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### **A Descriptive Phenomenological Exploration of Resiliency through Math Curriculum Changes from the Perspectives of Elementary Educators**

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A DESCRIPTIVE PHENOMENOLOGICAL EXPLORATION OF RESILIENCY  
THROUGH MATH CURRICULUM CHANGES FROM THE PERSPECTIVES OF  
ELEMENTARY EDUCATORS

By  
Shanna Good

A Dissertation Submitted to the  
Gardner-Webb University School of Education  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Education

Gardner-Webb University  
2019

## Approval Page

This dissertation was submitted by Shanna Good under the direction of the persons listed below. It was submitted to the Gardner-Webb University School of Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Gardner-Webb University.

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## **Abstract**

A DESCRIPTIVE PHENOMENOLOGICAL EXPLORATION OF RESILIENCY THROUGH MATH CURRICULUM CHANGES FROM THE PERSPECTIVES OF ELEMENTARY EDUCATORS. Good, Shanna, 2019: Dissertation, Gardner-Webb University.

Phenomenological research in education, especially regarding curriculum, is rare. Curriculum change in the state has occurred seven times since 2002, and more so in each district with material adoption. This descriptive phenomenological research study describes the experiences of elementary educators through changing math curriculums. To collect data, the researcher interviewed 10 elementary math teachers including a pilot interview. Using a purposeful, convenience sample, three participants from three different schools participated in this study to ensure validity and reliability. After conducting semi-structured interviews, the researcher followed protocol for descriptive phenomenological research and analyzed the data for meaning units that described how changing math curriculums affected teachers' resiliency through those changes. The findings supported the idea that participants exhibited high levels of resiliency as well as an overall positive shift in their students' understanding of number sense. Findings also indicated participants felt supported in curriculum change and overwhelmingly sought support in collaboration with colleagues.

*Keywords:* math, curriculum, resilience, implementation theory, elementary

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## **Chapter 1: Introduction**

Aguilar (2018) described resilience as a set of adaptive behaviors and outlined the idea that resilience can play in transforming schools. Hall and Hord (2014) offered principles to follow when implementing change, and Siebert (2005) explained the levels of mastering resilience. This study is a qualitative, phenomenological process to describe the way elementary educators have persevered and maintained resiliency through mathematical curriculum change.

### **Historical Context**

Wagner and Dintersmith (2015) claimed that “from their earliest origins, humans invented, learned, and adapted” (p. 21). From primitive drawings on caves to Egyptian hieroglyphics on papaya, human nature was to discover and share. As society changes, curriculum must change so that it maintains usefulness (Marsh & Willis, 2007). Apprentices gave way to trades, which led to schools, colleges, and universities. Society is responsible for essential curriculum pursuits which reflect in the needs of the present and the future (Marsh & Willis, 2007). Laws were passed that required children to attend school; and in the 19<sup>th</sup> century, “formal” education started to take shape. “By the end of the century, most Americans believed that democracy required broad political participation and thus everyone needed some formal education, not necessarily to be leaders themselves, but to be able to choose leaders wisely” (Marsh & Willis, 2007, p. 33).

When the Progressive Education Association (PEA) initiated the “Eight-Year Study” and eventually published it in 1942, it started the shift towards what is now known as the “traditional academic education” in place today (Marsh & Willis, 2007).



Sputnik launched in 1957; and in the 1970s, pressure in the form of accountability started to sweep the nation (Marsh & Willis, 2007). In response, the state's first testing program was established in 1977 which created annual competency tests for students in Grades 1, 2, 3, 6, and 9 (Peek, 1992). As the years have progressed, new testing measures have led to new adoptions of curriculum. According to the state department of public instruction's website, the department of education ensures that the enacted curriculum is reviewed every 5-7 years to allow for consistent implementation and necessary revision.

According to the North Carolina State Board Policy Manual, the K-12 mathematics Standard Course of Study (SCOS) has been revisited and revised seven times (including the shift to the Common Core State Standards [CCSS]) since the state adopted the term to unify the format for consistency in 2002.

Change is inevitable, and assessing reform is a difficult task (Tyack & Cuban, 1995). Curriculum reform is one of the most challenging tasks to assess, as most state and local administrations insist on using standardized testing to judge the ability of both students and teachers regarding the mastery of curriculum content. "Phenomenologists are interested in trying to slow down and open up how things are experienced, as scientists, theologians, students, teachers, nurses, leaders, bricklayers, electricians, plumbers, mechanics, and so on, are doing what they do" (Vagle, 2018, p. 23). Using a phenomenological lens, this study sought to understand how elementary teachers experienced and navigated these mathematical curriculum changes.

### **Overview of the Research Problem**

Math brings anxiety to many students, their parents, and their teachers (Tobias, 1987). Tobias (1987) wrote that from all perspectives, it is hard to understand why some

individuals feel competent and others feel inept. The debate usually ends in disagreement on whether one really needs math to become a successful citizen. Boaler (2016) stated, “No one is born knowing math, and no one is born lacking the ability to learn math” (p. 5). So, why is it still common to hear that people are not “naturally good at math?”

When the CCSS Initiatives were launched in 2009, teachers had mixed emotions with the changes of the course of study. “Today, 41 states, the District of Columbia, four territories, and the Department of Defense Education Activity (DoDEA) have adopted the Common Core and are implementing the standards according to their own timelines” (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010, para. 1). The CCSS delivered key components missing in some state curriculums that aligned with higher level thinking skills that contribute to math best practices and problem-based learning.

Boaler (2016) described a common predicament of elementary school teachers, noting they are often told at some point in their lives that math is not for them, which leads to a fear of teaching it. Tobias (1987) argued there are two myths about math: (a) college level mathematics is too difficult to master, and (b) without mathematics one cannot live a productive and professional life. According to Tobias (1987), college level mathematics anxiety can stem from the “style” of traditional mathematics teaching in that it does not offer discourse or discussion; answers are right or wrong, black or white.

Tobias (1987) continued with describing that people often assume you must be good at math *or* numbers and that being good at both is not usually part of your professional life. Elementary educators who have been teaching since at least 2008 offer a unique perspective on their personal and professional experiences with math and how the

changing curriculum affected their perceptions, teaching, and related phenomenon.

“Mathematics is a cultural phenomenon; a set of ideas, connections, and relationships that we can use to make sense of the world” (Boaler, 2016, p. 23). Researchers and educators need to continue to make connections between curriculum mandated from the district, state, and nation in comparison with what it means for the teachers implementing those programs and standards. Relationships of all kinds (with colleagues, with past experiences, and with content) need to be studied to provide rich professional development experiences that encourage reflection of new and engaging practices. This study explores and describes those lived experiences through phenomenology.

### **Purpose Statement**

The primary purpose of this study was to provide a description of how elementary educators persevered through math curriculum changes. Teachers who have been teaching since at least 2008 have experienced at least three curriculum changes from the state: SCOS, CCSS, and the SCOS incorporating the CCSS (NCSCoS). Many school districts have also implemented more specific programs to facilitate the new curriculum. Once teachers comprehend the big ideas and essential questions, the curriculum pathways seem to alter and therefore require teachers to adopt something new. By investigating and describing the ways in which teachers handle and push through the constant changes that are being implemented by state and local leaders, this study provides a foundation of growth for the importance of descriptive phenomenology in education.

A secondary purpose of this study was to help pave the way for increased awareness of phenomenology in education research. Vagle (2016) described conducting an ERIC search for peer-reviewed articles with phenomenology in three leading

curriculum studies journals and found only seven of 1,081 matched for the Journal of Curriculum Studies, two of the 378 matched for Curriculum Inquiry, and none of 20 matched for the Journal of Curriculum Theorizing. The researcher conducted a similar ERIC search (December 21, 2018) that resulted in only 231 total results using the descriptor phenomenology in educational practices. One reason widespread change only occurs modestly is that implementers do not fully understand what it looks like when completed (Hall & Hord, 2014). Conducting and publishing educational research with phenomenological methods can help teacher practitioners envision final products.

### **Statement of the Research Problem**

There is research suggesting phenomenology and curriculum studies are beneficial. Iannone (1995) pointed out that there is not one specific formula, rule, or theory that works with every group of students and such should be with trying to research the science of curriculum and teaching. A phenomenological case study by Duobliene (2013) highlighted the connections between phenomenology and critical pedagogy to the development of dialogue and critical thinking. Garcia and Lewis (2014) used a phenomenological lens to study curriculum development in teacher education programs and found that it emerged as a critical tool that stayed true to the lived experiences of teachers that otherwise got lost when the concern of praxis (as a relation between belief and practice) was at the forefront of teacher education programs. This study will help contribute to research with evolving math curriculum. Steiner (2017) wrote that strong research on curriculum should be a top priority and that “what we teach isn’t some sidebar issue in American education: it is American education” (p. 11).

## **Methodology**

Instead of measuring resilience levels by using quantitative methods or by strictly gathering observational data to code and analyze, this research explored the lived experiences of the actual phenomenon of math curriculum as described by the teacher who experienced this change (Christensen, Welch, & Barr, 2017). In 1970, Husserl identified phenomenology as the philosophy of examining and studying consciousness (Giorgi, Giorgi, & Morely, 2008). “The phenomenological approach dwells on how consciousness presents itself and its functions” (Giorgi et al., 2008, p. 177). Unlike empiricism and hermeneutics, phenomenology calls for description, not interpretation (Giorgi, 2012). Phenomenology wants to understand, not dictate and therefore requires both the subject and the act (Giorgi, 2012). The subjects are the elementary teachers who have taught through at least three math curriculum changes and the act is how they responded to those curriculum changes. This study followed Giorgi’s (1985; 1997) five-step Descriptive Phenomenological Psychological Method (DPPM). Giorgi et al. (2008) wrote that with this method, the descriptions come from others, not the researcher. The intended outcome is more psychological than philosophical, as it will provide facts, not interpretations (Giorgi et al., 2008).

## **Research Question**

Moustakas (1994) stated that phenomenological research questions stem from intense interest in a particular topic and that excitement and curiosity inspire them. By building on the concept of Vagle’s (2018) idea of slowing down and getting the descriptions of what teachers do, this study focused on discovering the meaning of the phenomenon of math curriculum change (Englander, 2012). This study asked one

question, “How do elementary teachers describe their lived experiences through multiple math curriculum changes?”

### **Definition of Terms**

**Curriculum.** Marsh and Willis (2007) offered eight different versions of the term curriculum and even acknowledged their definition is a working definition. The definition used for this study is “an interrelated set of plans and experiences that a student undertakes under the guidance of the school” (Marsh & Willis, 2007, p. 15). Curriculum is the interplay between the teacher and the material and how that manifests in the life world.

**Resilience.** The term resilience brings connotations of hardship, trial, and struggle. Greitens (2015) argued that too often we determine resilience as the amount of challenge one experiences instead of what we have done to contribute to those situations. “Resilience is often endurance with direction” (Greitens, 2015, p. 25). Siebert (2005) described people with high levels of resiliency as people who can “bounce back” and expect to be flexible and adaptable to change.

### **Summary**

This study provided a concrete example of a phenomenological approach in curriculum studies. This study used resilience as a theoretical lens to frame interview questions, semi-structured interviews as a medium, and then described those findings with meaning units. The intent was to explore the emotions and actions of veteran elementary educators as they have navigated math curriculum throughout their career to provide a resource for all educators who are experiencing the same changes.

## Chapter 2: Literature Review

### Overview

Phenomenology in education is a rarely used medium for research (Vagle, 2016); therefore, the purpose of this study was to deliver a descriptive phenomenological example of how elementary teachers persevered through at least three math curriculum changes. Semi-structured interviews and utilizing Giorgi's (1985; 1997) five-step method provides rich descriptions of how those teachers persevered. In following Butin's (2010) idea that a literature review acts as a rationale for the research conducted but maintaining Vagle's (2018) commitment to remain as open as possible to the phenomenon, a partial review of relevant literature is provided. The overall research question was, "How do elementary teachers describe their lived experiences through multiple math curriculum changes?" To conduct an accurate phenomenological study, it is vital that there is room for novel ideas to present themselves (Dahlberg, Dahlberg, and Nystrom, 2008); therefore, this chapter provides a brief overview of curriculum theory, math curriculum best practices, math anxiety, implementing change, and resilience.

