NOVICE ELEMENTARY TEACHERS’ EXPERIENCES WITH PREPAREDNESS TO TEACH MATHEMATICS: A PHENOMENOLOGICAL STUDY

by

Ashleigh Rose Chaves

Liberty University

A Dissertation Presented in Partial Fulfillment Of the Requirements for the Degree Doctor of Education

Liberty University

2018
NOVICE ELEMENTARY TEACHERS’ EXPERIENCES WITH PREPAREDNESS TO TEACH MATHEMATICS: A PHENOMENOLOGICAL STUDY

by Ashleigh Rose Chaves

A Dissertation Presented in Partial Fulfillment
Of the Requirements for the Degree
Doctor of Education

Liberty University, Lynchburg, VA

2018

APPROVED BY:

Russ Claxton, Ed.D., Committee Chair

Carol Dolan, Ed.D., Committee Member

Christy Hill, Ed.D., Committee Member
ABSTRACT

The purpose of this transcendental phenomenological study was to describe novice elementary teachers’ experiences with preparedness to teach mathematics in a large school district in southeastern Massachusetts. In defining the novice elementary teachers’ experiences, I looked at the participants’ self-efficacy through the lens of Bandura’s self-efficacy theory. Self-efficacy was defined as how confident the novice teachers were in regard to their ability to teach mathematics. The focus of this study was how adequately prepared the teachers felt teaching elementary mathematics but also investigated how the teachers felt about their readiness to address the challenges students experience in mathematics. The following research question provided the framework for this study: What are the lived experiences of novice elementary teachers as described through their self-efficacy in teaching mathematics? For the purpose of this study, novice teachers are defined as teachers with five years or less experience, and elementary is defined as first grade through sixth grade. I used individual interviews in conjunction with a demographic survey, a writing prompt, and Hoy and Woolfolk’s Teacher Efficacy Scale, as means of data collection. Data was analyzed using Moustakas’ transcendental phenomenological reduction process. Overall, the participants described how incredibly underprepared the felt not only in teaching mathematics, but also with addressing the challenges that arise in their classroom. They provided suggestions for areas they were not taught during their teacher preparation program and talked about their doubts about entering into education with such a lack of training.

*Keywords*: mathematics, self-efficacy, novice teachers, elementary, teacher preparation programs
Dedication

How do I begin to thank the woman who has given me everything? Mom, you have been there for me through it all. Your tireless grace and love have molded me into the woman I am today. You have instilled unwavering strength and resiliency in me and have shown me that when I hit the end of my rope, to tie a knot and hang on. You have taught me that the sky is the limit; and when I reach the sky to push on to the stars. This paper would not have been possible had it not been for your enthusiastic passion for mathematics and continuing education, and your fanatic desire to push me to my best. You are the reason I began this program and you are the reason I am here today.

You helped me find a glimmer of light in the darkness. Thank you for the inspiration, dedication, and love you have shown me over my lifetime; especially during this program and while writing this dissertation. I am so lucky to have you as my mother, but more importantly as my best friend. You are the epitome of strength, beauty, and selflessness. You have truly found “your version of perfect” and have taught me how to find perfection in my life. Thank you for the sprinkled do-over days throughout this program that provided me the boost I needed when I needed them. Thank you for pushing me to keep writing on nights where I wanted to stop and for making me stop writing to enjoy my international travels. Thank you for re-igniting the fire when I began to lose my spark. Thank you for asking me, daily, how I was progressing. I truly could not have done this without you, and I hope to continue to make you proud of me. I love you more than words and I hope to grow to be half the woman you are.

You are my everything. This is for you. LYBGBU.
Acknowledgments

I cannot begin without acknowledging God. My faith brought me to and through this program. “She is clothed with strength and dignity and laughs without fear of the future” (Proverbs, 31:25).

To my family- Mom, Dad, Bryan, Gram, and the chihuahuas. Thank you for being my rocks and my biggest cheerleaders throughout the past four years. A lot has happened over those years, including many wonderful and many hard memories, and I am so blessed to have you by my side always. Thank you for supporting me and for making graduation what I can only assume to be the best vacation, do over trip ever. LYBGBU.

To Grampa, Avó and Avô - I know you are looking down on me with so much pride. Knowing Grampa, everyone at Dunkin Donuts in heaven knows I’m going to be a doctor. I love and miss you all.

To Aaron – thank you for your unwavering support, pride, and encouragement. You have called me Doc from day one and you helped me believe in myself. Thank you for the post-it notes pushing me to be the best and thank you for believing me when I said I would be done in a week. You accept me and allow me to be my unapologetic self and for that I love you, Feehan.

To Dr. Bunnie Claxton and Dr. Russ Claxton – thank you for inspiring me in Germany to kick it into gear with this dissertation. You two are the most incredible leaders and I am so fortunate to know you. Russ – thank you for believing in me and helping me accomplish my sometimes crazy, self-set deadlines. I am eternally grateful. Ca-caw!

This paper was written over four years, in six countries over three continents, during five moves, through travels to countless states, and ends with infinite love, gratitude, and support. I am so humbled to have written this and would not be here without the people that I love.
# Table of Contents

ABSTRACT .......................................................................................................................... 3

Dedication ........................................................................................................................... 4

Acknowledgments ............................................................................................................... 5

List of Tables ....................................................................................................................... 11

List of Figures ................................................................................................................... 12

List of Abbreviations ......................................................................................................... 13

CHAPTER ONE: INTRODUCTION ...................................................................................... 14

Overview ............................................................................................................................. 14

Background .......................................................................................................................... 16

   Historical ........................................................................................................................ 16

   Social ............................................................................................................................... 18

   Theoretical ...................................................................................................................... 19

Situation to Self .................................................................................................................. 20

Problem Statement ........................................................................................................... 22

Purpose Statement .............................................................................................................. 23

Significance of the Study .................................................................................................... 24

   Empirical ....................................................................................................................... 24

   Theoretical ...................................................................................................................... 25

   Practical ......................................................................................................................... 25

Research Questions .......................................................................................................... 26

   Central Research Question .......................................................................................... 26

   Sub Question 1 ............................................................................................................. 27
Sub Question 2 ........................................................................................................... 27
Sub Question 3 ........................................................................................................... 28
Definitions .................................................................................................................. 28
Summary ...................................................................................................................... 29

CHAPTER TWO: LITERATURE REVIEW .................................................................. 31
Overview ...................................................................................................................... 31
Theoretical Framework ............................................................................................... 32
  Theory of Self-Efficacy ............................................................................................. 32
  Social Cognitive Theory ......................................................................................... 35
Related Literature ........................................................................................................ 38
  Teacher Self-Efficacy .............................................................................................. 38
  Teacher Preparation Programs .............................................................................. 43
  Preparing Math Educators ..................................................................................... 46
  Student Teaching and Mathematics ....................................................................... 49
  Math Pedagogy – Current Practices ..................................................................... 51
  Transition From Preparation Programs to Classroom ........................................... 56
Summary ...................................................................................................................... 60

CHAPTER THREE: METHODS .............................................................................. 62
Overview ...................................................................................................................... 62
Design .......................................................................................................................... 62
Research Questions ..................................................................................................... 64
Setting .......................................................................................................................... 64
Participants .................................................................................................................. 65
Procedures ......................................................................................................................... 68
The Researcher’s Role ....................................................................................................... 70
Data Collection.................................................................................................................. 71
  Demographic Survey ....................................................................................................... 72
  Teacher Efficacy Scale .................................................................................................... 73
  Virtual Writing Prompt .................................................................................................... 73
  Interviews ....................................................................................................................... 74
Data Analysis.................................................................................................................... 78
  Bracketing/Epoché .......................................................................................................... 79
  Open Coding ................................................................................................................... 80
  Horizontalization .......................................................................................................... 81
  Clustering into Themes ................................................................................................... 81
  Textural Descriptions ..................................................................................................... 81
  Structural Descriptions .................................................................................................. 82
  Text-Structural Synthesis ............................................................................................... 82
Trustworthiness .................................................................................................................... 83
  Credibility ..................................................................................................................... 83
  Dependability and Confirmability ................................................................................. 83
  Transferability ............................................................................................................... 84
Ethical Considerations ...................................................................................................... 84
Summary ............................................................................................................................ 85
CHAPTER FOUR: FINDINGS .............................................................................................. 86
Overview ............................................................................................................................ 86
<table>
<thead>
<tr>
<th>Participants</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amanda</td>
<td>88</td>
</tr>
<tr>
<td>Bethany</td>
<td>88</td>
</tr>
<tr>
<td>Courtney</td>
<td>89</td>
</tr>
<tr>
<td>Danielle</td>
<td>89</td>
</tr>
<tr>
<td>Ethan</td>
<td>90</td>
</tr>
<tr>
<td>Felecia</td>
<td>90</td>
</tr>
<tr>
<td>Ginny</td>
<td>91</td>
</tr>
<tr>
<td>Harrison</td>
<td>92</td>
</tr>
<tr>
<td>Isabelle</td>
<td>92</td>
</tr>
<tr>
<td>Jessica</td>
<td>93</td>
</tr>
<tr>
<td>Katelyn</td>
<td>94</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Results</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic Survey</td>
<td>95</td>
</tr>
<tr>
<td>Teacher Efficacy Scale</td>
<td>96</td>
</tr>
<tr>
<td>Virtual Writing Prompt</td>
<td>98</td>
</tr>
<tr>
<td>Interview</td>
<td>98</td>
</tr>
<tr>
<td>Themes</td>
<td>99</td>
</tr>
<tr>
<td>Central Research Question</td>
<td>121</td>
</tr>
<tr>
<td>Research Question One</td>
<td>123</td>
</tr>
<tr>
<td>Research Question Two</td>
<td>125</td>
</tr>
<tr>
<td>Research Question Three</td>
<td>128</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Summary</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>130</td>
</tr>
</tbody>
</table>
CHAPTER FIVE: CONCLUSION .................................................................................. 132

Overview .................................................................................................................. 132

Summary of Findings ............................................................................................... 133

Discussion .................................................................................................................. 137

  Bandura’s Self Efficacy Theory ............................................................................. 138
  Social Cognitive Theory ......................................................................................... 140
  Teacher Self Efficacy ............................................................................................. 143
  Transition from Preparation Program to Classroom ............................................. 144

Implications ............................................................................................................... 145

  Theoretical Implications ....................................................................................... 145
  Empirical Implications ......................................................................................... 146
  Practical Implications ........................................................................................... 147

Delimitations and Limitations .................................................................................. 148

Recommendations for Future Research ................................................................. 150

Summary ................................................................................................................... 151

REFERENCES ............................................................................................................ 153

APPENDIX A: IRB Approval Letter ......................................................................... 169

APPENDIX B: Informed Consent .............................................................................. 170

APPENDIX C: Teacher Efficacy Scale ................................................................... 173
**List of Tables**

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Online Demographic Survey</td>
<td>66</td>
</tr>
<tr>
<td>Table 2</td>
<td>Online Demographic Results</td>
<td>67</td>
</tr>
<tr>
<td>Table 3</td>
<td>Teacher Efficacy Scale Scores</td>
<td>97</td>
</tr>
<tr>
<td>Table 4</td>
<td>Teacher Efficacy Scale Reliabilities: Short Form</td>
<td>97</td>
</tr>
<tr>
<td>Table 5</td>
<td>Themes and Codes from Significant Statements and Data Aggregation</td>
<td>100</td>
</tr>
<tr>
<td>Table 6</td>
<td>Open Code, Frequencies, &amp; List of Themes</td>
<td>101</td>
</tr>
</tbody>
</table>
List of Figures

Figure 1  Moustakas’ (1994) phenomenological data analysis steps ..........................79
Figure 2  Pie chart of participants years of teaching .............................................96
List of Abbreviations

Advanced Placement (AP)
Certificate of Advanced Graduate Studies (CAGS)
Common Core State Standards (CCSS)
Council for the Accreditation of Educator Preparation (CAEP)
Efficacy in Classroom Management (ECM)
Efficacy in Instructional Strategies (EIS)
Efficacy in Student Engagement (ESE)
Individualized Education Program (IEP)
Institutional Review Board (IRB)
Massachusetts Test for Educator Licensure (MTEL)
National Center for Education Statistics (NCES)
National Council for Accreditation of Teacher Education (NCATE)
Partnership for Assessment of Readiness for College and Careers (PARCC)
Qualitative Data Analysis (QDA)
Science, Technology, Engineering, and Mathematics (STEM)
Southeastern Massachusetts Public School District (SMPSD)
Statistical Package for the Social Sciences (SPSS)
Teacher Education Accreditation Council (TEAC)
Teacher Efficacy Scale (TES)
CHAPTER ONE: INTRODUCTION

Overview

Mathematics is undeniably one of the few subjects that people will use for the entirety of their lives. From telling time and leaving a tip at a restaurant, to building houses, and even putting candles on a birthday cake, math skills and numbers are everywhere (Reyna & Brainerd, 2007). For many, the calculator on an iPhone is the source of all calculations, leaving little to no room for mental math and estimation. With this increase in technology to solve the quantitative problems a person can face in a day, the need for basic math skills seems to be diminishing. Reyna and Brainerd (2007) argued, “Millions of Americans are unprepared to handle the quantitative tasks of everyday life” (p. 156). Jansen, Schmitz, and van Der Maas (2016) defined the use of math in everyday life “as the propensity to recognize and solve quantitative issues in real life situations” (p. 2). Real life situations with mathematics occur daily, and people need to have the skills to handle those situations.

With the ever-presence of the subject, it is important that students are proficiently meeting grade level standards in mathematics. “Proficiency in mathematics depends on a continuous growth and blend of intricate combinations of critical component skills such as concepts, procedures, algorithms, computation, problem solving, and language” (Riccomini, Smith, Hughes, & Fries, 2015, p. 236). In order to foster proficiency among students in the classroom, there must be a proficient teacher. Many articles have been published concerning underprepared teachers (Dotters-Katz, Hargett, Zaas, & Criscione-Schreiber, 2016; Faragher & Clarke, 2016; Johnson & Wells, 2017), indicating the importance of growth in teacher preparation programs and post-program professional development.
Cai et al. (2017) challenged researchers in the field of mathematics to focus their studies in a way that will provide content teachers can actually use in the classroom. They argued researchers could have a greater impact on education by ensuring that their studies provide teachers an opportunity to better their practices in the classroom. “That is, researchers who aim to impact practice by studying the specification of learning goals and productively aligned learning opportunities could add significant practical value by including implementation as an integral part of their work” (Cai et al., 2017, p. 342). With this in mind, the goal of this study was to discover if novice educators feel prepared to teach mathematics and share the lived experiences of these educators.

Chapter One of this study includes a historical, social, and theoretical overview of teacher preparedness and teacher preparation program requirements. Through this brief overview of the research, a gap in the literature is identified that provided the foundation for the research on this topic. I also clearly ascertain my motivation for conducting the research as well as define my relationship to the research site and participants. All of my biases, philosophical assumptions, and the research paradigm are articulated. Next, both the problem and the purpose statement are addressed and clearly state the intentions of this study as well as the problem the study sought to address. I also clearly define the significance of the study using practical, empirical, and theoretical examples of how the findings are beneficial. Then, I clearly define the research questions that drove the focus of the study before finally giving a list of definitions pertinent to the study to provide the reader with a basic understanding of the terms that appear consistently throughout the study.
Background

Educator preparation is something that has been the focus of research studies for years. Research has been conducted regarding science (Hsu, 2016), reading (Berkeley, Regan, Dimitroy, Gucket, & Ray, 2016), social studies (Urban, 2013), and even science, technology, engineering, and mathematics (STEM; Dailey, Bunn, & Cotabish, 2015), yet minimal research, if any, has been conducted on novice teachers and mathematics. This section provides a historical, social, and theoretical background for the foundation of the purpose of this research study.

Historical

Research commentating on teacher preparation dates back to as early as 1891 (Kansas, 1891). Evertson, Hawley, and Zlotnik (1984) stressed the magnitude of the first few years a teacher has after his or her preparation program: “Better teacher preparation programs would be seeking some ways to foster teacher learning during the first year or two of full time teaching” (p. 45). Starting in the 1900s, articles were published that spoke more negatively of teacher preparation programs and highlighted their weaknesses. Platt (1947) noted, “the limitation and narrowness of teacher training programs from the standpoint of their relation to basic social and cultural characteristics of American life has created one of the most serious problems that educators face” (p. 287). It appears that issues in teacher preparation programs have occurred over the past century, with nearly 12,000 articles appearing from 1981 to today.

More recently, research over the past decade has chronicled the decline in American students’ performances in mathematics (Schmidt, 2012; Sun, Strobel, & Newby, 2017). “By now it should be beyond dispute that the mathematics skills of American students leave a great deal to be desired” (Schmidt, 2012, p. 133). This level of underperformance is ranking the United States well below other countries when it comes to global scoring. “The performance of
U.S. students on mathematics assessments ranges from simply mediocre to extremely poor, depending on the type of test and grade level” (Schmidt, 2012, p. 133). Unfortunately, researchers have been unable to pinpoint causes behind this deficit. One of the potential causes outlined in several studies (Burkman, 2012; Krawec & Montague, 2014; Roberts, 2016; Sun et al., 2017; van Ingen, Eskelson, & Allsopp, 2016) is the lack of teacher preparation as a contributing factor in the underperformance and lack of meeting grade level standards. “What do prospective mathematics teachers really know about the topics they are expected to teach their own students in the not-so-distant future” (Clark, K., 2012, p. 68)? This is a problem that not only affects the teacher, but it also affects the students and the school, and it can often deter students from entering a career in a mathematical field (Medoff, 2013).

The experience a student has with a teacher directly impacts the student’s feelings towards the subject the teacher presents (Larkin & Jorgensen, 2016). Therefore, negative past experiences with mathematics can cause anger and frustration toward the topic. K. Clark (2012) had mathematics teachers keep a journal of questions they had about their mathematics education. Among the many questions the teachers wrote about, the one that consistently appeared in several journals read, “Were my previous mathematics teachers required to take a history of mathematics course so that their future students could reap the benefits of mathematical instruction informed by the history of mathematics” (Clark, K., 2012, p. 68)? Unfortunately, many teachers are beginning to express their frustrations with teacher preparation programs, often citing they did not feel adequately prepared to deal with the curriculum (Schmidt, Burroughs, Cogan, & Houang, 2017). Numerous studies have covered similar phenomena with pre-service teachers (Apeanti, 2016; Koçak & Soylu, 2017; Özyildirim-Gümüş et al., 2017) and with veteran teachers (Hampshire, 2014; Khalid, Sutoyo, Mungad, Sari, &
Herawan, 2014; Rhine, Harrington, & Olszewski, 2015), but no studies give a voice specifically to novice teachers and mathematics.

**Social**

The period of being novice teachers is one of the most challenging times educators will face throughout their career. Often referred to as the sink or swim period, the first few years will weed out those who are not cut out to be in the classroom (Clark, S., 2012, p. 197). Fresh out of their teacher preparation programs, these new teachers should be ready to face whatever is thrown at them, but oftentimes, they are not. Teacher preparation programs are arguably some of the most important college programs that exist today (Adoniou, 2013). Preparing teachers to mold future generations is not a task that should be taken lightly. One of the biggest ways that teacher preparation programs attempt to help pre-service teachers have some real, hands-on experience is by getting them into the classroom early. “The classroom-based experience, consistently noted as an essential element of teacher preparation, exists in teacher preparation programs in a variety of incarnations including student teaching, pre-student teaching classroom-based experiences, and very early observation experiences” (Maynard, La Paro, & Johnson, 2014, p. 244). Many teacher trainers believe that the earlier a pre-service teacher begins to have experience the classroom, the better off the teacher will be in the future. What is challenging about this is that many student teachers are only in a classroom for an hour or so a day, and they are not truly experiencing what it is like to handle both academic and social challenges. It is important to understand whether future teachers truly feel prepared to handle their responsibilities in the classroom upon completion of their teacher preparation programs.
Theoretical

Self-efficacy in educators is something that has been studied countless times (Bandura & Locke, 2003; Bostick, 2013; Elstad & Christophersen, 2017; Hoy & Woolfolk, 1993). Self-efficacy is the confidence or belief that people can be successful in a specific context (Bandura, 1997). Regarding education, self-efficacy can refer to a teacher’s level of confidence teaching a certain subject, working with students, dealing with social issues, or evaluating student success, to name a few (Ackermann, 2012; Akçali, 2017; Banas, 2014; Khoury-Kassabri, 2012; Langley, Martin, & Kitchel, 2014). It is the teacher’s belief in how successful he or she can be. Hearkening back to Descartes proposition of “I think; therefore, I am,” the self-efficacy theory shows that when teachers are confident in their abilities within the classroom, they are often met with success (Bandura, 1997).

Bandura’s (1993) self-efficacy theory and Bandura’s (1991a) social cognitive theory are the two theories that guided this study. The stronger the educator’s perceived self-efficacy the “higher the goal challenges people set for themselves and the firmer is their commitment to them” (Bandura, 1993, p. 118). Bandura’s (1991a) social cognitive theory emphasizes the environmental factor on learning and behaviors rather than biological influences. This study sought to add to both theories by showing that an educator’s self-efficacy about how prepared to teach mathematics he or she is plays into how well the students are performing in the subject. It also added to the idea that the way the teachers are taught in their preparation programs has a significant impact on how they teach in their future classrooms, something Bandura (2001) addresses with his social cognitive theory.
Situation to Self

With this study, I sought to understand the phenomenon of novice elementary teachers’ experiences with preparedness to teach mathematics (Moustakas, 1994). My motivation for conducting this study stemmed from being the daughter of a math teacher and being a math teacher myself for the past five years. I looked to describe the lived experiences of novice teachers, like myself, and their perceived level of how prepared they were to teach mathematics after graduating from their teacher preparation programs. Adams and van Manen (2017) wrote that phenomenology challenges us to “wonder, reflect, and draw nearer to joy, love, loss, contact, care, and all manner of deeply human meanings. It grants inceptual understandings of the nature of being and becoming human in our increasingly commercial, distracted, and conflicted world” (p. 781). As I sought to explore the lived experiences of the participants, I journaled to bracket my personal experiences and opinions out of the study. It was my job to seamlessly tie together all the stories of the participants to better understand their lived experiences. The themes that presented themselves in the study will allow me to work with local universities and my school district to create professional development programs or to fine-tune teacher preparation programs to more effectively meet the needs of novice elementary math teachers.

While sharpening my topic for this study, I leaned on the paradigm of constructivism to guide me. “Constructivism is a theory of learning which posits that students learn by actively constructing their own knowledge (Schcolnik, Kol, & Abarbanel, 2016, p. 12). As someone with a passion for the field of education since a young age, I have constantly been constructing my own meaning through an active learning process. Rather than studying about countries online, I have visited them to experience the culture firsthand. I appreciated my teachers who allowed me to think for myself rather than telling me how I should feel or what I should believe. With
original thoughts of studying children and math anxiety, I realized that I wanted to work with a
group of people to construct meaning for novice elementary teachers’ lived experiences. To gain
thick, deep, and rich experiences, I realized I would need to interview adults rather than children.
Using Bandura’s (2001) self-efficacy theory and social cognitive theory, I hope to better
understand the participants as “agents of experiences rather than undergoers of experiences” (p. 4) and how they take actions that directly impact individuals.

By defining ontological and epistemological assumptions, I was able to introspectively look at my own biases. Ontological assumptions ask, “what kind of world are we investigating, with the nature of existence, with the structure of reality as such” (Crotty, 2003, p.10). While I believe that the world operates through a cause-and-effect relationship, this assumption was important to address prior to conducting my research. I conducted qualitative research, which did not allow me to say “this causes that,” but rather, it allowed me to tell a story to get a better understanding of educators and math. Epistemological assumptions explain “how we know what we know” (Crotty, 2003, p. 3) and is “concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate” (Crotty, 2003, p. 8). Along with using a constructivism to guide my study, constructionism is another idea that addresses my epistemological assumptions. Crotty (2003) defined constructionism similarly to constructivism by saying that it is a “view of all knowledge and therefore all meaningful reality as such is contingent upon human practices, being constructed in and out of interaction between human beings and their world and developed and transmitted within an essentially social context” (p. 42). Therefore, I strongly believe in the fact that a person’s view of the world and his beliefs are constructed through experience.
When tackling my axiological beliefs, I kept reflecting on my Catholic upbringing. I believe that people have inherent value because they are created in the image and likeness of God. This belief is one of the driving factors behind me entering the Doctorate program at Liberty University; I wanted to further my education at a university that has beliefs which align with mine. I also believe that for many people, God calls them into a certain profession or career. For example, oftentimes teachers have followed a calling into the field of education, just as I did, and each participant’s story deserves to be heard. With this in mind, it was my goal to ensure that all participants felt nothing but the utmost respect during the entire research process as I sought to better understand their lived experiences.

**Problem Statement**

The problem is that novice elementary teachers do not feel prepared to teach mathematics in a classroom upon leaving their educator preparation program. With the lack of training comes the lack of student success, which can be seen in the fact that less than 40% of students are proficient in mathematics, with Massachusetts listed as a state that experienced a decline in scores (National Center for Education Statistics [NCES], 2013). Additionally, students who struggle in math in elementary school are significantly more likely to continue to perform below grade level during their educational careers (Bolley, 2013; Latterell & Wilson, 2017; Siegler et al., 2012). Research often points to teacher training programs as both the cause of success in students and as a potential cause of the problems students face regarding curriculum (Körhasan & Didis, 2015; Krawec & Montague, 2014; Roberts, 2016). Even though there is an abundance of literature on teacher preparation programs, the gap in the research is in one of the core subjects: mathematics. Teacher preparation programs have been analyzed regarding science (Hsu, 2016), reading (Berkeley et al., 2016), social studies (Urban, 2013), and even STEM
(Dailey et al., 2015), but little to no research has been conducted on mathematics preparation. The research that presently exists chronicles teachers’ reluctance and fear in regard to teaching mathematics (Wilburne, Keat, & Napoli, 2011).

This study allowed me to construct meaning between the teacher preparation programs and the teacher’s post program experiences with students in mathematics. With this in mind, I attempted to better understand the lived experiences of novice teachers and their preparedness to teach mathematics, and I specifically sought to describe how prepared they felt to teach math and address the students’ challenges in math.

