A Phenomenological Study of Teacher Experience during Implementation and Initial Sustainability of the National Math and Science Reform Initiative of a Middle Georgia High School

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ABSTRACT

The focus of this dissertation was to study the experiences and perceptions of four teachers involved in the implementation and the sustaining of the National Math and Science Initiative. The National Math and Science Initiative (NMSI) is a program funded by the private sector, with some financial backing from various divisions of the federal government. This reform was developed, in part, to respond to the United States of America's STEM (Science, Technology, Engineering, and Mathematics) crisis in the U.S. (*National Math and Science Initiative*, 2013). The National Math and Science Initiative (NMSI) is an aggressive reform that serves to raise interest in these areas by providing schools with resources, training, and methods for restructuring. The goal is to put more students, especially those of underrepresented populations, in Advanced Placement classrooms. The NMSI reform provides guidance, financial support, and training for teachers and students for three years.

This phenomenological study focused on the experiences of four teachers responsible for implementing the reform. The purpose of this study was to investigate 1) the experiences teachers had in implementing the NMSI reform, 2) what factors contributed to implementation, and 3) to what degree the reform was sustained after the initial three-year onboarding.

Themes, implications for future research, and recommendations are presented. The findings in this study address the impact the National Math and Science Initiative can have on the teaching and learning climate of an institution and may serve as a foundation for future studies.

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As I sit down to write this I cannot help but consider the first words I heard spoken of the Valdosta State Program: “Throughout this process there is no doubt you’ll have access to plenty of support and supporters, but make no mistake about it, this is your journey and at times you’ll be on that island alone.” Having completed the course work and this dissertation study, I can now pay that sentiment forward. While much of the work is done on the back of the researcher, the collaboration offered, guidance provided, and overall collegiality of the Valdosta State University (VSU) Curriculum and Instruction program proved to be invaluable in seeing me through this journey. I agree that at times one shall feel like this is a journey of the self, but acknowledge whole-heartedly that it takes a village to see it through. I am forever thankful of the VSU village.

I dedicate this work to my beloved sister. My sister, a champion for the elderly and defender of the less fortunate, instilled in me the desire to continue my pursuit in education. I witnessed she, all my life, set goals and aspire to achieve them. In doing so, she made this world a better place. I can still remember the day I told her I was about to begin the pursuit of a doctoral degree. She said how proud she was, but that I needed to slow down and find someone to marry, start a family. She was always worried about personal fulfillment as much as professional. We lost her while I have been pursuing this degree, and nothing makes me prouder than to know that I’ve completed what I promised her I would. I love and miss her dearly. And I have agreed to slow down.

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CHAPTER I

INTRODUCTION

Change has been inevitable. Change has often been continuous. Change in education has occurred through reform for nearly the entire existence of the American education system (Deal & Peterson, 1999; Ravitch, 2000). In fact, change has been so pervasive in the American education system that one cannot look back into the history of education in America and identify a true Golden Age of the system. One cannot find a period in this or the past century in which citizens, reformers, educators, and parents were completely satisfied with the schools (Ravitch, 2000). At the turn of the twenty-first century, this had not changed. Twenty-first century reformers and critics of American education have argued that changes need to be made to a broken system (Muhammad & Hollie, 2012). They referred to the low test scores on national and international assessments, referred to the grade inflation and social promotion of students, referred to the improperly trained teachers and referred to the low academic expectations in many of the nation's schools as the root to America's crisis in education (Hall & Hord, 2006; Levin & White, 2016; Ravitch, 2000). This had facilitated the occasion for unprecedented legislation requiring all schools to ensure learning for all students (Muhammad & Hollie, 2012). Never before in American education has the stakes been so high (Muhammad & Hollie, 2012; Ravitch, 2010).

There has been a widely held belief that schools can solve the woes of society; just the same, there is a commonly held belief that the right reform strategy can solve all of our schools' issues (Hunt, 2005). At the turn of the twenty-first century, lawmakers of Republican and Democratic parties and the media elite were all able to find a common platform of understanding by agreeing that the education system in America was broken (Ravitch, 2014). Policy makers believed this broken system could be fixed with the right prescription of reform (Hunt, 2005). Ravitch (2014) claimed that during this period the conversation in America's education system concentrated on the failing comparisons to other nations, the conditions of public schools, and methods for accountability. Ravitch (2010) posited that the language of this period developed a feeling of crisis in the education system; a crisis that, if not remedied through major sweeping changes, would threaten the American economy and our national security.

In 2001, with the election of President George W. Bush, came sweeping federal legislation known as No Child Left Behind (NCLB). With the passing of this legislation, the federal role in education was drastically changed. The NCLB law made it a requirement that every student be tested in grades three through eight annually in mathematics and reading. The supervising school of each test then was required to report scores, broken into categories of race, ethnicity, disability, limited English proficiency, and low-income status (Ravitch, 2014). By 2014 all students, despite association with categories just mentioned, were to illustrate proficiency on these standardized tests. Schools were required to track progress; if they failed to show improvement from year-to-year, then the school could be placed on the needs improvement list. Sanctions would

continue to mount for those schools who failed to get off the needs improvement list. The goal was to require the schools of our nation to achieve one hundred percent proficiency-a goal that Ravitch (2014) argued was impossible to achieve. However, as schools feared being labeled on the needs improvement list, a list the media and critics of education often referred to as a list of "failing" schools, they reached for plans that promised immediate improvement (Muhammad & Hollie, 2012). Likewise, millions of dollars were allocated by the states for testing and test preparation materials out of fear of "failing" (Ravitch, 2010).

