Ontario Teacher Candidates' Council v. The Queen, 2021 ONSC 7386			2021-12-16-OTCC-v-Ontario-FINAL-signed-by-all.pdf (otffeo.on.ca)

Ontario College of Teachers		April 30th, 2021 Update: Math Proficiency Test | Ontario College of Teachers (oct.ca) December 7th, 2021 Update: Math Proficiency Test – Fall 2021 Test Window | Ontario College of Teachers (oct.ca) p. 4-5 2021 Registration Guide - Requirements for Becoming a Teacher of General Education in Ontario including multi-session programs (oct.ca)	Math Proficiency Test No Longer a Certification Requirement | Ontario College of Teachers (oct.ca)

Appendix B

Document Analysis Extraction Tool (Template)

Project Title	Educational Accountability: A Case Study of the Creation, Implementation and Cancellation of the Math Proficiency Test in Ontario, Canada
Document Title	
Where was the document produced and when?	
APA Source	
Document Type Where was it located? Was it easy or difficult to access?	□ Statements made by Stakeholder groups □ Hansard Transcript □ Votes and Proceedings □ Policy Document □ News article
Why was the document produced?	
Stage	□ Creation □ Implementation □ Cancellation
Author Who wrote the document? What is their position, and do they have a bias?	
Audience Who was it written for?	
Summary	

How does the content relate to the accountabilities?

Accountability	**Evidence in document content**
Administrative	Formal organization, bureaucratic, procedure, public functions, educational programs
Legal	Laws, regulations, violations, legal action
Political	Public demands, elected officials, government
Professional	Specialized knowledge, skills, professional standards, teacher qualifications
Moral	Societal norms and behaviours, equity, values
Market	Competition, innovation, school choice
Performance	Rank, performance-based, large-scale assessments.

Appendix C

Feedback from REB

Tuesday, May 3rd, 2022

RE: EDUCATIONAL ACCOUNTABILITY: A CASE STUDY OF THE CREATION, IMPLEMENTATION ANDCANCELLATION OF THE MATH PROFICIENCY TEST IN ONTARIO, CANADA (FILE #S-04-22-8027)

Dear Ms. McGinnis and Professor Suurtamm,

Your application for ethics approval was examined by the Social Sciences and Humanities Research Ethics Board. Before approval may be granted, the REB requires the following clarifications and modifications. Please note that recruitment and data collection may not begin until full approval has been granted.

Question # 2.1: Please remove the information on the recruitment section from this question and consolidate this information with the answer to question # 2.10 (in order to avoid having differentinformation in different questions of the application form).

Question # 2.6: Please note that if teacher candidates will be recruited from their university, those institutions will likely require the researcher to obtain ethics approval from their Research Ethics Boards prior to sending recruitment messages to their students. As such, please select "Yes" to this question andconfirm that all necessary permissions will be obtained prior to recruitment.

Question # 2.10: Please note that as per the Office of Research Ethics and Integrity internal guidelines, official academic email listservs cannot be used to recruit students to participate in research at uOttawa(i.e. through their academic program). An alternative is to ask the student association to distribute the recruitment material to their members. Please address. (Note: These guidelines may differ at different institutions, which may allow for these types of listservs to be used.)

Teacher Candidate recruitment text:

a. Please note that the text appears like it will be addressed to specific individuals ("Dear_____"). However, this is not consistent with the recruitment process described in the application (general call for participants). Please address.
b. Please add the specific inclusion criteria for participation directly in the email.

Survey recruitment texts: Please include the anticipated time required to complete the surveys.

Question # 3.3: Please specify which online survey provider will be used (e.g., Survey Monkey). Pleasealso add his information to the consent form.

Question # 4.1: Please clarify when and where participants will be provided with the resourcesinformation (e.g., end of the consent form, end of the survey, etc.).

Question # 5.1(d): It is indicated that "However, if the interviewees choose not to be identified, anythingI identify about the institution (university or organization) will not lead back to identifying an individual within an administration or stakeholder group." Please clarify what information might be shared about the university or organization, as well as how the researcher will be able to protect the anonymity of participants with very specific roles/portfolios within those organizations.

Survey Consent Forms:

a. It is indicated that "I can decide whether or not my name can be used in the reporting of theresearch." However, given that surveys are collected anonymously, please remove this statement (as it seems it will be applicable to interviews only).
b. Please indicate how long the data will be kept.
c. Please add a section on the risks and benefits of the study.
d. Please indicate that because data will be collected anonymously, data cannot be withdrawn onceit has been submitted.
e. Please add a statement prompting participants to save/print a copy of the consent page for theirrecords.