### Curriculum Theorists

McNeil (1990) wrote that there are two kinds of theorists at work, soft and hard curricularists. As this research is not based on *how* to teach, but rather the interactions with teachers and their math curriculum, it is essential to describe the differences in the ones studying the curriculum, the curricularists. McNeil described the soft curricularists as ones who are presenting at conferences and writing articles and journals to understand the educational experience. The hard curricularists, on the other hand, rely on empirical data validation to follow a more rational approach to theory. This study is a combination

of both the hard and soft descriptions of McNeil: the rational approach given the nature of a dissertation needing a process, plan, and objective while weaving in the soft with the idea of phenomenology and the exploration of the explanations of teachers interacting with math curriculum.

### Curriculum Theory

Ubben, Hughes, and Norris (2017) had a very succinct explanation of the underlying threads of curriculum theory in general, and they are summarized in Table 1 to provide a more definitive picture of the ways the elementary teachers in this study could be taking an approach to their teaching styles.

Table 1

#### *Basic Threads of Curriculum Theory*

Theory	Purpose	Principal's Role	Teacher's Role	Approaches	Critique
Technological	To measure	Manager	Laborer or craftsperson	Sequential, mastery learning, time on task, skills acquisition	Little higher-order thinking
Academic	To research	Lifelong learning encourager	Authorities of subject	Fine arts, no frills Paideia, integrated studies	Too much emphasis on content and not process
Humanistic	Maximizing potential	Model for human relationships	Establish a climate of growth and risk; facilitator of experience	Holistic, reality thinking, self-awareness, self-discipline	Overemphasis on individual, not enough on group
Social reconstruction	Social change	Problem finders; revelers of the 'hidden curriculum'	Bridge between student and community; facilitator	Problem based learning, action learning, service learning, and multicultural education	Few agree on what is best for future society

*Source:* Adapted from Ubben et al. (2017).

The purpose of the technological theory is that of skill mastery and how to



measure it while systemizing learning to make it more predictable (Ubben et al., 2017). With curriculum history, this idea aligns with the Committee of Ten and Fifteen's reports to construct alignment and planning (Marsh & Willis, 2007). McNeil (1990) wrote that a technological perspective has been a significant factor in the competency testing movement forcing school accountability and that at first glance, it appears to be concerned with *how* rather than *what*. This is evident in curriculum assessments with pre and posttests, end-of-year exams, and evaluations of what was and was not learned.

McNeil (1990) wrote that the national anxiety in the late 1950s centered on keeping ahead of the Russians generated the cause of the academic curriculum approach. Under this approach is where students learn to think for themselves, to challenge, and to explore the content. "In this approach, there is a core of knowledge that every student should possess, and that learning is acquiring knowledge through the disciplines" (Ubben et al., 2017, p. 111). In this theoretical approach, teachers are considered the authority of knowledge and usually pass that information down through lectures and direct instruction (Ubben et al., 2017).

Arguments for the shift away from child-centered curriculum in the 1980s because of the assumption that the nation was at risk gave the humanistic theoretical approach a negative connotation (McNeil, 1990). "The humanistic curriculum increases self-awareness; it allows learners to seek typical personal patterns in their responses to a series of activities" (McNeil, 1990, p. 9). This is where one can see restorative practices and mindfulness coming into education today. Ubben et al. (2017) described this theory as holistic; affective development is just as important as academic development.

Ubben et al. (2017) argued that the purpose of social reconstructionism theory is

that “no real learning occurs until action is taken on that learning; learning is activity dependent” (p. 115). This approach is arguing for staying current and relevant with issues and trends in society and that “curriculum is the vehicle for change” (Ubben et al., 2017, p. 114). The argument with this theory is that there are no set rules or regulations (McNeil, 1990). What is relevant in one area might not be in another, or what is relevant 1 year might not be with the same group the next. Curriculum and the theories driving it influence what and how teachers teach. Often, teachers find themselves combining all four theories into one lesson. Rote practice before an activity models the academic approach and then, after that practice, a combination of humanistic and social reconstructionism occurs in group projects and rich problem-solving tasks. Then pre and posttests are given to provide the data that come with the technological approach. With math and the educational shifts of national curriculum and theory, research is provided for a mixture of all four theories to be prevalent in the best practices for math curriculum described in the next section.

### **Math Curriculum Best Practices**

Being a change agent or a facilitator of best mathematical pedagogies involves making teachers mindful of best practices. “Successful teachers use teaching methods that more people should know about” (Boaler, 2008, p. 12). With the implementation of the CCSS in 2009 and the standards for mathematical practice (Table 2), more educators became aware of key principles for effective mathematical behaviors and practices. These standards permeate all grade levels and indicate what proficient mathematicians do. These math practices should be folded into everyday teaching according to the CCSS for mathematical practice (National Governors Association Center for Best Practices,

Council of Chief State School Officers, 2010). Students should learn the concepts and should also learn how to apply the concepts to the real world with relevant, authentic tasks.

Table 2

*CCSS for Mathematical Practice*

CCSS.MATH.PRACTICE.MP1	Make sense of problems and persevere in solving them
CCSS.MATH.PRACTICE.MP2	Reason abstractly and quantitatively
CCSS.MATH.PRACTICE.MP3	Construct viable arguments and critique the reasoning of others
CCSS.MATH.PRACTICE.MP4	Model with mathematics
CCSS.MATH.PRACTICE.MP5	Use appropriate tools strategically
CCSS.MATH.PRACTICE.MP6	Attend to precision
CCSS.MATH.PRACTICE.MP7	Look for and make use of structure
CCSS.MATH.PRACTICE.MP8	Look for and express regularity in repeated reasoning

*Source:* National Governors Association Center for Best Practices, Council of Chief State School Officers (2010).

In making sense of problems (MP1), students not only understand the scenario that is being described but also persevere when attempting to solve a difficult problem. Driscoll (1999) described the impact teacher questioning can have on how students make sense of problems to solve them, indicating the need for teachers to know the content and be direct in influencing mathematical habits of mind. For mathematical practice 2, students should be able to use reason. For example, if Suzie bought eight apples and then ate three of them, the answer should be smaller than the original number of apples. Reasoning abstractly involves being able to represent and manipulate numbers. For

instance, if asked to deconstruct numbers within 10, which is a first-grade standard, students would be able to explain that not only is  $5+5=10$ , but so is  $3+7$  and  $4+6$ .

Constructing viable arguments (MP3) requires students to be able to explain and prove the previous example. They can answer why their strategy works, not just use it.

Modeling (MP4) is a great way to solidify understanding. For instance, as aligned to the CCSS, students learn how to apply what they learned in fourth grade with the box multiplication strategy to high school algebra's multiplying polynomials. Using appropriate tools (MP5) and attending to precision (MP6) maintains that students will be able to choose the most efficient method for their practice and then explain it using appropriate units of measurement. In first grade, students are asked to use everyday objects to measure; they need to know that using paper clips takes less time than marshmallows to measure the length of their paper. They also need to be able to explain that while it may take less time and tools, marshmallows provide a more precise measurement. Looking for structure (MP7) and repeated regularity (MP8) ensures that students combine their previous practices to generalize and connect using patterns and series. For example, in third grade, students are asked to add and subtract using the method for addition and subtraction with no regrouping and apply it to problems with regrouping. Students can see the hundreds boards breaking down into tens blocks, and then those tens blocks breaking down into ones to "borrow."

Smith and Stein (2011) incorporated the mathematical practice standards to give five practices that orchestrate math discussions: anticipating, monitoring, selecting, sequencing, and connecting. "Anticipating requires that teachers do the problem as many ways as they can" (Smith & Stein, 2011, p. 8). To demonstrate the CCSS for

mathematical practices, teachers must have an idea of how their students are going to respond so they can effectively monitor the mathematical discussions that may arise. Planning is essential in selecting student responses so that a connected sequence in instruction is effective. Smith and Stein wrote that these practices are what provide teachers with control over student-centered pedagogy.

Mathematics education best practices should incorporate making Hattie's (n.d.) visible learning happen through teacher intention and questioning. These best practices should be accessible to all through the national CCSS guidelines and the CCSS for mathematical practices. "All teachers have the capacity to be stars-they just need access to opportunities to learn, reflect, and grow" (Smith & Stein, 2011, p. 94).

### **Math Anxiety**

According to College Rank (2018) the top 10 highest paying college majors are petroleum engineering, actuarial mathematics, nuclear engineering, chemical engineering, electronics and communications engineering, electrical and computer engineering, computer science, human resources, economics, and biology. All these majors have one widespread denominator: math. Tobias (1987) argued that many higher education students are unwilling to study math because they are convinced that they "just aren't good at it" (p. 4). Oakley's (2014) ideas took it a step further and claimed that it can be a "saintly subject" (p. 2) in that it climbs and builds from addition to subtraction to multiplication to division but that it can also be a "wicked stepmother" (p. 2). "All you need is a disruptive family life, a burned-out teacher, or an unlucky extended bout with illness-even a week or two at a critical time can throw you off your game" (Oakley, 2014, p. 2).

A study by Pinxten, Marsh, De Fraine, Noortgate, and Damme (2014) found that both math enjoyment and math competence beliefs were positively correlated to math achievement, and those correlations between perceptions of math competence and enjoyment became slightly smaller with increasing age. They also found that participants who believed they were competent had a correlation almost twice as large as those who showed correlations between math enjoyment and math achievement.

Tobias (1993) offered solutions to overcoming math anxiety through instructors offering ways to incorporate “feelings” or discussions and that those feelings will influence learning. Tobias (1993) also wrote that another approach could be to visualize mathematics, as described above in math best practices. It is beneficial to study if, how, and why math perceptions affect their math teaching. Math anxiety has been incorporated into the literature review because of Boaler’s (2016) statement that many elementary teachers do not believe they are good at math. The researcher has unofficially and curiously asked elementary teacher colleagues, and they have confirmed it. A third-grade teacher just recently lamented about how she hates fractions and can only do what she teaches because she has done it so often. The interview questions in Chapter 3 asked about participants’ math background and provide insight into any mathematical anxiety.

### **Conceptual Framework**

Siebert (2005) gave a 5-level process to mastering resiliency and stated that “Highly resilient people are flexible, adapt to new circumstances quickly, and thrive in constant change” (p. 2). Hall and Hord (2014) wrote a guide on how to effectively implement change, and Aguilar (2018) stated that if we boost our individual resilience, we will have more energy to address organizational and system conditions (policies,

scripted curriculum, assessment reform, etc.). Aguilar explained a conceptual framework for resilience as a pie (orange slices in Figure 1), that “who you are,” “what you do,” “how you are,” and “where you are” constantly intersect in time and space. Context, genetics, habits, and dispositions are at the core of our mood and temperament. The researcher combined that with Hall and Hord’s change principles (CP label, green tiles in Figure 1) and Aguilar’s explanation of the cycle of emotion (COE label, green tiles in Figure 1) to show that while the emotional cycle and change principles align in theory, Aguilar’s framework is the core of the sphere. The change principles (Hall & Hord, 2014) and the cycle of emotion (Aguilar, 2018) can start at any point on the exterior ring and move accordingly, but they are moving with the idea that mood and temperament are the core.

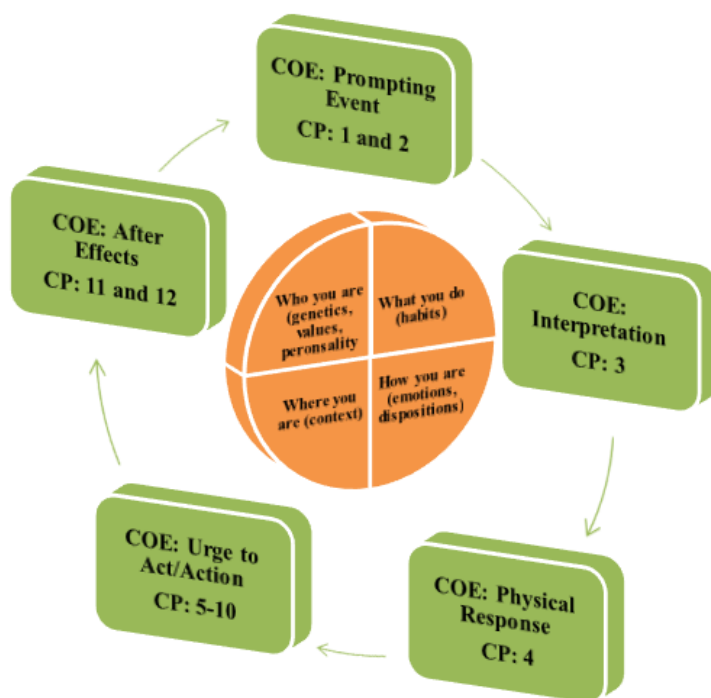


Figure 1. *Conceptual Framework.*

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*Source:* Adapted from Siebert (2005), Hall and Hord (2014), and Aguilar (2018).