In 2008, with the election of President Barak Obama, NCLB drifted away. Many educators, I included, expected a great change in federal education policy. However, instead of major deviation away from generating quantified results of standardized testing as a method of accountability, educators received word of a similar plan in the form of Obama's Race to the Top Initiative. This was a competition among states funded by $5 billion in federal money. To be eligible, states had to adopt a set of common standards (known as Common Core), evaluate teachers based in large part on student test scores, and be willing to "turn around" failing schools with the firing of teachers and staff or the closing of the schools. Eleven states, including Georgia, won the funding (Ravitch, 2014). The Obama administration through this initiative was able to align state education policies with the requirements of Race to the Top, leveraging changes across the nation. While many educators were hoping to witness a reduced influence of testing as an accountability measure, what they got instead was a "full-throated Democratic

endorsement to the long-standing Republican agenda of testing, accountability, and choice" (Ravitch, 2014, p. 15).

The rollout of the Common Core Standards and Race to the Top initiatives by the Obama administration in 2008, and the initial adoption of these standards by the Georgia Department of Education, reiterated the desire for reform in many of the schools. If schools were going to remain off the needs improvement list, they were going to need to devise plans for improvement. The Obama administration and drafters of the Common Core curriculum did not field test the standards prior to the rollout. The state education departments cautioned the federal government that the rigorous nature of these standards could cause test scores, even in successful districts, to plummet (Ravitch, 2014). This then may have led to reformers being able to point once again at America's "broken" education system. Also, this would continue to pave the way for reform initiatives and education-based entrepreneurial opportunities. Because there would now be a common set of standards and shared assessments throughout the nation, Common Core supporters argued that this would develop an occasion in which education entrepreneurs might be able to develop the best products taken to scale on national markets (Ravitch, 2010).

This led to an increase in money spent and money earned. For the first time in the history of the U.S. Department of Education, programs were being designed with the intention of stimulating for-profit ventures in American education (Ravitch, 2014). Ravitch (2010; 2014) referred to this new wave of reform initiatives as corporate reform. She argued that while reformers of the corporate reform movement claimed to close the achievement gap, provide excellent education for all, and develop great teachers, what

they really attempted to accomplish was a transformation of the system into an entrepreneurial sector of the economy (Friedman, 2005; Ravitch, 2014). Because of the entrepreneur nature of corporate reforms, Ravitch (2010) cautioned that these types of reforms might be introduced without time to test in the field prior to suggested implementation, creating an occasion in which many of these reforms might make claims of improvement that had not been factually proven through empirical research.

The Bill and Melinda Gates Foundation, a leading funder of the corporate reform, awards hundreds of millions of dollars in grants annually. The Bill and Melinda Gates Foundation has made it clear through the programs it contributes to and policies it supports that they believe in the power of a teacher-based evaluation (Ravitch, 2014). The foundation has invested heavily in test-based evaluation of teachers and the concept of merit pay (pay earned for performance). In 2007, when the National Math and Science Initiative (NMSI) expanded from a Texas-based reform initiative to a national one, the Bill and Melinda Gates Foundation awarded them $10,093,793 (Bill and Melinda Gates Foundation, 2007). Falling in line with many other initiatives supported by the Gates Foundation, NMSI aimed to improve education by holding teachers accountable for demonstrating improvement to both access and success on standardized tests (Advanced Placement exams in the areas of math, science, and English).

National Math and Science Initiative (NMSI) is a program funded by the private sector and federal grant money, which boasts the mission of improving "student performance in the critical subjects of science, technology, engineering and math" (STEM). NMSI was developed in response to an expressed need in America for more

employable candidates in STEM fields (National Math and Science Initiative, 2015). NMSI's mission statement articulates a goal to transform teachers, schools, and education in the United States.

NMSI reformers argue that this initiative has been designed to raise teacher aptitude and student success in the areas of math, science, and English. The reform targets the Advanced Placement population and has been designed to increase enrollment of STEM-related fields in college, raise teacher proficiency in the areas of math, science, and English, and support students planning to attend college. Designers of the NMSI reform believe that this focus in our high schools will yield more interest in the areas of math, science, engineering, and technology, and therefore lead to a larger talent pool in the labor field (National Math and Science Initiative, 2015). School districts, school sites, administrators, teachers, and students participating in the reform have all been offered monetary incentives for improvement under the program. NMSI has claimed this reform would lead to positive impacts on student, school, and district success; i.e., it might ensure schools and districts were able to show annual yearly progress or qualify for Race to the Top grant money. Districts and schools rallied to the promise of a quick fix (Hunt, 2005; Ravitch, 2014).

Friedman (2005) asserted that conditions in the 21st century for America's workforce have changed because foreign competition has increased considerably. As corporations in America continued to seek out candidates in the STEM areas, they were looking for them from the shores of foreign countries more and more (Muhammad & Dufour, 2009). As more skilled labor enters the global workforce, education has become

more critical. This is especially concerning for the disenfranchised and poor of the nation. Muhammad and Dufour (2009) argued that if America intends to remain competitive in a global market place, then the quality of education for its students must improve; likewise, not just white, middle-class and the affluent, but many more students have to develop educationally. NMSI designers packaged together this initiative as a response to what Muhammad and Dufour (2009) claimed to be a crisis in American education. The NMSI reform was designed to target not only those students who would have likely been involved in rigorous, STEM-related courses, but also the underrepresented populations (National Math and Science Initiative, 2015).

NMSI has claimed its programs are intended to transform teaching and transform schools, and by doing so transform education in the United States (National Math and Science Initiative, 2015). In alignment with this mission, the scope includes four approaches: First, to improve the quality of secondary math and science teachers through more rigorous college preparatory programs (UTeach Expansion Program); second, to strengthen the current population of educators in the fields of science and math (Laying the Foundation); third, to raise the number of college-ready students (College Readiness Program); and lastly, to place focus on military families within the College Readiness Program (CRP) (National Math and Science Initiative Annual Report, 2014). The design of CRP is to encourage larger enrollment in the Advanced Placement subjects of English, math, and science. NMSI asserted that the more students are involved in rigorous courses such as Advanced Placement, the more college graduates there will be. They have confirmed their claim with quantified data illustrating the percentage

improvement of likelihood for a student to graduate who had taken an AP course over a student who had not. NMSI has claimed students who take an AP exam and earn a qualify score (a score of three or better on a five-point scale) are three times more likely to graduate than those that do not. Students who take an AP course, but not necessarily take the exam or pass the exam, are twenty-two percent more likely to stay in college past their freshman year than those who do not (National Math and Science Initiative Annual Report, 2014). NMSI claimed for a typical school involved in the grant test scores (the year prior to NMSI introduction) were on average thirty-two percent below average (based on AP test scores in the areas of math, science, and English) but after three years were forty-six percent above the average (NMSI Approach, 2017). The NMSI reformers assert that the interventions introduced through this initiative are a direct link to the increase in pass percentage on AP tests in these areas and in improved college readiness.