Interview consent forms:

a. Participation: Please add the information on the option for participants to review theirtranscripts.
b. Please note that if participants are given the choice of remaining anonymous or choosing to benamed in the project, there should be a space for them to indicate this choice (i.e. with check- boxes). Please add.
c. It is indicated that "I___, agree to participate in selected components of the above researchstudy…" Please revise the terms "selected components" as participants do not have various components to select.

In order to respond to the REB's feedback, sign into your eReviews account to access the request form for your project. Please insert your comments directly in each section of the online request form listed inthe feedback letter. In order to submit revised appendices (recruitment texts, consent forms, research instruments, etc.), please delete the original attachment and upload the new revised version, with changes tracked or highlighted. In order to submit the revisions, the study's PI must click "Submit" in the"Submit for Review" section.

If you have any questions, you may contact me at [personal information removed].Best regards,
[personal information removed] Protocol Officer for Ethics in Research
For [personal information removed], Chair of the Social Sciences and Humanities REB

Appendix D

Certificate of Ethics Approval

22/06/2022

Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number	S-04-22-8027
Titre du projet / Project Title	Educational Accountability: A Case Study of the Creation, Implementation and Cancellation of the Math Proficiency Test in Ontario, Canada
Type de projet / Project Type	Thèse de doctorat / Doctoral thesis
Statut du projet / Project Status	Approuvé / Approved
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	22/06/2022
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	21/06/2023

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Sarah MCGINNIS	Faculté d'éducation / Faculty of Education	Chercheur Principal / Principal Investigator
Christine SUURTAMM	Faculté d'éducation / Faculty of Education	Superviseur / Supervisor

Appendix E

Phase II Data Sources

Phase II			
	Creation	Implementation	Cancelation
Surveys			
TC survey	X	X	X
Open Ended Survey - Directors of Teacher Education	X	X	X
Open Ended Survey - Deans of the Faculties of Education	X	X	X
	Creation	Implementation	Cancelation
Interviews			
Professor at a Faculty of Education	X	X	X
Representative of People for Education	X	X	X
Representative of OTCC Co-Founder (Bella Lewkowicz)	X	X	X
Representative of OTCC	X	X	X
Chair of the Undergraduate Program at a Faculty of Education	X	X	X
Representative of Professional Affairs at the Ontario Teachers' Federation	X	X	X
Professor at a Faculty of Education	X	X	X
Member of Provincial Parliament	X	X	X
Representative of AEFO-Centre-Sud catholique	X	X	X
Assistant Professor at a Faculty of Education	X	X	X

Appendix F

Facebook post from “Rethinking the Teacher Candidate Math Legislation”

Bella Lewkowicz
September 14, 2022 ·

The provincial government is appealing the MPT decision. The case is probably half a year out. What we don't know is how losing the case will affect us. Will they bring a test back immediately? Will they go back to the drawing board? Will they turn their focus to certified teachers?

We will appeal a loss; it would go the Supreme Court so this potentially far from being a distant memory. With this in mind, allow me to introduce you to Sarah McGinnis a PhD student under the supervision of Dr. Chris Suurtamm at the Faculty of Education at the University of Ottawa. Sarah is researching the MPT and has reached out to us regarding our experiences. She has created a survey that will take you about 15 minutes to complete.

Why should you do it? Because if we lose our appeal and the case goes to the Supreme Court, Sarah's research and your contribution to it will be invaluable. Various PhD studies factored into our first win. Please invest in our collective future success.

Thanks,
Bella

Appendix G

Teacher Candidate Survey Questions Connections to Literature

Teacher Candidate Survey		
Category	**References**	**Questions**
Personal demographic questions		Age Gender Minority Group Disability Languages spoken
Educational Background		Level of education - Program / school Division Teaching subjects
MPT	MPT_Assessment_Blueprint_EN_20191127b.pdf (mathproficiencytest.ca)	Background in Mathematics Have they taken the test yet? Preparedness for the test
Questions around large scale assessment	- Earl & Torrance (2000) - Nagy (2000) - Ryan & Hall (2011) - Verger et al. (2019)	What is your attitude towards large-scale assessments? In your opinion who is accountable for raising students EQAO math test scores?
Educational Accountability	- Nichols, Glass & Berliner (2012) - Lee & Lee (2020) - Etim at al. (2020) - Boyed, et al. (2008) - Brewer, Knoeppel & Clark Lindle (2014) - Sahlberg (2010)	Teacher effectiveness vs student achievement Public perception of teachers Do you think the MPT is an effective way to ensure or prove math competency? Do you think the MPT will increase students EQAO math scores?