**Purpose Statement**

The purpose of this transcendental phenomenological study is to describe novice elementary teachers’ experiences with preparedness to teach mathematics in a large school district in southeastern Massachusetts. At this stage in the research, novice elementary teachers (grades 1-6) are defined as teachers with less than five years’ experience and therefore, “were still under probation and had not been formally confirmed as a part of teaching profession” (Goh, Yusuf, & Wong, 2017, p. 24). Additionally, level of preparedness is defined as the teachers’ “self-perceptions of effectiveness or teacher-based determinations of effectiveness” (Freak, & Miller, 2017, p. 54).

The theories guiding this study are Bandura’s (1993) self-efficacy theory, which details that “personal goal setting is influenced by self-appraisal of capabilities” (p. 117) and Bandura’s (1991a) social cognitive theory. When a person has a strong sense of self-efficacy, he or she will set higher goals for him or herself. People with strong self-efficacy are often incredibly committed to the goals they set for themselves (Bandura, 1993). Bandura’s (1991a) social cognitive theory emphasizes the environmental factor on learning and behaviors rather than
biological influences. Bandura (1991b) focuses on observational learning, which may or may not lead one to imitate a behavior. Rather than simply imitating behavior, one may combine an observed behavior with other observed behaviors to create more complex behaviors (Miller, 2011, p. 235). These theories relate to this study in that the participants’ level of self-efficacy and their observational learning will play a large role in their experiences as math teachers.

**Significance of the Study**

While it is arguable that any research is beneficial, it is important to discuss how this specific study is important empirically, theoretically, and practically. This section discusses the potential empirical significance of this study and note how this study could fill gaps in previously conducted research. This section also covers who can benefit from the study theoretically and practically, discussing how educators, universities, and administrators can use the findings of this study to drive change in educator preparation programs or professional developments. This study discusses how prepared educators feel, which will allow the districts to make changes accordingly.

**Empirical**

This study contributes to the literature on math preparedness by filling some of the gaps in previously published articles (Bolley, 2013; Chen, McCray, Adams, & Leow, 2014; Gainsburg, 2012; Latterell, & Wilson, 2017). This study is significant to researchers of education, and most importantly to universities that are preparing future educators. Several articles include in their discussions or further research sections the need to continue looking into teacher preparedness and mathematics (Hiebert, Berk, & Miller, 2017; Ng’eno & Chesimet, 2016; Schmidt et al., 2017; van Ingen et al., 2016). “There is a significant relationship between what teachers study in their teacher preparation programs and self-reported preparation to teach
mathematics” (Schmidt et al., 2017, p. 126), yet students across the nation, and even more specifically in Massachusetts, continue to underperform on state standardized testing. “This is a particular problem in lower secondary, as roughly three-fifths of such future math teachers graduate from the bottom quarter of teacher preparation programs in the US” (Schmidt et al., 2017, p. 127). The pressure on elementary teachers to be proficient across many subject areas may be one of the reasons there is such a deficit in mathematics scores in students, especially when considering many teachers fear teaching the subject (Wilburne et al., 2011).

**Theoretical**

The theoretical significance of importance to educators, professors of education, and universities who train future educators, is in this study’s ability to further expound on Bandura’s (1993) self-efficacy theory as well as his social cognitive theory (Bandura, 1991b). By conducting this study, I sought to better understand how teachers’ experiences in their pre-service teacher programs have prepared them to teach mathematics. By focusing on the individual teacher’s level of self-efficacy regarding mathematics, I provide additional support of Bandura’s (1993) idea that “there is a marked difference between possessing knowledge and skills and being able to use them well under taxing conditions” (p. 119).

**Practical**

The practical significance is that the results of this study provide information to help novice teachers feel more prepared to teach mathematics. The findings of this study may be used to guide professional development trainings for the following school year in mathematics pedagogy. The population that benefits from this study includes but are not limited to teachers, administrators, evaluators, the local school board, the superintendent, local colleges with education programs, professors, and future educators. In the Southeastern Massachusetts Public
School District (pseudonym) there were 34 elementary math teacher vacancies in the first roll out of job openings for the 2017-2018 school year (Job Posting Notification, 2017). The results of this study help stakeholders better understand and eventually address the deficiencies novice elementary math teachers experienced in their preparation programs and how the school district can better support them. This study helps enlighten those responsible for teacher preparation programs so they are able to do more to better prepare teacher candidates both pedagogically and emotionally for teaching mathematics. This study is significant not only to the educators involved but also to the administration of local school districts and universities that have teacher preparation programs in the southeastern Massachusetts area.

**Research Questions**

Given that the purpose of this transcendental phenomenological study was to describe novice elementary teachers’ experiences with preparedness to teach mathematics in a large school district in southeastern Massachusetts, the following questions were used to frame this study:

**Central Research Question**

What are the lived experiences of novice elementary teachers as described through their self-efficacy in teaching mathematics? Several studies (Burkman, 2012; Hesson, 2016; LaBoskey, 2015; Scales et al., 2017) all considered how novice teachers in both elementary and middle schools prepare to navigate content, manage their teaching practices, and adjust to unfamiliar circumstances. Lee and Walkowiak (2016) and Selling et al. (2015) focused specifically on teachers’ preparation and mathematics standardized testing at the elementary level. For the purpose of this study, and per the Massachusetts Teacher Fields and Grade Levels (2015), elementary school teachers are defined as educators who are certified to teach grades 1-6.
Numerous studies have covered similar phenomena with pre-service teachers (Apeanti, 2016; Koçak & Soylu, 2017; Özyildirim-Gümüş & Sahiner, 2017; Savard et al., 2017) and with veteran teachers (Hampshire, 2014; Khalid et al., 2014; Rhine et al., 2015), but no studies give a voice specifically to novice teachers of mathematics. Elementary teachers differ from middle school, high school, and continuing education teachers in that they are trained to teach all the subjects rather than focus specifically on one. This lack of specification and diverse amount of content elementary teachers are expected to know puts a large pressure on this group of educators and provides a prime participant group to investigate the phenomenon.

**Sub Question 1**

How do novice elementary teachers describe their self-efficacy as math teachers in regard to content knowledge? Novice teachers’ self-efficacy has been studied in-depth on second careers (Wagner & Imanel-Noy, 2014), agriculture (Langley et al., 2014), mentoring (Ackermann, 2012), social media and professional learning communities (Bostick, 2013), and school climate (Meristo, & Eisenschmidt, 2014), to name a few. There are no articles speaking to the self-efficacy in pedagogical content knowledge in mathematics with the target population of this study.

**Sub Question 2**

How do the participants describe their self-efficacy as math teachers regarding content dissemination? Math curriculum has been studied in urban schools using model-strategy-application approaches (Wu & An, 2016), elementary math mistakes (Liu, 2017), teaching math to deaf students (Shelton & Parlin, 2016), and inner-city math curriculum (Iyer & Pitts, 2017). There are no articles speaking to the self-efficacy in disseminating the curriculum in mathematics with the target population.
Sub Question 3

How prepared do the participants feel to address students’ challenges in mathematics? Elementary students face a myriad of challenges during their time from first grade through sixth grade. Not only do they experience an incredible amount of physical changes, emotionally and academically, the students must be prepared to deal with a lot. Smith et al. (2015) studied elementary school student social challenges and developed a social challenge screening questionnaire that was used to determine if changes in an influence student content performance. Oakes et al. (2012) examined the performance of elementary students with behavioral challenges and poor work completion. There is a deficit in the research focusing on how the educators help students address their challenges, specifically in regard to mathematics.

Definitions

1. Elementary – In Massachusetts, grades 1-6 (Teacher Fields and Grade Levels, 2015).

2. Initial license – A teaching license granted to someone who has completed the following: a Bachelor’s degree, passed all required Massachusetts Teacher Educator Licensure tests, holds the Sheltered English Immersion endorsement, and an approved educator preparation program in Massachusetts or one that is comparable to the license sought and sponsored by a college or university outside of Massachusetts that has been accredited by CAEP, TEAC, or NCATE (Teacher License Types and General Requirements, 2015).

3. Novice teacher - Novice teachers in this study are teachers who are still under probation and have not been formally confirmed as a part of teaching profession (Goh et al., 2017, p. 24). In the state of Massachusetts, these teachers will hold an initial license and have taught for less than five years.
4. **Self-efficacy** - Self-efficacy is the confidence or belief that people can be successful in a specific context (Bandura, 1997).

5. **Teacher Preparation Program** – A program that aims to properly prepare preservice teachers to effectively instruct all students. “Preparation programs must first identify then implement instruction in evidence-based management strategies” (Flower, McKenna, & Haring, 2017, p. 163).

**Summary**

The goal of this transcendental phenomenological study is to explore how novice elementary teachers feel about their preparedness to teach mathematics in a large school district in southeastern Massachusetts. To explore this goal, teachers were interviewed to discover their self-efficacy in regard to math content knowledge, content dissemination, and how prepared the educator feels to address challenges that occur in a math classroom (ex. math anxiety). With 2017’s state testing in mind, and the fact that only 34% of students in grades 3-8 in the Southeastern Massachusetts Public School District (pseudonym) met the mathematics expectations, it is important to understand teacher’s self-efficacy in mathematics in order to better prepare the educators to teach students in the coming years.

Research evidence is abundantly clear that learning mathematical skills, beginning with the basics of addition and subtraction, is immensely important for students at the elementary age. “Children should use various meaningfully acquired strategies, based on their understanding of numbers, operations, and mathematical principles and relationships” (Torbeyns, Peters, De Smedt, Ghesquière, & Verschaffel, 2016, p. 382). The goal was to discover if the educators feel that they are equipped to help students learn math in the variety of ways children will need to access the content. I hoped that by interviewing the participants and truly listening to their
stories, I would be able to accurately describe the preparedness of novice elementary teachers to teach math and effectively deal with the challenges students encounter in learning math.
CHAPTER TWO: LITERATURE REVIEW

Overview

The prominence of math educators in research has exploded in the last five years, but there are still many areas to be studied. “While early childhood teachers are generally described as lacking confidence in teaching math, surprisingly few studies have examined teacher confidence in relation to teaching tasks such as planning learning activities or assessing children’s math understanding” (Chen et al., 2014, p. 367). This gap in the research lends itself to a gap in professional development opportunities for educators. Before research on math educators and math education can begin, it is important to understand the theories that are guiding this study. It is critical to explore the level of self-efficacy elementary teachers have toward teaching mathematics, with special focus on their pedagogical content knowledge in their ability to deal with the challenges faced by students as they are learning math. Teaching is more than content dissemination; it involves on-the-spot critical thinking skills that are put to the test daily. To that end, this chapter dissects the literature surrounding the topic through two channels. The first, a theoretical breakdown, identifies the two theories scaffolding this study. Using Bandura’s theory of self-efficacy and social cognitive theory as guides (1991, 1993), this study focuses on a very specific aspect of being a math educator. The second part of this chapter breaks down the past and current literature surrounding novice elementary math pedagogy. By synthesizing the research and using the lens provided by the theoretical framework, this study has a very narrow, well-defined focus in seeking out a phenomenon among novice elementary educators.
Theoretical Framework

There were two main theories that provided the framework for this study. The first, Bandura’s (1993) theory of self-efficacy, set the foundation for the study of math teachers’ confidence in their teaching abilities. By defining self-efficacy through Bandura’s (1993) theory, the individual interview questions were developed, and a focus was established throughout the entire study. As the focus of this study was on novice teachers perceived level of preparedness to teach the content and handle the challenges they will face in the classroom, the participants level of self-efficacy played an incredibly important role. The second theory, Bandura’s (1991a) social cognitive theory, emphasizes the environmental factor on learning and behaviors rather than biological influences. This theory became more important when focusing on the learning that the educators have gained through their experiences both in the educator preparation program and in their first years in their classroom. These two theories provided the lens through which this study can be viewed.

Theory of Self-Efficacy

“Perceived self-efficacy refers to beliefs in one’s capabilities to produce given attainments. A sense of personal efficacy is the foundation of human agency” (Bandura, Pastorelli, Barbaranelli, & Caprara, 1999, p. 258). Self-efficacy is one of the determining factors of why people respond or react to a situation in the way that they do. It is something that is defined in a person’s mind based on his or her own experiences and sensed ability to handle certain situations. It encompasses a person’s confidence in his or her ability to successfully handle a situation, whether the situation was anticipated. Bandura (1993) wrote, “personal goal setting is influenced by self-appraisal of capabilities. The stronger the perceived self-efficacy, the higher the goal challenges people set for themselves in the firmer is their commitment to
them” (p. 118). In laymen’s terms, if an educator, or any person in general, believes he/she has the capacity to successfully handle a challenge, the harder and the higher the goals he/she will set. In the same light, if a person believes that he/she is ill-equipped to handle a situation, meaning he/she has a low level of self-efficacy, the lower, easier, and more attainable the goals will be. Similar to Descartes’ (2009) notion of “I think; therefore, I am,” Bandura’s (1993) self-efficacy theory goes more like “I think I can, therefore I can” or “I think I can’t, therefore I can’t.” It is very much a self-fulfilling prophecy. For example, “in their academic work, students receive a great deal of comparative information about their capabilities from grading practices and teachers’ evaluations of their scholastic performances. These unremitting comparative evaluations carry strong efficacy implications” (Bandura, 1993, p. 123). This notion is important to note in this study in that not only does the educator’s level of self-efficacy play a role on their abilities as a math educator, but it also plays a role on their student’s successes within the math class. It is human nature for people to compare themselves with those around them, and self-efficacy can be the driving force as to whether a person takes on a task. Self-efficacy can transcend from how a teacher perceives himself to how he perceives his students. The age-old adage of having a bad apple in class can affect the way the educator perceives his ability to teach said student. Self-efficacy is arguably one of the most critical aspects of being an educator in today’s schools.

Similarly, goal setting is a task that educators do, both consciously and unconsciously, on a daily basis. “In their various pursuits, people strive for certain goals or levels of confidence and receive social feedback from time to time concerning their performances” (Bandura, 1993, p. 123). Performance feedback, either from an educator to a student, from an administrator to an educator, or even from one person to another, has a massive impact on that person’s level of self-
efficacy, which can affect every decision that person makes. This delineation goes further than the split of type A personalities verses type B personalities. The level of self-efficacy a person has plays a large role in the motivation he has to succeed and the goals he will set for himself.

The balance of the self-efficacy of the educator and the self-efficacies of the students in the class is a pivotal one. “Among students equated for ability but differing in self-efficacy, those with a higher sense of efficacy manage their time better, are more persistent, are less likely to reject good solutions prematurely, and are more successful in their problem solving” (Bandura, 2012, p. 19). This can be said about educators with a high sense of self-efficacy as well. The higher the educator’s self-efficacy, the more challenging the goals he will set, and the more confidence he will have in his ability to proficiently complete the task at hand. Self-efficacy can pervade into lesson planning and delivery as well. As noted previously, self-efficacy is arguably the most telling indicator of success within a classroom (Bandura, 2002).

Bandura (1991b) argued that an individual’s level of self-efficacy may shift ever so slightly, but the slight shifts do not often result in significant changes over a person’s life. To this effect, educators’ levels of self-efficacy are often defined long before they enter their teacher preparation programs. The notion that the level of self-efficacy will minimally vary over a person’s live will also play a huge role into the pivotal first years as an educator outside of the teacher preparation program. Educators’ self-efficacy affects if they think “in self-enhancing or self-debilitating ways, how well they motivate themselves and persevere in the face of difficulties, the quality of their emotional well-being and their vulnerability to stress and depression, and the choices they make at important decisional points” (Bandura & Locke, 2003, p. 87). Vulnerability to stress is something that will test novice educators, and their level of self-efficacy will determine whether they respond to the stress in a positive of negative light. This
can be the make it or break it moment for a novice educator. For some educators, the stress of the job could cause them to leave the field. Bandura’s (1993) self-efficacy theory, in combination with Bandura’s (1991a) social cognitive theory provided the lens through which to view the participants’ stories about their level of preparedness to teach mathematics.

Social Cognitive Theory

When discussing Bandura’s (1991a) social cognitive theory, it is important to note that Bandura often added three words to the end of his articles mimicking the title of his theory. He would add “an agentic perspective” because he believed that people act intentionally to achieve a desired result (Bandura, 1991a). When talking about agency, Bandura (1991a) defined what he deemed to be the four core features of personal agency: intentionality, forethought, self-reactiveness, and self-reflectiveness.

The first, intentionality, is defined by Bandura (2001) as “a representation of a future course of action to be performed” (p. 6). This is linked to the notion that people act in a specific way for a specific purpose. For educators, intentionality appears throughout their career. Tasks as basic as following the curriculum require the intentionality to plan out the lessons in a specific order to ensure students are accessing the content. Intentionality can be seen in many aspects of a classroom. Elementary educators are especially intentional about things such as seating charts, classroom decorations, in-class job assignments, partner work, and homework, just to name a few. Intentionality, a massive role in personal agency, often presents itself when teachers are actively planning for something within their classroom.

The second core feature of personal agency, forethought, is defined as when “people set goals for themselves, anticipate the likely consequences of prospective actions, and select and create courses of action likely to produce desired outcomes” (Bandura, 2001, p. 7). Educators
use forethought daily when planning and executing lessons within their classrooms. Similar to intentionality, forethought plays a massive role in the daily ebb and flow of a classroom. These first two pieces seemingly go hand in hand with and can foster a very successful classroom environment.

The final two pieces, self-reactive and self-reflective, encompass a person’s ability to act and reflect on the actions that occurred (Bandura, 2001). For an educator, these two pieces can occur hourly. Teachers are constantly having to react in an instant to a situation and are trained on how to debrief, reflect, and rethink about the situation through other lenses in order to make the best decision in the future. For example, if an educator is teaching a lesson and the fire alarm goes off, the self-reactive side of him will instantly usher his students out of the building to safety. The self-reflective side of the educator will allow him to think what he could have done better to get the students out quicker or in a more orderly fashion. Even as educators are teaching lessons, they are constantly reflecting and reacting on how the can make the lesson better in the moment and in the future. Just as the first two core aspects of personal agency were linked, it is easy to see the connection between the second two. One could argue that split between the first two core aspects and the last two core aspects is when a situation will occur. In regard to the first two, intentionality and forethought both occur as a proactive means of handling situations. The latter two are reactive responses to situations.

Bandura (1991a, 1991b, 1993) often referred to people as agents of experience and defined the role of successful agents in many of his articles. “An agent has to be not only a planner and fore thinker, but a motivator and self-regulator as well” (Bandura, 2001, p. 8). This need for motivation and self-regulation ties into his theory of self-efficacy as well. Bandura (2001) argued that a person cannot have a specific end goal in mind and not act on it; he wrote,
“goals do not automatically activate the self-influences that govern motivation and action” (p. 8). Educators face this challenge daily. With demands from the state that students need to meet required grade level standards, it is up to the educator to ensure the appropriate steps are put into place so the students can be proficient in grade-level content. This is not an easy task, nor is it an easy undertaking. Getting students to proficiency requires intentionality, forethought, self-reactiveness, and self-reflectiveness. Luckily, many teacher preparation programs and educator evaluator programs teach the teacher candidates how to confidently tackle these four areas. Self-reflectiveness, of the four, is often the topic that educator preparation programs focus on the most. “It is at this higher level of self-reflectiveness that individuals address conflicts in motivational inducements and choose to act in favor of one over another” (Bandura, 2001, p. 10). These four features are incredibly important to the success of any human and are especially applicable within the constructs of a classroom.

One of the most interesting things about our species is the lack of major biological change we have gone through over the years. Similar to self-efficacy, “people have changed little genetically over recent decades, but they have changed markedly through rapid cultural and technological evolution in their beliefs, mores, social roles, and styles of behavior” (Bandura, 2002, p. 272). This rapid evolution has exponentially increased a person’s potential goal outcomes as well as their paths of getting to those outcomes. Ultimately, humans have an immense amount of supports to set and achieve their goals. With this increased potential comes an increased need for flexibility, and a person’s flexibility is majorly defined by his level of self-efficacy. Bandura (2002) argued that self-efficacy and the belief a person has in his ability to succeed is inescapable. Personal efficacy, especially efficacy in educators, is immensely important, “not because of reverence for individualism, but because a strong sense of personal
efficacy is vital for success” (Bandura, 2002, p. 273). The link between the theories is apparent in Bandura’s (2002, 2012) articles, making them two very appropriate theories to guide this study.

**Related Literature**

While extant literature exists on the field of education, for the purposes of this study six specific areas were examined. The first, teacher self-efficacy, focused on teachers’ level of confidence in regarding a variety of subjects. Drawing on information from Bandura’s (1993) theory, self-efficacy will be defined through the lens of education. The next three sections, teacher preparation programs, preparing math educators, and student teaching and mathematics, outline how teachers are prepared in their university program to teach math. Detailed information outlines the specific goals of teacher preparation programs, the specifics in how mathematics is taught within those constructs, and what student teaching and mathematics look like. The section following student teaching details the current practices in mathematics and how they are presented in the teacher preparation. Mathematics education has changed drastically over the years, and teacher preparation programs have shifted in response. The final section delineates the transition from teacher preparation programs into the classroom and discusses some of the struggles new teachers may face. These struggles often lead many educators to leave the field, and current statistics are presented outlining this.

**Teacher Self-Efficacy**

It can be argued that educators are the creators of all other jobs. With the notion that all children experience at least one teacher in their lives, regardless of what each child goes on to do in his or her life, a part of that shaping can be attributed to an educator. Thinking through this lens, it is easy to see how immensely important exceptional educators are to a school. “The
opportunities that education can bring may be crucial for students in adapting in meeting the needs of changing and transforming world” (Akçali, 2017, p. 648). Considering this, a teacher is one of the crucial components in ensuring the students successfully meet the grade level standards set forth by the education system, the districts, and the curriculum. It is important that the educator “possesses adequate professional knowledge, skills and attitude” (Akçali, 2017, p. 648) and should refine these skills during their student teaching or practicum. Having the necessary skills and attitude is something that an educator can continuously work on but, like self-efficacy, is often defined long before there are students present. It is undeniable how important having qualified, passionate, well-educated teachers are in today’s classroom. These teachers, often considered highly qualified, are typically ones with high levels of self-efficacy.

Self-efficacy encompasses the educator’s confidence in his ability to perform certain tasks. It also outlines with what level of proficiency the educator will tackle the daily challenges that arise within a classroom. From untied shoes in kindergarten to Advanced Placement (AP) Calculus questions in high-school, educators are constantly battered with a randomized, undefinable set of trials each day. The job of an educator is often compared to that of a ringleader in a circus, constantly having to juggle the unknown and provide a seamless performance regardless of the issues that arise. It is through the educator’s level of self-efficacy that these trials are handled. When self-efficacy is used in conjunction with education, it indicates a teacher’s belief on how capable he is to perform the tasks required as a teacher (Pendergast, Garvis, & Keogh, 2011). Self-efficacy goes beyond competency and deals innately with confidence in one’s ability. For example, a teacher may be comfortable teaching fractions, but a teacher with high self-efficacy might choose their fraction lesson as the one to be observed by their administrator because it is one that he has full confidence in. Levels of self-efficacy can
distinguish the good teachers from the great ones. Teachers with high levels of self-efficacy often creatively and optimistically enter their classrooms each day with a renewed sense of energy for what lies ahead, which is truly an unknown each day.

Teachers with a low sense of self-efficacy will be less confident in their abilities in the classroom. This lower level of confidence is something that can be easily detected by students and parents alike. It is easy to recall the educators of our past who were blatantly not passionate about education or were underprepared to teach on a given day. These educators can easily turn a student off from a subject and can make a student shy away from a certain career field. This relationship can have negative repercussions throughout the student’s life. Factor self-efficacy in with a challenging subject like mathematics, and it is either a recipe for disaster or success; this is why teacher preparation programs have the immensely important responsibility of ensuring not only that teacher candidates are prepared, but also that they are willing to continue to develop professionally to become the best educator possible.

With the ever-importance of a teacher having a high level of self-efficacy within his classroom, the question arises, “to what extent does teacher training prepare student teachers to manage a classroom and motivate pupils’ desire to learn” (Elstad & Christophersen, 2017, p. 2)? Education and being a successful educator require so much more than proficiency of content knowledge. Teachers must have a level of confidence in their abilities to handle the daily unknown, and that confidence lies within their level of self-efficacy. Teacher self-efficacy begins to form before the teacher candidates enter their teacher preparation programs, and long before they even enter the classroom. This level of self-efficacy that the teacher candidates come in with is nearly impossible to change (Woolfolk Hoy & Burke-Spero, 2005). It could be argued that teacher candidate’s level of self-efficacy is evident in his own educational pursuits from the
elementary level on. Teacher candidates who enter into a preparation program with lower levels of self-efficacy will most likely struggle more than teacher candidates with high levels of self-efficacy. “Student teachers with low self-efficacy may lack the initiative or motivation needed to improve or may leave the field altogether. Thus, we can infer that mastery and self-efficacy are useful for motivating individuals toward continued improvement” (p. 2). This motivation toward continued improvement could mean higher levels of retention for teachers, an area that is often seeing a decline.

Teacher self-efficacy is something that can be looked at as a whole or can be broken down into specific subtopics. For this study, the focus of the self-efficacy was on the subject of mathematics and addressing the challenges that can arise in a math class. These challenges can vary from issues with the curriculum to students with math anxiety. “Research about teacher efficacy in mathematics and science also indicates that levels of teacher efficacy are related to teachers’ content knowledge, pedagogical content knowledge, and beliefs and attitudes regarding content” (Harrell-Williams, Sorto, Pierce, Lesser & Murphy, 2014, p. 41). This infers that if a teacher has a high level of self-efficacy, he also tends to be proficient with the content and have good teaching techniques. Teachers with high self-efficacy tend to have higher, more positive beliefs about their skills as an educator and their transferability of those skills to their students. Furthermore, teachers with low self-efficacy will have much lower levels of confidence in the content and their pedagogical skill set.