The National Math and Science Initiative (NMSI) has been awarded millions of dollars in federal grants and support from the private donors. In fact, in 2014 NMSI reported $38,052,136 in total contributions for that year alone. Of that large sum, only approximately thirty-two percent came from federal grants ("Guide to Intelligent Giving," 2016). The program has introduced the initiative to new districts and schools every year since its inception, growing from an initial range of a few thousand students impacted yearly to, in 2016, over 50,000 students directly involved. With that sum of money being given annually and the growth trends projected, more information on how the program affects those involved should be generated.

Sarason (1990) and Ravitch (2000) both claimed that there were more reform initiatives in education that did not come to fruition than there were those that had and were sustained. Both argued that many reforms failed to be sustained because the reformers and implementers did not fully consider the implications of the initiative and how it might or might not have affected other parts of the whole institution. In other words, the failure of a reform occurred because the reform was not systemically implemented or was implemented half-heartedly (Deal & Peterson, 1999; Hall & Hord, 2002). Half-hearted implementation, Hall and Hord (2002) explained, occurs when there is a lack of commitment by those most instrumental in creating the desired change. The NMSI reform initiative does not include all teachers from all subject areas; so while the effects of the implementation may be felt by most in the school, the implementation has not been systemic. This, as Sarason (1990), Hall and Hord (2002), and Ravitch (2010) all noted, is a threat to reform sustainability. Implementation of any reform takes the cooperation of the parties involved if the site is to experience success (Muhammad & Dufour, 2009). Kronley and Handley (2003) discussed how past reform initiatives that were not systemic in implementation often failed to achieve desired results. There is less of a buy-in to participate fully when the reform initiative is not systemic, which ultimately may lead to an inability to sustain the initiatives and interventions of the introduced reform.

Lack of systemic implementation may result in a lack of sustainability. The implementers in most education reforms are the administrators and teachers, with the teachers being the direct contact with the suggested area of improvement (Ravitch, 2010). This being the case, the field of education deserves more studies that examine the effects

reforms such as NMSI have on a school's teaching climate and whether the intended or unintended change affects the students. As the school site investigated in this present study has fallen out of the period of direct implementation (past the final year of receiving all benefits offered), there is a need to examine the teachers' experiences through implementation, and their perceptions for the likelihood of sustainability. Investigating how a group of teachers navigated the expectations and instructions for implementation of a mandated reform may lead to a better understanding of the experiences teachers in such a reform go through. If policy makers, district officials, and teachers know more about the teacher experience, they may be able to make better-informed decisions on what types of reforms may work for their institution and how to better implement those reforms from the perspective of teachers.

Statement of Problem

Problem statement one: Students are not college and career ready. Even students from affluent schools go to college and drop out at an alarming rate. According to the National Center for Education Statistics (2016), approximately only sixty percent of students who enrolled in an undergraduate degree program for the first time completed their degree within six years. While there are factors outside of readiness that influence this rate, such as students who transfer to another college, students who complete their degree in just over six years, and unforeseen circumstances beyond the enrollees' control, one must acknowledge that a forty percent incompletion rate (between years of 2008 and 2014) illustrates a lack of preparedness for many students entering college. For colleges

with open enrollment or liberal enrollment (acceptance rate of eighty percent or higher) that number increases to upwards of sixty percent incompletion rate.

Problem statement two: Many reform initiatives promise to accomplish lofty goals. It may be difficult for a district and its administrators and teachers to navigate these reforms to select one that will yield positive results. There is a concern for a lack of sustainability of many reform initiatives due to the abundance of reforms to select from. Ravitch (2014) identified more than fifty corporate reform initiatives, some nonprofit, but most for profit, that all claim to have the "fix" for a broken system. Ravitch argued that the reformers of the American education system now speak of a broken system in crisis that is failing due to the teachers and school administrations. Beginning with NCLB and continuing through the Race to the Top Initiative, all schools are mandated to see all students be successful (Muhammad & Hollie, 2012). Reformers have seized this opportunity, developing reform initiatives, strategies and products for sale, promises of a fix, and so on. With so many reforms now being offered, districts, schools, administrators, and teachers have the very difficult task of determining which reform initiatives may lead them to the success promised.

Problem statement three: The site for the present study may not be offering a maximized educational experience for all their students even though it is an affluent high school. I believe there existed at the time of initial implementation a mentality, based on my perceptions of my home school (one similar to the present site) that there was a certain type of student that took AP courses. This certain type was often labelled as gifted in our district; however, the doors to the AP program have always been open to

students not labelled as gifted. Nevertheless, because there was an opportunity does not necessarily mean it was encouraged. While this site may have previously claimed success within the Advanced Placement (AP) program, one recognition at the onset of the grant acceptance was that this site may not have been offering opportunities to all students for access to rigorous courses such as AP. Before the implementation of NMSI, the study site enrolled 248 students in AP courses. After the first year of implementation, that number rose to 469, and by the final year of implementation that number continued to grow, illustrating a growth rate of over 150 percent. There was a total growth of 141 percent district wide (five high schools).