Appendix H

Survey Matrix for Teacher Candidate Survey

Survey Matrix			
Stages	Stage 1 - Creation	Stage 2 - Implementation	Stage 3 - Cancellation
Accountabilities			
Administrative (bureaucratic)	10. a 10. b	9. c 10. b 10. c 10. k 11. f	
Legal		11. c	10. d
Political	10. e	9. a 10. e 11. a 11. d	
Professional	10. e 10. f 10. i 10. n 10. o 10. q	9d 10. e 10. g 10. h 10. i 10. j 10. k 10. l 10. m 10. n 10. o 10.q 11. g 13c	10. i 10. n 10.o 10.q
Moral	10. o 10. p 10.q	10. o 10.p 10.q 10. r 10. s 11	10. o 10. p 10.q 10. s 10. t
Market	10. u	9. b 10. v 11	10. u

		13. b 13. d	
Performance		11. b 11. e 11. h 12 13. a 13. e	

Demographic Questions:
1
2
3
4
5
6
7
8
18*
19*
20*
21*
22*
23*
*These demographic questions have extra information that can be accessed in NVivo
Long answer: Dependant on participants answers, will be coded in NVivo
14
15
16
17
24

Appendix I

Teacher Candidate Survey

Math Proficiency Test Teacher Candidate Questionnaire

The goal of this survey is to gain a sense of how the Math Proficiency Test (MPT), from creation to cancellation, impacted you. Your participation would involve completing this online survey at a time and location that is most convenient for you. It should take you approximately 15 minutes to complete. All data gathered is anonymous and will be kept on a secure, password protected computer indefinitely. Any research findings that may be used in research related to my doctoral studies, or research related writings, will maintain participants' anonymity. The following outlines what you are consenting to.

Invitation to Participate: I am invited to participate in the research study entitled Educational Accountability: A Case Study of the Creation, Implementation and Cancellation of the Math Proficiency Test in Ontario, Canadaconducted by Sarah McGinnis in partial fulfillment of the requirements for the degree of Doctor of Philosophy of Education.

Purpose of the Study: I understand that the purpose of this research study is to make connections between how different educational accountabilities and connected stakeholders interacted within the different stages of creation, implementation, and cancellation of the MPT in Ontario, Canada.

Risks: I have received assurance from the researcher that every effort will be made to respect these personal reflections in the writing and reporting of the research. If at any time I wish to stop completing the survey I may do so. However, because the data will be collected anonymously, data cannot be withdrawn once it has been submitted.

Benefits: My participation in this study will provide information to the research community regarding educational accountability and large-scale teacher certification tests. By including my perspective I can make contributions to the understanding of the impact that teacher certification tests.

This research has been cleared by the University of Ottawa Research Ethics Board. By completing and submitting this online survey you are agreeing to participate in phase II of this research study. I encourage you to save/print a copy of this consent page for your records. Please complete and submit this survey at your earliest convenience.

If you have any questions about this research, please contact me, Sarah McGinnis, at [personal information removed]
about the research ethics of this study, contact the Protocol Officer for Ethics in Research at 613-562-5387 (ethics@uOttawa.ca).

Acceptance: By completing and submitting the survey, you are consenting to participate

in this research study.

* 1. Do you consent to participate?

- ◯ Yes
- ◯ No

Math Proficiency Test Teacher Candidate Questionnaire

2. Select the university of your Bachelor of Education (BEd)

- ◯ Brock University
- ◯ Lakehead University
- ◯ Laurentian University
- ◯ Nipissing University
- ◯ Ontario Tech University
- ◯ University of Ottawa
- ◯ Queen's University
- ◯ University of Toronto
- ◯ Trent University
- ◯ Western University
- ◯ Wilfrid Laurier University
- ◯ University of Windsor
- ◯ York University
- ◯ Other (please specify)

3. What undergraduate degree(s) have you completed?

Bachelor of Arts (BA) Area(s) of focus?