What is interesting to note is that Harrell-Williams et al. (2014) felt it significant to add that teacher attitude towards the content has an effect on the level of self-efficacy. This hearkens back to the notion that one negative experience in a subject can cause a person to dislike the subject later in life and make educational decisions based on that experience. If a math educator
did not have a good experience with the subject growing up, he may bring those emotions into the classroom or avoid the field completely. This is often why people who are passionate about education or people with abundant positive experiences in school may go into the field of education. At the elementary level, teachers are required to have a basic understanding of the concepts along with their pedagogical tools, and even a teacher with negative math experiences in the past can handle the content. It is in the middle and high school curricula, that the content is harder to get through with a low level of self-efficacy.

Teacher self-efficacy can be likened to a self-fulfilling prophecy. If a teacher is confident and believes in his abilities to perform, chances are he will be capable of performing the desired task successfully. Gibson and Dembo (1984) generated two results when looking at teacher self-efficacy: teaching efficacy and personal teaching efficacy. Teaching efficacy “refers to outcome expectation as suggested by Bandura and reflects the degree to which teachers believe that students can be taught, given their family background, socioeconomic status, and school conditions” (Khoury-Kassabri, 2012, p. 128). This level of efficacy plays a huge role in personal teaching efficacy. It is important to note that efficacy in educators is a combination of the beliefs that the students can succeed interwoven with the thought that the teacher possesses the skills to help the student achieve that success. Efficacy is also tied to job satisfaction in that “teachers with high levels of self-efficacy have strong communication in the workplace which leads to job satisfaction” (Türkoglu et al., 2017, p. 767). Overall, it is clear that teachers with a higher level of self-efficacy are the most desirable candidate to enter a teacher preparation program and will stay in the field longer. However, there are many candidates who enter preparation programs with a low sense of self-efficacy, and it is up to the preparation program to ensure that the teachers leave ready to successfully perform their jobs, regardless of the level of efficacy. With
all of the research provided, efficacy is arguably one of the most important determining factors to the success in any classroom.

**Teacher Preparation Programs**

To become an educator, a prospective teacher must go through some sort of teacher preparation program. Many programs offer a variety of multimodal learning opportunities both in and out of the classroom. These opportunities pose the question: How do novice teachers prepare for the challenges that lie ahead of them in their future classrooms? “They’re challenged every day and face uncertainty about whether their students are benefiting from their teaching. Many novice teachers find themselves overwhelmed by the responsibilities given to them, and they find themselves learning by doing” (Hsu, 2016, p. 1214). This notion of learning by doing hearkens back to Bandura’s (1993) social cognitive theory. The novice teachers are learning more by tackling the challenges of a classroom firsthand rather than sitting in a college classroom listening to a lecture about what could potentially happen during the school year. It is realistic to say that teacher preparation programs set out to ensure that a future teacher is prepared for the challenges they will face regarding students and curriculum, but it is unrealistic to assume that teacher preparation programs can cover every potential problem that will arise. This is where teachers use their problem-solving skills, in combination with their level of self-efficacy, to tackle whatever comes their way. In this regard, it is hopeful that the educator has a high level of self-efficacy. Many studies (Berkeley et al., 2016; Flower et al., 2017; Hsu, 2016; Salajan et al., 2017) suggest that teacher preparation programs are doing an inadequate job of preparing teachers, and thus doing a disservice to the entire education system. The authors believe that teachers are entering classrooms with the minimal requirements of preparation and are expected to handle a maximum amount of curriculum, students, and job requirements. In
reality, as is true with many careers, the true essence of a job is not experienced until that teacher is actually hired and is in his or her own classroom.

There is not a “one size fits all” approach for preparing the educators of the future, just as there is not one singular way to teach students. One of the biggest issues across preparation programs today is not only that the educators are coming out underprepared, their professors are often underprepared as well. “Although teacher preparation programs are vastly different, disconcerting reports suggest a lack of relevant information in course textbooks and a lack of conceptual knowledge of language across faculty who prepare future teachers” (Berkeley et al., 2016, p. 25). This lack begins a chain effect of unprepared, inefficient teachers running disorganized classrooms with deficits in management skills and content knowledge. Another issue with this is the combination of the deficits and an educator with low levels of self-efficacy can be incredibly detrimental to the learning environment for the students. Novice teachers are often the topic of study for educational research and much debate surrounds what makes a successful teacher preparation program; however, the consensus is that teachers are coming out of programs and entering their classroom ill-equipped. “Surveys indicate new teachers feel they have inadequate skills to manage a classroom and that their teacher preparation programs failed to properly prepare them” (Flower et al., 2017, p. 163). This notion is paramount to the development of this study.

Teacher preparation programs have been analyzed in regard to science (Hsu, 2016), reading (Berkeley et al., 2016), social studies (Urban, 2013), and even STEM (Dailey et al., 2015), yet minimal research, if any at all, has been conducted on novice teachers and mathematics. This gap in the literature provides the opportunity for this study to take place. “Although teacher preparation and certification/licensure are the strongest correlates of student
achievement, there continues to be a lack of alignment of teacher preparation programs to state certification/licensure requirements” (Berkeley et al., 2016, p. 26). This lack of alignment is causing a variety of issues within the classroom. Some of these issues stem from challenges with students, special education requirements, state mandates, curriculum, and teacher evaluation systems (Hsu, 2016). As stated previously, the issues that novice teachers face in the classroom often cause educators to change careers or leave the field within their first few years.

Teacher retention is a hot button topic, and the reality of the challenges educators face on a daily basis could be the cause of this mass exodus. “Research shows that, as a result of these difficulties, 20 to 25 percent of novice teachers of mathematics, science, and special education leave the profession during their first three years after graduation from the preservice program” (Hsu, 2016, p. 1214). This immense turnover is causing administration to worry about the future of the field. This also poses the question of how teacher preparation programs can do a better job of preparing the preservice teachers so when an issue arises, even one they have not experienced before, they have a set of skills for how to handle it. Hearkening back to Bandura’s (1991a) core features of personal agency, this would be the moment when the educator is self-reactive to what is going on in front of him.

In a conversation I had with a curriculum supervisor at an area high school about the challenges his teachers face daily (D. Rose [pseudonym], personal communication, September 17, 2017), he joked that there was not enough paper to write all of the challenges. He went on to describe that his teachers have, on average, 32 students in each of their classes, three classes a day, 10-15 of those students in each class are on an IEP, 3-5 will be behaviorally and emotionally disturbed, there is not enough funding for co-teachers in some rooms, and parent involvement is at an all-time low (D. Rose, personal communication, September 17, 2017). He
provided a fantastic analogy about the issues teachers face in education today. He explained that when a child goes to the dentist, the dentist provides all the tools and skills necessary for the child to return without a cavity. If, in six months the child returns with a cavity, it is the child’s fault. Blame is not cast on the dentist for underpreparing the child on their oral health. In the same light, his teachers can prepare their students and provide them the tools and skills necessary to be successful within their specific content, but if the child fails, parents are quick to blame the educator and question what the educator failed to do to prepare their child.

After speaking to some of D. Rose’s (high school teachers, personal communication, September 17, 2017) teachers in an informal setting, they noted that there was a disconnect between what they had learned in their teacher preparation programs and what they were actually doing as educators from day to day. This study seeks to determine if there is a lack of alignment in math curriculum taught within teacher preparation programs and the skills elementary educators actually need to possess in order to be successful within their classrooms. Hopefully, if the participants truly feel unprepared to teach mathematics, changes will be able to be made in order to fix the attrition rate of novice educators, and help the new educators feel ready when they enter the classroom for the first time.

**Preparing Math Educators**

Being an educator is more than simply understanding curriculum; it lies in the delicate balance between truly knowing the content and understanding how to present it to students in a way in which they can access it. These are innately two vastly different concepts and require the educator to be able to break down content for multi-modal learning styles. Understanding the quality of a mathematics teacher’s knowledge lies far beyond how many math classes he passed while in his educator preparation program (Ng’eno & Chesimet, 2016). “Knowledge of
mathematics teaching includes knowledge of pedagogy as well as understanding students' thinking and being able to assess students’ knowledge to make instructional decisions” (Ng’eno & Chesimet, 2016, p. 1). The latter part, the ability to assess knowledge and make decisions based on it, is crucial in a math classroom and is something that successful educators can do spontaneously. For example, if students are struggling with multiplying fractions, it would not make sense for the teacher to move on to dividing fractions, which is incredibly similar to multiplying. A competent math teacher must have the wherewithal to know when the students need to spend more time on a particular concept and have the skills to adjust the lessons accordingly. This may require the educator to present the same material in a different way to help the students grasp the content. It could also mean a lesson taking longer than the teacher anticipated, thus throwing off the schedule. Teachers need to be constantly flexible to the unknown that can throw off even the most perfectly planned lessons. Students, especially at the elementary level, are constantly questioning the real-life application of mathematical concepts, and a simple “I don’t know” is not an acceptable answer. Math educators truly need to know the ins and outs of the content and be ready to present the material in real life applications to help the students truly comprehend the curriculum.

Teacher preparation is something that is constantly debated between the government and lead decision makers in educational policy (Schmidt et al., 2017). With questions surrounding the effectiveness of teacher preparation programs, it is more important than ever to solidify future teachers’ knowledge that will be brought into the classroom. By focusing on their teaching practice, future educators can hone in on the skills that are crucial to their success as educators and the successes the students will find within the classroom. “Teaching practice can either greatly facilitate students learning or serve as an obstacle to it” (Ng’eno & Chesimet,
2016, p. 3), so therefore an important piece of math educators’ preparation, for the realities of the classroom lies within their educator preparation programs’ coursework and student teaching. In their first year as educators, the content knowledge teachers possess coming out of their teacher preparation matters little in comparison to the reality of trying to manage their first classroom (Schmidt et al., 2017). It should come as no surprise that “the exposure to instructional content could have an important impact on teachers’ mathematical knowledge . . . given the relationship between content exposure and mathematics learning for K-12 students” (Schmidt et al., 2017, p. 112), however the first year or two the focus is on merely surviving.

One of the principle tools that a mathematics educator needs to be proficient in is the specific grade-level content standards for which they intend to teach. These standards level the playing fields across the country and provide a baseline for comparison with other nations. “One way that most of the developed nations ensure the quality of mathematics instruction is by providing uniform national standards that define in detail the mathematics content that is to be covered by teachers at each grade level” (Schmidt, 2012, p. 138). In order to be competitive with other nations, these content standards are often the focus of the majority of educator preparation programs. These national content standards, often referred to as the Common Core State Standards (CCSS) in America, are the driving force behind all things education. “As a result, curriculum materials (e.g., textbooks, tests), teacher training, and professional development are all developed with respect to those standards” (Schmidt, 2012, p. 138). For many educators, myself included, the standards drove every facet of the preparation programs and continue to drive every facet of a public-school classroom today. While there is much debate over the effectiveness of these standards, they are what the majority of classrooms are teaching to today and are something that educators need to understand inside and out.
Student Teaching and Mathematics

One of the most highly praised aspects of a teacher preparation program is the student teaching component.

Many current teachers have referred to their student-teaching experience as an influential part of the transition between being merely a student and that of being a professional educator and have spoken of the impact that cooperating teachers had on their learning.

(Denis, 2017, p. 54)

Student teaching allows the future educator to get into a real classroom under the supervision of a mentor teacher and present a few lessons with the opportunity for feedback. This experience allows the teacher candidate to get out of the collegiate classroom and step into the world of elementary, middle, or high school education. It allows the future educator behind the scenes access to the age level they intend to get their degrees or licenses in. According to Denis (2017), “This key element of preservice teacher growth has been referred to as the most valuable experience [student teachers] had before beginning to teach, the time which they learned the most about being a teacher” (p. 54). This is the opportunity where the teacher candidates are able to try out some of the lessons they learned in their teacher preparation program. One of the key components to a successful student teaching experience is the teacher candidate’s ability to be self-reflective (Bandura, 2012). The mentor teacher, along with the preparation program professor, will provide the candidate with abundant feedback and suggestions for how to improve the lesson or how to tackle a classroom management issue in a different way. It gives the candidate some trial-and-error experience that cannot be simulated in the collegiate classroom setting.
Student teaching nearly always occurs in a setting at the same grade level that the teacher candidate is seeking licensure in. Goldhaber, Krieg, and Theobald (2017) argued that mathematics teachers benefitted most when the demographics of their student teaching classroom mirrored their actual classroom a year later. This means that the “school in which student teaching occurs has important implications for the later outcomes of teachers and their students” (Goldhaber et al., 2017, p. 327). For an elementary teacher, it is immensely important that the student teaching experience allow him some time in a mathematical setting. Upon being placed in a school for student teaching, preservice teachers are introduced to their cooperating teachers, someone who will serve as a mentor for the duration of the assignment. “Researchers have found that cooperating teachers have the ability to influence not only the basic environment, such as how much instruction the student teacher is allowed to give, but other equally important support aspects including emotional support and guidance” (Denis, 2017, p. 54).

With all of this in mind, it is incredibly important that teacher educators are paired with the appropriate setting for their student teaching, one that is most realistic to what the educator’s classroom will look like once they exit the program. The directors of teacher preparation programs “should learn more about the job preferences and opportunities for their graduates and consider placing more teacher candidates into student teaching schools that look like the schools they are likely to be hired into” (Goldhaber et al., 2017, p. 353) to give the preservice teacher a greater chance of success within the classroom. For the purposes of this study, this means ensuring the participants had experiences in mathematics during their elementary student teaching experience.
Math Pedagogy – Current Practices

“It is by now a cliché to point out that the U.S. mathematics curriculum is like the Missouri River, a mile wide and an inch deep” (Polikoff, 2012, p. 230). When considering elementary mathematics curriculum over the past decade, both the role of the teacher and the content have changed drastically. Even a consideration of the role of the educator separate from the mathematical content has completely shifted over the past decade. Gone are the days where the teacher would stand in front of the class while the students recited their multiplication facts. Today’s math lessons involve manipulatives, hands-on learning, rotating groups, and student-lead discussions, to name a few (LeSage, 2012). This shift in the role of the teacher had caused a shift in the way that math educators are viewed and trained.

Prior to 2005, the teacher was regarded as the sole authority of the classroom who presents the information and assesses student learning; however, in [newer] curricula, the teacher was declared as the facilitator of student learning. In other words, students are expected to actively participate in the learning process and develop their mathematical knowledge on their own. (Doğan, Işık sal & Koç, 2013, p. 914)

This shift in thinking comes with a new wave of mathematical instruction, which is prompting out of the box methodologies for solving age-old problems. In the elementary setting, tactile methodologies are sweeping through classrooms. Allowing the students to physically manipulate the numbers in a problem is allowing them new ways to gain understanding. Ultimately, teachers must possess a deep understanding of the mathematics they are expected to teach (National Council of Teachers of Mathematics, 2000), so it is the responsibility of the teacher preparation program to ensure that teachers leaving their programs are ready to tackle and disseminate the content in a way that all students can access it. This can require a teacher to
present one topic in multiple or different ways, provide students a hands-on opportunity to
engage in the topic, and include a writing component, as this is something many math curricula
are now requiring. This cross-curricula way of teaching is supposed to promote the importance
of mathematics throughout other content areas. “When a teacher doesn’t have a deep
understanding and affinity for mathematics . . . it’s hard to imagine how that teacher will help
students understand and get excited [about mathematics]” (Shulman, 2001, p. 7). Having an
affinity for mathematics is a rare sentence to hear from an elementary educator. This is where
past experiences in math classes can make or break the content for the educators. For most
teachers, the elementary level is the obvious choice for gaining licensure due to its wide and
narrow approach to content, as opposed to middle or high schools, where the content knowledge
required to teach is much deeper.

Math programs today tend to focus on including three “best practice” methods for
delivering the curriculum. These three research-based strategies are: using manipulatives, mixed
model instruction, and discussion (LeSage, 2012, p. 18). These components can be found within
any public school elementary math classroom today. The first research strategy, using
manipulatives, is designed to let the students have a hands-on approach with the mathematical
concept they are learning. Manipulatives or photographic representations of the problem are
used to model concepts that were previously considered abstract thinking problems (Siegler et
al., 2010). This allows the students to interact with the content in an intimate, visual, sensory
driven way, which will hopefully help to ingrain the concept into the students’ long-term
memory.

The second effective teaching strategy, or mixed model instruction “blends principles of
explicit instruction including teacher modeling, guided practice and corrective feedback”
This blended learning provides the students with multiple means of learning the same content and should reach learners at many different levels. Mixed model instruction often appears in flexible, rotating groups within an elementary math lesson. This usually involves four stations where the student can interact with the content in a variety of auditory, visual, and tactile ways. For example, the students may have a center where they are working on manipulatives, another center where the students are on iPads, and a teacher center. By having the same content presented in multiple ways, the students have a better chance of truly understanding what they are learning. The third strategy that math curricula includes today are opportunities for discussion or writing. This discussion can be teacher-centered, but also should include “student-focused discussions which provide alternative solution strategies expressed in students’ language” (LeSage, 2012, p. 18). Writing in mathematics is something that is becoming increasingly important in the development of new math programs and provides the students a cross-curriculum experience with their math lessons.

The key to today’s curriculum development in mathematics is that teachers are actively participating in mathematics instruction with the students rather than just being the disseminators of information. “Embedded in course design are opportunities for prospective teachers to ‘do’ similar tasks as their students in small cooperative groups, as well as discuss the nature of the mathematics pedagogy” (LeSage, 2012, p. 18). One math program, EnVision Math (Foresman & Wesley, 2017), provides students the opportunity to discover rules on their own. For example, when beginning to learn about adding fractions, students are provided with an abundance of audio, visual, hands-on experiences in which fractions are being combined. It is up to the student to determine the rule that fractions cannot be added unless there is a common denominator, something they will discover with guidance and prompting from the classroom.
teacher (Foresman & Wesley, 2017). Many math programs are also designed with a very specific sequence in which lessons should be taught. For example, Moss and Case (1999) noted that fractions and decimals should be taught “through a lesson sequence which builds on student knowledge of rational numbers beginning with benchmark percentage representations, and then connecting percentage to decimal representations and finally connecting decimals to fractional representations” (p. 136). These sequences, developed by the publishers of the curriculum, are guided by the state and national grade-level standards.

Unfortunately, many of today’s curricula focus on broad mathematical coverage of many topics but with minimal detail (Polikoff, 2012). “The shallowness and overwhelming breadth of the curriculum is believed to contribute to U.S. students’ relatively low levels of conceptual understanding in mathematics and their dissatisfaction with and lack of interest in mathematics” (Polikoff, 2012, p. 231). This dissatisfaction and lack of interest can have catastrophic consequences later in the child’s schooling and can even affect post-secondary decision-making. This shallowness of curriculum is often met with repetitiveness over the years in schooling, with a lack of opportunity for students to truly master the content, thus, lowering their level of self-efficacy in regard to mathematics. For example, textbooks often cover the same content year after year, in grade after grade (Schmidt et al., 2001), giving students the opportunity to grasp surface level concepts and rules, but provide a deficit in the true, rich, deep content knowledge they will need to be successful. “The redundancy not only takes up valuable instructional time, but it also contradicts the key underlying goal of standards-based reform—increased curriculum coherence” (Polikoff, 2012, p. 231). This can also repel the students from the field of mathematics as a whole and can cause great levels of mathematical anxiety.
Redundancy in the curriculum can be partially blamed on publishers but is also the fault of the national standards schools are required to follow. “Common Core Standards” is one of the hottest buzzwords in education today, and often garners eye rolls from parents scrolling through Facebook feeds filled with problems that are deemed unsolvable, or ridiculously graded by the teacher (Cobb & Jackson, 2011). “While many mathematics education experts believe the Common Core Standards are an improvement over most state standards, . . . this work suggests that more supports will need to be offered to teachers in order for [the standards] to have maximum impact” (Polikoff, 2012, p. 249). This notion, that the standards have changed but the teachers have not received new training or supports, should cause alarm. Teacher preparation programs, well aware of the massive overhaul that the education system has had in the past decade, needs to take the initiative to ensure that new teacher educators are leaving their programs equipped with the proper tools to foster success. The reform in education has received as much praise as it has criticism. The supporters “consistently advocate for using problem-based, constructivist approaches to mathematics encouraging the formulation of ideas and concepts through discovery and inquiry and the use of classroom discourse and reasoning to communicate mathematical thinking and sense-making” (Rice & McKeny, 2012, p. 267). This hearkens back to EnVision Math, where the students had to discover concepts on their own. This varies dramatically from how future educators are prepared in college. Thus, teachers are graduating and entering the classroom underprepared. This creates the massive problem where “a large majority of teachers do not have conceptual understandings of the mathematics they teach to effectively support and structure the pedagogical strategies advocated within these reform documents” (Rice & McKeny, 2012, p. 267). This major shift in the role of the educator
has resulted in tensions within the classroom but has shockingly not resulted in an overhaul in how future teachers are prepared.

It seems that all instruction, especially mathematics instruction, is changing yearly without providing educators a means of professional development to teach them current skills or provided them with updated methods of delivering the content. It is interesting to note that educators spend all day providing their students with the tools needed to be successful yet, after constant curriculum revisions and change, many educators are left in the dark with the new concepts, often having to figure out how to adequately teach the content individually. This is easy for the teacher with high self-efficacy in mathematics. The teacher with low-self efficacy in mathematics, however, will most likely opt to breeze through a math lesson so he can get onto the content that he is truly passionate about. Rice and McKeny (2012) detailed the frustration of teachers who feel they lack the skills necessary to implement this new instruction. They wrote:

Many teachers are challenged with establishing a well-connected and conceptual foundation for learning mathematics in the minds of young children that is predicated on purposeful problem-solving, reasoning, integrating mathematical ideas, and communication often default to a teacher-centered approach that relies heavily on the memorization of isolated facts, the repeated implementation of canned algorithms that have no inherent meaning, and mathematics classrooms that function within a framework of sanctioned silence. (Rice & McKeny, 2012, p. 267)

This challenge causes tension and frustration with today’s elementary math educator. As the standards and the rigor get increasingly more challenging, teachers are left to find their own supports or professional development opportunities.

**Transition From Preparation Programs to Classroom**
Being a novice elementary teacher is arguably one of the most challenging positions to be in. New educators must make the transition from the role as a student teacher with a mentor teacher constantly there to guide them, to the role of sole educator in a classroom. This can be an intimidating task for new educators, and it can often bring high levels of anxiety. “Once hired, beginning teachers face the daunting and demanding task of setting up a classroom and becoming a teacher that influences student achievement in positive ways” (Clark, S., 2012, p. 197). Not only are the first few years spent trying to get organized, it is also the time when teachers begin to figure out their teaching style, set up their classrooms, build relationships with their colleagues, all while trying to figure out the most effective way to present the curriculum to the students in order to help them achieve success. One novice teacher explained her anxieties as a new teacher.

I don’t even feel comfortable with myself as a teacher in all areas. I don’t think I got to develop that teacher side of me as much as I needed . . . and I think I really struggled with that when I was student teaching, just switching over between (being) a person who is working with kids to being a teacher. (Lambson, 2010, p. 1660)

This transition is one that oftentimes does not go as smoothly as one would hope. Challenges can arise that were not anticipated or taught in the teacher preparation program, leaving the educator to think and be self-reactive to the situation. Kauffman, Johnson, Kardos, Liu, and Peske (2002) wrote about experience of novice educators and demonstrated that 20-25% of novice teachers will leave the profession within the first five years. They are not alone in this diagnosis as several other articles (Gulosino, Franceschini, & Hardman, 2016; Ingersoll, 2002; Olson, 2000; Watkins, 2005) support this notion and list the percentage as high as 40% in suburban schools, and up to 50% in low-income schools. This turnover of educators has
negative impacts on the students in the classes. “As a result of such high turnover, students are exposed to increasingly high numbers of novice and inexperienced teachers” (Clark, S., 2012, p. 199). “Simply put, we train teachers poorly and then treat them badly – and so they leave in droves” (Merrow, 1999, p. 65).

One of the biggest challenges many new educators face is dealing with classroom management strategies. Teacher preparation programs often spend the majority of their focus on curriculum and content teaching; many fail to prepare a teacher to manage a variety of behaviors. What is challenging about this notion is, even if a preparation program teaches how to deal with certain behaviors, the reality does not sink in until the teacher is in front of the classroom with upwards of 20 students starting back at him. “Although instruction in classroom management has been identified as an essential component of pre-service teachers’ preparation, the inclusion of classroom management within required components of teacher preparation has been and continues to be inadequate” (Ficarra & Quinn, 2014, p. 72). This lack of preparation in behavior management poses a large problem for novice teachers. The majority of novice educators report that they learn more “from colleagues as well as from outside experts while on-the-job and actually favor the former method” (Frey, Lee Park, Browne-Ferrigno, & Korfhage, 2010, p. 226). Where there is clearly a deficit in preparation to handle classroom management, it was interesting to see if the novice educators in this study felt the same way about mathematics instruction. It is important to note if this level of preparedness that the teachers describe is something that is directly linked to their level of self-efficacy.

One of the most challenging tasks for novice educators is the need to combine what they learned in their teacher preparation programs and student teaching experiences and combine
them with the on the job, day-to-day problem-solving skills that they acquire within the first few years.

Teachers across subjects have struggled to translate the general theories they learn at the university into concrete teaching strategies that will work in their specific contexts. This struggle may be exacerbated in mathematics, where reform teaching is considered more difficult. (Gainsburg, 2012, p. 360)

All teachers have gone through at least 16 years of schooling as a student themselves, which can often cause them to have preconceived notions of how to teach certain topics or predetermined feelings regarding a certain subject area. This can often cause resistance of discomfort with the new teaching methods that are presented in universities (National Council of Teachers of Mathematics, 1991). This discomfort may cause novice educators to shy away from, or rush through, certain subjects that they are not passionate about to get to the content that they have a higher self-efficacy with. Many universities argue that classroom-based experience, or student teaching, is supposed to provide the real-life experience that teacher candidates need in order to successfully transition into their own classrooms (Maynard et al., 2014); however, teachers are entering the profession underprepared, and nearly half of them are leaving within the first two years (Watkins, 2005).