Problem statement four: With programs such as the Move on When Ready (MOWR) or dual enrollment, high schools are losing enrollment in Advanced Placement courses, threatening the survival of college-offered courses in the high school setting. MOWR is a Georgia program for all high school students who qualify, which allows them to pursue a college degree while attending high school. Students earn both college credit and high school credit for taking college courses. MOWR covers the cost of mandated fees, tuition, and textbooks. MOWR has been designed with the intention of providing more access to more students than similar programs of the past. Students participating in the MOWR program take these courses away from the high school. I am often asked by my AP Language and Composition students the question of whether or not to take my English course, or just take the equivalent of it at a local college. The general perception I can infer based on my many conversations is that students would rather take the course at a college than as an AP subject because it, in their words, is an easier course to pass,

and at the end of the course there is not the same high-stakes exam as there is with all AP subjects. This trend is a threat to the survival of AP programs across the state of Georgia.

Conceptual Framework

Constructivism

The research has been conducted through a constructivist lens. Constructivism "maintains that learning is a process of constructing meaning; it is how people make sense of their experiences" (Anfara & Mertz, 2006, p. 27). In other words, knowledge and reality reside in the minds of the individuals (Savin-Baden & Major, 2013). Through the constructivist framework, the researcher builds an understanding of the phenomenon being studied from the analysis of information collected throughout interviewing and observing those living the experience. By interviewing participants, both the participant and the interviewer begin to construct their own knowledge about the reality of the phenomenon. The meaning they make from these experiences shapes their knowledge related to that area of concentration (Patton, 2002). In the case of the present study, that area of concentration is the procedures, policies, and practices for implementing the NMSI reform. I therefore applied the constructivist theory. To do this, the participants and I unpacked individual experiences throughout the process.

Ultanir (2012) stated that people construct their own knowledge while tackling problems. Teachers construct meaning for their teaching and approach to teaching, and for the landscape of education, while tackling the issues associated with a task. The same theoretical lens applies to teachers involved in implementing reform initiatives and proposed interventions (Hall & Hord, 2006). Teachers are supposed to be continual

learners, life-long practitioners, who are instructed early on to take from their experiences and make meaning that can positively influence future instruction. Therefore, during times of reform implementation, it is plausible that teachers develop an opinion of the reform, its implementation, and its perceived success or failure. Teachers construct knowledge when they are able to make a comparison of new ideas in relation to their previous ideas. While doing this teachers traditionally determine how new knowledge may influence their teaching and relationship with others in the institution.

Teachers' experiences and perceptions about reform implementation thus become important. Through examining teachers' voices in interviews and their practices through observation, I developed concepts. This understanding may lead to an impetus for reformers to better implement reform initiatives and proposed interventions at the school level of a secondary institution. This research has also led to an opportunity to make recommendations for other institutions with characteristics similar to the study site, in considering reforms.

I, as a constructivist researcher, relied on the participants' views of their experiences in implementing the National Science and Math Initiative (NMSI) reform, by asking open-ended questions, allowing participants to make meaning of these experiences (Maxwell, 2013). The constructivist researcher's goal is to make sense of the participants' meaning of their world (Maxwell, 2013). Patton (2002) pointed out that constructivists believe that research is a mix of art and science. The mixing of both occurs best through qualitative research methods. Therefore, the best way to get to the

essence of AP teachers' opinions and beliefs about involvement in implementing the interventions of the NMSI reform initiative was through qualitative empirical research.

Motivation Theory

What motivates teachers to implement a reform with fidelity, or do so half-heartedly, as Hall and Hord (2006) explained, has much to do with the meaning they personally attribute to the reform. The constructed meaning is derived from those experiences lived, through how information regarding the reform is delivered, and from both internal and external motivating factors. Mitchell (1982) claimed that performance is the combination of motivation, ability, and environment. Motivation is the desire for achievement. Ability is having the acquired necessary skills and knowledge required to perform the task. Environment is having the right information, resources, and support necessary to perform the task. At times any one of these factors can be the determinate of success. For example, when a teacher hangs up student work on a bulletin board, the key factor leading to success is motivation; however, a teacher cannot expect a worthy product to hang on the bulletin board without the ability to instruct students on task expectations. The question then is: What motivates teachers to, or not to, implement a reform with fidelity?

Weiner (1974) claimed that success or failure of a goal will often result in an outcome-generated set of emotions. Emotion then, as he argued, is directly linked with the perceived success or failure of goal attainment, despite the cause for the success or failure. For example, a study by Weiner, in 1979, illustrated that students who were successful on a given exam experienced an emotion of happiness, regardless of what

causes led to the success, such as hard work or good luck. Discussing emotions felt by the teachers involved in implementation may lead to a better understanding of the perceived success or failure of the reform (whether that be moderate or extreme) and likewise lead to the ability to recommend implementation practices, in an effort to improve the likelihood of the feeling of happiness associated with success. The theory is if implementers are able to know ahead of time what causes may lead to success, they may make decisions that can lead to sustainability.

Weiner (1974) also claimed that motivation is determined by an incentive. However, the incentive for reaching a goal is not necessarily the same for all in pursuit of that shared goal; therefore, attributing success or failure to a single or few causes may be accurate in reference to one participant, but not so for the others. Weiner explained this with the analogy of a dollar bill; being, the dollar's value is constant. This is the objective property of the dollar. This incentive then, if examining its objective properties, is stable. However, how that dollar came to the participant may have different effects on the outcome. For example, a dollar from a friend may elicit the feeling of gratitude; a dollar earned through hard work may elicit pride. Weiner claimed then that "causal ascriptions influence emotions, and that emotional reactions play a role in motivated behavior" (1974, p. 559). Therefore, if one can ascribe causation for the immediate reaction to an attained goal, or a goal failed to reach, then one may be able to better predict what steps, processes, or procedures should be taken, to some degree predicting the outcome.