Bachelor of Science (BSc) Area(s) of focus?

Bachelor of Education (BEd)

Other (please specify)

4. What division will you be (or are) certified to teach? Check all the apply.

- [ ] Primary/Junior (P/J): Kindergarten to Grade 6
- [ ] Primary/Junior (P/J) - French as a Second Language (FSL): Kindergarten to Grade 6
- [ ] Junior/Intermediate (J/I): Grades 4 to 10
- [ ] Intermediate/Senior (I/S): Grades 7 to 12
- [ ] Other (please specify)

Math Proficiency Test Teacher Candidate Questionnaire

5. If you are certified to teach Junior/Intermediate (J/I) or Intermediate/Senior (I/S), what are your teachables?

First

Second

Other (please specify)

6. Please select all that describe your academic history involving mathematics:

- [ ] Last took mathematics or statistics in high school
- [ ] Took one to three university courses in mathematics
- [ ] Took more than three university courses in mathematics but majored in another subject
- [ ] Have completed a 3-year bachelors degree in mathematics
- [ ] Have completed an Honours (4-year) bachelors degree in mathematics
- [ ] Graduate degree in mathematics

7. What years were you enrolled in a B.Ed. program? Check all the apply.

- [ ] 2018
- [ ] 2019
- [ ] 2020
- [ ] 2021
- [ ] 2022
- [ ] Other (please specify)

8. Have you taken the Math Proficiency Test (MPT)?

- ◯ Yes
- ◯ No

9. What learning opportunities best prepare you for the MPT. Check all that apply.

- [ ] Elementary and high school mathematics learning
- [ ] More mathematics courses in university
- [ ] Required mathematics courses during the B.Ed. program
- [ ] Optional professional development workshops
- [ ] Other (please specify)

10. To what extent do you agree or disagree with the statements below?

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The purpose of the MPT was clearly communicated.	○	○	○	○	○
The relationship of the MPT to teacher certification was clearly communicated.	○	○	○	○	○
The procedures for taking the MPT (e.g., registration, locations, access) were clearly communicated.	○	○	○	○	○
The Ontario Teacher Candidate Council was justified in challenging the MPT in court.	○	○	○	○	○
Teacher testing will ensure that the teacher certification process is rigorous.	○	○	○	○	○
The MPT would help to ensure that teachers are better qualified to teach.	○	○	○	○	○
The content on the MPT appropriately measured my pedagogical knowledge.	○	○	○	○	○
The content on the MPT appropriately measured my mathematical	○	○	○	○	○

knowledge.

The MPT was an attack on teacher professionalism.	◯	◯	◯	◯	◯
I was well prepared for the MPT.	◯	◯	◯	◯	◯
The practice tests available on the MPT website were helpful in preparing me for the MPT.	◯	◯	◯	◯	◯
The MPT was useful to me becoming a qualified teacher.	◯	◯	◯	◯	◯
The MPT should be a necessary part of the teacher certification process.	◯	◯	◯	◯	◯
The MPT ensured effective teaching mathematics	◯	◯	◯	◯	◯
The uncertainty of the MPT was disruptive.	◯	◯	◯	◯	◯
All teachers need to have a basic understanding of Mathematics.	◯	◯	◯	◯	◯
All teacher candidates had equal access to the MPT.	◯	◯	◯	◯	◯
The MPT was unbiased.	◯	◯	◯	◯	◯
I was pleased that the MPT was cancelled.	◯	◯	◯	◯	◯
There should be more teacher tests required for teacher certification in Ontario.	◯	◯	◯	◯	◯

School Boards would be more interested in hiring teachers who scored well on the MPT.	○	○	○	○	○
I would have considered which teacher education program to attend based on their MPT pass rate.	○	○	○	○	○

11. I feel like the MPT was being implemented for the following reasons. Check all that apply.

- [ ] Increase public trust in the education system
- [ ] Make the teacher certification process more rigorous
- [ ] Improve K-12 student math scores
- [ ] As a political move
- [ ] Increase pre-service teachers' proficiency in mathematics
- [ ] Provide more structure to the certification process
- [ ] Align with other jurisdictions' teacher certification procedures and regulations
- [ ] Ensure highly qualified teachers in Ontario
- [ ] Other (please specify)

_____

- [ ] None of the above

12. Which of the following sets of teachers should be required to have foundational understanding of mathematics? Check all that apply.