Teacher preparation programs are designed to not only provide teachers with the curriculum they need but also with first-hand experiences with students. While future educators “progress through a teacher preparation program, they are gaining information and knowledge that both affirms their existing beliefs, knowledge, and experiences and some that may confront their beliefs, knowledge, and experiences” (Maynard et al., 2014, p. 254). This war between affirming and confronting can cause new educators to be incredibly conflicted upon entering
their own classroom for the first time and can develop a great deal of anxiety within the educator. Another challenge that teachers face in today’s classroom is the vast amount of diversity amongst the students, which is something that teacher preparation programs often fail to address (Pae, Whitaker, & Gentry, 2012). This trend of under-preparedness is going to cause a massive problem in our education system for the years to come. Overall, research seems to point that teacher preparation programs are doing an inadequate job of preparing teacher educators for the realities they will face in their classrooms. Deficits can be seen in areas such as classroom management, curriculum management, in content areas such as math, and diversity. Unfortunately, little to no articles can be found on the successes of teacher preparation programs. This lack in research leaves room for growth in many facets of teacher preparation. This study provides more insight into the lived experiences of novice educators, specifically regarding their math preparation to see if the participants feel adequately prepared to understand, teach and handle the challenges that teaching a math course might present.

**Summary**

For students to have a true understanding of mathematical concepts they must have access to teachers who are appropriately prepared to teach. The lack of highly-qualified, prepared, content-rich, passionate educators is one of the reasons the United States is constantly underperforming on mathematics exams when compared to other countries (Schmidt, 2012). It is the responsibility of teacher preparation programs to ensure that teacher candidates are graduating with the appropriate skill set for today’s classroom. Based on the research, teacher preparation programs are not doing enough to pedagogically and emotionally prepare their pre-service teachers to deal with the reality of today’s math classrooms (Flower et al., 2017). This
study seeks to describe how the teachers feel about their preparedness and the results of this study could inform future practices in teacher preparation programs.
CHAPTER THREE: METHODS

Overview

The purpose of this phenomenological study was to describe the lived experiences of novice elementary teachers and their preparedness to teach mathematics in a large school district in southeastern Massachusetts. Novice elementary teachers (grades 1-6) are defined as teachers with less than five years’ experience and therefore, “were still under probation and had not been formally confirmed as a part of teaching profession” (Goh et al., 2017, p. 24). Level of preparedness is defined as the teacher’s “self-perceptions of effectiveness or teacher-based determinations of effectiveness” (Freak & Miller, 2017, p. 54). The self-efficacy of the teachers, or the teachers’ confidence in their ability to teach mathematics, was studied.

In this chapter, I described what a transcendental phenomenological study is and detailed why it is the appropriate design. Next, I reintroduced the four research questions that provided the foundation for this study. Following the research questions, the setting, participants, and procedures are described in great detail, so as to allow the study to be reproduced at a later date. The role of myself as the researcher is then identified, followed by a breakdown of the four pieces of data collection methods. The next section outlines and illustrates Moustakas’ (1994) steps for analyzing the data through the phenomenological reduction process. Finally, the trustworthiness and ethical considerations of this study are defined.

Design

I conducted a qualitative study using the transcendental phenomenological approach. “Qualitative research in general, and phenomenology in particular, is concerned with describing and interpreting human phenomena from the perspective of those who have experienced them” (Milacci, 2003, p. 2). The goal of phenomenological studies is for the researcher to get rid of
any pre-judgment or bias using a journaling method to retell the lived experiences of a group of participants. By describing lived experiences, qualitative transcendental phenomenological studies seek to see if all of the participants experienced the same phenomenon regarding a particular question. For this study, the focus of the sought phenomenon was preparedness in mathematics. Journaling out personal bias allowed me to see the data through clear eyes, “not threatened by the customs, beliefs, and prejudices of normal science, by the habits of the natural world or by knowledge based on reflected every day experience” (Moustakas, 1994, p. 41). It allows the researcher the opportunity to set aside personal bias and hear the stories of the participants more clearly.

Phenomenologists agree that the key to understanding the lived experiences of the participant is rich, deep, and thick data collection (Moustakas, 1994; van Manen, 1990). These experiences are best heard directly from the participants’ voices (Milacci, 2003). “The basic purpose of phenomenology is to reduce individual experiences with the phenomenon to a description of the universal essence” (Creswell & Poth, 2018, p. 75) or to “grasp the very nature of the thing” (van Manen, 1990, p.177). Phenomenology was the appropriate method for the study because it allowed me to dig deep into the participants’ lives to discover the “what and how” they describe the experience (Moustakas, 1994).

Within the world of qualitative phenomenological studies, I chose to take the path of transcendental rather than hermeneutic phenomenology. The transcendental phenomenological approach was appropriate because it involved some level of intentionality. “Knowledge of intentionality requires that we be present to ourselves and to things in the world, that we recognize that self and world are inseparable components of meaning” (Moustakas, 1994, p. 28). A qualitative, transcendental phenomenology was the most appropriate design to take because I
sought to understand the lived experience of a specific group of people and especially pursued to find if they are all experiencing the same phenomenon. I collected data “from persons who have experience to the phenomenon and develop a composite description of the essence of the experience for all of the individuals” (Creswell & Poth, 2018, p. 75). This design also allowed for bracketing out personal biases and experiences to more clearly see the themes that emerge from the participants. The end goal of this transcendental phenomenological study was to be able to say that the participants either did or did not share in the same phenomenon of under-preparedness to teach mathematics.

Research Questions

Given that the purpose of this transcendental phenomenological study was to describe novice elementary teachers’ experiences with preparedness to teach mathematics, the following central question and sub-questions were used to analyze the data:

**CQ**: What are the lived experiences of novice elementary teachers as described through their self-efficacy in teaching mathematics?

**SQ1**: How do participants describe their self-efficacy as math teachers in regard to content knowledge?

**SQ2**: How do participants describe their self-efficacy as math teachers regarding content dissemination?

**SQ3**: How prepared do participants feel to address students’ challenges in mathematics?

Setting

The Southeastern Massachusetts Public School District (SMPSD) is a pseudonym that was used for the location for this study. Located between Massachusetts and Rhode Island, the SMPSD is one of the largest in the area. SMPSD was used as a pseudonym to keep the location
and the participants anonymous. The SMPSD contains seven elementary schools, three middle schools, a high school, and an alternative high school. Also, within the borders of the district are two private elementary schools, a private high school, and a vocational high school. The total enrollment in the district is 8,038 students, with 37.7% labeled as economically disadvantaged, 19.1% have disabilities, and 3.8% are English Language Learners. For last year’s state testing, PARCC, only 34% of students in grades 3-8 in the SMPSD met the mathematics expectations. There are 523 teachers in the district, with 99.4% of them being licensed in the field they are teaching. The student to teacher ratio is 15.4 to 1 (District Profile, 2017). The participants chosen for this study were comfortable with the setting because it is the school district they teach in, and the subject being tested has no negative connotations against the district. This district was purposefully chosen due to its proximity to one of the largest teacher preparation colleges in Massachusetts. This particular program sends many of its students to work for the district upon graduation. This should increase the chances of a larger pool of novice teachers for participants.

**Participants**

The participants for this qualitative study were selected using two types of purposeful sampling procedures (Maxwell, 2005). Purposeful sampling methods are appropriate due to the sample size. Purposeful sampling was chosen because it allows the researcher to assume “based on their *a-priori* theoretical understanding of the topic being studied, that certain categories of individuals may have a unique, different or important perspective on the phenomenon in question and their presence in the sample should be ensured” (Robinson, 2014, p. 32). The sample size consisted of 11 participants. I originally planned on having 10 participants, but interviewed one more to ensure data saturation.
The first type of purposeful sampling that was used is criterion sampling. The criteria the participants had to meet were the following: The participant must be a novice elementary teacher in the SMPSD. At this stage in the research, novice elementary teachers are defined as teachers with less than five years’ experience and therefore, “were still under probation and had not been formally confirmed as a part of teaching profession” (Goh et al., 2017, p. 24). The participants are bounded by these criteria due to the gap in the literature on novice elementary teachers’ experiences. In order to ensure that all participants meet the criteria, they completed a quick demographic survey that outlined the basic participant requirements. See Table 1 for questions and rationale.

Table 1

<table>
<thead>
<tr>
<th>Question</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you an elementary teacher (1-6)?</td>
<td>Criterion Sampling</td>
</tr>
<tr>
<td>Are you a novice teacher (entering your 2nd - 5th year of teaching)?</td>
<td>Criterion Sampling</td>
</tr>
<tr>
<td>Do you teach mathematics?</td>
<td>Criterion Sampling</td>
</tr>
</tbody>
</table>

Many studies have tackled pre-service teachers, and this study sought to identify a phenomenon within this new group of educators. SMPSD, along with all of the participants’ names, are pseudonyms to protect the identity of those involved. Snowball sampling was also used to gain additional participants. “This involves asking participants for recommendations of
acquaintances who might qualify for participation, leading to ‘referral chains’” (Robinson, 2014, p. 37). The goal was to get enough participants to ensure data saturation.

In the case of a phenomenological study design, the point at which data saturation has been attained is different than if one were using a case study design. To be sure, the use of probing questions and creating a state of *epoché* in a phenomenological study design will assist the researcher in the quest for data saturation. (Fusch, & Ness, 2015, p. 1405)

All participants filled out a basic demographic information form, and data from this form are displayed in Table 2.

Table 2

*Online Demographic Results*

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Gender</th>
<th>Age Range</th>
<th>Ethnicity</th>
<th>Years of Experience</th>
<th>Degree Earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amanda</td>
<td>Female</td>
<td>25-29</td>
<td>Caucasian</td>
<td>2</td>
<td>Masters</td>
</tr>
<tr>
<td>Bethany</td>
<td>Female</td>
<td>21-24</td>
<td>Caucasian</td>
<td>1</td>
<td>Bachelors</td>
</tr>
<tr>
<td>Courtney</td>
<td>Female</td>
<td>21-24</td>
<td>Caucasian</td>
<td>1</td>
<td>Bachelors</td>
</tr>
<tr>
<td>Danielle</td>
<td>Female</td>
<td>35-39</td>
<td>Caucasian</td>
<td>5</td>
<td>CAGS</td>
</tr>
<tr>
<td>Ethan</td>
<td>Male</td>
<td>25-29</td>
<td>Caucasian</td>
<td>2</td>
<td>Bachelors</td>
</tr>
<tr>
<td>Felecia</td>
<td>Female</td>
<td>25-29</td>
<td>Caucasian</td>
<td>3</td>
<td>Masters</td>
</tr>
<tr>
<td>Ginny</td>
<td>Female</td>
<td>25-29</td>
<td>Caucasian</td>
<td>4</td>
<td>Masters</td>
</tr>
<tr>
<td>Harrison</td>
<td>Male</td>
<td>21-24</td>
<td>Caucasian</td>
<td>1</td>
<td>Bachelors</td>
</tr>
<tr>
<td>Isabelle</td>
<td>Female</td>
<td>25-29</td>
<td>Caucasian</td>
<td>2</td>
<td>Masters</td>
</tr>
<tr>
<td>Jessica</td>
<td>Female</td>
<td>25-29</td>
<td>Caucasian</td>
<td>4</td>
<td>CAGS</td>
</tr>
<tr>
<td>Katelyn</td>
<td>Female</td>
<td>25-29</td>
<td>Caucasian</td>
<td>1</td>
<td>Masters</td>
</tr>
</tbody>
</table>
Note that CAGS is an acronym for Certificate of Advances Graduate studies.

**Procedures**

No research was conducted without approval from Liberty University’s Institutional Review Board (IRB); therefore, the first step was seeking approval through Liberty University’s IRB. After gaining approval from the IRB (see Appendix A), participants were identified, and data was collected. All procedures were described in detail. These procedures enhanced trustworthiness by providing enough information so that the study can be replicated. In order to ensure I had enough participants using criterion and snowball sampling methods, a letter of introduction to the study was emailed to potential volunteers, posted to my personal Facebook, and sent to local university professors who may know potential participants (snowball sampling). The goal was to get 10-15 volunteers who graduated from a variety of local teacher preparation colleges, and who are within their first five years of teaching at the elementary level.

As the participants began to show interest in the study, they were emailed a welcome letter, an informed consent form (see Appendix B), as well as a link to the demographic survey. The first page of the demographic survey included criterion-based questions. If the participant answered “no” to any of the questions, they were informed that they did not meet the criteria to participate in this study.

The demographic information was displayed in a table. The basic demographics sought were the participants’ age range, gender, ethnicity, degrees earned, university attended, and number of years taught. All questions were chosen to allow for purposeful selection of the participants. All data in the table is protected with pseudonyms. The goal was to interview 10-15 participants from a variety of local colleges and universities.

After the demographics were compiled, the interviews were immediately scheduled, and
pseudonyms were assigned. Pseudonyms were assigned in alphabetical order to keep things organized. It is important to note that I conducted interviews as the participants signed up, rather than waiting for all 10-15 participants and then beginning interviews. Since all participants came from SMPSD, the interviews were set up in a mutually agreed upon meeting space. I lived within 15 minutes of the border of the school district, so some interviews were conducted in my home.

Two pilot interviews were conducted with elementary teachers that I have a relationship with to test the understanding of the questions as well as to practice getting more information from the participants when clarity is needed. These practice interviews helped ease my nervousness and allowed for the questions to be updated before the actual participant interviews. Any data retrieved from the pilot interviews was excluded from the final data analysis. The pilot interviews merely provided me an opportunity to get comfortable with the interviewing process and ensure the questions translated well to the participants. All interviews were audio recorded and transcribed by me or by a professional transcription service. Each individual transcription was sent back to the participants for review as a form of member checking to increase trustworthiness and credibility. I also had a notebook to record any physical observations that would not be noticeable on audio recording (body language, facial expressions, etc.).

I anticipated that the interview process would last from an hour to an hour and a half. The participants completed the online writing prompt, the Hoy and Woolfolk (1993) Teacher Efficacy Scale, and the individual interview in one setting. The information from the Hoy and Woolfolk (1993) Teacher Efficacy Scale is displayed in table form after the demographic information is listed. Participants were offered a gift card as thanks for participation in the research. Participants were also able to withdraw from the study at any point, with no
Before, during, and after the data collection occurred, I actively kept a journal. There, I recorded feelings, biases, judgments, etc. This process of bracketing out my feelings allowed me to remove myself from the data. “The world in the bracket has been cleared of ordinary thought as is present before us as a phenomenon to be gazed upon, to be known naively and freshly through a ‘purified’ consciousness” (Moustakas, 1994, p. 85). This process of epoché reduced researcher bias. All data, including but not limited to demographic information, virtual writing prompt replies, the Hoy and Woolfolk (1993) Teacher Efficacy Scale results, the transcribed interviews and the audio recordings, as well as my research journal entries, are stored on a locked computer and backed up on a locked flash drive. The only people with access to this information are myself and my dissertation committee.

The Researcher's Role

I had several motivations for conducting this study. First and foremost, I am the daughter of a math teacher. I grew up with mathematics always flowing through the house, and it was apparent that my mother was passionate in the field. She just completed her Certificate of Advanced Graduate Studies (CAGS) and wrote her thesis on math anxiety in high school students. Second, I never had any intention of becoming a math teacher, but when I moved to Georgia, it was the only position available, and five years later I am in love with the subject. One of my biggest reservations in accepting the math position in Georgia was that I did not feel I was prepared to teach the subject. Third, in my teacher preparation program, I was only required to take two basic math classes, both of which I took my sophomore year of college. In reality, it had been three and a half years between taking the classes and beginning to teach math, so I was incredibly worried. I was lucky enough to have my mother as a resource, and I could call her if I
was stuck on how to teach a particular concept, but most teachers do not have this type of resource at their disposal.

I worried that if I did not feel prepared to meet the needs of my students, there must be other teachers who feel the same way. Unfortunately, there is not a lot of professional development that specifically targets making teachers feel more prepared to teach content after graduating from a teacher education program. Another reason I was interested in exploring this phenomenon is that I have taught in four different schools over the past five years, and I have seen the majority of my students performing below grade level when it comes to mathematics. It can be considered a rare occurrence to find an elementary student who claims math as his or her favorite subject. It was my hope that through this study I would be able to discover if more teachers do not feel prepared to teach mathematics.

My relationship with the setting of this study is that it is the district in which my mother and I work, but we are both teaching in the high school; my pool of participants are coming from elementary schools. I did not anticipate a prior relationship with any of the participants, and I had already spoken to the superintendent and had obtained permission to interview teachers throughout the district. I assumed that one or two of the participants may have attended the same university as I did for my undergraduate and graduate experience, but I journaled to minimize my personal bias from this study.

**Data Collection**

This qualitative transcendental phenomenological study employed several forms of data collection. The study used a demographic survey, Hoy and Woolfolk’s (1993) Teacher Efficacy Scale, virtual writing prompt, and individual interviews to explore the phenomenon of novice teachers’ preparedness and mathematics. It was my goal to obtain rich, thick data on the lived
experiences of the participants in order to best describe the phenomenon. The demographic survey was used to ensure that all participants did not come from the same teacher preparation program, and it also provided basic information such as age range, gender, degrees earned, etc. Hoy and Woolfolk’s (1993) Teacher Efficacy Scale was used to determine the individual participants’ level of confidence in their teaching abilities. The virtual writing prompt provided the participants a place to answer a prompt on what the teachers consider their biggest challenge when it comes to teaching mathematics. Finally, the individual interviews allowed the participants to share, in detail, their lived experience with the phenomenon. All of these data collection methods only provided trustworthiness through triangulation and also provided incredibly saturated information on the essence of the experience.

**Demographic Survey**

While the demographic survey occurred before individual meetings, it was an important part of the data collection. I was looking to have 10-15 participants with as much variety in their backgrounds as possible. The demographic survey ensured that the participants were novice elementary teachers who teach mathematics. It also provided general information such as the ages of the participants, gender, what university they earned their degree from, what their degree specifically is in, and what teaching license they hold. This information was used to ensure that all of the participants did not come from the same teacher preparation program. Researchers “should determine if the study sample would provide the researcher with a rich description of the phenomenon of interest in a qualitative study. The demographic data should help demonstrate the participants’ appropriateness for the study” (Connelly, 2013, p. 269). The demographic survey took place in a private Google form with the answers protected in a locked account.
Teacher Efficacy Scale

I used the short form of Hoy and Woolfolk’s (1993) Teacher Efficacy Scale as another means of data collection (see Appendix C). “The purpose is to gather information regarding the actual attitudes of educators concerning these statements. There are no correct or incorrect answers. We are interested only in your frank opinions” (Hoy & Woolfolk, 1993, p. 569). The Teacher Efficacy Scale was utilized primarily for descriptive purposes and provided me with an understanding of the level of confidence the participants have in their teaching abilities. The data from the Teacher Efficacy Scale (Hoy & Woolfolk, 1993) was used to prompt more questions during the individual interviews and also gave me a scale of how confident the participants were in their abilities as an educator. For example, if a teacher scored high on the efficacy scale, he may have been more confident in his math skills. While this information is quantitative, it provided me a basic understanding of how the teacher viewed his skills as an educator, particularly in the field of mathematics.

Virtual Writing Prompt

Upon meeting the participants for the first time and after completing Teacher Efficacy Scale (Hoy & Woolfolk, 1993), the participants had 10 minutes to type a response to an online writing prompt. Having this prompt in a digital format allowed the responses to already be transcribed by the participants themselves. The prompt the participants answered was, “Describe the biggest challenges you face as a math educator.” The time it took the participant to answer the question allowed me to set up all audio recording equipment. The rationale behind this prompt is that it allowed me to have a written explanation of a challenge each of the participants have faced in their time as a math educator. It is an interesting place to begin comparisons of the participants’ experiences.
The prompt allowed me to completely remove myself from this section of data collection, and the experiences went right from the participants’ memories into the board. The participants were able to elaborate as much or as little as they desired. I also had interview questions that dealt with challenges as a math educator, so I was able to get more information from the participants later in the data collection. While the participants were responding to the writing prompt, I noted any physical reactions the participants had (facial expressions, head scratching, etc.) in order to better understand their emotional response to the question (van Manen, 1990). Since the writing prompt was in a Google format, all responses were instantly converted into a Microsoft Word document, and the participant’s name was replaced with a pseudonym.

**Interviews**

The final step in data collection was the 11 audio-recorded personal interviews. The interview questions focused on the lived experiences of the novice elementary teachers and their experiences with preparedness to teach mathematics. The interview began with an icebreaker question followed by 12-20 questions about their teacher preparation programs, their experiences with teaching mathematics, their self-efficacy for teaching mathematics, and their ability to handle challenges related to mathematics. Before the interviews with the participants occur, a veteran math teacher and a qualitative research expert reviewed all interview questions. Once the questions were approved, two preliminary interviews with elementary teachers occurred to ensure questions were covering the content I was seeking to understand as well as to get feedback on the understandability of the questions.

After the pilot interviews and the questions were updated and finalized, the individual interviews with the participants occurred. All interviews were audio-recorded for transcription purposes. I also took notes regarding body expression, facial expressions, or any other pertinent
physical data that would not be heard on the audio recording. The interviewees were first assigned a pseudonym that matched the one used for the participants’ Hoy and Woolfolk (1993) Teacher Efficacy Scale, as well as their virtual writing prompt, and then was transcribed by me or by a professional transcription service. All digital transcriptions are stored on a locked computer. Participants were sent a copy of their transcription and were asked to read through it to clarify any misunderstandings and to ensure accuracy.

From the development of the questions through the personal interviews, the goal of this study was to better understand the lived experiences of novice elementary teachers’ preparedness to teach math. It was my hope that I would discover the essence of the lived experiences of the teachers that has not yet been studied. All interview questions focused on answering the four research questions and provided me with deep, thick, rich information about how prepared the participants felt to teach mathematics after completing their teacher preparation programs. This notion of keeping the research in mind comes from van Manen (1990), when he wrote that researchers need “to be constantly mindful of one’s original question and thus to be steadfastly oriented to the lived experience which makes it possible to ask the ‘what it is like’ question” (p. 42). The hardest anticipated portion of the interviews for me was keeping my personal stories out of the interview and letting the participants talk the entire time. Journaling helped me to bracket out my experiences and biases.

Individual Interview Questions for Novice Elementary Math Teachers

1. Please describe your educational history, including the types of school you attended.
2. Please describe any memories you have as a math student.
3. Describe any specific situations that either caused you to like or dislike mathematics.
4. Please describe how and why you decided to enter the field of education. (*If the teacher
has a concentration of mathematics, why did you decide to focus on math).

5. Please describe the requirements of your teacher preparation program. (i.e. courses, student teaching, etc.)

6. Please describe your mathematics requirements in your teacher preparation program.

7. During your teacher preparation program, specifically, speak to the mathematics methodology courses you had to take.

8. Describe how well you feel those courses prepared you pedagogically to teach mathematics.

9. Describe how well you feel those courses prepared you to handle the challenges you have faced in teaching mathematics in your classroom.

10. How was the transition between your teacher preparation program and your actual classroom regarding teaching mathematics?

11. Please describe how prepared you felt to teach mathematics to your students?

12. Please describe any mathematics professional developments or trainings you have attended since completing your teacher preparation program. How do you feel these trainings helped/did not help prepare you to teach the content?

13. Please describe any successes you have experienced while teaching mathematics after completing your teacher preparation program.

14. Please describe any challenges you have experienced while teaching mathematics after completing your teacher preparation program.

15. Is there anything else you would like to add?

Questions one through three are basic, background questions. “Asking these questions in an open-ended rather than closed manner elicits the respondent’s own categorical worldview”
These questions do not require any opinions and provide factual information. They are no consequence questions that should not evoke any major emotions. Patton (2015) noted, “you’re hoping to elicit relevant answers that are meaningful and useful in understanding the interviewee’s perspective. That’s basically what interviewing is all about” (p. 471). This is why it is important for me to have begun my interview with questions that were not threatening to the participants and helped them be comfortable with what was being asked of them. This basic background information provided the foundation for the following interview questions and were the basis for the four research questions.

Questions four through nine are experience questions and dove into the experiences the educators had during their teacher preparation programs. These questions “about what a person does or has done aim to elicit behaviors, experiences, actions and activities that would have been observable had the observer been present” (Patton, 2015, p. 444). They allowed me to better understand the requirements set forth by the universities the participants attended and what the demands of the preparation programs were. These questions connect with sub-question three in that they are focused on how prepared the novice elementary teachers feel to address students’ challenges in mathematics, a skill that would have been taught in the preparation program.

Questions 10 and 11 are feeling questions. “Feeling questions aim at eliciting emotions – feeling responses of people to their experiences and thoughts. Feelings tap the affective dimension of human life” (Patton, 2015, p. 444). These questions allowed me to begin to understand the lived experiences of the participants after they left their teacher preparation program, the root of this study. Question 10 focuses on the transition from the program to the classroom and question 11 evokes the participants’ feelings on how prepared they felt once the
transition had occurred. Sub question one and two are tied into these two questions, focusing on the emotions and levels of self-efficacy the teachers are experiencing.

Questions 12 through 14 are a combination of knowledge, background and feeling questions. These questions focused on the successes and trainings the candidate has experienced post-preparation program. Some of these questions evoked some emotions, as teachers tend to have strong opinions of professional development, but these questions helped me understand how prepared the novice elementary teachers felt to address students’ challenges in mathematics.

Question 15 is the final, one-shot question. “In the spirit of open-ended interviewing, it’s important in qualitative interviewing to provide an opportunity for the interviewee to have the final say” (Patton, 2015, p. 470). This question, which doubled as the closing question for the interview, allowed the participant to offer any additional information they deem appropriate and allowed the participant to summarize the topics covered in the interview if he/she desired to. Patton (2015) suggests this is often where some of the best data comes from.

**Data Analysis**

Data was analyzed throughout the collection process. All transcriptions were completed by a professional transcription service. Moustakas’ (1994) phenomenological reduction process was used to analyze the data. His analysis is broken down into seven steps: bracketing/epoché, open coding, horizonalization, clustering into themes, textural descriptions, structural descriptions, and text-structural synthesis (see Figure 1).
Figure 1. Moustakas’ (1994) phenomenological data analysis steps.