As individuals move through Siebert's (2005) five levels of resiliency explained in Chapter 2, they should exhibit the full cycle of emotion outlined by Aguilar (2018) and have experienced most (if not all) of Hall and Hord's (2014) change principles.

Interviewing teachers with a background of at least two curriculum changes using a descriptive phenomenological lens helped illuminate those experiences.

### **Implementing Change**

"Implementation science was borne out of a desire to address challenges associated with the use of research to achieve more evidence-based practice (EBP) in health care and other areas of professional practice" (Nilsen, 2015, p. 1). Kunnari and Toom (2018) recently published a study that highlighted the experiences of teachers managing pedagogical innovation and found that collaboration was essential in not only significantly improving the teachers' work, but also student achievement. Hall and Hord (2014) addressed the challenges around educational pedagogical innovation by explaining the change principals they found in their work. "We need to emphasize that at all levels-individual, organizational, and system-change is highly complex, multivariate, and dynamic" (Hall & Hord, 2014, p. 8).

**Change principle 1: Change is learning—it's as simple and complicated as that.** Hall and Hord (2014) described this process with the help of riding a bicycle. We know we need to move faster, and the bicycle is the solution to that problem; however, we need to learn how to ride that bike. We need to learn how the bicycle works (pedals, rules of the road, etc.), but it is helpful when someone we know coaches us through that experience. "Professional learning is a critical component embedded in the change process" (Hall & Hord, 2014, p. 10).



**Change principle 2: Change is a process, not an event.** In this principle, Hall and Hord (2014) argued for at least 3-5 years for implementation and that short- and long-term goals need to be set and addressed along the way. They described that often teachers will need a period of mourning (grief, sense of sadness) to let go of some of their favorite parts of the already learned curriculum. When taking into consideration pedagogical changes, implementers need to be aware of the time it takes to learn and improve and that it is continual, not fixed.

**Change principle 3: The school is the primary organizational unit for change.** “Everyone—teachers and principals in the school and personnel in the district office must consider and understand how a school learns and advances as a change process unfolds” (Hall & Hord, 2014, p. 12). Schools are not an island, and while they are the “key” to success for change, everyone involved needs to be working together to pull and utilize resources. Hall and Hord (2014) emphasized here that change should be addressed the first year and then resources provided where individual schools need them as the process takes off.

**Change principle 4: Organizations adopt change—individuals implement change.** This principle is perhaps the most important idea of this study. The state and district have adopted curriculum changes, and the teachers are the ones implementing them. Hall and Hord (2014) described the many ways individuals affect the change process. Some may grasp the ideas immediately, some may need additional time, and some may avoid them altogether. Either way, there are patterns leaders should anticipate and adjust for (Hall & Hord 2014).

**Change principle 5: Interventions are key to success of the change process.**

Hall and Hord (2014) described the difference in innovations (the change itself) and the interventions (actions that facilitate). Interventions can include “one-legged interviews” (Hall & Hord, 2014, p. 15) or professional training workshops. According to Hall and Hord, interventions can be brief or in depth, but they are necessary actions that promote the change itself.

**Change principle 6: Appropriate interventions reduce resistance to change.**

Determining the type or reason resistance is being perceived is crucial. Hall and Hord (2014) described three types of resistance that include grief or a sense of loss for the comfort of mastered content, questions about the actual results of the implemented policy, and that pain must be endured for change to take effect. Understanding the differences in resistance is the foundation for addressing those feelings with appropriate interventions (Hall & Hord, 2014).

**Change principle 7: District- and school-based leadership is essential to long-term change success.** Hall and Hord (2014) argued here that even though implementation should be from the “bottom-up” (p. 16), there is research to support that if the higher levels of your organization do not endorse or support the effort, it will eventually fail. If policy makers and administration do not implement resources and structures to encourage the change, the successfulness of the change will be short lived (Hall & Hord, 2014).

**Change principle 8: Facilitating change is a team effort.** It is in this principle that Hall and Hord (2014) detailed everyone involved in making change successful. They called this a “policy-to-practice continuum” (Hall & Hord, 2014, p. 17) that lists the federal leaders (president, secretary of education, congress), state leaders (governor,

commissioner of education, legislature), district leaders (superintendent, board of education), and school leaders (principal, site counselor, teachers).

**Change principle 9: Mandates can work.** Hall and Hord (2014) also argued that mandates can work if they are supported over time. They must be accompanied by communication, ongoing learning, on-site coaching, and time for this to happen (Hall & Hord, 2014).

**Change principle 10: Both internal and external factors greatly influence implementation success.** Hall and Hord (2014) described the internal factors as physical features (setting, size, resources, etc.) and as people factors (beliefs, attitudes, values, etc.). External factors are the policies and procedures related to accountability and socioeconomic status as well as district and state leaders (Hall & Hord, 2014). Both the internal and external factors need to be addressed and interpreted for change to be successful.

**Change principle 11: Adopting, implementing, and sustaining are different phases of the change process.** In keeping with change principle 2 (process, not event), Hall and Hord (2014) made sure to point out that a decision cannot just be made at the beginning of the school year. Decisions must be addressed at each level of implementation to be successful.

**Change principle 12: And finally, focus! Focus! Focus!** Last, Hall and Hord (2014) argued that anyone can be successful with implementing change as long as they understand the complexities that come with it and focus on the primary goal to be achieved. “These elements require consistent, enduring, and uninterrupted attention to the goals and intended results of each change initiative” (Hall & Hord,

2014, p. 19).

So, if we know at least some of the key factors which enhance good education governance and good educational practice to the end of enhanced student learning outcomes, then we should be doing everything we can, from every possible angle, at every possible level and at every possible point of intervention to contribute to the production of critical mass and the precipitation of change in a desired direction. (Mason, 2016, p. 439)

Keeping curriculum theorists, mathematical best practices, and anxiety in mind when examining change or implementation science provides the foundation in this phenomenological endeavor. In the educational context, resilience is conceptualized as “the ability of an individual, team, or school to adapt to changing demands, to recover, and to remain vigorous after the changes have occurred” (Schelvis, Zwetsloot, Bos, & Wiezer, 2014, p. 631).

### **Resilience**

Focusing on the reasoning behind veteran teachers’ interactions with curriculum change and pressing onward, resilience needs to be addressed. Schools are stressful places; teachers make decisions in mere moments in response to actions outside of their control (Danielson, 2006). Glickman, Gordon, and Ross-Gordon (2018) wrote that physical teacher isolation leads to psychological isolation which leads to resistance in collaboration and change. Glickman et al. wrote about inadequate resources, unclear expectations, and reality shock affecting new teachers as difficulties with the profession, which strengthens the argument for understanding how veteran teachers have maintained

a sort of resilience in teaching in the classroom. Aguilar (2018) gave an extended definition of resilience that is organized in Table 3.

Table 3

*Extended Definition of Resilience*

Resilience is...	Extended definition
A way of being	Allows us to bounce back quickly, stronger, and able to fulfill purpose
An adaptive, dynamic process	Context, not individual functional behavior, influences interactions over time and ability to adapt
Cultivated through	Engaging and specific habits, fostering of dispositions
An enabler of	Ability to thrive, not just survival modes

*Source:* Adapted from Aguilar (2018).

According to Aguilar (2018), resilience is more than just bouncing back and thriving. It is an authentic way of being; it is an adaptive, dynamic process and it is cultivated. A foundation of this study is Aguilar's call to consider teachers' social-emotional learning in the same way students are now being supported through social-emotional learning programs and restorative practices. Researchers focused on the well-being of veteran teachers, and their interactions need to understand and utilize Aguilar's conceptual framework for cultivating resilience in teachers and schools.

### CYCLE OF AN EMOTION



Figure 2. *Cycle of Emotion.*

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Source: Aguilar (2018).

Resilience defines how well people deal with life's uncertainties, and Aguilar (2018) explained that emotions are a series of events. In the cycle of emotion (illustrated in Figure 2), there is a prompting event, interpretation, physical response, urge to act, actions, and aftereffects. While this is cyclical, Aguilar (2018) wrote that you can shift your thinking at any point if you are self-aware of your emotional experiences. The focus of this research is to understand the emotional experiences that resulted from multiple curriculum changes. In this case, the prompting event is the curriculum reform, which would lead to the teacher's interpretation. The interpretation would elicit a physical response and an urge to act. The teacher's action would be how they actually implemented the changes, and then finally the aftereffects in test scores and classroom climate.

In phenomenology, it is essential to get a quality snapshot (Smith, Flowers, &

Larkin, 2009) of the interviewee's experience. Researching with a resilience lens will help gain a snapshot of perseverance of the educators who are the inspiration for this study. Aguilar's (2018) resilience theory in conjunction with descriptive phenomenology can provide that quality snapshot and weave together curriculum and resilience research. The purpose of this study was to learn more about how these teachers persevered through curriculum changes as well.

Siebert (2005) explained resiliency hierarchy and noted there are certain levels one must master, like martial arts, to obtain the highest levels of emotional resiliency. The results highlighted participants' resiliency levels and the practicality of the influence resiliency has had on their teaching. Results also connect Aguilar's (2018) cycle of emotion (Figure 2) and Hall and Hord's (2014) change principles through the responses in Chapter 4.

Table 4

*The Five Levels of Resiliency*

Resiliency Level	Descriptor	Cycle of Emotion	Change Principles
Level 1	Optimize your health: a practical action plan	Prompting event	1 and 2
Level 2	Skillfully problem solve	Interpretation	3
Level 3	Strengthen your three inner selves	Physical response	4
Level 4	Stage 1: Unleash your curiosity: enjoy learning in the school of life Stage 2: The power of positive expectations Stage 3: Integrating your paradoxical abilities Stage 4: Allowing everything to work well: the synergy talent	Urge to act, action	5-11
Level 5	Stage 1: Strengthening your talent for serendipity Stage 2: Mastering extreme resiliency challenges Stage 3: Our transformational breakthrough	Aftereffects	12

Source: Adapted from Siebert (2005), Aguilar (2018), Hall and Hord (2014).

**Resiliency levels 1 and 2.** In level 1, resiliency, Siebert (2005) described a way to optimize your health by creating a practical action plan that is based on how you handle your feelings. Feelings need to be acknowledged and processed before you can effectively maintain emotional control. In level 2, Siebert (2005) explained that you can problem solve in one of three ways: analytical intelligence, creative intelligence, or practical intelligence. With prompting events and interpretation, your mind needs to make sense of what happened (Aguilar, 2018). Siebert also noted that you can combine the three as long as you find a balance that works for you and you use the action plan you



learned to create in level 1. Siebert continued to describe that by mastering these two levels, you can handle life challenges well and solve problems as they occur.

These resiliency levels also connect to Hall and Hord's (2014) change principle 1, change is learning— it's as simple and complicated as that; and change principle 2, change is a process, not an event. These two principles weave together the idea that change, learning, and improvement are continuous cycles. Prompting events (Aguilar 2018) start those cycles in motion. Hall and Hord's change principle 3, the school is the primary organizational unit for change, is where the connection to Aguilar's (2018) interpretation piece comes in to play. It emphasizes the fact that change is dynamic and complex. This principle also calls to attention the importance of interpreting those change events as a whole before separating by departments (i.e., teachers, principals, district office).

**Resilience level 3.** Siebert (2005) described level 3 as strengthening your inner selves (self-confidence, self-esteem, and self-concept) which stem from three major nervous systems in the body (somatic, autonomic, and central nervous systems). This level is described as a team of athletes and that the mind-body connections have to be strong in order to handle challenges thrown your way. Self-confidence, esteem, and concept have to be nurtured and cultivated in order for one to fully master level 3 resilience. Aguilar (2018) summarized this with a statement about physical response in the cycle of emotion: "The event and your interpretation result in a psychical response in your body" (p. 47).

In Hall and Hord's (2014) fourth change principle (organizations adopt change— individuals implement change), they emphasized that the individual is the one going through the implementation of the change. Strengthening their inner selves, they must

exhibit the “mind-body connections” that Siebert (2005, p. 73) described in this level of resiliency. They must combine their interpretation of the curriculum change to elicit those physical responses Aguilar (2018) described to master this level.