- [ ] All elementary teachers
- [ ] All high school teachers
- [ ] High school teachers who teach mathematics
- [ ] Other (please specify)

13. Which of the following options would best support pre-service teachers in developing the foundational mathematics knowledge needed to support teaching and learning? Check all that apply.

- [ ] An entrance exam to a B.Ed. program to check mathematics proficiency prior to entry
- [ ] Required mathematics courses to enter the B.Ed. program
- [ ] PD session(s) during the B.Ed. program on mathematical literacy
- [ ] More mathematics courses throughout the B.Ed.
- [ ] A math proficiency test
- [ ] Other (please specify)

14. What was your reaction to the MPT being a requirement for certification?

15. How did you feel about how the MPT was implemented?

16. What was your reaction when the MPT was cancelled?

17. The MPT was challenged in court and was ultimately cancelled. "The Divisional Court found that the Math Proficiency Test had an adverse impact on entry to the teaching profession for racialized teacher candidates and other reasonable alternatives should have been implemented." Did this argument resonated with you? Or did you feel that the MPT should have been cancelled for other reasons?

18. Gender [fill-in the blank]

- [ ] Prefer not to answer
- [ ] Fill in the blank

19. What is your age group?

- ◯ 18-25
- ◯ 26-29
- ◯ 30-35
- ◯ 36-39
- ◯ 40-45
- ◯ 46-49
- ◯ 50 and older
- ◯ Prefer not to specify

20. Do you self-identify with, or have ancestry as an Indigenous person (status or non-status Indian, Métis, or Inuit)?

- ◯ Yes, First Nations
- ◯ Yes, Métis
- ◯ Yes, Inuit/Inuk
- ◯ Yes, other
- ◯ No
- ◯ Prefer not to answer

21. Do you consider yourself to be a member of one or more minority groups? If you choose "yes" please feel free to describe.

- ◯ No
- ◯ Prefer not to answer
- ◯ Yes

22. Do you self-identify with having any disability or impairment? If you choose "yes" please feel free to describe the nature of your disability.

- ◯ No
- ◯ I prefer not to respond
- ◯ Yes

23. What languages do you speak? Please check all that apply and/or name additional languages.

- [ ] English
- [ ] French
- [ ] Prefer not to answer
- [ ] Other (please specify)

24. Please feel free to add any additional comments related to the MPT here:

Appendix J

Recruitment E-mail for Faculty of Education Administrative Survey

You are invited to participate in the research study entitled **Educational Accountability: A Case Study of the Creation, Implementation and Cancellation of the Math Proficiency Test in Ontario, Canada** conducted by Sarah McGinnis in partial fulfilment of the requirements for the degree of Doctor of Philosophy of Education. The purpose of this research study is to make connections between how different educational accountabilities and connected stakeholders interacted within the different stages of creation, implementation, and cancellation of the Math Proficiency Test (MPT) in Ontario, Canada.

You are invited to take part in a survey for Faculty of Education Deans and Directors of Teacher Education regarding the Math Proficiency Test. This survey will take about 15 minutes of your time. Hearing about your perspectives and experiences, and those in your university, will contribute to a robust study of stakeholder views and related educational accountabilities. Various stakeholder groups have interacted with the MPT at the different stages of creation, implementation, and cancellation of the Math Proficiency Test.

I (Sarah McGinnis) will be carrying out this study under the supervision of Dr. Chris Suurtamm at the University of Ottawa, Faculty of Education. The data is being collected for my PhD thesis in education and perhaps for subsequent research articles.

You can participate in this on-line survey here: https://www.surveymonkey.ca/r/2B66N9L

Your response is valuable as it will contribute to the data regarding experiences connected to the Math Proficiency Test which will add to research on large-scale assessment, particularly teacher testing.

Participation in this survey is voluntary and your responses will be collected anonymously. Your data will be kept strictly confidential, and it cannot be withdrawn once it has been submitted. The survey is hosted by a secure site. For any additional information or inquiries, please do not hesitate to get in touch with either myself [personal information removed] or my supervisor, Dr. Chris Suurtamm [personal information removed].

Thank you for providing your valuable feedback.

Sincerely,
Sarah McGinnis

Appendix K

Follow up Interview E-mail to Administrators

Thank you for taking the time to complete the survey regarding the Math Proficiency Test (MPT) that was sent to you earlier this month. Hearing more about your experiences, and those in your university, will contribute to a robust study of different educational accountabilities and connected stakeholders who have interacted within the different stages of creation, implementation, and the cancellation of the MPT.