Bracketing/Epoché

The first step in Moustakas’ (1994) transcendental phenomenological reduction is bracketing or epoché. Bracketing, or the Greek term epoché, can be described as “a process of setting aside predilections, prejudices, predispositions, and allowing things, events, and people to
enter a new into consciousness, and to look and see them again, as if for the first time” (Moustakas, 1994, p. 85). It allows the researcher to set aside personal bias before starting to analyze the data. Moustakas (1994) added that it is an “opportunity for a fresh start, a new beginning, not being hampered by voices of the past that tell us the way things are or voices of the present that direct our thinking” (p. 85). Bracketing gives the researcher the freedom to take all previous knowledge of the subject at hand and put it aside, to allow room for the themes to present themselves apart from any preconceived notions. In this study, I journaled before, during, and after data collections so I had a place to put my own thoughts, judgments, personal experiences, biases and opinions. This allowed me to look at the data with a fresh set of eyes.

**Open Coding**

Open coding is the second step that was used to analyze the data. Open coding allows the researcher to “analyze the data for significant statements, meaning units, textual and structural description, and description of the essence” (Creswell, 2013, p. 105). I began the open coding process by reading all of the transcribed interviews three times before using the Microsoft Excel to begin highlighting and categorizing pieces of information from all of the interviews. By using this Excel, it allowed me to easily see the different themes that presented themselves between the participants. This allowed me to take all of the data and minimize it down to the rich and thick data I needed to tell the story of the phenomenon. Tables are used to represent the data from the demographic survey as well as the Hoy and Woolfolk’s (1993) Teacher Efficacy Scale. Pieces of the transcribed interviews are included along with snapshots of the virtual writing prompt where teachers discussed one of their biggest challenges as a math educator.
**Horizontalization**

Horizontalization actively took place as I read the transcribed interviews and while I open coded and looked for themes. “When we horizonalize, each phenomenon has equal value as we seek to disclose its nature and essence” (Moustakas, 1994, p. 95). Excel allowed each of the themes to be coded, and it was easy to pull up all statements made under a specific theme. For example, when coding the transcribed data, I was able to code any information specific to the university the participant attended. If later I wanted to be able to look at all of the data from all participants on this theme, I was able to select this particular theme and all statements about their university appeared. By constantly looking over the data, I was able to accurately describe the phenomenon I hoped that the participants are living, and if not, I would have been able to describe the lived experiences from an equal ground.

**Clustering into Themes**

The next step of phenomenological reduction required me to take all of my coded data and cluster it into themes. This is where the vast amount of codes began to narrow down to the essence of the phenomenon I was exploring. The key at this point of reduction was keeping my research questions in mind and looking for themes that directly answered the questions I had asked. The importance of clustering the data into themes allowed me to “remove overlapping and repetitive statements” (Moustakas, 1994, p. 118) and get to the core of the phenomenon.

**Textural Descriptions**

Constructing a textural description of the experience is one of the biggest challenges to phenomenological reduction. By going through the entire reduction process, a description presented itself “in the state of openness and freedom, facilitate clear seeing, making possible identity, and encouraging the looking again and again that leads to deeper layers of meaning”
(Moustakas, 1994, p. 96). This step allowed me to understand the lived experience of the participants and allowed me to bring the participants “to a self-knowledge and a knowledge of the phenomenon” (Moustakas, 1994, p. 96). This is the step where I took each of the experiences and minimized them to a singular phenomenon or a “group or universal textural description” (Moustakas, p. 180). This occurred after several reductions of the themes.

**Structural Descriptions**

In comparison to the textural descriptions, which are “vivid descriptions of the experience” (Moustakas, 1994, p. 135), structural descriptions explain how the phenomenon was experienced. Structural descriptions “portray the themes and essences in living descriptions that enable one to know the meaning of” (Moustakas, 1994, p. 142) what is being studied. The structural description for this phenomenological study explains how prepared the novice elementary teachers feel within five years of completing their teacher preparation program.

**Text-Structural Synthesis**

After the textural and structural descriptions are completed, then comes the task of synthesizing all of the information into one, well-defined phenomenon. The textural-structural synthesis integrates “all individual textural-structural descriptions into a universal description of the experience representing the group as a whole” (Moustakas, 1994, p. 122). This step provides an essence of the lived experience for the particular group of participants in the study. The hope for this study was to describe how prepared the teachers feel to teach mathematics. By using Moustakas (1994) method of data reduction, the data went through numerous rounds of coding until the themes were evident. The constant reading, re-reading, and coding of the data allowed for data saturation to occur when the bulk of the data was separated into the six major themes, with no more reduction to occur.
Trustworthiness

Guba and Lincoln (1989) coined the term “trustworthiness” and used it as a means of judging the quality of qualitative research. They defined it as the quality of an investigation (and its findings) that made it noteworthy to audiences (Guba & Lincoln, 1989). Guba and Lincoln (1989) developed the four criteria that all qualitative research seeks to meet. Credibility, dependability, confirmability, and transferability all address the level of trustworthiness of the study. Some of the methods that were used to increase trustworthiness include, but are not limited to, triangulation, member checks, clarification of researcher’s bias, and the provision of deep, rich, and thick information throughout the entire study.

Credibility

Credibility “addresses the issue of the inquirer providing assurances of the fit between the respondents’ views of their life ways and the inquirer’s reconstruction and representation of the same” (Schwandt, 2015, p. 309). The credibility of this study was established by using triangulation methods. This process usually involves “corroborating evidence from different sources to shed light on a theme or perspective. When qualitative researchers locate evidence to document a code or theme in different sources of data, they are triangulating information and providing validity to their findings” (Creswell, 2013, p. 251). Data was collected from demographic surveys, Hoy and Woolfolk’s (1993) Teacher Efficacy Scale, individual interviews, and virtual writing prompts. By triangulating all four methods of data collection to search for common themes, credibility was established and saturation was reached.

Dependability and Confirmability

Dependability “focuses on the process of the inquiry and the inquirer’s responsibility for ensuring that the process was logical, traceable, and documented” (Schwandt, 2015, p. 309).
Confirmability is concerned with “establishing the fact that the data and interpretations of an inquiry were not merely figments of the inquirer’s imagination” (p. 309). Member checks are a powerful tool used to establish both dependability and confirmability. Bracketing also allowed for clarification of the researcher’s bias, another auditing tool to ensure that the inquirer did not invent the findings.

**Transferability**

Schwandt (2015) defines transferability as “the inquirer’s responsibility for providing readers with sufficient information on the case studied such that readers could establish the degree of similarity between the case studied and the case to which findings might be transferred” (p. 309). In order to gain the most transferability, the reader must be provided with rich, deep, thick information.

Rich, thick description allows readers to make decisions regarding transferability because the writer describes in detail the participants or setting under study. Thick description means that the researcher provides details when describing a case or when writing about a theme. (Creswell, 2013, p. 252)

Transferability was ensured in this study in that each of Moustakas’ (1994) steps for transcendental reduction were followed. This required mass amounts of information to be provided for the readers. The readers are then able to replicate the study in another setting that has similar parameters.

**Ethical Considerations**

This study maintained “the necessary ethical standards, establish clear agreements with the research participants, recognize the necessity of confidentiality and informed consent, and develop procedures for insuring full disclose of the nature, purpose, and requirements of the
research project” (Moustakas, 1994, p. 109). This included consent forms for all aspects of data collection, pseudonyms being used for all participants, locations, and schools, and all data, including transcribed interviews, virtual writing prompts, demographic data, and the researcher’s journaling being kept on a password-protected computer. I am the only person with constant access to the password-protected computer, but the dissertation committee also had access. I ensured participants felt that their contributions were valued and respected each of their stories (Moustakas, 1994).

**Summary**

My goal was to synthesize the lived experiences of all of the participants by analyzing their demographic information, personal interviews, virtual writing prompt, and Hoy and Woolfolk’s (1993) Teacher Efficacy Scale in the hopes of discovering a mutually shared essence. It was my hope that these four means of data collection would provide rich, deep, and thick information for me to begin to synthesize into common themes. By using Moustakas (1994) modification of van Kaam’s (1959, 1966) method of analysis, I bracketed out my own personal experiences and allowed the voices of the participants to ring through.
CHAPTER FOUR: FINDINGS

Overview

The purpose of this transcendental phenomenological study was to describe novice elementary teachers’ experiences with preparedness to teach mathematics in a large school district in southeastern Massachusetts. Chapter four provides descriptions of the participants’ stories as novice elementary educators and their experiences in their preparation programs and their own classrooms. I analyzed the responses from the four methods of data collection: interviews, the Hoy and Woolfolk’s (1993) Teacher Efficacy Scale, the demographic survey and the virtual writing prompt. One central research question and three sub questions directed the process of data reduction in order to discover recurring themes. The subsequent questions guided the process:

CQ: What are the lived experiences of novice elementary teachers as described through their self-efficacy in teaching mathematics?

SQ1: How do participants describe their self-efficacy as math teachers in regard to content knowledge?

SQ2: How do participants describe their self-efficacy as math teachers regarding content dissemination?

SQ3: How prepared do participants feel to address students’ challenges in mathematics?

Once data was analyzed from each method of collection, it was obvious that there were emerging themes that the participants all experienced. Before, during, and after each interview, I journaled my thoughts and emotions, allowing me to set aside my preconceived notions about the participants and let their stories come to the forefront. Results are presented encompassing textual descriptions, structural descriptions, as well as a text-structural synthesis of the
participants experiences, as per Moustakas’ (1994) method of phenomenological data reduction. This chapter closes with a narrative on how the themes discovered addressed the research questions.

**Participants**

The participants for the study included 11 novice, elementary educators from a variety of teacher preparation programs across the state of Massachusetts. After sharing the initial recruitment informational post on Facebook, a professor at a local university shared the post which garnered much attention and drew many participants. All participants took part in the entirety of the study with the exception of one participant who opted out of the writing prompt. Eight of the participants came from a traditional elementary education classroom setting, two participants teach in a special educator role, and one participant works at a children’s hospital in Boston. The gender demographics of the participants included nine females and two males, which was very exciting considering the majority of elementary educators are female. All participants in the study were Caucasian.

Amongst all participants, teaching licenses held, and degrees earned, 10 different colleges and universities were represented, with three main colleges in Massachusetts accounting for the teacher preparation programs attended. To keep the identities of all participants anonymous, and in compliance with IRB, each participant was assigned a culturally appropriate pseudonym. Pseudonyms were assigned alphabetically based on participant order to keep the interviews chronological. In descriptions of their experiences and in the different analyses, the participants are referred to as Amanda, Bethany, Courtney, Danielle, Ethan, Felecia, Ginny, Harrison, Isabelle, Jessica, and Katelyn. Each description includes demographic information, information
on their current job, and a detailed narrative of his or her experience within his or her teacher preparation program and the transition to the classroom.

**Amanda**

Amanda is a third-grade teacher who was hired at the school where she completed student teaching and served as a long-term substitute. She just finished her second year of teaching as the regular education instructor, and she works hand in hand with a special educator. Amanda reported frustration as a math student, noting that she was a systematic learner and would often struggle checking over her work. She cringed as she recalled the days of sitting in rows taking timed multiplication tests and completing worksheets. Her goal is to make her lessons more hands on for her students. While she did not enjoy math, she credited her success in the subject to her parents’ involvement in helping her study. She fondly remembered her father helping her with flash cards on her multiplication facts. Amanda always knew that education was her calling. She remembered, “When I was a little kid, I used to play teacher. I’ve always loved it. I love kids . . . I just feel like a natural” (Amanda, personal communication, May 17, 2018). Amanda attended a local state university, where she double majored in Elementary Education and Sociology and then she stayed at the university through the completion of her Master’s in Special Education.

**Bethany**

Bethany is a first year, fourth grade teacher who originally attended a private university in Rhode Island majoring in English Communications, but then transferred to a local public university in Massachusetts to enter the teacher preparation program. She double majored in Elementary Education and English and has nearly completed her Master’s in Special Education Moderate Disabilities: Pre-K through 8. Bethany recalled never liking math as a student stating
that, “I didn’t like [math] because I had to try, and that wasn't something I was used to doing, quite honestly. I was just used to being good at everything academically right off the bat, automatically” (Bethany, personal communication, May 18, 2018). She mentioned that in high school her attitude towards math shifted due to her passionate teachers who reengaged her in the subject. Bethany noted that many people, especially teachers, attempted to steer her away from a career in education, but she knew that it was her calling.

Courtnety

Courtnety is a fourth-grade teacher who, like Amanda, was hired at the school that she completed her student teaching and is in her first year in the classroom. Courtnety attended a local state university and majored in Elementary Education and Geography. Courtnety laughed at the fact the interview was about mathematics stating, “I hated math going through school, but it’s one of my favorite things to teach . . . I don’t know if it’s because I’m looking at it in a different perspective, and teaching it is more concrete” (Courtnety, personal communication, May 21, 2018). She remembered struggling on timed multiplication tests and how much stress they would bring her as a student, which in turn steered her away from majoring in math. She cited her fourth-grade teacher as the catalyst for why she entered the field of education.

Danielle

Danielle works as a teacher in a school for students with severe special needs. The entire makeup of her school is substantially separate classrooms, with eight to 10 students in each room at varying levels of disability. Currently in her fifth year as an educator, Danielle attended a local state university for nine years, completing her undergraduate degrees, her Master’s degree, and her Certificate of Advanced Graduate Studies (CAGS). During her undergraduate work, Danielle double majored in Social Work and Special Education. She then went on to complete
her Master’s in Social Work and her CAGS in Educational Administration. Her rationale for going into education is different from many other participants, it was not a calling for her. Rather, she used her challenges as a student to empower her to make a difference. She struggled as a student with writing. She recalled, “I wanted to make sure it was easier for students going forward. It was hard for me to understand . . . There has to be a better way so kids can learn and not have it be so stressful” (Danielle, personal communication, May 22, 2018). She also noted that she neither loved nor hated math; it was a neutral subject for her.

**Ethan**

Ethan is a fifth-grade mathematics teacher in his second year at a middle school in SMPSD. He attended a public college for his undergraduate degrees. While at college, he dual majored in Elementary Education and Geography and minored in Special Education. Ethan commented on the irony of him being a mathematics teacher now, as math was always a struggle for him growing up. “I think it’s cool, because I think of it a different way—and I know that I struggled so I can maybe teach it a different way to the students that are kind of similar to me” (Ethan, personal communication, May 24, 2018). He recalled that math was boring for him as a student and noted how much he dreaded spending hours working on problems from his math textbook for homework. Ethan’s parents instilled in him a passion for volunteering at a young age. He credited the volunteerism and his love of school as the reason why he chose to major in education.

**Felecia**

Felecia is in her third year working as a fifth-grade special education inclusion teacher in a public elementary school in SMPSD. She attended a local public university for her undergraduate work in Speech Therapy and Psychology and received her Master’s in Special
Education with a concentration in Communication Disorders. She then studied in Charleston, South Carolina, and did a Master of Arts in Teaching program for Special Education with a concentration in learning disabilities from kindergarten through grade 12. She is licensed to teach in both South Carolina and Massachusetts. As a student who struggled with mathematics growing up, Felecia attended many tutoring sessions to try and stay on track. With both parents working as educators, she swore she would not go into education. After unsuccessfully searching for a job as a speech therapist, Felecia fell on what she called her back up plan and got her Master’s in Special Education. She is the only participant who attended her teacher preparation program out of the state of Massachusetts.

**Ginny**

Ginny is a third-grade teacher at a middle school in SMPSD, where she has been teaching for four years. She began her path to the classroom very differently than the other participants. Coming from a family of nurses, Ginny felt the call to follow in her family’s footsteps. After her first few classes, she realized the medical field was not for her and transferred to a local university closer to her home. Having worked with students as a lifeguard, Ginny began substitute teaching and found her passion reignited in the classroom. She entered the Dual Licensure program at her university, double majoring in Elementary Education and Psychology with a minor in Mathematics. Ginny is a self-proclaimed math enthusiast and recalled a memory where she and another student were so far ahead of the rest of her third-grade class that the teacher pulled the two aside to teach them harder math facts. An honors and advanced placement student, Ginny’s love of math has continued beyond her master’s degree, having earned an additional 30 credit hours in math courses.
Harrison

Harrison is a first year, fourth grade special education teacher who began his collegiate years as a musical theater major at a college in Boston. In talking about the transition from a major in theater to education, Harrison remarked that if he remained with musical theater, he would be waiting tables for the rest of his life. “Theater is teaching, so I think that that is why I brought the two together. And my classroom is a very theater, dance, music-based classroom. If I am bored, I know the kids are bored” (Harrison, personal communication, June 5, 2018).

Harrison completed his degree program, majoring in Special Education: Moderate Disabilities, PreK-8, and is also licensed in Elementary Education. He is currently enrolled in an English as a Second Language program and will have that license by the end of the year. Math was Harrison’s favorite subject, and he recalled his favorite teacher would make songs and poems to help the class remember math algorithms. It was only after working in a classroom with a student who was autistic that Harrison discovered his love for special education and is able to integrate his musical theater background into his lessons daily. He remarked that he is often compared to the teachers you see on Facebook dancing on the desks.

Isabelle

Isabelle is a second year, first grade teacher at a public elementary school in SMPSD who began her collegiate years at a university in New Hampshire. After three weeks, Isabelle realized that she did not like being so far away from her family, so she dropped out, moved back home, and began her search for a new college with better tuition rates and a good education program. Isabelle knew that she wanted to teach in Massachusetts, so going through a program out of state and getting a certification to teach in New Hampshire would not align with her goals. She began again at a college closer to home and double majored in Elementary Education and
Psychology. She recently completed her Master’s in Special Education: Moderate Disabilities PreK-8. Education was always a calling for Isabelle, following in her mother and aunt’s footsteps. Isabelle recalled being indifferent towards math, saying she felt like a human calculator that could memorize information to pass tests but could not recall it a week later. To this day, her father reminds her of the many nights of math homework she spent in tears at the kitchen table, not wanting to complete the assignment. She noted a breakthrough in one of her college classes that allowed her to work hands-on with math concepts. She had a teacher who explained the concept of fractions “how I should explain fractions [to my students]. I knew that’s how you solve it, but the way she explained it was eye opening, because I don’t think I ever knew” (Isabelle, personal communication, June 13, 2018). Math is now one of her favorite subjects to teach.

Jessica

Jessica is a fifth-grade math and science teacher in a school with two fifth grade teams. Each year the teams rotate who gets the special education population and which team gets the English Language Learners. For this school year, Jessica has the rotation of special education students, with a caseload of 12 students who have IEPs. In her fourth year as a teacher, Jessica noted that education was a natural option for her. “Honestly, it was an all I ever knew kind of thing. You know, you're always in school, and I didn't know what business was, or I'm queasy at blood” (Jessica, personal communication, June 18, 2018). “All she knew” turned into her passion after her first experience in the classroom. She knew she had to enter a field where she could make a difference, and education was the perfect fit for her.

Jessica studied at a private college north of Boston, obtaining a Bachelor’s in in Integrated Liberal Studies and Elementary Education, and a minor in mathematics. She
continued her studies at another university in Boston, using their online program to attain her Master’s in Math Education. She also graduated this spring with her CAGS from a well-known university in Massachusetts in Educational Leadership. Jessica did not like math growing up due to one of her teachers telling her that she was not good at the subject and should just stick with reading books. That incident gave Jessica the fixed mindset that she could not be successful with mathematics. After a breakthrough in one of her college courses, Jessica realized that her untraditional approaches to solving problems would help her be a more empathetic math teacher, and now it is her specialty.

**Katelyn**

Katelyn is a first-year teacher in a non-traditional setting. Katelyn serves as a teacher for any child currently admitted to Mayflower Hospital (pseudonym) in Boston. Any student from SMPSD that is admitted to this hospital is serviced by Katelyn. She begins each day with a caseload of seven children but ends up seeing four to six a day depending on how healthy they are. Katelyn studied at a college in upstate New York for her undergraduate degree. After graduating with her Bachelor’s in Secondary Education with a concentration in English Education, she continued her education at a college in Boston. There, she earned a dual Master’s in Elementary Education and Special Education. She is licensed in the state of Massachusetts from first grade through 12th grade. Katelyn originally majored in journalism, but then switched to education because she knew it was her calling. “I always played school. My parents would set up a classroom for me in my room, and at the end of the year I’d have to change rooms to make it realistic. I always knew I wanted to teach” (Katelyn, personal communication, June 19, 2018). Having student taught in a traditional classroom, Katelyn was passionate about helping the students rather than teaching to the state mandated tests. She noted that her job at the
hospital is a dream because her sole focus is helping the children. Katelyn has horrible memories of math as a child and noted that she would often write about her struggles during her master’s program.

**Results**

The results detailed below represent a compilation of the significant statements and commonalities that surfaced through the demographic survey, the virtual writing prompt, the Teacher Efficacy Scale, and the structured interviews with the 11 educator participants. After several rounds of reading the transcriptions and responses to the prompts and scales, I developed a list of significant statements, coded the statements into themes, and used those themes to analyze all the data collected. Using my research questions as the driving force behind the focus of the themes, I continued to journal to keep my own bias out of the investigation and allowed the participants’ voices to be heard. It was apparent from the beginning that there were similarities in themes amongst the participants, and it was my goal to allow their life experiences, both as students and as educators, to shine through. Where multiple data collections sources were used, I had a wide lens through which to look at the participants perceptions of their level of preparedness and was able to note general themes early on in the data analysis phase. The diversity in the sources of data collection and the variety of experiences in each of the participant’s lives both in college and in the classroom provided interesting springboards to begin coding from. The codes, themes, and significant statements are summarized below, and the research questions are addressed.

**Demographic Survey**

Before the formal interview, each participant was emailed with three links to fill out. The demographic survey was the first of the three links. The demographic survey allowed me to
gather basic background information on the participant prior to the interview. The participants’ gender, age range, ethnicity, years of teaching, licenses held, and highest degrees earned were gathered in the survey. All results of this survey are in a password protected folder on my computer. Since this survey was completed as a Google Form, the responses are presented in many charts and tables. Figure 2 shows the breakdown of years in education since the participants completed their teacher preparation programs or years the participants have been actively teaching.

![Figure 2. Pie chart of participants’ years of teaching.](image)

**Teacher Efficacy Scale**

The second link of the introductory email was the Teacher Efficacy Scale. I chose to have the participants complete the Short Form, which consisted of 12 questions that allow the researcher a sense of the participants Efficacy in Student Engagement (ESE), Efficacy in Instructional Strategies (EIS), and Efficacy in Classroom Management (ECM). The results of this Likert scale-style form are listed below with the Teacher Efficacy Scale (TES) Scores in the
three domains listed in Table 3 below, and the Teacher Efficacy Scale (TES) Reliabilities are listed in Table 4. It is interesting to note that eight of the participants fell above the average on their total efficacy score.

Table 3

*Teacher Efficacy Scale Scores*

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>TES Total</th>
<th>ESE Score</th>
<th>EIS Score</th>
<th>ECM Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amanda</td>
<td>6.33</td>
<td>6.5</td>
<td>6</td>
<td>6.5</td>
</tr>
<tr>
<td>Bethany</td>
<td>9.00</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Courtney</td>
<td>8.33</td>
<td>9</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Danielle</td>
<td>7.67</td>
<td>7.75</td>
<td>7.5</td>
<td>7.75</td>
</tr>
<tr>
<td>Ethan</td>
<td>7.33</td>
<td>6.5</td>
<td>8.25</td>
<td>7.25</td>
</tr>
<tr>
<td>Felecia</td>
<td>5.50</td>
<td>5.5</td>
<td>5.25</td>
<td>5.75</td>
</tr>
<tr>
<td>Ginny</td>
<td>8.33</td>
<td>7.5</td>
<td>9</td>
<td>8.5</td>
</tr>
<tr>
<td>Harrison</td>
<td>7.92</td>
<td>8.75</td>
<td>7.75</td>
<td>7.25</td>
</tr>
<tr>
<td>Isabelle</td>
<td>7.08</td>
<td>7.25</td>
<td>7.25</td>
<td>6.75</td>
</tr>
<tr>
<td>Jessica</td>
<td>7.50</td>
<td>6.75</td>
<td>7.5</td>
<td>8.25</td>
</tr>
<tr>
<td>Katelyn</td>
<td>7.67</td>
<td>8</td>
<td>6.75</td>
<td>8.25</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>7.52</td>
<td>7.5</td>
<td>7.39</td>
<td>7.66</td>
</tr>
</tbody>
</table>

Table 4

*Teacher Efficacy Scale Reliabilities: Short Form*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TES</strong></td>
<td>7.1</td>
<td>.98</td>
<td>.90</td>
</tr>
<tr>
<td><strong>Engagement</strong></td>
<td>7.2</td>
<td>1.2</td>
<td>.81</td>
</tr>
<tr>
<td><strong>Instruction</strong></td>
<td>7.3</td>
<td>1.2</td>
<td>.86</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>6.7</td>
<td>1.2</td>
<td>.86</td>
</tr>
</tbody>
</table>
Virtual Writing Prompt

The third and final link of the introductory email to participants included a virtual writing prompt. Another Google Form, this prompt allowed the participants to describe the biggest challenges they face as a math educator. Since this was an open-ended question, the participants were able to write, at whatever length they felt appropriate, about their struggles. The responses did not have to be transcribed, as the participants typed them on their own. One participant opted out of the virtual writing prompt. The overarching theme in the majority of the responses spoke to making mathematics fun for the students to learn. Many of the participants are challenged daily with the need to keep the lessons interesting so as to not lose the children’s attention during the lessons.

Interview

Each participant sat for a structured interview. Interviews ranged from 20-40 minutes long. Interviews took place in setting that the participants deemed were comfortable and confidential enough for them. The interviews took place in the teachers’ classrooms, at my home, their home, or via Facetime. After participant consent (see Appendix B), I audio recorded the interviews using the Voice Memo app on my iPhone. After the interview, the audio file was airdropped to my computer and stored in a password protected file. The interviews are stored both on my hard drive and on my Google Drive. During the interview, I had both the questions and a blank Word document open to jot down any physical cues the participants gave that would be undetected by the audio recording. Both before and after each interview, I journaled how it went, what my emotions were towards the responses, anything that surprised me, and anything I wanted to note later. The biggest struggle I encountered was holding onto my poker face while
the participants responded to the questions exactly as I hoped they would. This is a theme that appeared in my journal several times throughout the process.