In other words, in the Attributional theory Weiner (1974) stakes the claim that people try to determine why they do what they do; people, that is, attempt to interpret the causes for events or actions. This is a theory that aligns most often with achievement. Once a person has experienced the happiness of success, or the unpleasantness of defeat, he or she next, as Weiner argued, seeks out the causation for this effect. A person who seeks to understand why a person did something may attribute one or more causes. In order for that to occur, Weiner posited that the person must perceive or observe the behavior, must believe the behavior was intentional, and must determine whether or not the behavior was forced. Weiner claimed that what a person attributes to success or failure can be classified under three causal dimensions: stability, controllability, and locus of control. Locus of control can be further classified as those causes that are internal or external. Stability refers to whether or not the causal factors change over time. Controllability differentiates between the causes that one can control and those one cannot. Weiner (1974) argued these causal dimensions of attribution are directly related to achievement. Achievement can be attributed to effort, ability, level of task difficulty, or luck. For those who consider themselves high achievers, they believe success is a result of ability and effort, whereas failure can be often attributed to bad luck or poor design of the task. Low achievers tend to feel the opposite; which is to say they tend to believe even when successful, that success had more to do with luck or "who you know," thus, resulting in less of a sense of accomplishment.

Weiner's theory can be applied to education. There is a strong relationship between self-concept and achievement (Weiner, 1974). Weiner posited that attributions

of cause may determine reactions of success and failure. For example, a student who receives an A on a task will not feel as successful if that teacher gives only the grade of A to students. On the other hand, someone who wins a fishing tournament over a higher-ranked fisherman after much practice or receives an A from a teacher who gives out few will generate a positive reaction. The same can likely be inferred about educators, as they are life-long learners and practitioners.

Weiner (1974) claimed that among most motivational theoretical propositions is the inclusion of expectancy of goal attainment. Weiner's attributional theory builds on this idea by establishing the basis for causes that lead to the success or failure of goal attainment. Weiner's description of attributional theory lays out that participants of a movement, such as an educational reform, will seek out causes for actions, complications, successes and failures. This attribution is constructed through lived experiences. This theory has guided the design and analysis of my research as I sought to better understand how teachers perceive the implementation procedures and policies, the interventions introduced, and the likelihood of sustainability in an effort to make recommendations to policy makers, district and school officials, and teachers. If one can construct meaning, that may lead to a causal understanding for actions taken throughout implementing the reform, then one may be able to better recommend what steps to take in the future, being always aware of possible causes that lead to a desired, or undesired, outcome. This then gives policy makers, district and school officials, and teachers a better expectancy of success in selecting and implementing chosen reform initiatives.

Change Theory

People often seek out causation for an experienced change in an effort to replicate in the future practices that led to success, or avoid those that led to failure (Weiner, 1974). It is safe to assume that often when an institution selects an initiative or program to introduce, the institution is doing so with the aspirations of facilitating change.

Change theory is an understanding that those selecting or actively implementing an initiative can use to determine the causal links between outcomes and practices. The theory is grounded in the fact that those involved will work backwards, first determining what the desired outcomes should be, then identifying preconditions necessary for change to occur (Weiner, 1985). Change theory further explains that the process may also occur in retrospect as a form of reflection in which those who have participated in a reform reflect on their practices.

There are three stages of change: unfreezing, moving, and freezing. Unfreezing is the stage when those involved in promoting change realize the need for change. The stage of moving is when the change is initiated. And the refreezing state is when equilibrium is established (Lewin & Cartwright, 1964, as cited by Mitchell, 2013). At the time of this present study, education is primed for all three stages. In other words, because the American education system is currently under attack for being broken, for being inadequate, and for being in "crisis," the search for how to make improvements is happening across the nation (Ravitch, 2010). Schools have sought out and accepted reform initiatives on the promise of change (Ravitch, 2010).

Richardson and Placier (2001) claimed that there are two approaches to this change: empirical-rational and normative-reeducative. The empirical-rational approach occurs when change is determined by administrators, district supervisors, or policy-makers. This change is facilitated by teachers being told about the change and expected to implement it. Normative-reeducative is change that occurs when individual teachers are involved in the process through dialogue and deep reflection. This type of change may occur when a teacher is self-motivated to improve practice. Whereas normative-reeducative change is traditionally intrinsic and self-motivated, empirical-rational change is handed down (or up) to the persons expected to implement. This type of change is what Fullan (2001) referred to as a top-down, implicit theory of change. This form of change can come about by announcing new policies, forced legislation (such as *NCLB* or *Race to the Top*), new performance standards such as Common Core, by proclaiming a get better or you're out ambience, or all of the preceding. Fullan argued that this form of change leaves those responsible for implementation with a sense of compulsion, *we are doing it because we are told*, lack of time for meaning-making, or people are frightened because they do not understand and do not have the time to come to understanding. Likewise, top-down change is often accompanied by a transitory nature to the reform. Those responsible for implementing the reform may feel dejected as they put in much effort to implement, just to witness it replaced by a newer reform.

Fullan (2011) further argued that for real change to last, change should be facilitated through both top (policy makers) and bottom (teacher) input. Features of sustainable change include: it is focused on improving teaching and learning, the reform

agenda is appropriate to the school, teachers direct the change process in a community of trust and collaboration, data are used to guide changes in practice, a long-term perspective of five to seven years is taken, and school leaders guide the innovation (Fullan, 2011; Goodson, 2001; Hargreaves, 2004; Smith, 2008). In order to sustain deep change as Fullan (2001) claimed, the persons responsible for proposing the change should get external commitment from all involved, and in the long run be able to garner intrinsic commitment. External commitment exists whenever someone defines the steps to take to reach a set of objectives and goals. Fullan (2001) explained that external commitment will see results achieved for the school or organization. But for change to be sustained over prolonged periods of time, the implementers of change will need to develop a "deep sense of internal purpose among organizational members" (p. 9).