You have indicated in the survey that you would be interested in participating in a follow up interview. This individual interview will take approximately 30 minutes and will occur virtually using Zoom. If you prefer, the interview can be conducted over the telephone. With your permission, the interview will be audio recorded in order for me to fully engage in our conversation, without having to take detailed notes. Following the interview, I will transcribe the interview myself, and will offer you a copy for your records. Your participation in this study will include you responding to questions about your experience regarding the creation, implementation and cancellation phases of the MPT. You have my assurance that every effort will be made to respect your personal reflections in the writing and reporting of the research. If, at any time, you wish to end the interview, and/or withdraw from the study your request will be respected. Should you choose to withdraw from the study and prefer that I not use your interview data collected up to that point, I will remove it from the research.
This study is carried out under the supervision of Dr. Chris Suurtamm at the University of Ottawa, Faculty of Education. The data is being collected for the purposes of my PhD thesis in education and perhaps for subsequent research articles.

If you are interested in participating in this research study please fill out this doodle poll (https://doodle.com)and let me know your availability. Once you have confirmed a date and time that works best for you, I will send a zoom link along with a consent form. The consent form will need to be signed before we start the interview. If you have any questions, please do not hesitate to get in touch with either myself [personal information removed] or my supervisor, Dr. Chris Suurtamm [personal information removed].

Sincerely,
Sarah McGinnis

Appendix L

Interview Consent Form

uOttawa

Université d'Ottawa
Faculté d'éducation

University of Ottawa
Faculty of Education

Name of Professor: Dr. Christine A. Suurtamm
Faculty of Education, University of Ottawa
Telephone: [personal information removed]
Email: [personal information removed]

Name of Ph.D. Candidate: Sarah McGinnis
Faculty of Education, University of Ottawa
Telephone: [personal information removed]
Email: [personal information removed]

Invitation to Participate: I am invited to participate in the research study entitled Educational Accountability: A Case Study of the Creation, Implementation and Cancellation of the Math Proficiency Test in Ontario, Canada conducted by Sarah McGinnis in partial fulfilment of the requirements for the degree of Doctor of Philosophy of Education.

Purpose of the Study: I understand that the purpose of this research study is to make connections between how different educational accountabilities and connected stakeholders interacted within the different stages of creation, implementation, and the cancellation of the Math Proficiency Test (MPT) in Ontario, Canada MPT.

Participation: My participation will consist essentially of one audio-recorded session of approximately 30 minutes during which I will be interviewed. The interview will be scheduled for a date and time that are convenient for me. I agree that the researcher may contact me, via email, to ask any follow up questions or to verify content from the interview.

Risks: I have received assurance from the researcher that every effort will be made to respect these personal reflections in the writing and reporting of the research. If at any time I wish to end the interview, and/or withdraw from the study I may do so.

Benefits: My participation in this study will provide information to the research community regarding educational accountability and large-scale teacher certification tests. By including my perspective I can make contributions to the understanding of the impact of teacher certification tests.

Tel/Tél : 613-562-5804
Fax/Téléc :613-562-5144

145, Jean-Jacques Lussier
Ottawa ON K1N 6N5 Canada

www.education.uOttawa.ca

Confidentiality and Anonymity: I have received assurance from the researcher that the information I share will remain strictly confidential. No data, such as my name or my university name will be used that might identify me. I can decide whether my name can be used in the reporting of the research. I have the option to review my transcript. The contents of the interview will be used for the proposed research study as well as future research articles in the area of large-scale assessments.

Conservation of data: The audio recording and transcript will be kept in a secure manner on a password protected computer. The data will be retained indefinitely.

Voluntary Participation: I am under no obligation to participate and if I choose to participate, I may withdraw from the study at any time and/or refuse to answer any questions. If I choose to withdraw, all of my data gathered until the time of withdrawal will be destroyed.

Acceptance: I, _____, agree to participate in the above research study conducted by Sarah McGinnis of the Faculty of Education, University of Ottawa, which research is under the supervision of Dr. Christine A. Suurtamm. I understand that by accepting to participate I am in no way waiving my right to withdraw from the study.

☐ I AGREE to participate in one individual interview.

☐ I would like to remain anonymous in the reporting of this research.

☐ I would like to be named in the reporting of this research.