After I sent the audio files to a transcription service, the participant would receive an email the next day with their transcription. By sending the transcription to the participant, I used member checking as a means of ensuring accuracy. No changes were made to any transcriptions after the participants viewed them. Upon completion of the last interview, I highlighted key points from each interview and then coded these points to begin finding meaningful themes in my data. It was apparent from the preliminary round of coding that there were significant similarities between the majority of the participants.

Themes

Data collection from the 11 educators consisted of four methods: a demographic survey, the Teacher Efficacy Scale, virtual writing prompt, and structured interviews. After the interviews were transcribed, I conducted an initial read through, highlighting sentences of importance for later. After that initial round, I stepped away from the data for a week to clear my mind of preconceptions. From the first interview until the final one was transcribed was a period of only one month. That month included constant thought, focus, and immersion into my study. After a week away from the data, I began my secondary look for significant statements. I began a rudimentary coding system, highlighting absolutely anything of importance. At that time, I also read through the virtual writing prompt and the results from the Teacher Efficacy Scale. At this stage, it was apparent that the participants all had concerns with their amount of preparation prior to entering the classroom. I then analyzed the results of the Teacher Efficacy Scale and compared the participants’ results with the reliabilities and found that several participants scored themselves lower than the standard mean.
The themes that surfaced from the sources of data are as follows: (a) entering education was a calling, (b) experience leads to preparedness, (c) making math fun is challenging, (d) missing pieces of the puzzle - pedagogical techniques, (e) they did not teach me how to teach, and (f) “I’m drowning” - under preparedness of educators (see Tables 5 and 6). These themes formed the scaffolding through which the participants stories were built. Through these themes it is apparent that our educators are graduating college and entering their classrooms underprepared and overwhelmed.

Table 5  

*Themes and Codes from Significant Statements and Data Aggregation*

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Significant Statement</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT</td>
<td>Entering education is a calling</td>
<td>EC</td>
</tr>
<tr>
<td>INT/VWP</td>
<td>&quot;I’m drowning&quot; - Under preparedness of educators</td>
<td>UP</td>
</tr>
<tr>
<td>INT/VWP/TES</td>
<td>Attitude is everything</td>
<td>AE</td>
</tr>
<tr>
<td>INT/VWP</td>
<td>Experience leads to preparedness</td>
<td>EP</td>
</tr>
<tr>
<td>INT</td>
<td>Making math fun is challenging</td>
<td>MF</td>
</tr>
<tr>
<td>INT/TES</td>
<td>Missing pieces of the puzzle - pedagogical techniques</td>
<td>PP</td>
</tr>
<tr>
<td>INT/TES</td>
<td>Misconceptions must be recognized and addressed</td>
<td>MRA</td>
</tr>
<tr>
<td>INT/VWP/TES</td>
<td>They did not teach me how to teach</td>
<td>THT</td>
</tr>
</tbody>
</table>
Table 6  Open Codes/Data Source List of Themes

*Open Code, Frequencies, & List of Themes*

<table>
<thead>
<tr>
<th>Open Code</th>
<th>Frequency</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>I always knew I would teach</td>
<td>15</td>
<td>Entering education was a calling</td>
</tr>
<tr>
<td>Why I went into education</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Teaching was my dream</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Told not to go into education</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Volunteerism as a cornerstone</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Inspiring teachers</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Math professional developments</td>
<td>10</td>
<td>Experience leads to preparedness</td>
</tr>
<tr>
<td>Learning on the job</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Student teaching experience</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Transition from college to classroom</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Never stop learning</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Math was not engaging as a student</td>
<td>13</td>
<td>Making math fun is challenging</td>
</tr>
<tr>
<td>Successes in my classroom</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Math is all about juggling</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Students need to experience the content</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Lack of motivation</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>I wish they taught me . . .</td>
<td>10</td>
<td>Missing pieces of the puzzle - pedagogical techniques</td>
</tr>
<tr>
<td>Pedagogical techniques necessary</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Unknown resources</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Prep geared toward younger students</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Classroom management skills</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Minimal math requirements</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Preparation program requirements</td>
<td>15</td>
<td>They did not teach me how to teach</td>
</tr>
<tr>
<td>College math classes were easy</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Managing personalities</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Less focus in math than other subjects</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Had to teach myself</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Skimmed the surface</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Broad curriculum</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Feelings of preparedness</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Disliked math as a kid/scared to teach as an adult</td>
<td>10</td>
<td>&quot;I'm drowning&quot; - Under preparedness of educators</td>
</tr>
<tr>
<td>Not prepared at all</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Working with minorities and students with disability</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>
Entering education was a calling. All 11 of the participants spoke to the fact that education or working with children was a calling to them. Their level of self-efficacy prior to entering college was high, with many participants mentioning they always knew they would teach and, more importantly, that they would be an exemplary teacher. It is no wonder that many of the participants with backgrounds in volunteerism went on to become teachers. The majority were also able to recall a teacher that made an impact on them during their educational upbringing. Unbeknownst to me, both Bethany and I credit the same woman for inspiring us to become educators. This is a testament to the impact that a teacher with high self-efficacy and high competence levels can have on the lives of the students they have in their classroom each day. The following is a list of quotes from each participant recalling how they chose to major in education.

- I really couldn’t decide on one subject that I could see myself just teaching. Then, I found elementary. I worked at the preschool, I subbed at a high school. I’ve subbed at daycare, worked with middle school. I’ve worked with all of them, and I really do like elementary. I like seeing their personalities coming out. (Amanda, personal communication, May 17, 2018)

- I’ve always wanted to be a teacher . . . People, especially teachers, told me not to be a teacher, but over time I realized that’s what I really wanted to do, especially after [trying] a different major. I was just always around kids, so I think that made it more natural of a decision to work with kids, but then to specifically work with kids as a teacher. (Bethany, personal communication, May 18, 2018)

- My fourth-grade teacher. She is the reason why I am a teacher. She helped me get through the anxiety and other things that I [was dealing with]. She was there
for me on a personal level, and I think realizing that teaching was more than just teaching. (Courtney, personal communication, May 21, 2018)

- Mrs. Holmes in fourth grade. She looked at me and she said, “I don’t care how you spell as long as I know what it means.” To me, I was like, “All right. She gets it. It doesn’t matter because I still have the right answer.” For her to understand that I had the right answer and it didn’t have to be in perfect form was huge for me. (Danielle, personal communication, May 22, 2018)

- Growing up, I always liked to help people, whether it was friends or in the community. My parents were always good about having us volunteer, and I was big in the Boy Scouts growing up. So, [I was taught to] put other people first and help people. But I think since elementary school I always wanted to be a teacher. Just to get kids excited about school and work with them and show them that it doesn’t have to be this boring place, you know. (Ethan, personal communication, May 24, 2018)

- It’s kind of a roundabout way, I would say. My undergrad was in speech therapy. I’m working with the same students I would have worked with anyway, the same population. It’s funny because both my parents were educators. (Felecia, personal communication, May 31, 2018)

- I’d always worked with kids. Even in high school, I was lifeguard and taught swim lessons, and then I worked for a before and after school program. I started subbing, and I just loved it; it was exciting. I loved getting the kids excited, especially about math. (Ginny, personal communication, June 4, 2018)
• I was put in a classroom, and I was directly put with a student with autism, and I fell in love. So, I decided that I was going to become a special educator. And that's that. (Harrison, personal communication, June 5, 2018)

• I have a small family, and my mom’s a teacher, two of my aunts, and a few family friends, my cousin, so it just felt right. (Isabelle, personal communication, June 13, 2018)

• I really just fell in love with it. When I student taught for the first time, it was just an experience where I was like, “Okay, I really like working with kids.” Then my second piece of it was that I can see that I’m making a difference, and I can see that these kids can respond to what I'm doing. I’m good at this. I was passionate about it. (Jessica, personal communication, June 18, 2018).

• In college, I actually went for journalism because I like to write, but then teaching just called my name. I went and switched [majors] my first year. Ever since then, I’ve been doing teaching. I guess I always knew. (Katelyn, personal communication, June 19, 2018)

The passion that comes along with answering the call to be a teacher was apparent in every single participant. It is interesting to note that on average the participants rated themselves .42 higher than the Teacher Efficacy Scale Reliability average. This means these participants believed in their ability to be an effective teacher. When they would share about successes in their classroom, I could hear the adoration in their voices. I was thankful to not have had any participants who loathed teaching or despised children. It was truly a blessing to be able to interview people with such passion for learning and for the success of their students. While several themes presented themselves throughout data collection, this theme made me proud to be
an educator alongside the participants, but it also brought feelings of dejectedness as they would confess the shortcomings of their preparation made evident during their first years as an educator.

**Experience leads to preparedness.** In regard to content knowledge, as with anything, more exposure brings with it more comfort. It is a cyclical pattern: more exposure leads to higher levels of confidence, higher levels of confidence translate to higher levels of self-efficacy, and high self-efficacy tends to lead to better educators. For the participants, many noted that their second year of teaching felt much more natural than their first year did. “Coming into [my second year], I felt a lot more prepared” remembered Isabelle (Isabelle, personal communication, June 13, 2018). One participant stated it would be interesting to compare the scores of the Teacher Efficacy Scale of the first-year teachers and of the teachers with more experience. She insinuated that the teachers with more experience would more than likely score themselves higher than the new teachers. The first year an educator steps into the classroom is often accompanied with a myriad of emotions and experiences that would be nearly impossible to prepare for or simulate in a college classroom. The only way to tackle these unfamiliar experiences is to dive in, headfirst as Ethan described. He said,

I think learning once you get [in your classroom] is kind of just figuring out your groove. And then just being more comfortable with the curriculum too. So, like, teaching myself it all last year and getting through it, now I really understand it. And finding different ways and strategies to show kids, whether it's a picture and a number line, how to break [standards] apart. (Ethan, personal communication, May 24, 2018)

The first year for educators is merely about survival; learning their way around the school and figuring out what resources are available to them. New teachers are often assigned a mentor
teacher so they have a veteran to rely on in situations that are unfamiliar to them. In a
conversation with the principal of one of the schools, he mentioned that he uses his teachers with
high levels of self-efficacy to mentor the new teachers. He believes the more seasoned teachers
are a valuable resource for the newer educators. What was truly astounding to me was the
disparity between what the participants said their colleges told them they would need for the
classroom and what they found they actually used in their first few years. Danielle, Ginny,
Harrison, and Katelyn all spoke about the broadness in the math curriculum during their teacher
preparation program. Several of the programs described by the participants picked a miniscule
number of mathematical topics to focus on, and that was all of the content that was covered.
Ginny acknowledged,

    Yeah, I actually don't think that [my prep program] prepared me that much. I think I was
    more prepared because I had higher level math in college . . . For example, a lot of kids
don’t have number sense. And if you don’t have that foundation, you can’t do word
problems. So, I think that because we had such a specific focus, and we never really did
anything other than multi-step word problems . . . I wasn’t truly prepared. (Ginny,
personal communication, June 4, 2018)

The moment where a teacher does not feel prepared for the content that he or she is
teaching can be very dangerous and can cause a drop in self-efficacy. This lack of knowledge
and low level of self-efficacy in the educator can often lead to students developing
misconceptions that can take years to undo. So, what is a teacher to do when their preparation
program has failed them? The teachers who refuse to give up on their students often turn to
whatever resources are available to them. These resources can be professional development,
other teachers, administrators, curriculum binders, online databases, and academic coaches, to
name a few. Jessica shared her experience on how she gained more confidence,

I think now where I’ve had a couple more years’ experience, I’m more confident and I’ve
learned from the people around me and I’ve worked with my math coach a lot to be
pulling from the different curriculums we use. Whereas when I first started it was just
like, “Give me the script. I need to read every single word.” I wasn’t very prepared,
which I guess a lot of new teachers [feel the same]. (Jessica, personal communication,
June 18, 2018)

More important than having a solid foundation in math curriculum, new educators must
be taught the importance of identifying and using the resources available to them when they
begin teaching. If teachers knew where to turn in moments that were not covered during their
preparation program, there may be less fear or reservation going into their classrooms for the
first time. It is essential that colleges provide not only a foundational grasp of the math content,
but also provide new educators the actual tools they will need to be successful. Having a clear
understanding of the content is immeasurably important for a new educator, however, if they do
not have the necessary pedagogical skills, failure is almost certain.

The notion of continued learning on the job came to the forefront of many of the
participants’ experiences and became one of the overarching themes of this study and may
contribute to higher levels of self-efficacy in more experienced teachers. The teachers pointed
out that if they wanted to be as effective in their classrooms as they believed they could be, they
had to take it upon themselves to learn what was not taught to them in college. Ethan spoke to
this saying,
I feel like a lot of my experiences I had to just learn on the go, like, classroom management stuff . . . And then as I started, and taught, and I learned a lot more about math. Because I don't really think that my college classes helped. I think a lot of it I had to figure out on my own when I got here. (Ethan, personal communication, May 24, 2018)

Figuring it out on your own is not a positive emotion for a first-year teacher to have.

Making the transition from college courses to actually being in front of the students is a massive transition, and there are many things new teachers will experience that they are unequipped to handle. Amanda disclosed:

I think I thought I was prepared to deal with some behaviors, but honestly, I don't think [I was] . . . I feel more prepared with the more experience I have, the more I try things, trial and error. In college, we really didn't teach math to kids. We taught a science lesson. We taught history. We did reading with them, but . . . I don't think there was any time where we went and taught a math lesson. (Amanda, personal communication, May 17, 2018)

Behavior management is arguably one of the most challenging aspects of being a new educator for the simple idea that it is hard to recreate that environment in a college classroom. Behavior issues can arise for a variety of reasons, but many times will pop up when a student is confused, bored, or frustrated, emotions that are all too frequent in a math classroom. Where the teacher preparation programs the participants attended did not have a classroom management course requirement, that skill along with many others, falls in the lap of the teachers to take into their own hands.
Amanda, Felecia, and Isabelle agreed that preparation programs waste time on teaching the educators things that they will not have to be doing in their classrooms. Isabelle specifically talked about the overwhelming feeling of preparedness and high level of self-efficacy she felt upon leaving college only to realize she was not ready at all.

[My first year of teaching] I was very unaware. You come out of college and you’re like, “Yes, I’m ready to do this, I got my degree, I’ve got this.” Then when you’re in that classroom, you’re like, “Oh my God, I really have no clue.” It was hard. I thought I had made the wrong choice, that I shouldn’t be a teacher, like, what else can you do with a teaching degree? (Isabelle, personal communication, June 13, 2018)

Isabelle’s statement brings to light a very serious issue amongst new educators. If they are leaving college with high levels of self-efficacy for teaching, and upon entering their classrooms realize they are very far from being prepared, teachers may begin to doubt their career choice or may even leave the field. It is immensely important that new teachers enter their classrooms with a sense of preparedness and the resources to know where to turn when something arises they are not ready for. Danielle perfectly summed it up when she said,

You gain most of your experience when you're in the classroom. No matter how much you've been taught, how much you've read or how much you think something is going to work it's very much in the moment with the kids” (Danielle, personal communication, May 22, 2018)

Making math fun is challenging. Math facts. Drill and skill. Fluency. Order of operations. These, and many other topics, can instill fear in teachers and students alike. The challenge presents itself of how to disseminate a curriculum or content area that many students have such strong emotional responses to. When probing the participants about their math
memories from elementary school, many remembered how harsh, negative, and cold the subject was. Courtney recollected, “I remember timed multiplication tests, and I remember being stressed. I would under the table try and use my hands and very quickly try and figure it out . . . It’s actually something I don’t do [in my class]” (Courtney, personal communication, May 21, 2018). Danielle also reiterated the speediness of math in elementary school. She said,

[I remember] the timed tests. How quickly we had to get everything done in a short period of time. We had a math bee in the sixth grade. It was spitting out math facts in a rapid fire. It was fun because if you got one they’d throw candy at you. (Danielle, personal communication, May 22, 2018)

I found it interesting that Danielle was referring to something that many of the participants recalled, but she remembered it in a positive light because of the candy reinforcements used.

All of the participants had very polarizing opinions about mathematics. The majority of them recalled hating it, with Ginny being the lone contributor who loved math. Ethan recalled how boring his math teacher was when he was a student and vowed to make math one of the most enjoyable classes for his students. He spoke about how he refused to assign numerous math problems from a textbook to his students because that is not how to get them engaged. Rather, he talked about the importance of helping the students not fear math and try to relate it to their lives. Contrary to the apparent passion in his interview, Ethan rated himself below the mean for student engagement on the Teacher Efficacy Scale. He said,

A lot of kids hate math, so trying to find a way to teach it that's creative, or try to make it interesting for them, and to pull them in, and you got them hooked a little bit. And then once you teach that skill, and give them some manipulatives, or another strategy to try, and once they kind of see that they’ve figured it out is exciting. So, I to try to turn those
kids to show them that math doesn't have to be your enemy. And I tell them, “I wasn't
good at math when I was little too,” to try and relate to them. I think it's very
challenging, a lot of the stuff that we do. So, I pull in my own personal background with
it, and then try to relate it to their lives a little bit, so they're more willing to listen. Just to
show and create that safe space and be like, “It's okay.” (Ethan, personal communication,
May 24, 2018)

The importance of relating the curriculum to the students is something that will stick with
them forever. When I was in elementary school, we had songs or poems to help us remember
important pieces of information, such as the order of operations. Songs, especially annoyingly
catchy ones, will stay with students long beyond their elementary years. Harrison, who ranked
himself highest on student engagement on the Teacher Efficacy Scale, talked about the
importance of incorporating music into his classroom and noted the benefits he has seen since
implementing them. He exclaimed,

I create songs for everything. And so, there's a fraction song. There is a division song . .
. I like when kids are appreciating math. I try to make math fun because I mean let’s be
honest - the majority of kids do not like math. (Harrison, personal communication, June
5, 2018)

As a teacher, watching the lightbulbs go off as a student finally understands a topic is a moment
of pure joy. In math, those moments are incredibly important as they tend to lay the foundation
for more challenging skills later in the students’ educational career. Jessica referred to these as
the “ah-hah” moments:

I think that when you’re teaching math you kind of get the little success a lot more. I can
see the small successes in [my students in math] a lot more than I think you would see in
the ELA side of things. And it can be more rewarding to get those like, “ah-hah” moments, because I think they happen more, and things click more with the math than they ever really do with the ELA. So, I guess my successes aren’t really super major but I kind of celebrate those small successes more than anything else. (Jessica, personal communication, June 18, 2018)

Isabelle also spoke about the fun “ah-hah” moments in a lesson she learned in a professional development called “My Favorite No.” In the lesson, a problem is put on the board and the students work it out on an index card. The cards are then split into piles of correct answers, or Yes’s, and incorrect answers, or No’s. The teacher picks her favorite No, and the students then have an open discussion of all of the things the student, who remains anonymous, did right, which she calls Glows, and then the mistakes. Isabelle spoke about using this lesson to correct misconceptions and to learn from mistakes. She commented that the “My Favorite No” lesson is her most requested lesson format from her kindergarten students, and it is a fun, interactive way to get kindergarteners talking about math.

It is exceedingly challenging for a novice educator to not only have a firm grasp on the curriculum, but now to be able to disseminate the content in a way that is engaging and will help the students connect. It is hard for them to take their level of self-efficacy and apply it to their classrooms successfully when they did not learn how to do so in college. Thankfully, teachers today live in a world of websites that are overflowing with engaging and stimulating lessons for any mathematical concept. For example, a simple search of fraction-related lesson returned over 70,000 resources on one website. This poses the challenge: How do colleges teach educators the content they will need to know and provide the pedagogical skills to deliver the content in a way that resonates with the students?
Pieces of the puzzle are missing – Where are the pedagogical techniques? Danielle, who rated herself above average in every category on the Teacher Efficacy Scale, hit the nail on the head when she stated, “I don't think they [my college] prepared me at all. It was something I had to learn myself” (Danielle, personal communication, May 22, 2018). After my first interview with Amanda, I realized that I wanted to ask an additional question during my conversations with the participants. Amanda spoke of the different challenges she faces in her classroom and how she did not graduate college with the skills to deal with them. She kept mentioning how she wished she had higher self-efficacy with manipulatives, or she wished she knew how to work better with inclusion students. After this interview, I added in the question “What do you wish your preparation program taught you?” The responses were overwhelming and varied. Bethany spoke of her challenges saying,

I’ve had a hard time, specifically teaching relating fractions and decimals, because a lot of my kids came in with a lot of misconceptions about decimals. I feel like some of them were from trying to understand what their older siblings are doing, just correcting the [mistakes] . . . I feel like I didn't have enough experience with relating the two in terms of I didn't feel like the curriculum that I was using was entirely effective. (Bethany, personal communication, May 18, 2018)

Bethany went on to ask me what my recommendation was when a curriculum isn’t effective and there is nothing to fall back on. Where does a teacher turn for resources? How does a teacher learn to teach when preparation programs are not doing any justice? The majority of the participants expressed dissatisfaction with their teacher preparation programs and were alarmed at how different being in their actual classrooms are in comparison to how it was portrayed they would be. Many participants referred back to their self-efficacy levels, citing they knew they
could be a successful teacher if they only had the necessary tools for the job. Katelyn discussed her thoughts on the gaps between what she learned in college and what she is doing in her classroom. She theorized,

I think [we need] more on the delivery of math. Even though we had to do lesson plans, I don't think that they were critically reviewed by the teacher, though that's where the gap is. Then accommodating for needs; I don't think the feedback was there. (Katelyn, personal communication, June 19, 2018)

Educators know the importance of feedback in a classroom when it comes to their students, so it is shocking to think there is a lack of feedback during the preparation program. Courtney, Ethan, Ginny, and Danielle all expressed an issue with the magnitude of differences between first grade and sixth grade and how it is nearly impossible to prepare an educator for something that expansive. Ethan, whose highest self-rated score on the Teacher Efficacy Scale was Efficacy in Instructional Strategies, asserted that the license should be broken down in the finer levels, such as first through third grade and fourth through sixth grade. This would allow preparation programs to have a more fixed set of curriculum standards to focus on and would allow the educators to develop higher self-efficacy within their respective grade levels. Ginny also mentioned,

I would like to see more opportunity to go into different levels. So instead of just being in one specific grade, having the opportunities to teach lessons in multiple grades. I would love if they could implement new ways to teach. I feel Math Workshop is the big push for a lot of districts right now, and I had no idea. Or even just small group instruction. I felt like a lot of our preparation . . . was just whole group everything. And
whole group; just do the worksheets; this is what you do.  (Ginny, personal communication, June 14, 2018)

Ginny was not the only participant to mention that whole group instruction ran the preparation programs. Other complaints from participants were the lack of classroom management skills, behavior management skills, use of manipulatives, managing personalities, student motivation, constant co-teaching, how to manage standards pacing, standardized tests, and how to bridge gaps, to name a few. The disastrous part is that the teachers, even with the high levels of self-efficacy that they have, cannot advocate for themselves to learn these skills because they have not had the experience to know there are issues in the first place. Unfortunately, the participants had more complaints than compliments to give their teacher preparation programs.

And I wish they taught more of how you could use your math block. This is how you could break it up, these are some different activities you could do, [here are] manipulatives you can use throughout the grades, games and things you can manipulate. And centers or how you want to run things - which would have been helpful. I learned all that when I started at [my school], but it would have been nice to come in with some stuff too.  (Ethan, personal communication, May 24, 2018)

Ethan’s notion ties back into the overarching theme of gaining preparedness through hands on experience in the classroom, but teachers should not be immediately thrown to their own devices. They should be leaving their preparation program with some tools they can rely on to get themselves started in their new role. It is sad and scary that so many new teachers are fending for themselves because their preparation program has, in a way, failed them. Colleges need to look introspectively at their educator preparation programs and reassess what they are teaching
the future educators. It appears that, unfortunately, as many students are coming to into the classroom with gaps in their learning and misconceptions, so too are the teachers.

They did not teach me how to teach. Felecia, who rated herself the lowest overall on the Teacher Efficacy Scale, shared her frustrations with her preparation program and the less than satisfactory job it did for getting her ready. She admitted, “[I’m] just coming up with lessons and materials on the spot . . . I don’t have a strong foundation in teaching, so coming up with it on the fly is not wonderful and not having anyone to discuss curriculum with stinks” (Felecia, personal communication, May 31, 2018). Her low level of self-efficacy was predominant during her interview. The notion that the participants did not feel prepared shocked me. I asked each of them to describe the challenges they face in their classrooms and I got a wide range of answers. The most common challenges listed were: the gap in student achievement, relating math concepts, managing personalities, motivation, classroom management, pacing, teaching the standards, student attitudes towards math, and working with English language learners and special education students. This list encompasses the things that teachers deal with every day in their classrooms so why are colleges not addressing them? I began to think that the participants were merely forgetting a class that they had taken, but one after the other, they all went on to describe how they were not prepared to handle challenges in their classroom, let alone in mathematics. For the participants, the only thing that was saving them in their classroom was their high level of self-efficacy. They were determined to be effective teachers and constantly challenged themselves to be better. Danielle explained her biggest struggle,

To be honest, most times it’s classroom management. If we’re having a student that’s struggling it really interrupts the lesson so you kind of have to backtrack. Though the
classroom sizes are small . . . one child struggling really throws the whole lesson off.