Fullan claimed, due to the contradictions found in many leadership books discussing change, that while change can be understood and perhaps led, it is unlikely to be managed. Understanding change theory, as Fullan (2001) asserted, is necessary if a leader hopes to evoke sustainable change and achieve fidelity in implementation. Fullan argued that change is unlikely to be sustained, if the leaders of implementing the reform or strategy do not establish a culture in which there are deliberate innovative conditions and processes. These conditions have to be established prior to the implementation and then the leaders must serve as guides throughout. Therefore, the work of developing a moral purpose, giving way to a design of working backwards (with the shared end-goal in mind), should be inherent to the school culture prior to accepting terms for implementing a top-down reform; otherwise, the reform is likely to be short-lived (Fullan, 2001).

Schools are often faced with piecemeal, episodic projects that are received from hierarchical bureaucracies in the form of top-down initiatives (Fullan, 2001). Because of this, schools may experience a colliding of innovations, which may result in failure to sustain (Fullan, 2001; Hall & Hord, 2006; Ravitch, 2010). Because of this there is often a generalized fear that change will not last, and therefore a lack of buy-in of the faculty and staff for an innovation or reform (Mitchell, 2013). Sustainable change through the implementation of a top-down reform is unlikely to occur. If change does happen, it is often then short-lived, if those responsible for introducing the reform do not understand the theory of change (Fullan, 2001).

The site of the present study was mandated, by the district-wide acceptance of the National Math and Science Initiative reform, to implement practices, policies, and interventions. These practices and interventions were promised to facilitate change in how Advanced Placement courses were instructed and in enrollment policies for student participation in these courses. The promise of change was the grounds for acceptance of the conditions of the initiative. This change was supposed to raise the level of students participating in AP courses, increase the number of qualifying scores on Advanced Placement exams, improve teacher aptitude, and facilitate more collegiality among the teachers involved (NMSI Approach, 2017). While NMSI had asked outside organizations to complete independent studies on the student assessment results of schools and districts prior, during, and after implementation of the initiative, no record of a study in how this initiative may have affected the climate of relationships among those teachers involved, those teachers not involved, and the administration, has yet been done. No doubt it is

likely that the selected site for this study has experienced change as a result of implementing this reform. Whether that change was positive, was negative, was a combination of both, or will have lasting effects, may be found through the empirical study of how a select number of teachers navigated the implementation of the reform.

Purpose of Study

With this study I have intended to better understand the effects the implementation of a mandated reform may have had on the practice of teaching Advanced Placement students in a specific high school. A goal of mine in studying the teacher-perceived effects of the National Math and Science Initiative (NMSI) during the stage of implementation was to better understand how selected interventions, policies, practices, and the implementation environment may have influenced the likelihood of a successful, sustainable reform. I investigated and unpacked the experiences of Advanced Placement teachers who were directly involved in this specific reform.

Through interviews, document analysis, and observations, I sought a better understanding of teachers' perceptions during, and after the implementation of NMSI. The findings from a study such as this may have generalizability for this specific district and for similar districts when selecting reforms. NMSI is a national reform effort that has demonstrated a likelihood for continued growth; therefore, a district considering to agree with the terms of NMSI may also use the findings of this study to help better determine whether or not this reform is right for that district.

As Mitchell (2013) and Ravitch (2014) both argued, there are certain characteristics that many of the recently introduced reforms have: Expectation of change

through more accountability of teachers, through standards-based instruction, through the use of standardized testing as a way to credit teacher success or failure, through incentives for gains, and though targeted professional learning for teachers, to name a few. The NMSI design includes many of these qualities. NMSI incentivizes student scores, targets teacher quality through professional learning and a demand that unqualified teachers be removed from the AP classroom, offers resources and supports that may lead to more aligned curricula and instruction, and demands schools do this while recruiting nontraditional AP students. While NMSI is nonprofit and many of the current reform initiatives are for profit (Ravitch, 2014), the similarities in design may offer an opportunity for policy makers and stakeholders responsible for determining which reforms to accept and which to reject to learn from hearing how teachers involved in this reform believe they were affected. This added understanding may lead to changes in design, or at the minimum a better understanding of how interventions may or may not affect the involved teachers.

While this study was not an examination of student success quantified by student scores on the AP exam and therefore was not a study on the impact the NMSI reform has on the student, it may add to the understanding of how students are affected by a reform. Teachers in this reform, and most reforms in education, are the most influential instrument in its success or failure (Hall & Hord, 2006; Muhammad & Hollie, 2012; Ravitch, 2014). This being the case, it then seems logical that policy makers, researchers, reform implementers, district officials, and school administrators may be able to use the

findings from this study to make decisions on which interventions may lead to gains in student success.

Teachers may take away from a study such as this ideas for interventions to implement as a package or independently. Because NMSI is a reform initiative designed to raise standards of student learning while offering more opportunity to the underrepresented populations, it packages many interventions together as a means to accomplish the larger goal. Teachers who are not implementing the reform, however, may still find value in knowing which individual interventions may have or have not worked for the teachers. This may then provide teachers with informed decisions on what may or may not work with their students in an attempt to raise student achievement. With all this in mind I purposefully selected four AP teachers: One math, one science, and two English. These four all had a role in implementing the NMSI reform. In an effort to better understand the implications of reform implementation and sustainability, I examined the teachers' experiences, and how the school environment may have played a role during implementation. Studying teacher attitudes about the interventions, such as views on merit pay, the selective design of the initiative, and perceived the value that the initiative has in the classroom, may inform better reform implementation practices for similar schools or districts, and likewise may inform teachers on what may work or not in attempting to raise student success. The goal has been to construct meaning behind the experiences these teachers had, in an effort to better identify procedures during the implementation of top-down reform efforts that benefit sustainability of the initiative.

Research Questions

1. How do teachers involved with implementing the National Math and Science Initiative describe their experiences?
2. How does the environment of MGCHS contribute to teacher experiences related to the implementation of the National Math and Science Initiative?
3. What are the opinions of AP MGCHS teachers concerning sustainability of the National Math and Science Initiative for their school and district?