If I have any questions about the study, I may contact Sarah McGinnis and/or Dr. Suurtamm.

If I have any ethical concerns regarding my participation in this study, I may contact the Protocol Officer for Ethics in Research, University of Ottawa, 550 Cumberland Street, Room 154, (613) 562-5387 or ethics@uottawa.ca.

I am invited to keep a copy of this consent form for my records. I understand that a copy must be signed, dated and emailed to Sarah McGinnis at [personal information removed] before the start of the interview.

Participant's signature: _____ Date: _____

Researcher's signature: _____Date: _____

Appendix M

Faculty of Education Administrative Survey

Administrative Survey

The goal of this survey is to gain a sense of how the Math Proficiency Test (MPT), from creation to cancellation, impacted you and your teacher education program. Your participation would involve completing this online survey at a time and location that is most convenient for you. It should take you approximately 15 minutes to complete. A second, optional, component of the project will involve a follow up interview. If you would consider taking part in the second component of this project, please complete that option as part of the survey. All data gathered will be kept on a secure, password protected computer indefinitely. Any research findings that may be used in research related to my doctoral studies, or research related writings, will maintain participants' anonymity and confidentiality.

Invitation to Participate: I understand that I am invited to participate in the research study entitled Educational Accountability: A Case Study of the Creation, Implementation and Cancellation of the Math Proficiency Test in Ontario, Canada conducted by Sarah McGinnis in partial fulfilment of the requirements for the degree of Doctor of Philosophy of Education.

Purpose of the Study: I understand that the purpose of this research study is to make connections between how different educational accountabilities and connected stakeholders interacted within the different stages of creation, implementation, and the cancellation of the Math Proficiency Test (MPT) in Ontario, Canada. I understand that I do not have to answer any questions that I may feel uncomfortable answering and that I can discontinue participation at any time.

Risks: I have received assurance from the researcher that every effort will be made to respect these personal reflections in the writing and reporting of the research. If at any time I wish to stop completing the survey I may do so. However, because the data will be collected anonymously, data cannot be withdrawn once it has been submitted.

Benefits: My participation in this study will provide information to the research community regarding educational accountability and large-scale teacher certification tests. By including my perspective I can make contributions to the understanding of the impact that teacher certification tests.

This research has been cleared by the University of Ottawa Research Ethics Board. By completing and submitting this online survey you are agreeing to participate in phase II of this research study. I encourage you to save/print a copy of this consent page for your records. Please complete and submit this survey at your earliest convenience.

If you have any questions about this research, please contact me, Sarah McGinnis, at

[personal information removed]

about the research ethics of this study, contact the Protocol Officer for Ethics in Research at 613-562-5387 (ethics@uOttawa.ca).

Acceptance: By completing and submitting the survey, you are consenting to participate in this research study.

* 1. Do you consent to participate?

- ◯ Yes
- ◯ No

Administrative Survey

2. What position do you hold?

- ◯ Dean of Education
- ◯ Director of Teacher Education
- ◯ Associate Dean or Vice Dean
- ◯ Other (please specify)

3. How long have you held this position?

- ◯ Less than 1 year
- ◯ 1-2 years
- ◯ 3-5 years
- ◯ 6-8 years
- ◯ 9+

4. How many students are in your teacher education program?

5. Do you think teacher testing is beneficial? Why or why not?

6. What was the impact of the MPT on your teacher education program?

7. What was your initial reaction when the MPT was first announced as a requirement for teacher certification?

8. What were some of the reactions to the implementation of the MPT?

a. Teacher candidates' reactions

b. Professors' (in the teacher education program) reactions

c. Your reaction

9. Who do you think should be responsible to prepare teacher candidates for a teacher test like the MPT?

10. What do you feel contributed to the cancellation of the MPT?

11. What was your reaction to the MPT being cancelled?

12. How did the cancellation of the MPT affect your teacher education program?

13. Please add anything additional about the MPT that you want to share:

14. *Optional* Please, select which university you are currently affiliated with:

- ◯ Brock University
- ◯ Lakehead University
- ◯ Laurentian University
- ◯ Nipissing University
- ◯ Ontario Tech University
- ◯ University of Ottawa
- ◯ Queen's University
- ◯ University of Toronto
- ◯ Trent University
- ◯ Western University
- ◯ Wilfrid Laurier University
- ◯ University of Windsor
- ◯ York University
- ◯ Prefer not to say
- ◯ None of the above