**Resilience level 4.** Level 4 resilience has four stages. The first Siebert (2005) described is unleashing your curiosity and that learning is the key to mastering change. Hall and Hord’s (2014) change principles 5 and 6 (interventions are key to success of the change process, and appropriate interventions reduce resistance to change) relate to Siebert’s idea that learning is key. Interventions and, more importantly, the appropriateness of the interventions, promote the actual change (Hall & Hord, 2014).

The second stage is where the individual learns that attitudes are essential and how optimism strengthens resilience (Siebert, 2005). Attitudes affect how individuals respond to the leadership influencing the change. Hall and Hord’s (2014) change principles 7 and 8 (district- and school-based leadership is essential to long-term change success, and facilitating change is a team effort) reiterate that implementing change is a team effort and that leadership needs to be able to gauge and respond to resistance and timing.

The third stage is where you combine your curiosity and attitudes and realize that you have the power over both. Siebert (2005) gave an analogy of hot and cold water faucets; you can choose to drink hot or cold water by turning the faucet of your choice. In addition, Hall and Hord’s (2014) change principles 9 and 10 (mandates can work, and both internal and external factors greatly influence implementation success) state that even though a change is “forced,” they can work if internal and external factors (such as curiosity and attitudes) are recognized and accounted for.

Finally, the fourth stage of level 4, describes the way your intentions pull everything together (Siebert, 2005). “As you master all four levels of resiliency, you become better and better at handling high levels of change and can thrive in rough situations that overwhelm others” (Siebert, 2005, p. 156). In this stage, one is representing Aguilar’s (2018) urge to act and create action and Hall and Hord’s (2014) 11<sup>th</sup> change principle (adopting, implementing, and sustaining are different phases of the change process). Each stage of the change process, much like each level of resiliency, are *different* stages and must be treated as such.

**Resilience level 5.** This is the highest level of resilience, according to Siebert (2005). In these three stages, Siebert (2005) claimed you must realize that you have a talent for serendipity, in which you can turn negative experiences into positives and that it is an art that you must develop continually. In this level, Siebert also acknowledges that there are extreme challenges that may arise such as natural disasters, debilitating accidents that alter the quality of life, or unimaginable acts of terror. Resilient people are those who maintain mental and emotional stability and remain open to converting life-disrupting change into desirable events (Siebert, 2005). This is when we see the aftereffects (Aguilar, 2018) of how our emotional call to action has affected our ability to be resilient.

Aguilar (2018) wrote, “By recognizing the cycle of emotional experiences, you’ll learn one of the most empowering lessons about emotions, which is they are temporary” (p. 49). In each resiliency level described by Siebert (2005), Aguilar’s cycle of emotions is exhibited and fortified in understanding. Educators who show high levels of resiliency are the ones who persevere; they are the ones who have beaten the odds of rising teacher

turnover rates. They are open to new ideas and overcome setbacks by problem solving. “Thus, it is that they become accustomed to quickly taking in and processing new things that are happening. They can react to an unexpected, life-disrupting change by welcoming it and converting it into a desirable life event” (Siebert, 2005, p. 202). Hall and Hord (2014) agreed, and in their 12<sup>th</sup> change principle (and finally, focus! focus! focus!) described that the change process can be successful if stakeholders understand the complexities that come with it and adjust accordingly.

### **Summary**

“Perseverance is not the same as stubbornness, of course; it must be tempered by flexibility and informed by reflection” (Danielson, 2006, p. 40). Aguilar (2018) called for research on resilience and the importance and relevance of its implications for teacher support and coaching during periods of curriculum change. Informed by Hall and Hord’s (2014) concept of implementing change, this literature review helps provide an understanding of what resilience can mean to educators persevering through math curriculum changes. This chapter defines and describes best practices while illuminating anxiety and the responsibilities of those closest to curriculum change. Through descriptive phenomenological methods, this study connects ideas to provide potential implications for the classroom.

### **Chapter 3: Methodology**

The purpose of this study was to explore the lived experiences of elementary math teachers through multiple curriculum changes. Relevant literature in implementation theory, curriculum, mathematical best practices, resilience, and anxiety has been provided to ensure context. Purely qualitative in measure, phenomenological interviews with nine math teachers were conducted. Utilizing Giorgi's (1985, 1997) 5-step method for descriptive phenomenology, descriptions of those lived experiences are provided (McMillan & Schumacher, 2006) in Chapter 4.

#### **Descriptive Phenomenology**

Giorgi's (1985, 1997) DPPM outlines a 5-step process. The first step in conducting this research was to obtain a description of concrete experience from participants. Second, the researcher assumed the attitude of reduction and read the description. Third, the researcher reread and established meaning units; and fourth, the researcher transformed those meaning units into "sensitive statements" of the lived experience. Finally, the researcher integrated those data units into a description of the structure of the experience found in Chapter 4.

This process can be thought of as the phenomenological reduction (Bevan, 2014) and the commitment to staying faithful to the descriptions is the Epoché. "The Epoché is to be seen as a critical-position-taking attitude that requires the phenomenologist to adopt and accept a resolve to take nothing for granted" (Bevan, 2014, p. 139). It is imperative that consistency is maintained by being articulate about the methods and procedures outlined in this chapter (Englander, 2012).

### **Setting and Participants**

Being critical of the participants in this study, it is important that they represent the “who” of the relationship this study sought to define (Englander, 2012). They were purposefully and conveniently selected (Creswell, 2014) to describe their lived experiences of the transitioning curriculum, as they have witnessed at least two curriculum changes. Englander (2012) also argued for purposeful selection due to the validity that comes with having participants with experience of the phenomenon in question. Participants in this study were nine elementary teachers who have taught math in some capacity since 2008. They have been a part of two major North Carolina curriculum changes including four different versions of math curricula: (a) 2002 state’s SCOS, (b) 2007 revision of the SCOS, (c) the 2012 CCSS, and (d) the 2018 SCOS incorporating the CCSS (NCSCoS). These participants have been recruited from three elementary schools in one county. The county is rural and houses approximately 15,900 students in kindergarten through Grade 12. The ideal participant pool would be established when the information collected reaches saturation (Creswell, 2014) which is often approximately four to five participants. Englander stated that sample sizes for phenomenological studies tend to be smaller and that saturation is generalizable based on the experience. Giorgi (1997) recommended at least three participants. Therefore, to increase validity, three teachers each from three different elementary schools in the county (teaching Grades 3-5) were interviewed.

### **County Description**

According to the county’s website, there are 30 schools (17 elementary, six middle, six high, and one Grades 6-12) in which approximately 1,309 teachers are

employed. Ethnically and categorically, the county represents seven ethnicities and three subgroups, as indicated by the percentages in Table 5.

Table 5

*Student Demographic Breakdown*

Category	Percentage
American Indian	00.40%
Asian	01.73%
Hispanic	18.57%
Black	03.88%
White	71.25%
Pacific Islander	00.06%
Multi-Racial	04.12%
Academically Gifted	10.00%
Students with Disabilities	11.90%
English Learners	05.78%

Even though the county represents seven ethnicities, most of its student population is categorized as White, while the next most represented ethnic group is Hispanic. The county has an 89.5% graduation rate (state is 86.3%) and a dropout rate of 1.58% (state is 2.31%). In Grades 3-8, the county is 53.8% proficient on end-of-grade reading accountability tests (state is 57.3%) and 55.2% proficient for math (state is 56.1%), according to the district website.

### **Site Descriptions**

Within this rural school district, participants were selected from three of the seven different elementary schools. The three sites were strategically and purposefully (Creswell, 2014) chosen to help increase validity. Each site represents a different category in state student achievement growth status, with Site 1 having not met academic growth, Site 3 having met expected growth, and Site 2 having exceeded expected academic growth. Sites 1 and 3 have been achieving a state school report card grade of a

C for the last 2 years, and Site 2 has received a B. Percentages of economically disadvantaged students at Site 1 is 37.2%, Site 2 is 43.7%, and 51.1% at Site 3. With the implementation of the Every Student Succeeds Act in 2015 by the federal government, each state must identify schools that need assistance with consistently underperforming subgroups and those schools receive funding and support at a more local level. All three sites are considered to be flagged targeted support and improvement for consistently underperforming subgroups, according to the state report card.

### **Participant Descriptions**

Including a pilot interview, 10 participants were purposefully and conveniently selected (Creswell, 2014) based on their years of experience, relation to the three sites, and availability. Participants are described in chronological order of interviews conducted.

Susan has taught in the county for 25 years. The last 4 years, she taught at Site 1. Before that she was at another elementary school for 22 years. She received her elementary education degree from a local community college in conjunction with a local university and has experience teaching second and third grades. She has also worked as an assistant in all grades, kindergarten through fifth.

Chandra has been teaching for 18 years. Most of those years have been at Site 2. Prior to that, she taught sixth and seventh grade at a local middle school and fourth grade at a local elementary school. Since moving to Site 2 when it opened, she has taught fourth and fifth grades in traditional, self-contained classes as well as in a block setting with cooperating teachers. She has her gifted education certification and National Board certification in literacy.



Allie has her bachelor's degree in elementary education with a minor in psychology as well as a master's degree in education with a concentration in elementary mathematics. She has been teaching for 10 years at Site 2. She taught fourth grade for 2 years and fifth for the last 8 years.

Marlene received her elementary education bachelor's and master's degree from a local university. She completed National Board certification in 2012 in early childhood generalization and her academically and intellectually gifted certification in 2017. She has been teaching fourth grade for 5 years, first grade for 3 years, and second grade for 4 years. She has spent all 12 years at Site 2.

Amy graduated from a local university and started teaching in a surrounding county in 2008 as a kindergarten teacher. She taught there for 7 years and then completed her master's degree in reading and the add-on licensure for reading specialist. She moved to the county and Site 1 in 2015 and has taught third grade since.

Karen graduated from a local college in 1995 with a degree in elementary education and a minor in psychology. In 2009, she graduated from a local university with a graduate degree in reading certification for K-12. She has been teaching for 21 years, with 11 of those at Site 3 in second and third grade. She previously taught at an alternative school for math and science in a surrounding county.

Lindsay has been teaching for 12 years and received her elementary education degree from a local university with a concentration in communications. She has taught in three surrounding districts and has taught all grade levels from kindergarten to fifth grade. She has been teaching fifth grade for the last 2 years.

Heather started her teaching career at a local elementary school in 1996 after

receiving her bachelor's degree in elementary education with a minor in English. After teaching fifth grade for 8 years, she took a job at Site 3. She has been teaching third grade at Site 3 for 15 years, for a total of 24 years in education.

Stacey has been teaching fourth grade at Site 1 for 15 years. She received her bachelor's degree in elementary education from a local university and her master's in academically gifted education from a local college. She completed her National Board certification in early childhood generalization in 2012.

Bonnie taught for 16 years in a surrounding county while teaching fourth grade for 14 years and fifth grade for 2 years. Three years ago, she moved to Site 1 and has been teaching fifth grade. She received her bachelor's degree in elementary education from a local university.

### **Data Collection**

Participants were secured via word of mouth and collegial networks. Interviews were scheduled for the last three teacher workdays of the year, allowing for time periods of 90 minutes. Semi-structured interviews typically take between 45 and 90 minutes (Seidman, 2006). The researcher interviewed (Appendix) each participant and acquired background information to determine if their personal math education has an impact on their perception of how they teach the math content, how they perceive the math curriculum changes, and if there are any factors they see as instrumental in their resiliency. The researcher conducted open-ended, semi-structured interviews to allow free response of their lived experiences. The interview questions are formatted after Seidman's (2006) idea of the 3-part interview and Aguilar's (2018) resilience pie model (Figure 3) and are connected in Table 6.



Figure 3. *The Resilience Pie.*

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Source: Aguilar (2018).

The researcher asked participants the four primary slices of Aguilar’s (2018) resilience pie: who you are, where you are, how you are, and what you do. “Who you are” consisted of questions about gender, race, values, and beliefs. “What you do” included questions that covered how participants learned, processed, and taught the changing math curriculums. “How you are” questions sought to collect data regarding the participants’ personality traits and how they decided to become elementary teachers. This question frames math anxiety and how that affects the way these teachers teach their students math. “Where you are” describes the participants’ circumstances and how they have changed over the years. This section provides contextual data such as building or classroom moves as well as different administrative changes. This framework aligns with Hall and Hord’s (2014) change principles.

Part 1 of the interview was focused on the background knowledge and history of the participants’ experiences with teaching and learning math to connect with the who and where pieces of the resilience pie. Part 2 was focused on the change of curriculum experience with the what you do slice of the resilience pie and the connection to Hall and

Hord's (2014) change principles 1-11. Part 3 was utilized as a reflection of that experience to describe the how of the resilience pie and connect Hall and Hord's change principal 12.