Site Description and Significance

The site for this study has been an institution that has experienced much academic success, considered an affluent high school by most measures, and therefore is not typically a target of major reform initiatives. This school, though not a school on any "needs improvement" list or resembling many of the traditional characteristics of schools needing intervention from the top down, is one nevertheless that looks to improve upon its past successes and therefore accepted to participate in the reform. With that said, studying a site such as this is significant because of what it may be able to help us understand. This school resembles many of the demographics and characteristics of many other schools involved in this reform. The school's likeness—academic success, military affiliation, and other factors—to many selected schools makes it a significant location, for it may represent similar schools involved in implementing this reform. This understanding then may lead to a more informed decision on whether or not future sites apply for the grant. Likewise, NMSI may be able to use the results from a site such as

this affluent high school to better make decisions on which schools, or districts, they should consider for the initiative.

The Middle Georgia School System consists of, as of fall 2018, 38 schools, approximately 28,200 students, and about 2,100 teachers. The 2014 district accreditation report (District is going through accreditation Spring 2019) displayed demographics for the district, claiming that the district was 49% White, 36% Black, 7% Hispanic, 4% Multicultural, and approximately 3% Asian. The staff comprises of 78% White, 20% Black, and less than 2% Hispanic (ethnicity and racial labels are reported as defined by the Georgia Department of Education). Other demographic information regarding the school district include: 14% Students serviced in the Honors Program; 54% Economically Disadvantaged; 11% Students with Disabilities; and nearly 3% English Language Learners.

Of the 38 schools, there are five traditional high schools, one career academy, and one alternative high school. Of the five traditional high schools, three as of the 2013 school year were Title 1 schools. Being a Title 1 school means that a large portion—the district set the baseline at 50% of school population—of the population is on free or reduced lunch. In the past two years, all five of the traditional high schools were named AP STEM Schools, and all but one was named an AP STEM Achievement School. Awards, given to schools, students, and teachers, are in abundance for the Middle Georgia school district (District Accreditation Report, 2014).

The Middle Georgia County school district believes in setting standards that go above and beyond the set standards for minimally acceptable achievement. There is much

emphasis put on the success for every student. Likewise, there are many resources and professional learning opportunities to help ensure the teaching population of Middle Georgia County is competitive, regionally, state- and nation-wide. The district communicates these expectations and guidelines through district and school mission statements, through various outlets of social media and regional reporting, and through the Opening Session for all certified staff. A motto, nearly all certified staff of Middle Georgia can communicate, is "*It's the Middle Georgia Way*."

This motto insinuates that there is a right way to do things, then there is the way of going above and beyond; that's the *Middle Georgia Way*. In seeking to be above and beyond other districts of the state, Middle Georgia has continued to develop professional learning opportunities for its teachers and implementation of initiatives that would improve students' education in seemingly an already academically strong system. Middle Georgia County High School is one of the two high schools in the district not considered Title 1. The other is Wolverine High School (WHS). WHS opened in 2010. I worked for MGCHS for four years before migrating to WHS. While the two schools have their evident different cultures, much of what I experienced at MGCHS regarding academic rigor and expectation is the same at WHS. MGCHS was the newest campus in the district until the establishment of WHS. MGCHS, though still newer and in better condition than other schools in the region, has become dated in some ways. For this reason, the district voted to remodel the school's exterior and interior, a process that will cost several million dollars and two years to complete. This has illustrated some of how

the district, school, and community of Middle Georgia County are dedicated to continued growth and success for all the high schools in the district.

MGCHS has been recognized, for academic excellence, as a *National School of Excellence* (District Accreditation Report, 2014). Those who work there pride themselves on academic success. MGCHS students compare well across the state and country on scoring of standardized tests such as the SAT and ACT. For state standardized tests such as the End-of-Course assessments, MGCHS boasts they consistently score highest in region and above state averages. Their motto, "expect excellence," and their school improvement plan communicate an expectation of high academic success (District Accreditation Report, 2014).

One might be led to think that MGCHS would be a school of complacency. To the contrary, MGCHS is a school of continued innovation and heightened expectations. It is because of this belief that MGCHS was considered along with the Title 1 schools of the county to participate in the NMSI reform. The school goals, outlined in MGCHS's *School Improvement Plan* for 2018, included to better engage all stakeholders, to provide professional learning opportunities using research-based practices, to provide high-quality instruction, and to plan, facilitate, and monitor organizational practices. The MOU between the district and NMSI discussed the nature of acceptance being contingent upon alignment of reform with school improvement plans. Because MGCHS's plan has a scope of both teacher and student development, it met the initial requirements for acceptance.

This site offered a unique opportunity to examine how teachers of an academically successful institution navigated through a mandated reform. While the Title 1 schools may have a similar experience in implementing the reform, there may be significant differences between the two to justify selecting one site over the other. My interest in this study has been to better understand teacher perception regarding decisions made, and the effects of these decisions throughout implementation. Because of obvious threats to validity in studying the experience at my place of work, where I have intimate relationships with potential participants, it was best to study the experiences of teachers in another school.

Middle Georgia County High

MGCHS's current enrollment is just above 1700 students, making it the second largest high school in the district. According to the 2014 Accreditation Report, Middle Georgia County High has a student body comprised of 43% minority, 26% economically disadvantaged, and 48% female. The graduation rate for this school changes from year to year, but the average rate over the past ten years has been 92 % (District Accreditation Report, 2014). This school has never been given the designation of Title I. Rankings were done early in 2017 to determine the "best" high schools in the state of Georgia; MGCHS was ranked 41 out of 426 schools, ranked 32 for the best teachers at a school, and ranked 42 out of the best STEM schools in the state (Miller, 2017). Likewise, this school has landed on the list of National Schools of Excellence every year for the past fifteen. This is an affluent, diverse school.