That’s my biggest challenge because I end up behind often because we have a moment where I could go 10, 15 minutes where I can’t teach. If you have a 45-minute session it’s like, “Okay, what do you do now?” (Danielle, personal communication, May 22, 2018)

To do some quick math, students are in school on average six hours a day, five days a week, four weeks a month – that totals around 7200 minutes a month. Wasting 45 minutes a day dealing with issues in a math class can lead to 900 minutes of wasted time a month. That equates to five whole days of school a month that are completely unproductive because teachers are not prepared to handle situations, such as a child holding the class up, a behavior issue, or a student acting out. Isabelle had some very negative memories of her teacher preparation program. She divulged,

It was known as the block. It was hell for six months. They purposely tried to give you all of this extra work and assignments, so you would be used to not having a lot of free time your first year of teaching, and they had you do the lesson plans that are eight pages long, which you think that’s life after but it’s not at all true. (Isabelle, personal communication, June 13, 2018)

Danielle, who rated herself 1.05 higher than the mean for classroom management on the Teacher Efficacy Scale, commented that she learned her classroom management skills after she had completed her master’s degree while she was taking courses to complete her CAGS. She echoed many of the other participants feelings of how time was wasted on pointless assignments that were unrealistic to a classroom today. Like many others, Danielle expressed, with frustration,

It was more how to write a lesson plan, not necessarily the fundamentals of walking into a classroom and the things to expect when you get into a classroom. I think as I got
further into the administration portion of the CAGS they kind of prepared for some of that classroom management style. They didn't really prepare you for some of the things that you may also need to know. With regards to teacher preparation they’ve kind of gone through the fundamentals based on grade . . . but in my field of severe I was not [prepared] at all. (Danielle, personal communication, May 22, 2018)

One after the other, the participants mentioned learning how to write detailed lesson plans but not how to truly teach mathematics. Bethany, with the highest overall scores on the Teacher Efficacy Scale, even remembered having to submit a 12-page lesson plan and worried over every tiny detail, and then her first principal never required her to submit them. The bulk of the participants at some point in their interviews expressed not only the shock of not having to turn in lesson plans, or to have less detailed lesson plans, but also the miniscule amount of importance assigned to that task in comparison to others in the classroom. With classroom management, motivation, and behavior management at the forefront of the issues that all of participants mentioned, why are colleges not focusing on these areas in their teacher preparation programs?

“I’m drowning” - Under preparedness of educators. Although I constantly journaled through the entire process of data collection, there was one entry that kept resurfacing, and I revisited it several times. After interviewing Jessica, I reflected,

There is something utterly heartbreaking about hearing a new teacher discuss their struggles and question their career choice. I am not a mom, but someday I hope to send my children into schools and classrooms where teachers feel that they are [prepared].”

(Ashleigh, personal journal, June 18, 2018).

Katelyn, the participant with the most unusual classroom setting, had a very interesting viewpoint to offer. As a teacher in a hospital, she is required to have completed a teacher
preparation program and hold a state teaching license but does not know day-to-day what she will be focusing on with her students. When asked if she felt adequately prepared to teach math she said,

I feel prepared for the younger kids, but that’s just part of my own common knowledge of what I know about math . . . I don’t feel confident. Not for math. I think [my college] should’ve had us do more courses with content, like making sure that we were comfortable. We didn’t really do much [with math]. (Katelyn, personal communication, June 19, 2018)

The participants often brought up the notion that they were originally not afraid of teaching elementary mathematics. “How hard can it be?” Several of them posed to me. Thinking about teaching elementary math to a non-educator might seem as simple as teaching numbers and counting, but with the newly updated common core standards, math classes are more rigorous than ever, yet preparation programs have not followed suit. Five of the participants remembered their math classes during their program to be significantly easier than any of the other classes. Courtney, with the second highest overall efficacy score on the Teacher Efficacy Scale recalled,

For math specifically, we worked in groups a lot. We always had our group. We taught in the classroom in a group. We were all responsible for one lesson per unit. When we taught, if you weren’t up there teaching, you would just kind of help and assist . . . and then the next week it would be [someone else’s turn to teach]. We did a whole unit like that. So that’s how math was different for me. It also seems like math was, I wouldn’t say the easiest, but it was different than all the others. I don’t know if it was because we were in that group setting we didn’t have to do everything on our own. But [math] was
the one where it was kind of like . . . You didn’t have to put as much work into it as the
other [subjects]. (Courtney, personal communication, May 21, 2018)
As someone who taught math for four years, the idea that math classes in college required less
effort infuriated me. I have many heated journal entries where I go on about the repercussions of
less engaging math lessons and how quickly a student can be turned off to math.
It is frightening to think that my 11 participants, with their varying collegiate
backgrounds and variety in their degree programs, all noted at some point in their interviews that
math classes required less work of them or were easier than English or history classes. Felecia
talked about how much she struggled to engage her students in math class. She was the
participant who rated herself lowest on Efficacy of Student Engagement on the TES. She
described with frustration, “I mean, it’s pretty challenging when you have no instruction and no
skills to teach these kids. You have nothing to pull from” (Felecia, personal communication,
May 31, 2018). Ginny and Jessica also reiterated this hindrance and were really able to describe
the essence of the sheer petrification they felt their first few years as a teacher.
I think when I first started I felt like I was drowning every single day. I was teaching first
grade, so the math was a little easier. I could do [the math]. When I came to 5th grade
math for the first time there was definitely a “Oh my God” moment and “What if I do this
wrong?” When I looked at fractions again I was like, “Oh my God, I haven't looked at
fractions since I was probably in 5th grade” and there was definitely that, “Can I even do
this” moment. (Jessica, personal communication, June 18, 2018)
Unfortunately, this is not the feeling of only one of the participants. Each and every participant
echoed the paralyzing fear that they had upon realizing they were teaching math as a part of their
day. This fear came with knowing they were not equipped to stand in front of that class and help
push students to their potential. This hearkens back to the cyclical notion mentioned before: the teachers self-efficacy in mathematics fell upon entering their classroom and realizing the realities of what they would be teaching. It is easy to imagine the uproar that would come from involved parents who found out their children’s teacher was not prepared, did not have adequate resources, efficacy, or did not have the skill set necessary to teach the content standards to their children or to challenge them to think with a STEM mindset. Ethan summed it up with a deflating sigh saying,

Learning on the job. Which I hate to say, but . . . it is what it is. It’s hard. You know, teaching is one of those careers that you never stop learning. So, “How do you nail down what to teach a teacher?” (Ethan, personal communication, May 24, 2018)

Central Research Question

The Central Research Question asked, “What are the lived experiences of novice elementary teachers as described through their self-efficacy in teaching mathematics?” I chose to make this the central focus of my research to get a clear picture of the experiences the participants have had since graduating college and entering their own classrooms. My goal was to discover the core occurrences, emotions, and conditions that new teachers encounter and to see if their preparation programs enabled them to handle what they have encountered. When I analyzed the data, two major themes emerged: (a) experience leads to preparedness, and (b) under preparedness of educators upon leaving college. These themes came up, without fail, in every interview I conducted. It was also apparent through the virtual writing prompt how frustrated the teachers are with attempting to stay afloat in the ever changing, demanding world that is education.
While each of the participants teaches in a different grade, at a different school, and has a distinctive overall role, the experiences they imparted were eerily similar and their levels of efficacy were very similar. With the exception of Felecia, who rated herself much lower than the other participants, the difference in the average scores on the Teacher Efficacy Scale was only 2.67 points. Each participant shared a story that was unique, but with each interview the participants would get to a point of frustration at the lack of reality in their teacher preparation programs in comparison to their perceived level of effectiveness. I heard many stories of wasted time spent on writing excruciatingly long lesson plans, something no teacher has had to do in their current classroom, in teacher preparation programs. They expressed frustration in the absence of resources and sheer absurdity of the components they spent time on while in college in comparison to their classrooms now. Another unifier between all of the participants was the unsullied amount of passion for the field. They believed they possessed the abilities to make a difference in the loves of their students. Many of the participants chose to go into education because they have a hunger for learning, a heart for helping children, and the certainty that they were capable of being the best person to facilitate learning. That was a tie that bonded them all together helped me understand that these teachers wanted to do anything and everything they could to help their students succeed.

It was interesting to compare the results of the Teacher Efficacy Scale and the interview transcriptions. Several participants ranked themselves favorably on the scale, but in conversation, they were deflated at their skills in classroom management and expressed a need to constantly make the curriculum exciting for the students. It is noteworthy that the educators who ranked themselves highest on overall efficacy commented about how they had to take learning into their own hands if they wanted to be successful. Harrison, in particular, wrote in his
response to the virtual writing prompt about how challenging it is to truly teach students. “I had to really come to learn how to physically teach. Student teaching . . . only prepares you for so much” (Harrison, personal communication, June 5, 2018). The challenge arises in how the educators bridge the gap in their own learning and how they find success in their classroom within the first few years.

**Research Question One**

Research Question One asked, “How do participants describe their self-efficacy as math teachers in regard to content knowledge?” The intent of this research question was to get a clearer picture of how confident the participants were in their knowledge of the mathematical content they would be teaching. As stated previously, the overarching initial thought was that elementary math cannot be hard to teach. The majority of the participants only had to take three or fewer courses geared towards mathematical content and instruction during their college careers. Ginny was able to skip some of the elementary math requirements due to her second major in mathematics. Even still with her extra math in her background, she discussed her displeasure with the required courses.

We had to take three specific classes, it was Elementary Math I, Elementary Math II, and Elementary Math III . . . It was actually not, I like to say, “Not real math.” It was a lot of things that we did in K-6 math, but I honestly don’t remember ever doing anything out of base ten, for example. And I just remember being in Elementary Math Class I, and we were doing things in like Base 2 and Base 12 and Base 4. Once we did it, obviously, we got the concept of it, but I never remember doing anything like that in elementary school. (Ginny, personal communication, June 4, 2018)
The consensus between the participants was that the required courses were less about how to teach mathematics and more ensuring the educator herself knows how to do the math. They mentioned that the classes ensured the level of self-efficacy in the educators’ ability to solve math problems themselves, but that the courses never developed the participants self-efficacy in the content that they would actually be teaching. It is frightening to think that in order to graduate from a public high school in the state of Massachusetts, student must pass their English, science, and mathematics state mandated tests. One would think that educator preparation programs would use those three subjects as the springboard for new teacher preparation. A prepared teacher with high levels of self-efficacy can help lead more students to success, yet currently aspiring teachers are taking minimal classes with little to no effect. Amanda remembered enjoying her math classes in college, something she credited to how easy the courses were. She recalled,

I just had to take two classes, and they were just like prep classes. In the class, it was very easy, because I was taught third grade math, elementary level math, but I wasn’t necessarily taught how to present it in a fun way. It was just like, “Yes, I can do this. This is easy, because I'm in college and I've learned it.” (Amanda, personal communication, May 17, 2018)

Amanda had a high level in her self-efficacy for her ability to solve math problems but mentioned that there was no way the few math courses could have prepared her for the vast amount of mathematics she teaches in her classroom. Katelyn, who attended a different preparation program than Amanda and several other participants, also discussed only having to take one math course throughout the entirety of her program. She remembered the course focusing on math anxiety in students and not at all on content or pedagogical skills. To her, that
math course was more of a reading class where her professor would say, “Here’s articles to read and then write a lesson plan” (Katelyn, personal communication, June 19, 2018). Unfortunately, the ability to write a lesson plan does not equate to having the appropriate content knowledge. A saving grace with all of the participants is that, without a shadow of a doubt, they all knew that the classroom was where they belonged.

**Research Question Two**

Research Question Two asked, “How do participants describe their self-efficacy as math teachers regarding content dissemination?” This question was developed to set aside the teachers understanding of the subject of mathematics and get at the core of their pedagogical skill set. For this question, I sought to dive beyond the participants’ emotional connection to the subject and get into the nitty gritty of how well the participants felt the colleges prepared the educators in regard to their ability to teach. When asked how prepared she felt, Katelyn said,

> On a scale of one to ten, I would say a five. I felt like I was getting some good research about anxiety and kids and how to plan your lessons, but I think there was a big part missing on how to deliver it. When I go to teach math, especially at the hospital, [the students ask], “Well what do I do?” I’m like, Well . . . I know a lot of curriculum in certain areas, but it’s confusing, [I try to do] what works best for them. (Katelyn, personal communication, June 19, 2018)

Of the three categories on the Teacher Efficacy Scale, Katelyn ranked herself lowest on Efficacy of Instructional Strategies. Delivery of the content is just as important as understanding the content. When the participants expressed the majority of their frustration, it came in the lack of focus during their preparation program on pedagogical skills when they had high levels of self-efficacy to know they could be a successful teacher. The interview questions geared toward
answering this question often made the participants nervous to answer. They were fearful about truly admitting that their time in college, and all of the money that they spent to be there, was essentially a waste because they have had to truly teach themselves or learn on the job if they wanted to be an effective teacher and truly help make an impact on their students. After a little probing, the participants were comfortable with candidly expressing their experiences. Harrison, who ranked himself .82 higher than the mean for self-efficacy, admitted with hesitation,

I don’t think my courses taught me how to teach pedagogically. I think that my courses mainly focused on the content, and how to solve the problems. But I don’t think that I really understood how to completely teach everything until I was doing it. (Harrison, personal communication, June 5, 2018)

His response also ties into the need for experience in order to gain confidence and the skill set that was not taught during his college program. He mentioned that his level of self-efficacy plummeted during his first year, questioning if education with the right path for him to be on.

Each teacher needs to develop his or her own rhythm, style, and system in his or her classroom. This can take months or years to master and is often something that continuously develops over the years. Colleges and universities should, along with helping future educators understand the content, provide them with the tools of the trade. Just as if a plumber went to school with the goal of graduating and plumbing for their career, educators deserve the same amount of attention dedicated to how to teach. Many of the participants expressed that they were left to their own devices for learning how to teach, which could explain the low levels in the Efficacy in Instructional Strategies category in the Teacher Efficacy Scale. Courtney said of her preparation program,
Style-wise, I wouldn’t say [I was prepared] at all. I would say the content was all there. And you did what works for you. I don’t think the style came from them. Even when we were in that math group setting, that was the only time where I taught beside another person, and it was . . . They could be completely different, completely different style, but we were teaching the exact same thing . . . the exact same way. (Courtney, personal communication, May 21, 2018)

Echoing that same sentiment, when asked what her preparation program equipped her to do Felecia said, “I would say nothing. Nothing” (Felecia, personal communication, May 31, 2018). Interestingly, Felecia ranked herself lower than all of the participants in every category of the Teacher Efficacy Scale. Felecia, Courtney, and Isabelle all brought up the point that, while their classes left a lot to be desired, it is incredibly hard to teach future educators everything they will need to know when the license they are obtaining is so widespread. All of the participants are certified at a minimum for elementary education in grades one through six, and all commented on their high level of self-efficacy in regard to their ability to be a successful teacher if they were appropriately taught. Isabelle dove into this notion more saying,

We are [in a program] for a one through six license - you can’t really generalize that . . . Each school is so different. The way that one school does math is nowhere near how another school does math, so it’s hard to have one class for one semester saying vaguely how to teach math. [Our professor] talked about pairing a read aloud and connecting it to math using manipulatives, centers, having math be more about games I guess, and to get kids interested. We talked about how math has such a bad reputation for some kids and how they can shut down. (Isabelle, personal communication, May 13, 2018)
Despite the blatant feelings of under preparedness and low levels of self-efficacy in regard to instructional strategies, educators are also challenged with making the curriculum enjoyable for the students. In order for students to connect with mathematics, teaching tactics of old must be replaced with new, fun, interactive lessons to engage and excite the students.

**Research Question Three**

Research Question Three asked, “How prepared do participants feel to address students’ challenges in mathematics?” This question was inspired by my original idea for my dissertation. Initially, I planned on studying math anxiety in elementary students but after talking with a few educators about their anxieties I decided to shift the focus of my study. There are numerous challenges that can arise in any classroom, so it is important that colleges are frontloading teachers with strategies for how to handle anything that may arise during the school year. With three of the participants ranking themselves at or below the mean for Efficacy in Classroom Management skills, and two more participants ranking themselves a hair above average, the lack of preparedness in addressing challenges in mathematics with a hot button topic with many of the participants. When asked about the challenges she faces in her classroom and how prepared she was to handle them Jessica laughed, “Ahhh, so many challenges. And that is really frustrating for me” (Jessica, personal communication, June 18, 2018). It is curious that Jessica ranked herself highest in classroom management of the three categories on the Teacher Efficacy Scale but was able to go on for several minutes about the challenges she faces daily.

The majority of the participants spoke about the two or three math classes that they were required to take in their pre-practicum and how little those courses contributed to their knowledge as educators. They talked about their self-efficacy levels varying throughout the years. Their self-efficacy, overall, was high entering college knowing they were going into
education. Many participants even noted how prepared they felt leaving college and entering their own classroom. Where the levels shifted was when the participants realized the actual requirements of their classroom or school and then had a moment of panic upon realizing they were not ready. Over and over again, the participants would note that the classes during their preparation program were content driven, ensuring the future educators could handle elementary math. These classes reinforced the participants high level of self-efficacy in their ability to solve math problems on their own but did not help their self-efficacy in content dissemination of classroom management. Many would scoff at the notion that they needed three entire classes dedicated to content and little to no classes dedicated to pedagogy. Ethan shared a story of how he is trying to convince the math coach at his school to go work for a university teacher preparation program. He told her,

“You should go and teach at [a college], because I’ve learned so much more from you already.” And like even our math coach, like - you know - that are actually working in a school district versus someone who used to teach math a long time ago. . . . I just feel like it was - it could have been so much better. (Ethan, personal communication, May 24, 2018)

All of the participants expressed the importance of preparation programs being rooted in reality rather than focusing on what classrooms used to be like. Unfortunately, the participants did not feel prepared to address students’ challenges in mathematics, and even the challenges that arise in the classroom separate from the curriculum. The only time a participant would discuss being prepared to handle a situation in their classroom followed a story of professional development geared to classroom management, which hearkens back to the theme of in classroom experience leading to higher levels preparation.
Summary

Chapter Four detailed the results of the data collection that sought to explain the lived experiences of novice elementary teachers’ level of preparedness in mathematics. Across demographic surveys, Teacher Efficacy Scales, virtual writing prompts, and structured interviews, the participants chronicled their experiences in college and their classrooms and expressed frustration with the inadequate way they were prepared to teach. Participants shared their memories of themselves as math students, explained why they went into education, detailed their teacher preparation program, and recounted colorful stories of their first years as licensed educators. Six themes emerged during the data reduction process that are as follows: (a) entering education was a calling, (b) experience leads to preparedness, (c) making math fun is challenging, (d) missing pieces of the puzzle - pedagogical techniques, (e) they did not teach me how to teach, and (f) “I’m drowning” - under preparedness of educators.

After reviewing the data, the central research question and three subsequent questions were answered with evidence provided from the virtual writing prompt and the structured interviews. Overall, the participants described themselves as not being prepared to teach mathematics to their students. The under preparedness came to the forefront immediately, and the need for experience in the classroom came second. Each and every participant spoke of the calling of education to them. All of the participants talked about having to problem solve on their feet, having to manage behaviors and learn how to schedule a math block on their own. The educators all spoke about a lack of resources and the need to create and come up with lessons on their own. Most notably, the lack of classroom management skills, motivation, and behavior management were reoccurring topics in the interviews.
The educators each posed a variety of ways to remedy the missing pieces of information they did not gain in college, from professional development days to buddy teachers. Alas, these are gaps the new teachers are left to fill on their own, all while causing many of them to doubt their career choice. Continuously the educators grumbled about their lack of understanding of what being the sole adult in a classroom is truly like. Continued focus on unrealistic lesson plans, the absence of being taught classroom management skills, and sheer frustration and defeat came up in every interview, without fail. There is an old saying that goes ‘those who cannot do, teach.’ This statement is outrageously untrue. Teachers need to be trained to do it all and colleges need to prepare these future educators sufficiently.
CHAPTER FIVE: CONCLUSION

Overview

The purpose of this transcendental phenomenological study was to describe novice elementary teachers’ experiences with preparedness to teach mathematics in a large school district in southeastern Massachusetts. Data was collected by means of a demographic survey, the Teacher Efficacy Scale, a virtual writing prompt, and a structured interview. These data collection methods were used to study the lived experiences of novice educators while they were in their teacher preparation program and their experiences since graduating college and entering their own classrooms. The Teacher Efficacy Scale, virtual writing prompt, and structured interview provided a clear picture of the experiences that the teachers have lived and allowed them to express their frustration in the overall lack of preparedness they felt. By using Moustakas (1994) method of phenomenological data reduction, I was able to set my own experiences aside through journaling to let the participants’ stories come to the forefront.

The importance of this study extends far beyond the educator participants themselves. The results have implications for future educators, elementary schools, school districts and colleges, to name a few. There is also the notion of the potential damage that an underprepared educator can inflict on a student’s learning that may be irreversible. One bad math experience can cause a student to shy away from a STEM related career, which is the exact opposite of what the reframed state curriculum standards are hoping to achieve. Future teachers, and the colleges that prepare them, must possess a realistic understanding of what being in the classroom truly is like in order to find success in their first years out of college. School districts must provide vital professional development opportunities for teachers, both novice and veteran, to gain more
practical skills that they can implement in their classrooms. Colleges may also need to re-examine their curriculum to see if it is aligned with what teachers really need.

Chapter Five includes a summary of the findings that came from all of the data that was collected, a discussion relating the study to the literature review in Chapter Two, as well as the implications, delimitations, and limitations of the study. The chapter closes with recommendations for future research and a summary of the study.

**Summary of Findings**

The goal of this transcendental phenomenological study was to describe the lived experiences of novice elementary teachers and their preparedness to teach mathematics in a large school district in southeastern Massachusetts. This study was completed using a variety of data collection methods which allowed a clear, detailed, rich story to be told. Data were collected using a demographic survey, the Teacher Efficacy Scale, a virtual writing prompt, and structured interviews. The research questions that guided this study were:

**CQ:** What are the lived experiences of novice elementary teachers as described through their self-efficacy in teaching mathematics?

**SQ1:** How do participants describe their self-efficacy as math teachers in regard to content knowledge?

**SQ2:** How do participants describe their self-efficacy as math teachers regarding content dissemination?

**SQ3:** How prepared do participants feel to address students’ challenges in mathematics?

In an attempt to answer the research questions, data was collected through a demographic survey, Teacher Efficacy Scale, virtual writing prompt and structured interview. The data collection methods concentrated on obtaining rich, thick data to accurately illustrate the lived
experiences of novice educators from the time they entered college through their first few years as a licensed educator in the state of Massachusetts. All data was either hand typed by the participant or transcribed using a professional transcription service. Transcriptions were then sent back to the participant for member checking. Through four rounds of coding and data reduction, six major themes arose. After following Moustakas’ (1994) phenomenological data analysis steps, six themes materialized. These themes are: (a) entering education was a calling, (b) experience leads to preparedness, (c) making math fun is challenging, (d) missing pieces of the puzzle - pedagogical techniques, (e) they did not teach me how to teach, and (f) “I’m drowning” - under preparedness of educators.

These themes were used to answer the Central Research Question and the three sub-questions that were posed in the beginning of the study. These questions sought to get at the heart of the participants’ lived experiences in regard to mathematical content knowledge, content dissemination, and the ability to handle the challenges that may arise in a mathematics classroom. Overwhelmingly, the participants discussed their lack of preparedness upon entering their classrooms and the frustration that went hand-in-hand with those emotions. The themes helped shed a light on an issue that all 11 of the participants are currently facing and allowed them to be open and honest about what they are undergoing in their classroom in comparison to what they were told they would be facing during their preparation program. The stark differences between the two, the faux reality presented to the educators in college and the actual reality they are facing daily in their classroom, are shocking.

The central research question was answered through two themes. The first theme illuminated a very important contradiction in teacher preparation programs. While the educators concluded that their experiences led to their level of preparedness, many college preparation
programs do not allow the teacher candidates into the classroom with students until their senior year. One participant shared that her mother forced her to substitute teach when she entered college because it would give her first-hand experience in a classroom to truly sort out if that was what she wanted to have as her career. The participants spoke about the need for a realistic preparation program; one focused on interacting with the students, trying out lesson plans, and learning different teaching styles from professors who were up to date on current best practices. Through this theme, the frustration in the participants became evident. The participants have taken it upon themselves to gain wisdom through their experiences.

The second theme was entitled “I’m drowning.” While this may seem like a dramatic title for a theme, it is truly the essence of how the participants viewed their feelings during the first year as an educator. The goal of phenomenological research is to get to the rich, thick, detailed life experience of the participants. Drowning, panic, rage, fear, and doubt were all reoccurring words during the interviews, and they are emotions that new teachers expressed they did not enjoy feeling. Rather than being full of joy and passion for the field of education, or anxious nerves as the teacher prepares the classroom for the incoming students, the teachers were filled with dismay and dread of encountering yet another problem that they were not prepared to handle. Overall, the teachers, regardless of how passionate they are for their field of work, do not feel that they were truly ready to enter their classrooms.

The first research question was answered through the themes of education as a calling and again, how experience leads to preparedness. These themes that emerged from the data was the most enjoyable to listen to each participant talk about. They all expressed their calling to enter the field of education and how, for six of the participants, becoming a teacher was fulfilling God’s mission for them here on Earth. This theme was full of stories overflowing with love,
excitement, and the heart of being a servant for children. Hebrews 6:10 reads, “God is not unjust; he will not forget your work and the love you have shown him as you have helped his people and continue to help them” (NIV). Many of them shared stories of volunteerism as the cornerstone of their families. The participants of this study wake up every morning and go to work to help God’s children, a feat that not many people would be able to successfully do and continue to do daily. This trait that all of the participants shared provided a lens of truthfulness to their stories of frustration and uncertainty. For these educators, they had known for years that education was their calling, so to have that questioned upon entering the classroom, and to have self-doubt at their ability to handle their classroom, was earth shattering for them.

The second research question focused on the notion that mathematics needs to be fun. It also brought up that the teachers have many gaps in their learning from their college preparation program. The data focused on the need for math lessons to be fun and engaging for the students. The participants shared stories of the increase in student engagement in lessons that were interactive for the students. One participant shared the importance of songs or mnemonic devices to help the students remember important mathematical concepts. Another participant talked about how she links mathematics to other content areas to form cross-curricular bonds. The majority of the participants recalled the drill and kill methods of yesterday, cringing as they remembered having to complete 60-second timed tests. It was also fun to hear one participant break into song about his love of fractions and decimals. Students need education to be as enticing as the applications on their phones, and teachers must meet this challenge if they desire to have their students understand the math curriculum.