Table 6

*Interview Questions*

Topics	Interview Questions	Data Sources	Aguilar (2018) and Hall and Hord (2014) Alignment
Section 1: Participant's Life History	IQ 1: How did you come to be a teacher of math?	Transcripts from audio-recorded individual interviews conducted with participants in person	Who you are (genetics, values, personality)
	IQ 2: What was your perception of your math ability growing up?	Meaning Units	
Section 2: Participant's Details of Experience	IQ 3: How has math curriculum changed since you started teaching?	Transcripts from audio-recorded individual interviews conducted with participants in person	What you do (habits) Where you are (context) Change Principles 1-11
	IQ 4: Tell me about how leadership implemented these changes?	Meaning Units	
	IQ 5: How have those changes affected the way you teach math?		
Section 3: Participant's Reflection on Meaning	IQ 6: How did you respond with the changes in math curriculum?	Transcripts from audio-recorded individual interviews conducted with participants in person	How you are (emotions, dispositions), Change Principle 12
		Meaning Units	
Summative Question	IQ 7: In your experience, has the impact of curriculum changes on your students' mathematical learning been positive or negative?	Transcripts from audio-recorded individual interviews conducted with participants in person Meaning Units	How you are (descriptor, attitude, mood)

Each question was carefully crafted to ensure a complete picture of the experience of math curriculum change, how the data were collected, and alignment to the literature review. The interviews were face to face and audio recorded for transcription and

reduction purposes.

### **Data Analysis**

In the first two steps of the DPPM, the researcher maintained the attitude of phenomenological reduction (Giorgi, 2012) after obtaining a description of the experience from participants; therefore, a level of openness during the interviews was maintained as to not allow the researcher to bring any beliefs of her own. This level of openness was ensured by asking questions suggested by Englander (2012), such as “tell me more about...” (p. 28) or “how did that make you feel” (p. 28). By clarifying meaning during the interview, a better sense of the meaningful units in step 4 of the DPPM was developed.

Step 3 required the researcher to read the interviews in their entirety before trying to locate meaning units. As the data were collected, they were transcribed immediately after the interview using the Otter AI app so the researcher was able to proof and reread while the data were readily recalled.

To continue following the DPPM, analysis began once all interviews were complete. Distinguishing the meaning units (step 4) so they became sensitive statements is described in Chapter 4, procedures. More specifically, these meaning units are discovered when the researcher experiences a shift in reading the transcriptions (Giorgi et al., 2008). The meaning is not interpreted, just noted with a slash. The researcher refrained from interpretation and only used descriptions of the actual data as reported by participants. These meaning units went through several filters before reaching saturation which is part of the reduction process, or the Epoché. “It is important to realize that phenomenological psychological analysis of the original data is a process” (Giorgi et al.,

2008, p. 187). Some descriptions took many transformations, some did not. The researcher followed Giorgi et al.'s (2008) example of placing the transcribed description in the first column of a table and the breakdown of the meaning unit transformation in the following columns.

Finally, for step 5 of the DPPM, portrayed in Chapter 5, the researcher connected the descriptions (meaning units) collected with relevant literature and application. The researcher read the descriptive meaning units and interview transcriptions three separate times to allow concepts from the related literature to evolve. Common meaning units led to assumptions and implications for implementation theory and resilience in education.

### **Validity and Reliability**

Giorgi (1997) wrote that the researcher must acknowledge that consciousness plays a role that cannot be avoided in phenomenological studies. To be genuinely phenomenological, it would mean that the researcher would be able to eliminate any potential bias or past experience from inhibiting the description of the participants' experiences. The second distinctive feature Giorgi (1997) mentioned in conducting a phenomenological study is that the word "experience" should be broadened from its original context to become "intuition." To increase validity, Yardley's (2000) four broad principles were used as a guideline throughout this process. The guidelines are sensitivity to context, commitment and rigor, transparency and coherence, and impact and importance. A partial literature review is included in Chapter 2 to ensure Yardley's idea of sensitivity to context, leaving room for ideas outside of any assumptions to arise. To ensure commitment and rigor, this research followed Giorgi's (1985, 1997) DPPM model. To maintain transparency and coherence, all audio and transcription files will be

kept and maintained for 1 year on a password protected device. After 1 year of this study's completion, audio records will be destroyed. Interview transcripts are documented in Chapter 4 in an order that makes them easily readable and distinguishes connections found in the research. Yardley's last principle is established in the results section of this document (Chapter 5), for descriptions highlighting the lived experiences of math curriculum change through elementary teachers' perspectives.

A more concise plan is outlined in Table 7 to ensure the nature of descriptive phenomenology and create a reliable study.

Table 7

*DPPM Procedures for Reliability*

Step	Description	Connection to Reliability
1	Obtain a description of concrete experience from participants	Interviews, data collection, sample
2	Assume the attitude of reduction and read the description as a whole	Literature Review, interview transcriptions
3	Reread and establish meaning units	Analysis
4	Transform those meaning units into "sensitive statements" of the lived experience.	Analysis
5	Integrate those data units into a description of the structure of the experience	Results, Conclusion
6	Member checking	Validity
7	Peer Review	Validity

*Source:* Adapted from Giorgi (1985, 1997) and Creswell (2014).

The first step to increasing validity was conducting a pilot interview to test the interview questions. While the interview questions are based on research from Seidman (2006), the researcher amended them to ask questions related to this study; therefore, this



was the first time these exact interview questions were asked. McMillan and Schumacher (2006) described this process as necessary to evaluate intent and clarity and eliminate any leading questions.

To maintain individuality and validity, the researcher asked participants to engage in member checking and a final review. Creswell (2014) noted that member checking is helpful to determine accuracy by allowing participants to comment on the interpretations. McMillan and Schumacher (2006) described this as a participant review where the interviewees are given a transcript of the meaning units the researcher derives from the interviews to ensure modifications do not need to be made to the descriptions. The researcher gave each participant a copy of their transcribed interviews, a copy of the meaning units derived from their transcripts, and then a copy of the final dissertation to review. Each participant was given a week to respond. One participant (Bonnie) asked for the transcription quotation for “where my background was” to be changed to “in my immediate family.” Two participants (Susan and Lindsay) responded that everything appeared appropriate. The others did not respond. A peer reviewed this study in its entirety so they could ask questions and provide generalizations beyond the researcher’s knowledge (Creswell, 2014). The peer reviewer is a doctoral level researcher with experience in phenomenology and curriculum and instruction. The peer reviewer was given the final copy of the dissertation and allowed a week for response. Grammatical changes were made, but overall, the reviewer felt confident the descriptions were portrayed correctly.

### **Limitations and Delimitations**

The researcher chose to be explicit in teaching criteria so there were fewer options

in demographics and geographical areas for this study. Since this study is on lived experiences, there is no way to eliminate the impact of outside factors that may influence the phenomenon being observed.

Using interviews may also be considered a limitation of this study because participants may filter information or provide biased responses due to the researcher's presence (Creswell, 2014). This study's findings may not be generalizable given the nature of phenomenological research. Especially considering the limitation of diversity, data analyzed from the interviews may not be generalizable to other fields of curriculum in different schools, districts, or states.

A delimitation of this study is that it was performed with only elementary school teachers. The researcher chose to use this sample due to the high volume of changes to the curriculum in elementary school math during the transition to CCSS. Another delimitation that must be identified is that only teachers who have been teaching since 2008 were considered, because it was imperative to the study that the participants have extensive knowledge in teaching both the NCSCoS and the CCSS.

## **Summary**

This chapter provided background and a rationale for using a descriptive, phenomenological study through interviews. Participants were described in accordance to their relevance and importance to the successful completion of this study. Data collection methods and instruments were detailed and presented with a rationale as to how they will be effective in presenting the information obtained during the process. Delimitations and limitations were discussed and noted for future implications and replications.

## **Chapter 4: Findings of the Study**

### **Purpose of Study**

The purpose of this study was to provide a description of the lived experiences and resiliency of elementary educators through math curriculum changes. Presently, there is little research using a phenomenological lens to provide research-based resources for teachers looking to make sense of persevering through multiple curriculum changes. Through the review of literature, resources are provided on how to implement change (Hall & Hord, 2014) and how to manage resiliency (Aguilar, 2018; Siebert, 2005). This study sought to combine the two main concepts of resiliency and implementing change through a description of the lived experiences of elementary educators regarding math curriculum. North Carolina math curriculum has changed repeatedly over the last 12 years, with more adopted curriculums at the county and school levels. This study was performed at three different elementary schools in a rural county of approximately 15,900 students in kindergarten through 12<sup>th</sup> grades.

### **Overview**

Data collection and analysis were conducted to answer the research question guiding this study, “How do elementary math teachers describe their lived experiences through multiple math curriculum changes?” The results of this descriptive phenomenological study are presented in the form of written descriptions detailing the participants’ responses as well as a description of common meaning units derived from those described experiences. The narrative written descriptions of the interviews provide reflection of the researcher’s general observations and perceptions (Moustakas, 1994).

## Results

To follow Giorgi's (1985, 1997) DPPM, the researcher immediately transcribed each interview after its completion. All interviews were completed before the researcher assumed the phenomenological reduction (Bevan, 2014) of reading through the transcripts in their entirety before determining the meaning units for each participant. Each of the 10 participants who were recruited followed through with their interview within 3 days of data collection. The researcher summarized the interviews in order of completion, outlined in Table 8, using pseudonyms to ensure anonymity.

Table 8

### *Participant Description*

Name	Reference Acronym	Years of Teaching Experience
Susan	Pilot, Site 1	25 years
Chandra	Participant 1, Site 2	18 years
Allie	Participant 2, Site 2	10 years
Marlene	Participant 3, Site 2	12 years
Amy	Participant 4, Site 1	11 years
Karen	Participant 5, Site 3	21 years
Lindsay	Participant 6, Site 3	12 years
Heather	Participant 7, Site 3	24 years
Stacey	Participant 8, Site 1	15 years
Bonnie	Participant 9, Site 1	19 years

**Susan (the pilot interview).** Susan was able to provide a unique example for the researcher in which to conduct a pilot interview, due to her extensive experience in education. Susan's interview was conducted on the last day of school in her classroom. She was very nervous and concerned if her answers were "right." Throughout the interview, the researcher assured her that this was purely descriptive and there were no right or wrong answers. She has more experience than any other participant, and her views transitioned seamlessly from her experience as both a teacher assistant and a

classroom teacher.

During the first part of the interview, based on Seidman's (2006) background experience, Susan elaborated on how she was not on the math track in high school and how she did not care for math because she said it was based on "drill and kill" and memorization; overall, she felt unsuccessful. While taking classes as part of the college program for teacher assistants, she started to experience learning through discovery and the realization that not everyone learns the same way. She noted,

And I think that's why I probably can teach better because I teach it a stupid way and some kids get it. They say "oh this is easy. I understand that." It's like, yes, my simple brain, you know, I also see how everybody does not learn the same way.

During the second section of the interview questions, Susan described the curriculum changes as not really being a "big deal." She elaborated that maybe some of the standards have changed but that they have really been teaching Common Core using a resource called Investigations for about 10 years; curriculum change has not seemed like a big transition since then. She stated that it was hard for some teachers to give up control when Investigations pushed through but that having a good administration helped. Her biggest issue in how the changes were implemented was vertically collaborating with other grade levels. She explained that there are math "tricks" that teachers teach students before a test because they [teachers and students] get evaluated using those scores.

For the third section, Susan elaborated that she self-taught when faced with a standard or concept that she was not sure about. She stated that professional learning communities, lesson plans, and professional development have not really changed

throughout the years but that she had noticed the shift towards student growth. She said, “I don't think it's about the curriculum at all. It's about the teacher and how the teacher makes that person think deeper.”

Susan’s final statement for the summative question was that as long as these math curriculum changes continue to be implemented and encouraged, students will grow. Her words were powerful when she postulated,

I think if we keep going, if you have a strong administration and as mad as the teachers get, they still push you to doing the right thing. Eventually, it's not going to help the kids we have right now, but if we start, you know, going up, it will help kids be able to think more for themselves about math and how math works.

**Reflection on pilot interview.** Conducting the pilot interview was critical to the success of this study in several ways. First, it allowed the researcher the opportunity to practice with the audio recording application and transcription process. This study was the first time the researcher has conducted research of this nature. Feeling adept in the tools led to the researcher’s increased confidence which translated to a more relaxed atmosphere during the upcoming interviews and more of the “conversational feel” Moustakas (1994, p. 114) described in phenomenology.