15. If you are willing to participating in a follow up interview, please provide your e-mail address:

Appendix N

Recruitment E-mail to Stakeholders

This is an invitation to participate in a research study entitled Educational Accountability: A Case Study of the Math Proficiency Test in Ontario, Canada. The study is being conducted by Sarah McGinnis for the degree of Doctor of Philosophy of Education, under the supervision of Dr. Christine Suurtamm at the University of Ottawa. The purpose of this research study is to make connections between how different educational accountabilities and connected stakeholders interacted within the different stages of creation, implementation, and cancellation of the Math Proficiency Test (MPT) in Ontario, Canada.

Your view will make an important contribution to this study. You are invited to participate in an individual interview that will take 20 - 30 minutes. The purpose of this interview is to gain your perspective on the MPT in its various stages. The interview will occur virtually using Zoom. If you prefer, the interview can be conducted over the telephone. With your permission, the interviews will be audio recorded in order for me to fully engage in our conversation, without having to take detailed notes. Following the interviews, I will transcribe the interview myself, and will offer you a copy for your records. Your participation in this study will include you responding to questions about your experience regarding the phases of the MPT. You have my assurance that every effort will be made to maintain confidentiality and to respect your personal reflections in writing and reporting the research. You will not be named. If, at any time, you wish to not answer a question, end the interview, and/or withdraw from the study your request will be respected. Should you choose to withdraw from the study and prefer that I not use your interview data collected up to that point, I will remove it from the research. The data is being collected for the purposes of my PhD thesis in education and perhaps for subsequent research articles.
If you are interested in participating in this research study please complete this doodle poll (https://doodle.com) so that I can schedule a date and time that are convenient for you. Once we have confirmed a date and time that works best for you, I will send a zoom link along with a consent form. The consent form will need to be signed before we start the interview. If you have any questions please do not hesitate to get in touch with either myself [personal information removed] or my supervisor, [personal information removed].

I would really appreciate your participation in this research study. I am sure that you have much to contribute. Thank you for your time!

Sincerely,
Sarah McGinnis

Appendix O

Sample of Interview Questions

1. Do you think that a teacher test should be a part of the teacher certification process for teachers?

a) Why?

b) If yes, what do you feel teachers should be tested on?

2. Did you play any role in any of the stages of the MPT?

a) Creation

b) Implementation

c) Cancelation

3. Why do you think that Ontario's teacher test was focused on mathematics?

4. What are ways that you think we can ensure high quality teaching in Ontario?

5. Did you see any challenges in the implementation of the MPT?

6. What was your reaction to the cancellation of the MPT?

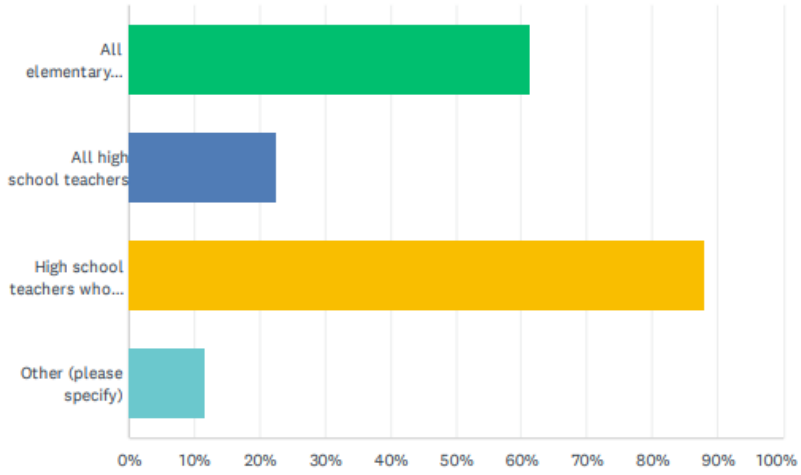
Appendix P

Short Answer Coding Example for TC Survey

Math Proficiency Test Teacher Candidate Questionnaire

Q12 Which of the following sets of teachers should be required to have foundational understanding of mathematics? Check all that apply.

Answered: 260 Skipped: 89



ANSWER CHOICES	RESPONSES	
All elementary teachers	61.15%	159
All high school teachers	22.69%	59
High school teachers who teach mathematics	88.08%	229
Other (please specify)	11.54%	30
Total Respondents: 260		