The second theme that helped to answer the second research question came from the participants discussing what pieces of their education were missing from their preparation
programs. This theme came from the educators’ frustration at the pedagogical techniques they were lacking and how they have had to learn things on their own. While many participants agreed that teaching style is something that develops over the years, seven participants made it a point to state that colleges should at least provide examples of different teaching styles for future educators to see. This also ties into the idea that they need more time in classrooms with certified teachers to get a fresh perspective on pedagogy.

The fifth theme, that developed purely out of anger, helped to answer the final research question. The participants expressed their dissatisfaction with their teacher preparation programs and irritation at all of the things they had to figure out on their own as a first-year teacher. The extraordinarily long lesson plans they were required to write as a part of their pre-practicum came up in many of the interviews. One participant posed the question of how much time was wasted learning to write essay-long lesson plans when that is something that will never be done post-graduation. The educators were upset that they went to college to learn how to become teachers, and they left with little to no skills that are truly applicable in their current classrooms. Thankfully, they have professional development opportunities to bridge the gap in knowledge, but many expressed the frustration over paying for a degree which, in turn, did not set them up for success.

**Discussion**

Bandura’s (1993) self-efficacy theory and Bandura’s (1991a) social cognitive theory are the two theories that guided this study. This section contains a discussion of these two theories along with themes from chapter two and provides insight into why the participants behaved the way they did. This section will expound upon the link between the theories and the data.
obtained from the demographic survey, the Teacher Efficacy Scale, a virtual writing prompt, and structured interviews.

**Bandura’s Self Efficacy Theory**

When educators have high levels of self-efficacy, they will push themselves harder, set higher goals, and seek to perform their jobs to the best of their ability. Overall, the majority of the participants in this study ranked themselves with high levels of efficacy on the Teacher Efficacy Scale. In the category of student engagement, eight of the participants ranked themselves higher than average. This translates to high levels of confidence in their ability to keep their students engaged in a math class, which ties back into the theme of mathematics lessons being fun for the students. In the category of classroom management, all but two participants ranked themselves higher than the mean, with the two low scores coming from teachers who were in their first year at their respective schools. This equates to the majority of the participants believing that they now possess the tools necessary, or they know the availability of the resources to them to manage their classroom. The final category, instructional strategies, was the most shocking. The results were split with half of the participants falling just above the mean and half falling below. This notion ties into the themes of under preparedness and not being taught how to teach. Predominantly, the participants expressed self-assurance in their ability to successfully run their classrooms with one caveat: they must have been taught the skills necessary.

Bandura (1993) also spoke about the contrasting side of self-efficacy, noting that if a person believes he or she cannot attain something, he or she is setting him- or herself up to not attain it. One of the participants ranked herself very low on the Teacher Efficacy Scale, and it was evident in her interview. The ways the interviews were conducted began with the
participant filling out the TES and then the virtual writing prompt, which was followed by the interview. I did not read the participants responses to the TES and the writing prompt prior to the interview. This means I was unaware of how they scored themselves on the scale or what they wrote about in the prompt. It was clear from her interview that she was not only very worried about the lack of skills she has, she was questioning her abilities as an educator, joking about what other careers she could enter with a teaching degree. Self-efficacy is a concept where what the participant thinks will occur usually will. The same notion applies to students; if they think they can succeed, they will attempt. Conversely, if they think they will fail, they often give up. The notion of student self-esteem came up in several interviews as another missing piece of the puzzle that was not discussed during college preparation programs. The educators wanted more resources for helping their students reach high levels of self-efficacy, which was something they commented as something that was left out of the curriculum.

The participants also mentioned the requirements of goal setting in the teacher evaluation system that SMPSD uses. They described that, at the beginning of each school year, they are required to write a personal goal and a student learning goal. These goals serve as the driving force for the year, and the educators have to document the steps they are taking to reach those goals. In turn, these goals force the educators to look at the school year with a positive light and see all of the potential that lies in front of them. Through these goals, the evaluators provide feedback through observations throughout the year. These check-ins afford the educators the opportunity to self-evaluate and reassess where they are on the path to achieving the goals. Working with an administrator, each educator had the ability to identify resources they may need in order to reach their goals and help their students gain a positive sense of accomplishment, especially regarding mathematics. It is interesting to note that eight of the participants, although
they are elementary educators and teach all of the subjects, noted that their student learning focused on mathematics for the upcoming year.

The self-efficacy of novice elementary educators can make or break their level of achievement in their classrooms. There are many factors that can bring stress to a new teacher, and if the teacher does not have the resources to tackle what might arise, it is possible he or she could struggle. These are the emotions described by the participants of this study. The first five years are so pivotal for a new educator in figuring out how to transfer the skills learned in college to the classroom, but it is challenging if those skills are not pertinent to the realities of a school day. Bandura (1991b) spoke about how a person’s self-efficacy is something that is set in clay rather than stone. The basis of the self-efficacy may shift, but overall there are no substantial changes in how capable a person believes himself to be. Yet the participants of this study, with higher than average levels of self-efficacy, expressed such frustration, anger, and doubt in regard to their abilities as educators leaving their college preparation programs.

**Social Cognitive Theory**

Similar to the self-efficacy theory, Bandura’s (1991a) social cognitive theory discussed a person’s ability to act in a way that would achieve a desired goal. He stressed the four core features of personal agency (intentionality, forethought, self-reactiveness, and self-reflectiveness) and how they cause people, especially educators, to behave in a certain way. Primarily, intentionality is seen through a multitude of facts in the world of education. The participants of this study mentioned the need for intentionality in lesson planning, unit pacing, seating assignments, and other classroom management skills, many of which they had to learn on their own. For the participants, intentionality also surrounded their desire to attain the knowledge they believed they were lacking upon graduation from their preparation programs.
One participant mentioned she attends every math-related professional development session that the district offers in order to gain more skills and provide more rigorous, engaging math lessons for her students. Intentionality is easy to pick out from the interview transcriptions and coincides with the teachers’ level of self-efficacy.

The second core feature of personal agency, forethought, can be seen in the participant stories of goal setting, as mentioned previously with self-efficacy. The participants talked about setting goals for themselves and their students and breaking those goals into attainable steps for all involved to help them feel that they can reach the objectives. The goals are monitored by the educator as well as administration, and they work together to remain accountable for student learning. Forethought can also be seen during curriculum pacing, something that many schools are pushing now so students can successfully pass state mandated assessments. Forethought, similar to intentionality, takes part in the day-to-day undertakings in a classroom. With high levels of confidence in the two, teachers set themselves up to reach high potential within their classrooms.

Self-reactive and self-reflective, Bandura’s (2001) final two core features of personal agency, take place daily for the educators. To my surprise, many participants emphasized the importance their teacher preparation programs stressed on being self-reactive and reflective. Teachers are constantly challenging students to reflect on their thinking, words, or actions, so it is imperative that educators not only have the skills to facilitate that but also must possess the skills themselves. Not every lesson is going to go exactly as planned, regardless of the amount of forethought an educator put into it. It is the ability to react on the fly and reflect on it later that can make a great educator. One participant talked about a lesson she did in math class with fractions and M&Ms. She, with intentionality and forethought, meticulously planned out the
lesson, down to every last detail. When she timed the lesson prior to teaching it, she estimated
that the lesson could take anywhere from 50 to 60 minutes, depending on how quickly her
students were working that day. She laughed as she pointed out that the lesson took 15 minutes
for the students complete, and by the 20-minute mark all of the M&Ms were gone. This
particular participant was fascinating because she was keeping a journal of her experiences in her
first year as an educator. She was able to find the journal entry from that day and shared it with
me. Regardless of what she wrote about the lesson, the fact that she was able to be self-reflective
demonstrated the fact that this is a huge skill that educators need to possess.

Bandura (1991a, 1991b) constantly called people the agents of their experiences and used
the four core features to describe how and why people act the way they do. In his argument
about specific end goals, he mentioned that goals do not determine motivation (Bandura, 2001)
but yet, self-efficacy and social cognition play a massive role in motivation. Many of the
participants spoke about their own motivations for participating in the study as well as their
motivation for trying to continue to learn new skills. One educator mentioned the she is a
lifelong learner, and that it is her responsibility to ensure her students leave her classroom having
mastered the necessary skills to be successful in the next grade. All of the participants, with their
love of teaching, mentioned how no one is holding their hands to help them learn what they
missed in college; it is on them to be intentional about the gaps they need to fill.

Thankfully, both the educator participants and their students are full of potential and
vigor to continue to grow. This can be seen in both self-efficacy and social cognition and is an
immensely important characteristic in a new teacher and is something administrators may want
to consider during the hiring process. Personal efficacy and the efficacy the educators have for
their students can make or break how the school year unfolds. The link between these two
theories is evident and sheds a light on why the participants act and react the way they do. The amount of passion that was presented during the interviews allowed me to gain an unfiltered view into their daily lives and the struggles they are facing. It is paramount that college programs are focusing on pieces of their curriculum that will help develop a future educators’ sense of intentionality, forethought, self-reactive, and self-reflectiveness, which will have a positive effect on self-efficacy.

**Teacher Self Efficacy**

The concept of self-efficacy extends to the educators’ beliefs about their students’ ability to succeed. One participant recanted a story of a teacher she had in middle school who appeared to hate working with children, so the participant was shocked that this woman ended up as an educator. The participant claimed the teacher wanted her students to fail, so she would often set themselves up for a letdown and shattered the confidence of the students. This is the opposite of how the participants described their students. The students were described as limitless, full of potential, driven, and able to achieve anything they set their minds to, so it is up to the teachers to facilitate that realization. Self-efficacy causes a person to view life in a different way, and the higher the level or self-efficacy, the more positive the outlook a person will have. People with a strong sense of self-efficacy view problems as tasks to be mastered, develop interest in the activities in which they participate, commit to their interests, and recover quickly from setbacks (Banas, 2014, p. 240). With this notion, the participants with a strong sense of self-efficacy felt better equipped and more confident to handle the unpredictable challenges that arise in their classroom. These educators are more confident in their ability to deliver the curriculum as well as their ability to problem solve as trials arise.
This cyclical process, the chain of preparedness and high levels of self-efficacy, has an immeasurable effect on the students. One educator ended her interview reiterating the magnitude of the responsibility educators carry. She mentioned that she has the power to make or break a student’s attitude towards mathematics, and that is not a responsibility she took lightly. It is something that forces her to use the four core features of social cognition, identifiable in her interview, along with her belief that all of her students can succeed. Through the Teacher Efficacy Scale and the interviews, it is clear that all of the participants possess the “I think, therefore I can” attitude, which is a combination of Descartes and Bandura, in regard to both their students and their own personal success. The participants are driven to ensure their students reach their highest potential, and they are willing to do whatever it takes to get them there.

**Transition from Preparation Program to Classroom**

Transitions in any type of job can be challenging and there will always be a gap or learning curve. For the participants of this study, that gap was detrimental to their success in their first year in their classroom. Concepts that are basic to a seasoned teacher are alien to new teachers, and many of the participants expressed their shock in the content that was missing from their program. The participants of this study all believed they possess the ability to be successful in their classrooms, they merely need the tools to get there. Self-efficacy is the reason the participants acted the way they did. Debatably, it is the reason they participated in the study to begin with. All of the participants came with a passion for the field, as exemplified in the theme of education as a calling, and all sought to share their stories in the hope that things could change for future educators. These participants set in their minds that they will be successful teachers and that their students will understand the grade level expectations of them. The issue arose in the lack of preparation that they felt upon leaving college.
In order to ensure that success, the participants have gone above and beyond their duties as an educator to keep their heads above water in their classrooms. They have bridged their own gaps in learning with their mentor teacher, professional development sessions, and additional college courses. One participant spoke of how at the beginning and the end of the year she writes a strengths and weaknesses list, and then she uses that list to try and address her deficits with professional developments, trainings or workshops. Primarily, the participants scored themselves above the mean on the Teacher Efficacy Scale, showing that they believe in their ability to succeed. This, in turn, means the educators will continue to set higher goals for themselves and their students because they believe they can attain them.

**Implications**

In Chapter Two, I presented several main ideas in the literature review that later emerged as themes during data collection. The following themes were acknowledged in the research: (a) entering education was a calling, (b) experience leads to preparedness, (c) making math fun is challenging, (d) missing pieces of the puzzle - pedagogical techniques, (e) they did not teach me how to teach, and (f) “I’m drowning” - under preparedness of educators. The novice elementary educators answered questions on these themes in the Teacher Efficacy Scale, the virtual writing prompt, and the structured interviews. The following section discusses the relationship between the six themes above and the literature found in Chapter Two.

**Theoretical Implications**

The theoretical implications of this study lie in the results’ importance to educators, professors of education, and universities who train future educators. This study and its findings corroborate Bandura’s (1993) self-efficacy theory and his social cognitive theory (Bandura, 1991). I sought to better understand how teachers’ experiences in their pre-service teacher
programs have prepared them to teach mathematics, and I found that the materials and curriculum implemented in the preparation programs need to be revised. Professors in universities have a responsibility to appropriately prepare future educators for what they will face in their classrooms. The participants of this study realized they were not prepared upon entering their classroom for the first year. If the teacher wanted to be prepared, they needed to take it upon themselves to bridge the gaps between the preparation program and their classroom.

Bridging the gap in a classroom is not something that teachers require students to do, yet colleges are forcing new teachers to do just that. I focused on the individual teachers’ levels of self-efficacy regarding mathematics, both in content understanding and content dissemination, and found that colleges are not focusing on these areas at all. Preparation program curriculum must be revised to include many missing pieces of information that teacher will need in their classroom, especially including content dissemination strategies and classroom management skills. I also probed about the ability to handle challenges that arise in a mathematics classroom through the participants’ stories, the difference between understanding math content and being able to effectively teach mathematics.

**Empirical Implications**

The findings of this study will contribute to the vast database of research on educators. While many articles have been published on the importance of educator preparedness, none probed the preparedness in mathematics in novice elementary educators. This study and its findings will have significance for researchers of education, and most importantly for universities that are preparing future educators. The notion of the burden of preparation of elementary educators is one that has been told many times. Elementary educators are responsible for having a grasp on all content areas: language arts, mathematics, social studies,
and the arts. With students in Massachusetts continually underperforming on state standardized tests, even though they are the number one state in the nation for mathematics (National Center for Education Statistics [NCES], 2013), it is more important than ever to ensure that future educators are prepared to enter their classrooms each school year. One recommendation to ensure teachers feel prepared their first year is a new teacher professional development series. These professional development courses could be held either during the school day or after school and would cover a variety of topics that were not covered in the preparation programs or that teachers would like more information on. For example, some courses could cover curriculum development, content dissemination, Positive Behavioral Interventions and Supports, special education information on IEP’s and team meetings, and STEM trainings to name a few.

**Practical Implications**

The practical implications of this study lie in the information provided by the educators about their experiences. It is evident that changes need to be made to educator preparation programs or to school district professional development offerings to allow future educators to feel that they have the resources necessary to be successful. Teachers, administrators, evaluators, the local school board, the superintendent, local colleges with education programs, professors, and future educators can all benefit from this study. A month into the school year, there are still three vacant elementary math positions in SMPSD. The themes that presented through the data will help all stakeholders recognize and address the deficiencies in collegiate elementary educator preparation programs and how school districts, administrators, and veteran educators can better support new teachers.

These results point out that teacher preparation programs need better curriculum for preparing teacher candidates, both pedagogically and emotionally, to teach mathematics. Deans
of the Education programs at area colleges should evaluate the effectiveness of their current
curriculum and make any changes necessary to help the educators leave with higher self-efficacy
for teaching. This study is significant not only for the educators involved and the schools at
which they teach, but also to the administration of other surrounding school districts and
universities that have teacher preparation programs in the southeastern Massachusetts area. It
could be argued that the findings of this study are applicable to novice elementary educators
throughout southeastern Massachusetts and even neighboring states, such as Rhode Island.

**Delimitations and Limitations**

The results of this study are limited in that they apply to the specific group of
participants. The results may not apply to a different group of participants in a different district
or state. This study was full of delimitations as I had a very specific pool of participants I was
looking at. I did not include kindergarten teachers, as their level of mathematics required is
different than that of certified elementary teachers. Their teaching licenses also did not allow
them to participate. No administrators, regardless of whether or not they currently teach, were
included in the study. My goal was to describe the lived experiences of teachers only, and
administrators or pseudo-administrators have different experiences with curriculum and
education, as a whole, than novice educators. Administrators, by nature of the position, already
have several years of teaching experience, which is not what I wanted to focus on. By excluding
administrators, the reliability of the experiences of novice educators increased. I also only
included teachers that are certified to teach in the state of Massachusetts, one of the hardest states
in which to gain a teaching license. The requirements include possession of a bachelor’s degree,
completion of a Massachusetts elementary approved program passing the communication and
literacy skills test, passing a general curriculum multi-subject test, passing the foundations of
reading test, and passing a mathematics subtest, to name a few. With other New England states so close, it would have been easy to include teachers from New Hampshire or Rhode Island, but instead I chose to focus on one large district due to the proximity of the district to my home.

A limitation of the study is the gender breakdown of the participants. Ideally, I would have had 50% of the participant male and 50% female, but the reality is that the majority of elementary educators are female. In actuality, I was pleasantly surprised and frankly elated to have two men participate in my study. The ethnic breakdown of the participants was also a limitation. All 11 of the participants identified as Caucasian in the demographic survey, and I would have liked to have more diversity amongst the participants. I was fortunate to have a relationship with the superintendent of the district, who allowed me to mass email all of the elementary school teachers, but I only received replies from 11 people who were interested in serving as participants in the study. Another massive limitation of the study is the proximity of the school district to one of the largest teacher preparation programs in the state. A 20-minute drive, the university began as a teacher preparation college and continues that lineage today. I went into the study well aware that the majority of the participants might have come out of that preparation program, but I was able to find teachers who had studied at a variety of universities throughout their undergraduate and graduate schooling.

The final limitation to the study was the size of the sample of participants. As someone with a math background, I debated for a while between qualitative and quantitative research, ultimately deciding I am a story teller first and foremost. Ideally, I would have loved a larger, more even disbursement of participants that are representative of all of the grades included in an elementary teaching license. At 11 participants, my sample size was appropriate for a transcendental phenomenological study, and I was able to truly get to know the experiences of
the participants. While this view is moderately restricted due to the small sample size, the essence of each participant is evident in Chapter Four.

**Recommendations for Future Research**

The phenomenon in question in this study was that of novice elementary teachers’ experiences with their level of preparedness to teach mathematics. I found, without exception, that all of the participants felt underprepared in some way. The overarching consensus was that college programs pale in comparison to the hands-on learning that teachers go through in their classrooms. Only one participant had a slight edge over the others in that she had a background in mathematics, but even she admitted that a degree does not equate to an ability to effectively disseminate the content. This study would be interesting to replicate from a quantitative standpoint. It could easily be replicated with the data coming from a questionnaire and then run through Statistical Package for the Social Sciences (SPSS).

The results of this study also point in several directions for future research but can be divided into two categories: research in schools and research in colleges. The first, research in schools, provides several avenues of potential study. Initially, it could be interesting to examine administrators’ interpretations of their new educators’ levels of preparedness. Where administrators are observing new educators many times within their first few years of teaching, it would be notable to figure out in what areas new educators are lacking the most. Administrators could provide insight into the mentor system that occurs in their schools and what the mentor teachers are responsible for when guiding the new educators. They would also have insight to talk about the areas in which new teachers tend to lack, either curriculum wise or pedagogically.

Another interesting area that could be studied is the perception of student teachers in a classroom. A similar study could be conducted but with the focus on how prepared the student
teachers feel in regard to mathematics. Alternative areas that could be studied for future research are the effectiveness of professional development days. Many of the participants in this study noted the importance of the professional development days in their hands-on, experience driven learning. These days, which are built into the school year or take place after school, provide the opportunity for educators to learn more about a topic or topics that interest them, usually ones that can be implemented into their classroom immediately.

The second area of study focuses on the teacher preparation programs themselves. A former college professor used to joke that the last time he was in the classroom was before computers were invented, and yet he was responsible for preparing future educators. The classroom of the 1980s is nearly unrecognizable when compared to the classroom of 2018, and the professors in charge of preparing educator candidates should have a grasp of the realities of today’s classroom. A study could be conducted on the effectiveness of full-time professors in teacher preparation in opposition to the effectiveness of professors who still teach outside of the college. It would be fascinating to see if it is more beneficial to have professors who still have one foot in the classroom. Preparation programs as a whole should be examined to see where the gaps in the curriculum lie. According to the results of this study, there are massive gaps in pedagogical skill learning, and many participants expressed the need to experience time in the classroom earlier than they did in their preparation program. Could earlier exposure and experiences in the classroom lead to higher levels of preparedness in the future?

Summary

The importance of studying how prepared educators are is evident. Nearly every person on the planet will come across an educator, school, or classroom at some point in his or her life. Humans, by nature, are curious beings, and we turn to schools and teachers to provide us with
the knowledge we seek. The Bible says, “An intelligent heart acquires knowledge, and the ear of the wise seeks knowledge” (Proverbs 18:15, ESV). The desire for knowledge will never cease. Colleges must take responsibility for the massive task of preparing future educators for the situations they will undoubtedly encounter. School districts must provide opportunities for educators to learn on the job and allow their students to gain new skills. Arguably, education is the most important profession to choose because every other profession requires attending school. In many countries, such as Norway and Sweden, teachers are revered like doctors, and it is sad that that same level of respect and reverence does not exist in the United States. There is a cyclical pattern of responsibility between future teachers, professors, schools, and school districts to provide students with prepared educators and rigorous curriculum.

It was instantly evident in the first interview and then continued to surface in each interview after that these teachers do not feel ready. These educators, with high levels of self-efficacy, have had to take learning into their own hands to fill the gaps in education between their collegiate preparation program and their classrooms. It is our duty to do better by our teachers. Imagine a scenario where a person with heart trouble needs a bypass. During the pre-op, when the patient is speaking to the doctor, the patient finds out that the doctor attended medical school but concentrated on veterinary studies and not on human studies. Sure, the doctor has had training, but is he really prepared to operate on this patient? Many people would not allow themselves to go under the knife in this situation. In essence, we would never send a doctor into an operation room without the proper equipment and training, so it is inconceivable that we are forcing educators into that exact scenario.
REFERENCES


doi:10.1177/8755123315610386


doi:10.3390/educsci7010027


Hampshire, O. (2014). Middle school mathematics teachers’ experiences with school-based and district-based support and its relationship to integrating technology. *ProQuest LLC.*


Hesson, N. (2016). How do selected novice middle school teachers from various certification pathways perceive the effectiveness of their teacher preparation? *ProQuest LLC.*


Siegler, R. S., Duncan, G. J., Davis-Kean, P. E., Duckworth, K., Claessens, A., Engel, M., . . .


Urban, D. J. (2013). Toward a framework of inclusive social studies: Obstacles and opportunities in a preservice teacher education program. *ProQuest LLC.*


APPENDIX A: IRB Approval Letter

May 2, 2018

Ashleigh R. Chaves
IRB Approval 3236.050218: Novice Elementary Teachers' Experiences with Preparedness to Teach Mathematics: A Phenomenological Study

Dear Ashleigh R. Chaves

We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

[Signature]

Liberty University | Training Champions for Christ since 1971
APPENDIX B: Informed Consent

CONSENT FORM

Liberty University’s Institutional Review Board has approved this document for use from 5/2/18 to 5/1/19. Protocol # 3236.050218

Novice Elementary Teachers’ Experiences with Preparedness to Teach Mathematics: A Phenomenological Study
Ashleigh R. Chaves
Liberty University
School of Education

You are invited to be in a research study on Novice Elementary Teachers’ Experiences with Preparedness to Teach Mathematics. You were selected as a possible participant because you are over the age of 18 and are certified to teach mathematics in grades 1-6 in the state of Massachusetts and have taught for less than five years after completing your teacher preparation program. Please read this form and ask any questions you may have before agreeing to be in the study.

Ashleigh Chaves, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this transcendental phenomenological study is to describe novice elementary teachers’ experiences with preparedness to teach mathematics in a large school district in southeastern Massachusetts.

Procedures: If you agree to be in this study, I would ask you to do the following things:

1. Demographic Survey, lasting approximately 5 minutes. Pseudonym will be assigned to your response.
2. Teacher Efficacy Scale, lasting approximately 5 minutes. Digitally recorded response.
3. Virtual Writing Prompt, lasting approximately 5 minutes. Digitally recorded typed response.
4. Interview, lasting approximately 1 hour. Audio recorded.
5. Review the transcription of your interview for accuracy.

Risks: The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

Benefits: Participants should not expect to receive a direct benefit from taking part in this study. This study will benefit local school districts in its ability to help identify whether or not teachers are leaving their educator preparation program feeling prepared to teach mathematics. It may
also help local universities better understand how prepared their teacher candidates feel upon graduation.

**Compensation:** Participants will be compensated for participating in this study. Participants will be given a $10 gift card to either Starbucks or Amazon.

**Confidentiality:** The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. I may share the data I collect from you for use in future research studies or with other researchers; if I share the data that I collect about you, I will remove any information that could identify you, if applicable, before I share the data.

- Participants will be assigned a pseudonym. I will conduct the interviews in a location where others will not easily overhear the conversation.
- Data will be stored on a password locked computer and may be used in future presentations. After three years, all electronic records will be deleted.
- Interviews will be recorded and transcribed. Recordings will be stored on a password locked computer for three years and then erased. Only the researcher will have access to these recordings.

**Voluntary Nature of the Study:** Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University or your school. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

**How to Withdraw from the Study:** If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw, data collected from you will be destroyed immediately and will not be included in this study.

**Contacts and Questions:** The researcher conducting this study is Ashleigh R. Chaves. You may ask any questions you have now. If you have questions later, you are encouraged to contact her at [redacted] or arsmith29@liberty.edu. You may also contact the researcher’s faculty chair, Dr. Russ Claxton, at rclaxton@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, you are encouraged to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 1887, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.

**Statement of Consent:** I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.
(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

☐ The researcher has my permission to audio-record me as part of my participation in this study.

________________________________________    Date

Signature of Participant

________________________________________    Date

Signature of Investigator
APPENDIX C: Teacher Efficacy Scale

https://goo.gl/forms/thEOrM1clV7qBs3J3