The pilot interview was completed in about 45 minutes, allowing the researcher to keep the 60-90 minute time allotments for the subsequent interviews. In reflection, the researcher did not ask as many open-ended questions as is suggested by Creswell (2014) and instead tended to agree and use the expression “right” to keep the conversation flowing. To be more open minded and not create bias, in the participant interviews, the researcher used the term “tell me more” instead of the agreement term “right”; therefore,

more time was needed to complete the subsequent interviews.

Finally, completing the pilot interview helped increase the validity and reliability of this study. Creswell (2014) suggests that completing a pilot study ensures that interview questions are accurately measuring the information sought and improves the overall format of the study.

**Chandra.** Chandra's interview was conducted on the first of the three workdays before school let out for the summer and she was busy cleaning and packing up her classroom because the county would paint her classroom walls over the summer break. She continued to work during the interview which made for a very organic experience. She seemed overall very supportive and engaged in the conversation.

During the first section of the interview, Chandra described that she had always wanted to be a teacher but knew they did not make enough money, so in college she went the business route. Personal life changes in the form of graduation, calling off an engagement, and not finding a job with her business degree allowed her to find her opportunity in teaching through lateral entry. Chandra's perception of her math ability was that she always "got it." She was good at math because she was good at memorization. She even stated that she felt she was a better reading teacher because she struggled a bit more with reading content and was therefore able to teach her students how to struggle through it. This level of efficacy is unlike her confidence in teaching math, which came easy to her as a student. She was reluctant to take a math teaching position but stated,

If you can show them three or four different ways of how to multiply numbers that not every kid is going to get it one way, but every kid is going to get it in

some way. Just got to figure out what works for them.

Chandra described the changes in math curriculum to be less of a focus on “tricks” and more of a focus on understanding. The biggest struggles she described were helping other adults see why multiple strategies were a good thing and the order in which the state and county require standards to be taught. She stated that professional development was provided but that it was somewhat counterproductive the year of the switch to Common Core because she was teaching fifth grade and had to attend the fifth-grade sessions while knowing she was moving down to fourth grade the next year. She said she self-taught new strategies and reached out to the county math specialist as well as the school lead teacher when she needed resources.

For response to changes, Chandra described that her site is a place where she feels most teachers go “above and beyond the 7:30 to 3:30” and seek out opportunities for growth. The cohort she participated in for her master’s degree is still at the same site and they get excited about new opportunities for professional growth and ask each other “what can we do next?”

Chandra also described that she thinks the math curriculum changes have been overwhelmingly positive with regard to student growth. Her final statement is powerful for curriculum in general,

I guess I've always wanted to say [it was great to say] you had your whole class proficient, but this is also the real world. I mean, I had nine kids in my room this past year that didn't pass there, you know, reading test in fourth grade. And, you know, every student in reading this year, I know this doesn't apply to math, but in reading, every single kid in my class this year grew. There were no zeros; there



was not anybody that went backwards. Everybody had positive growth. And so, I mean, they didn't all pass, but I'm like positive growth is big.

**Allie.** Allie was the second interview at Site 2 on the first workday, and she had her room packed and ready for painting, so her interview was conducted side by side at her desk. She had also participated in an interview earlier that morning with some of her colleagues involving a study with a local university.

Allie described her background as always wanting to be a teacher and working with kids. She loved school as a kid and wanted to bring that same passion to others. She described being taught using the drill and kill method and that she was good at memorization and therefore good at math in school (until she got to calculus). She feels like the change to Common Core has helped for things like number sense, but with the new additions from this past year, restrictions make it hard to finalize those connections. She stated,

And then this year, with the new standards, things have just got a little more restricted. For example, fractions, with adding, subtracting, it now like has to be a fact family for unlike denominators. So, it used to be just you got to add subtract fractions, and mixed numbers with unlike denominators can be thirds and fourths. Now, if it's thirds, it's [the denominators] got to be six or 12. Like that's got to be in the family.

When the researcher asked how she dealt with those changes, her response was that she reaches out to her colleagues and the county math curriculum specialist. She stated that she is more inclined to work with teams, especially when trying new things like deciding to start her National Board certification.

During the implementation portion of the interview, Allie responded that her lead teacher brings many resources from her professional development back to their math team and that has been really helpful. The way she described the math curriculum change is that it has moved away from drill and kill and lecture/note-taking to making sure students are working in groups and participating in collaborative activities. She added that the move has been hard at times for the teachers; when the new strategies were implemented, she remembered working for 2 hours with her colleague on figuring out how to teach multiplication with boxes instead of the standard algorithm; however, when asked about how it has affected students, she said it has been overwhelmingly positive. She stated,

I think it's so much easier, and it's better. I wish I would have learned that way. Because it actually makes sense to me. Like, I wish I would have learned with pictures to make sense of it before I learned that flip rule. Because now I completely understand why the flip rule works. Like I get it.

**Marlene.** Marlene's interview was the third interview at Site 2 and took place on the second end-of-year workday. She had her room mostly packed up as well, and the interview was face to face at her desk. She seemed very enthusiastic and excited about the opportunity to share her experiences.

Since childhood, Marlene revealed that she always wanted to be a teacher. She stated she was usually the girl in the group of boys trying to figure out a math problem. In college, she started out as a math major only to realize she wanted to concentrate on elementary education and work with small children. She recalls being taught using drill and kill and lecture and note-taking. She comments,

It was the traditional algorithm. That's what I tell the kids all the time, like, we were taught one way to do it. And I said, I'm a better math thinker, the way that I teach you to do it.

During the implementation portion of the interview, Marlene revealed that math curriculum has changed only in concept; instead of teaching students one way to do a problem, now they are teaching them several avenues to find the right answer. She sees that change reflected even on the state exams. Despite pushback from parents and other adults opposed to Common Core math, she believes it has not really changed material, just medium. She recalled the county providing day workshops for the implementation of Common Core when it first rolled out but that she mainly takes professional development and resources into her own hands; she reaches out to her lead teacher and the county math specialist. The biggest change in the way she teaches math is in the resources she pulls from.

When asked about how leadership implemented these changes, she recalled being asked her opinion through end-of-year surveys and participating on the county textbook adoption team. She gave her opinion on the pacing guide and how her team felt two of the clusters should be swapped but she is not sure that it will happen. When asked about how math curriculum change has affected her students' mathematical learning, she stated that her county seemed to be ahead of the game when it pushed through with the Investigations curriculum adoption before Common Core was implemented. She recalled again how the math curriculum specialist has been vital to the transition and summed up her students' progress with this final statement:

I think that I love the way our kids think. You'll see parents post things on

Facebook, where they're like, my kid didn't do long division and look how much work he did to solve this problem. But then you ask the kid about it, and he understands why it works. I'd much rather than have that conceptual understanding than to have one way to figure out the right answer.

**Amy.** Amy's interview was the first (other than the pilot) conducted at Site 1 on the second to last workday of the school year. She was working with her third-grade team on getting their cumulative folders together and asked if it was okay if they stayed and continued to work while she answered the questions. The group stayed, and Amy multitasked during the interview.

Growing up, Amy was torn between becoming a nurse or a teacher. She stated that she knew she wanted to help people, but it was not until it was time to go to college that she made the decision to become a teacher. She recalled that math was not her favorite subject because she did not feel confident in it. She elaborated that maybe it was because she thought her teachers were really scary when teaching, giving her lecture and then practice. When asked if others perceived her math ability the same way, she responded that they probably did not. She did enough to get by and make the grades; she just did not feel comfortable with math. She stated that she is way more comfortable with her math ability now and wishes she had been taught the same.

During the change and implementation portion, Amy recalled her experience in a surrounding county where teachers sang songs and taught students the tricks for math to help them memorize skills for the standardized assessments. When she transitioned to Site 1, they had already been implementing Common Core through Investigations and she remembers taking a proverbial step back and teaching herself how to not use the

tricks in teaching. She remembers asking parents to be patient, that drawing out an answer or not using the standard algorithm may take longer, but the kids understand what they are doing. They shifted from memorization and worksheets to hands-on activities and self-discovery.

Leadership was beneficial to the curriculum change process according to Amy. She recalled many days that her team went through modules together on the new standards and how the county math curriculum specialist gave them numerous resources and guides to follow. She did recall being frustrated with the newest curriculum change for this year in that the state standard required teaching certain denominators for fractions and so that is how they taught their students, only to be given the state standardized test and see a question using a denominator they were not supposed to teach.

Overall, Amy thinks the math curriculum changes have been positive for her students' mathematical learning; however, she is still frustrated with state testing. She feels like there is disconnect between what they say to teach versus how they measure student growth. She elaborated on materials provided by the state in their online resources: "But then we find these errors in them all the time so if we're going to be these amazing math teachers and follow the standards, then we want the assessments to reflect, you know, the standards."

**Karen, Lindsay, and Heather.** The three participants from Site 3 requested the interview be conducted as a focus group instead of individually on the last workday of the school year. They were slightly uncomfortable without knowing or having a previous relationship with the researcher and felt more confident in answering questions together. As the research for this project is phenomenological, it was deemed appropriate as they

have experienced this change together.

When asked about why they became teachers, Heather replied that it is in her blood. She comes from a long line of teachers on both sides of her family; and Karen agreed that while she did not have that many teachers in the family, she was taught a service attitude growing up. She wanted to be of service to others, and teaching was a way to do that. Lindsay, on the other hand, grew up watching her mother as a teacher and did not want that life for herself. She ended up with a teaching scholarship that paid for her undergraduate degree, and she recalls now that she cannot believe she thought she did not want to do this job. She cannot imagine herself in any other career.

Karen and Heather both lamented on how they hated math growing up. They both stated they were not good at it, and Karen even recalled a time when she cheated on a test to just finally pass something. They both elaborated on how it was memorization and drill and kill; they felt it was miserable. On the contrary, Lindsay really enjoyed her math experience growing up and fondly remembered tutoring algebra 1 students during college in her free time. She recalls that it was hard for her to make the switch to Common Core math and she had to teach herself before she taught her students.

Both Karen and Heather recalled the switch to Investigations, as they were with the county (and Site 3) during that transition before Common Core and remembered how difficult it was to make that switch. They had been teaching the way they were taught for quite a while, and the state had not made the switch to hands-on discovery; standardized assessments were still SCOS based. Once they had a few years of that resource under their belt, they felt when the state did decide to adopt Common Core, they (and the county) were very well prepared. Lindsay repeated her early comment about how

learning the new strategies were harder for her and she teaches herself before her students to make the transition easier. She has also been in quite a few grade levels and three counties, so she feels her frustration may be more geared to that change every year rather than the curriculum itself.

All three teachers from Site 3 have felt supported from administration and leadership during the implementation of new curriculum. They all recall professional development days focused on specific changes and being able to reach out to others as well as county curriculum specialists. Lindsay recalled “honing in” to the vertical alignment piece, especially with her experience in so many grade levels. Karen and Heather recalled how their professional learning communities pulled together to create resources and units to allow the shift from worksheets to student activities and stations.

When the group was asked if they felt their students’ mathematical ability has been affected by math curriculum change, they all agreed that it would be interesting to see when the first groups of kindergartners graduate in 2025. While they personally feel that their students have a better understanding of concepts and that it has been positive change in the classroom, Heather is not convinced there is enough data yet to say that curriculum change (Common Core specifically) has had a positive effect.

**Stacey.** Stacey was the second teacher interviewed at Site 1, and her interview was completed on the last workday of the school year. Her room was clean and packed for the year, and she was completing some end-of-year paperwork. The interview took place at her desk, face to face. She was very enthusiastic and seemed genuinely excited to share her experience.

Stacey has always wanted to be a teacher; she has always loved helping children.

She recalled there was a time when she thought she might want to be a pediatric nurse but that did not last long because she realized teaching was her true calling. She feels like she was always good at math because she was quick with her facts. Stacey recalled her teachers doing one or two examples and then practicing for the rest of the class on her own. She did problems quickly and efficiently; she knew she was good at making numbers make sense.

When Stacey first started teaching at Site 1, she remembers teaching the same way. When the county adopted Investigations, she recalled that it felt outside her comfort zone. She said, “As teachers we don’t want to see our students struggle; we want to teach them the correct answers. Why can’t I just tell them the answers first and then let them explore?” Stacey described how she and her colleagues adapted to the change as a collaborative process. She reminisced on her and her fourth-grade teammate at the time sitting for hours trying to teach themselves the material before presenting the lesson. She stated that she reached out to the county math curriculum specialist, their lead teacher, and principal at the time quite often and they were always ready and willing to help model lessons or give advice. Her room was even chosen several times to be a model lesson room for the county curriculum specialist to model lessons with her students while other teachers were able to observe.

When asked about how leadership implemented the changes, she again stated that they were extremely helpful, even when she felt frustrated. Stacey described a year when her principal asked the entire school to use nothing but Investigations to implement the program with fidelity and determine if the materials and outcomes were appropriate interventions. She remembers how hard that was, sticking to one thing when they were



teaching their students that there were several ways to solve the same problem. She felt she was not leading by example, and the school overall made it about half the year before the principal let them pull from other resources.

Stacey recalled in her preparation for teaching the changing curriculum that instead of mapping out the problems for the day, she would pick one or two really rich problems and figure out how her students would try to solve them. She would spend most of her planning time figuring out where and how they could go wrong (or right) instead of preparing worksheets. Her classes would have rich discussions about different ways to solve the same problem instead of individual, silent practice. Stacey also recalled that there used to be quite a few options for professional development that were readily available if teachers wanted to sign up for them. Currently, it is more of an online module that is a little generic. She began researching how to teach discovery and problem-based learning and recalled that it really opened her eyes into how she wanted to teach.

When asked about how curriculum change has affected her students' learning, Stacey stated, "I think there has been a change in like the student ownership, their interest, their ability to explain, ability to apply. I think they just had a deeper math understanding than when there was memorization."

**Bonnie.** Bonnie's interview was conducted on the last workday; she was the third interview for Site 1, and the final interview for the project. She was packing her room to leave it organized for summer cleaning. The interview was conducted face to face at one of her student table groups.

Bonnie described coming from a long line of teachers in her family. She

described her experience with racial segregation and how that affected the decisions her family made. She recalled that even though it was never really spoken, it was evident in how hard each member of her family worked. Her family lived by example. She said, “In my immediate family, you always put school first; education is priority and that is the most important thing. Education is key.” So, when she graduated high school, she became the first in her family to get a college degree in elementary education.

When asked about her perception of math ability growing up, Bonnie remembered doing worksheets and workbooks that had pages you could tear out to take home. She recalled that there were not many word problems, just rote practice. She does not feel like she was “bad” at math, but she does remember having to work harder on it than her other subjects. She remembered getting to high school and having to look at math through a different lens; she really had to put forth more effort to understand what her teachers wanted. She stated that it was the same when she first started teaching: lectures, examples, practice sheets.

Bonnie remembered when change started to take place from less drill and kill to discovery, and she was fully on board. She knew that students needed more and that she could help them. She remembered going to teacher discount store sales and buying manipulatives she thought she could use or make and bringing in her own resources to supplement. While leadership implemented the changes and provided the outlines, she wanted more. She stated,

So yes, we can implement these things, but children need to know that this is something you keep, to learn and hold on to, not just, just watch me do this. So I kind of always struggled a little bit because of me, my principles. I looked at

teaching as more than just a job. I took it seriously.

When asked how math curriculum change has affected her students' learning, Bonnie visibly got excited. She expressed that it has been great watching students who struggle (like she did) work with others to figure out a different way to get to the right answer. She stated,

I also could kind of see where children sometimes, hit that wall and they need to know they don't have to hit that wall, and if they do hit that wall, they don't have to stay at that wall that they can chip away at it; they can try it and just work on it and get it. And when children get over that piece of it and are like, wow, I got this. I think that's the best part.

### **Meaning Units**

Throughout these interviews, participants described their personal background, how they became a teacher, what they perceived as their math ability growing up, how math curriculum has changed, and how leadership implemented those changes. Participants described how they navigated those changes and how they thought it has affected their students. The researcher followed Giorgi et al.'s (2008) example of placing the transcribed description in the first column of a table and the breakdown of the meaning unit transformation in the following columns during the reduction and then combined the meaning units into one cohesive table for reader clarification (Table 9).

Table 9

*Meaning Units Derived from Interviews*

Interview Question	Meaning Unit	Participant
IQ 1: How did you come to be a teacher of math?	Received an opportunity through a cohort education	Pilot
	Lifelong dream	Chandra, Allie, Marlene, Amy, Stacey
	A wish to serve others	Karen
	Received an opportunity through scholarship	Lindsay
IQ 2: What was your perception of your math ability growing up?	In her blood	Heather, Bonnie
	I never liked it/It was drill and kill/I did not learn the same way everyone else did	Pilot
	Loved it because I was good at it/It was easy	Chandra, Allie, Marlene, Lindsay
	Was not confident in her abilities	Stacey
IQ 3: How has math curriculum changed since you started teaching?	Hated it because I was not good at it	Amy, Bonnie, Karen, Heather
	From worksheets to students discovering on their own/Teachers had to give up some control	Pilot
IQ 4: Tell me about how leadership implemented these changes?	Less telling, more discovery	Chandra, Allie, Marlene, Amy, Karen, Lindsay, Heather, Stacey, Bonnie
	There were some resources given, most I found on my own/There is a need for more vertical teaming	Pilot
IQ 5: How have those changes affected the way you teach math?	Initial resources provided led to future collaborative endeavors	Chandra, Allie, Marlene, Amy, Karen, Lindsay, Heather, Stacey, Bonnie
	More focused on student activities and goals versus materials	Pilot
	More focused on growth and strategies than memorization	Chandra
	More focused on strategies than memorization	Allie, Marlene, Stacey, Bonnie
	More focused on teaching critical thinking than tricks	Amy

(continued)

Interview Question	Meaning Unit	Participant
	More focused on student activities and goals	Karen, Heather
	More focused on student activities and goals/vertical alignment	Lindsay
IQ 6: How did you respond with the changes in math curriculum?	Self-taught/Reached out to the county math specialist	Pilot
	Partnered with collaborative colleagues	Chandra, Allie, Marlene, Amy, Karen, Heather
	Self-Taught/ Partnered with collaborative colleagues	Lindsay, Stacey, Bonnie
IQ 7: What has been the impact of curriculum changes on your students' mathematical learning?	If we keep going, positive	Pilot
	Positive, much better at number sense	Chandra, Allie
	Positive, much better at critical thinking	Marlene, Stacey, Bonnie
	Overall positive, hard to measure	Amy, Karen, Lindsay, Heather

The meaning units from each interview question were then connected to the interview questions and literature provided in Chapter 2 to highlight similarities and differences in participant responses.

### Research Question Connections

The research question guiding this study, “How do elementary teachers describe their lived experiences through multiple math curriculum changes,” was designed to elicit a phenomenological response from the participants. Participants were asked a series of interview questions based on Seidman’s (2006) structure, Aguilar (2018)’s resilience and cycle of emotion, and Hall and Hord’s (2014) change principles.

In part I of the interview questions, question 1 asked how they became a teacher. Two participants described receiving a scholarship or educational opportunity they could not turn down and one recalled having always wanted to be of service to others. The majority of participants recalled that it was a lifelong dream, or it was in their blood due

to a high volume of teachers in the family. As for math ability perception in interview question 2, three participants said they hated it, with two describing it as not being confident. The other five participants (50%) recalled that they loved math because they were good at it in school.

Part 2 of the interview questions focused on how those changes happened and were implemented as well as participant response. For question 3, every participant stated that teaching math has become less about telling students the right answer and more about helping them discover ways to solve problems on their own. For question 4, every participant also recalled that the counties and schools provided initial resources and were available for help when reached out to but that they spent hours on their own and with their colleagues teaching themselves and finding other materials. And while the wording varied slightly in the meaning statements for question 5, all participants described the change in teaching as less focused on repetitive practice and more focused on student activities and discovery through problem-based learning.

Part 3 of the interview was geared towards gauging the response or resilience of participants. Again, in question 6, all participants recalled participating with colleagues to persevere through the math curriculum changes with four participants elaborating that they also went out on their own to find professional development or resources. In the final summative question of the interview, every participant responded that math curriculum change has been positive overall in regard to student learning.

## **Summary**

In this descriptive phenomenological study, participants were asked to recall math curriculum changes and how their background and leadership affected their teaching and

students' learning. This study provides an example of how phenomenology regarding curriculum can be a pivotal starting point in future studies that can provide common themes and future areas of research interest. In Chapter 5, the researcher expands on the common descriptions and further discusses the implications of this study in education.

## **Chapter 5: Discussions and Overview**

### **Introduction**

Vagle (2016) wrote that phenomenologists like to study things that may seem obvious to perhaps reveal things taken as “normal” or assumed. Change is a constant (Hall & Hord, 2014) and the only thing we can count on (Aguilar, 2018). Curriculum is seen as a living, breathing concept (Marsh & Willis, 2007) and something that stakeholders in education follow. Through a literature review of resilience, math anxiety, implementing change, and math curriculum best practices, a conceptual framework highlighting the connections between these essential ideas was established (Figure 1). In completing a descriptive phenomenological study using semi-structured interviews based on Seidman’s (2006) work, 10 participants including a pilot described their experiences with persevering through curriculum change.

### **Summary of the Study**

This study followed Giorgi’s (1985, 1997) DPPM. The researcher interviewed 10 participants who had been teaching since at least 2008. The researcher employed site triangulation by recruiting from three different elementary schools. The researcher also conducted a pilot interview to ensure validity in the interview questions. After interviewing each participant, transcriptions were compiled; and it was not until the completion of the interviews that the researcher assumed the attitude of reduction, or the Epoché process (Bevan, 2014). Transcribed answers were derived into meaning statements (Giorgi, 1985) and compiled in a table (Table 9; Giorgi et al., 2008). The researcher also sought to strengthen the validity of the study by having each member check their transcriptions and meaning units as well as descriptions in Chapter 4 to ensure



accuracy (Creswell, 2014). The researcher then elicited the help of a peer reviewer with background knowledge of phenomenological studies to provide another source of validity (Creswell, 2014).

## **Findings**

The goal of this research was to answer the research question, “How do elementary teachers describe their lived experiences through multiple math curriculum changes,” through phenomenological research methods. Moustakas (1994) wrote “Phenomenology is committed to descriptions of experiences, not explanations or analyses” (p. 58). While it is difficult to interpret descriptive phenomenological studies, there were similarities that arose in the meaning units of the participants’ answers.

In the first section of the interview questions, participants were asked questions designed to incorporate Aguilar’s (2018) resilience pie pieces for whom and where you are in life; i.e., genetics, values, and personality in relation to math. The first similarity in participant responses was that the teachers in this study either grew up loving math because they were good at memorization or hating math because they were not. This exemplifies Boaler’s (2016) ideas on mathematical mindsets and the call to develop habits of mind that encourage math as sense making, connections, and thinking versus memorization of steps and processes.

The findings in this first section of the interview also relate to the math anxiety literature presented in Chapter 2. Tobias (1987) argued that the “style” of teaching mathematics can lead to anxiety in the form of opinions on either being good or bad at math. Every participant described the style of how they were taught as drill and kill or lecture and note-taking, which, according to Tobias (1987), can elicit emotional

responses that inhibit memory pathways from working efficiently. The results from this section of the interview also support the study by Pinxten et al. (2014) who found that math enjoyment and math competence beliefs were positively correlated. While further research is needed to assume Boaler's (2016) statement about elementary teachers not teaching higher maths because they felt inept, this study can prove confidence and enjoyment are related to style of teaching. With half of the participants supporting Boaler's (2016) claim and half not, more data are needed to determine whether that statement is appropriate.

Findings from section 2 of the interview questions were intended to connect Aguilar's (2018) "what you do" slice of the resilience pie framework and Hall and Hord's (2014) change principles. Participants were asked how math curriculum has changed since they started teaching (interview question 3) and how those changes have affected the way they teach math (interview question 5). Responses were significant in that every participant described the shift from less telling, less drill and kill/lecture and note-taking, to more discovery and hands-on learning through discovery. These findings support the literature connection to mathematical best practices described in the CCSS (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). Smith and Stein (2011) supported this transition with their ideas for productive mathematical discussion, and Driscoll (1999) called for the attention to fostering that discussion through teacher preparedness.

To connect implementation theory, the associations are slightly more difficult to make. While all participants' meaning units whittled down to "initial resources leading to collaborative endeavors," for interview question 4, in which they were asked how

leadership implemented the changes, it seemed that most participants had a hard time remembering what exactly happened. During the interviews, each participant would think for a moment and respond similarly with recalling some professional development, but nothing stood out in those memories. Perhaps it was too long ago and too narrow of a question to consider the connection to the conceptual framework. The only outcome for certain is that they were inspired by leaderships' initial endeavors enough to either self-teach new ideas or reach out to a colleague for help. This action-oriented response relates to Hall and Hord's (2014) change principle 7 (district- and school-based leadership is essential). Every participant recalled collaborating with colleagues which solidifies the idea that "good teaching does not develop in isolation" (Smith & Stein, 2011, p. 87). Participant answers do align with Hall and Hord's change principles 1 and 2 (change is learning, change is a process) as the participants each described their own way of gaining new information. They described ways in which the county gave plenty of time to ensure their adoptions of Investigations and then later Common Core were effective.

In the last section of the interview questions designed to describe the lived experiences of math curriculum change, participants were asked how they responded to those changes (interview question 6). This question was asked to connect the last slice of Aguilar's (2018) resilience pie framework which is the how you are slice; i.e., emotions and dispositions. It was also meant to tie in Hall and Hord's (2014) 12<sup>th</sup> change principle, focus. Every participant, including the pilot, either self-taught new material, reached out to a colleague, or reached out to the county curriculum specialist. In their discussions, the participants describe collaborative teaming with others in their grade level as well as planning together during or after school. Hall and Hord described their

first change principle (change is learning) as a foundation of organizational effectiveness. Because every participant described not only reaching out for but also participating enthusiastically in communal learning, it speaks to the level of cultural scholarship at each site.

### **Discussion of Findings**

Much like change and education in general, Hall and Hord (2014) wrote, “The road to success is always under construction” (p. 306). Aguilar (2018) argued that resilience is cultivated in that space between stimulus and response, and those cycles of emotion are what propel actions and responses. While this study did not measure teachers’ resiliency levels, indications of their resiliency to change were noted as they all described knowing where their own learning gaps were, how they sought ways to fill them, and then collaboratively helped others. “The more we learn, the more we want to learn, and the better we are at managing challenges, the more curious we become, and so on” (Aguilar, 2018, p. 244). Findings from this study produce valuable phenomenological descriptions related to the conceptual framework of connecting resilience, math anxiety, and best practice with regard to implementing curriculum change.

### **Mathematical Best Practices and Anxiety**

This study highlighted the importance of the cultural shift from viewing mathematics as a memorization-based application to a student-centered discovery of depth (Boaler, 2016). Every participant in this study described the shift in mathematical curriculum change as a positive experience, as one they wished they would have encountered during their education. Allie’s response was, “It is so much easier, and it’s

better. I wish I would have learned that way.” Stacey responded, “I think there is more ownership for the students; if they are stuck on a problem and one strategy didn’t work, they have another one to fall back on.” Hattie et al. (2016) supported the idea that deep learning instead of surface learning (i.e., memorization, rote exercises) is accomplished when students work collaboratively and interact with their peers. This study highlights the importance of continuing to propel and support the shift from memorization to application in mathematics education. Eliminating mathematical anxiety starts with redesigning the way the nation sees success in math, shifting from “ability” to persistence, confidence, and communication (Tobias, 1987).

### **Resilience**

Participants in this study described responses to curriculum change that support Siebert’s (2005) claim that highly resilient individuals are always curious and seek out new ways of trying and doing things. During the interviews, participants’ reactions to the questions about curriculum change almost seemed to be a sort of indifference. Marlene said, “It’s not really the content that’s changed, it’s just the way we teach it.” Karen’s response was, “The strategies aren’t necessarily new with the standards. I think maybe because of the math adoption [Investigations], we might have been a little ahead of the curve on some of those [changes].” Math curriculum change seemed to be a given, not something new or adversary. It was as if it was part of their everyday routine to find something new and then learn how to teach it. “They are open to take in, examine, and process new inputs, ignore or let go what is not of value or interest, and move on to the next experience” (Siebert, 2005, p. 201). Each participant also seemed supportive of the change; there was buy-in. Hall and Hord (2014) supported teacher buy-in and

collaboration in change principle 8, facilitating change is a team effort. Teachers at all three sites were able to work together to make the math curriculum change successful. Even Stacey, who at first struggled with the change, witnessed their curriculum specialist model lessons and get the students excited about learning new strategies. After reflecting on that first year of Common Core implementation, she said, “Honestly, I think it's the best thing we've done.”

One of the most important findings from this study is that every single participant, including the pilot, all recalled reaching out to colleagues to collaborate with math curriculum change. Allie remembered it taking her and a colleague 2 hours to figure out how to teach one problem the first year of Common Core implementation because it was not the way she was taught. Chandra recalled the benefits of working as a grade level team and how much easier it is to accomplish big tasks. She stated, “When you can collaborate and work together, you've got more than one person [who] has ideas. Sounding boards and what not. Meetings go by faster.” Aguilar (2018) stated that we are social beings; that communication is needed to not only survive but thrive. All the participants in this study utilized Aguilar’s cycle of emotion (Figure 2) effectively and apparently seamlessly. The prompting event was the curriculum change. Then, their interpretations led to the physical response and urge to act. What is interesting about these participants’ urge to act is that they chose to act in collaboration not in isolation. They sought help from their colleagues in addition to seeking resources on their own. They reached out to grade level colleagues (Chandra, Allie, Marlene, and Stacey) to work collaboratively during and after school as well as reaching out to the county curriculum specialist for ideas and advice (Stacey, Bonnie, Chandra, Marlene, Karen, and Heather).

Collectively, they were able to take action and move through math curriculum changes in a highly resilient approach. Research has shown that teachers working in isolation will negatively affect teacher attitude and school culture (Glickman et al., 2018). All participants in this study sought dialogue with colleagues in regard to the implemented curriculum and put forth the amount of effort and focus described in Hall and Hord's (2014) change principle 12, and finally, focus! focus! focus!

### **Implementing Change**

Results for connecting Hall and Hord's (2014) change principles to participants' cycles of emotion (Aguilar, 2018) and phenomenological structure of the interview questions are hard to implicate. Every participant, including the pilot, answered that administration and content coaching was a beginning part of curriculum change. Responses did not get any more specific than a surface level answer; however, the participants did not speak negatively of how the change was implemented. The general response was that the participants knew where to go for help. Results can connect to Hall and Hord's overall concepts of implementing change and their view on individuals typically being the ones expected to implement the actual change. With successful implementation, those who envision the change are successfully addressing each participant's level of use (LoU) and stage of concern (SoC; Hall & Hord, 2014). Hall and Hord described a participant's LoU as how one approaches a particular change innovation and their SoC as their attitude and reaction towards that innovation. LoU essentially is rated on a scale of 0 (nonuser) to 6 (renewal), and all participants in this study described responses to math curriculum change that could be represented at the top LoU; however, interview questions did not dive quite deep enough or provide enough

concrete data to support assigning each participant an actual LoU profile.

Hall and Hord (2014) rate SoC from 0 (unconcerned) to 6 (refocusing). Again, all participants seemed genuinely excited about the change from SCOS to the CCSS and agreed that the curriculum indicated a positive shift in overall student growth and teacher satisfaction with content delivery. This could indicate that these teachers were at the high end of the SoC scale as well; however, Hall and Hord warned that LoU and SoC can fluctuate (and should) at different points of implementation. This study did not assess LoU and SoC throughout the change process and cannot draw conclusions as to whether implementation leaders were using them to help facilitate the change effort.

Though the findings of this study cannot be definitive, the researcher postulates that administration and curriculum coaches at these schools were providing just the right amount of support due to the unanimous positive responses in the interview questions. Without further questioning, however, this cannot be assumed in this study nor can the change principles be thoroughly connected to the conceptual framework used to frame the interview questions. It also could be due to the convenience sampling conducted in this study, in that participants were generally positive people. Results may have been much different through a random, anonymous sample.

### **Summary of Findings**

This study used a phenomenological lens to frame semi-structured interviews to answer the overarching research question, “How do elementary educators describe their lived experiences through multiple math curriculum changes?” A conceptual framework connecting resilience (Siebert, 2005), a cycle of emotion (Aguilar, 2018), and implementation theory (Hall & Hord, 2014) was utilized to connect research to



application in the interview questions. First, results overwhelmingly support that each participant exhibited positivity and resilience in response to curriculum change even though half of the participants felt some sort of anxiety about their own math performance growing up. Aguilar (2018) wrote that choosing to remain optimistic even when faced with an undesirable event is indicative of a resilient profile. Second, results also reveal that participants have embraced new teaching methods and believe that it has been an overall positive shift with regard to the implementation of the CCSS (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). A major step in eliminating math anxiety, according to Tobias (1987), is to make math make a conversation, not a memorized theorem. Third, collaboration was a key response to curriculum change based on the fact that the participants unanimously agreed on collaboration as a means of navigating the change and actively seeking resources to help the change occur (Aguilar, 2018). Finally, results connecting Hall and Hord's (2014) change principles to the conceptual framework are too scarce to conclude. It is likely, however, that the change implementation became a catalyst for a collaborative, resilient environment.

### **Limitations**

There are several limitations that may have substantial implications for this study. First, the study was conducted in a centralized location within a small, rural county. Results in a larger county with a more diverse population of educators and students may vary. Second, this research lacks gender perspective. The study was conducted with all female teachers, and the researcher would suggest that a male perspective may fluctuate from these findings. Finally, the time frame during which this study was conducted could

attribute to the results. Interviews were conducted on the last three workdays of the school year when teachers were engaged with cleaning classrooms and making sure end-of-year paperwork was in order. The researcher suggests that conducting the interviews at a different time in the school year could alter results of future studies.

Further limitations that require documentation in the completion of this study are the deviations from the original single participant interviews described in Chapter 3. Due to the time constraints previously mentioned, one interview was conducted with outsiders present which could have inhibited the participants' responses. Another interview was conducted as a focus group, which could have resulted in filtered responses or unequal verbalized answers (Creswell, 2014).

### **Implications for Future Study**

The researcher's purpose for this study was to provide a needed resource for phenomenology in education, more specifically in curriculum. With little research demonstrating the phenomenon of math curriculum and how teachers reside and persevere, this project lends itself to many other avenues of exploration.

1. Replicating this study with other curriculum strands (language arts, science, social studies, etc.) would lend credibility and reliability to the interview questions.
2. Replicating this study with other grade levels (middle school, high school, administration, etc.) would lend credibility and reliability to the overall structure and methodology of this study.
3. In continuing to use this research as a foundational resource, it would be beneficial to follow a case study of teachers physically experiencing a

curriculum change to elaborate on implementation theory findings.

4. Differences in veteran teachers versus beginning teachers would be an interesting avenue to also explore using the framework of this study. With the shifting trend of mathematics education, findings could vary in emotional responses.

### **Summary**

Regardless of curriculum strand, grade level, building, position, or longevity, it is imperative that we continually seek ways to tell the story of perseverance. Hattie et al. (2016) described mathematical teaching as being able to make the transfer of learning visible; that by deliberately designing opportunities and building comprehension, learning moves past surface level to a complex dynamic that solidifies that transfer and makes an impact. It is the hope that in this study, the continual push to make resilience in education visible has inspired more research for implementation and cycles of emotional response. In providing a descriptive phenomenological study of teacher resilience through math curriculum change, teachers' stories have been told and can be used as a foundation for more. "Telling stories, and listening to stories, therefore are mechanisms to boost our collective resilience-whether at a school site, in a district, or in our country" (Aguilar, 2018, p. 84).

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Appendix  
Interview Questions

## Interview Questions

### Part I- Who you are (genetics, values, personality), Where you are (context)

1. How did you come to be a teacher?
  - a. Reasons why
  - b. Schools attended
  - c. Degrees obtained
  - d. Other roles or positions
2. What was your perception of your math ability growing up?
  - a. Did you feel confident in your own math abilities?
  - b. How did others perceive your abilities?
  - c. How were you taught math (drill and kill, problem solving, etc.)?

### Part II – What you do (habits), Change Principles 1-11

3. How has math curriculum changed since you started teaching?
  - a. State
  - b. District
  - c. School
4. Tell me about how leadership implemented these changes.
  - a. Timelines
  - b. PD
  - c. Resources
5. How have those changes affected the way you teach math?
  - a. Lesson plans
  - b. PLCs
  - c. Student activities
  - d. Student growth

### Part III – How you are (emotions, dispositions), Change Principle 12

6. How did you respond with the changes in math curriculum?
  - a. PD
  - b. Self-taught/self-sought information
  - c. Schooling
  - d. Mentors

Final Summative Question: In your experience, what has been the impact of curriculum changes on your students' mathematical learning?