During the 2017-2018 school year, Middle Georgia County school district was placed on the Advanced Placement Honors School list, a list reserved for districts that increase access to AP coursework, while yet maintaining or increasing the percentage of students earning scores of 3 or higher on the exam (Miller, 2017). The increase in access to AP coursework over the last three years may be correlated with the acceptance of NMSI guidelines as condition of accepting the grant. For example, the AP Language and Composition program grew from an average yearly enrollment of 70 students to nearly 160 students the first year NMSI was implemented, and during the second and third years of implementation the Language and Composition enrollment was an average of 207 students. This increase was due to a change in how Middle Georgia County structured the eleventh grade curriculum, as mandated through conditions of NMSI grant acceptance. AP Language and Composition had the most drastic increase in enrollment among the three contents (English, math, and science) targeted by the reform; however, other programs did experience growth, and this growth occurred throughout nearly all AP contents, regardless of participation in the reform.

A change has occurred due to the implementation of this reform. Whether or not this change is for the betterment of the school or its detriment has yet to be examined. Predicting sustainability of this reform, now that the three-year implementation phase is over, is unlikely. However, one may be able to determine which interventions, policies, and practices the teachers valued most. How that affected their teaching may lead to a better understanding of what the school, district, and teachers should actively retain, and what practices, if any, should halt.

Middle Georgia County by summer of 2016 had participated in the intervention program with supervision for three years. This supervision entailed that the NMSI program overseers monitored the implementation of proposed interventions, analyzed the data as involved schools released it, and continued to make recommendations for program implementation and improvement of instruction throughout involvement with the program. School district officials, such as curriculum coordinators, administrators, and Advanced Placement teachers, developed the plan for school and classroom implementation of proposed interventions. The fall of 2016 began the period of sustainability. During this period a small group of NMSI instructors and employees began to supervise MGCHS, in an effort to maintain the implementation of the proposed interventions.

Procedures

To best answer the research questions, qualitative research was most appropriate. Phenomenological research, as explained by Merriam (2002), is the study of the essence of a person's lived experience through their personal perception. In order to understand the experience teachers had, and their perceptions on the change(s) that occurred as a result of implementing this reform, an appropriate approach was to focus on the phenomenon of the experience, rather than the initiative or people involved solely. Phenomenology attempts to "uncover the essence, the invariant structure of the meaning of the experience" (Merriam, 2002, p. 93). In order to do this, I collected data through interviews, observations, and document analysis. These three methods of collecting data

provided data-rich material in my efforts to unpack the experiences of teachers and their perceptions of change related to the implementation of NMSI.

The primary tool for phenomenological research is the interview. The intention being to understand the experiences teachers had while implementing this reform, the best way to do so was by talking to those that lived the experience. Interviews, as Patton (2002) argued, help determine factors that cannot be directly observed. Understanding the experience teachers had throughout the phenomenon of implementing this reform and then into the period of sustainability can most effectively be accomplished through interviews of teachers directly involved. The intention was to conduct two interviews with each teacher, each ranging in time of 70-90 minutes. For the first interview I focused on asking questions about the participant's work history, pedagogy, and thoughts on the initial implementation of the reform. The purpose was to develop rapport with the participant, while targeting through interview questions the essence of the teacher experience. The second interview, done after initial analysis of the first, focused on teachers' reflections from the first interview and, in addition, the teachers' perceptions of sustaining the reform and how or if his or her teaching has been changed as a result of involvement in the initiative. Because I am a new researcher, I used a semi-structured interview guide. This guide provided me with the tools to keep our conversation focused and intentional, while permitting the ability to take advantage of in-the-moment follow-up questions or newly developed questions based on the conversation.

I first analyzed documents related to the reform. I pulled these documents from three levels, which included the National Math and Science Initiative organization

documentation (memorandums, annual reports, training documents), the school district (memorandums, pacing guides, training documents), and the school site (memorandums, teaching tools, meeting notes). The document analysis informed my understanding of the intentions of the reform and implementation procedures, which therefore influenced the development of interview questions and the purpose of teacher observation.

I selected participants through purposeful sampling. Maxwell (2013) stated the purpose of such sampling in qualitative research is to represent a typical case of setting or circumstance, to select individuals critical to testing themes and concepts, or to select participants with whom the researcher can build productive relationships. Because phenomenological research depends upon participants sharing their stories, it was important that each have intimate knowledge of the NMSI reform and that I and the participant be able to build a productive relationship.

With the help from district coordinator and school building assistant principal of instruction, I had already been able to generate a list of possible participants. These participants were limited to teachers who taught an AP subject in Math, Science, or English during the years of NMSI grant implementation. This limited the pool of candidates to ten for the selected site. Of those ten not all had been participants throughout the entire implementation, which is a preference for this study. This resulted in an expectation of four or five participants for this study. More about participant selection is discussed in Chapter 3.

I observed each teacher actively teaching for three periods of thirty-minute duration. The observations were recorded using a video camera. The observations have

been a way for me to triangulate my data, ensuring that some of what was reported by participants during interviews and what I discovered during document analysis was in fact a likely occurrence in the act of instruction. To establish the foundation for the observation I first set up a conference with each participant. This conference was done in person following the conclusion of our first interview session. During this conference we established expectations of the participant to ensure the likelihood of observable teaching taking place. For example, it would have done no good to go observe a teacher on a day he or she was giving a formal assessment.

I also did some data analysis throughout the process of data collection. The purpose in conducting analysis throughout, and not just after all data had been collected, was to inform collection decisions during the interviews and observation. Seidman (2006) and Maxwell (2013) both argued that some analysis should happen throughout the collection of data in order to better prepare the researcher for more collection. For example, the documents I analyzed initially (NMSI materials such as training documents and memorandums) informed the development of the semi-structured interview guide used during interview one. The continued analysis of teacher memorandums, NMSI-developed teaching instruments, and teacher lesson plans informed the development of the interview guide for interview two.

For analysis of the documents, interviews, and observation notes, I coded the data through a two-cycle coding process. This, Saldaña (2016) argued, is an effective method in order to reduce and manage the data. During the first cycle of coding I reduced the data by circling, highlighting, bolding, or in some other way acknowledging any quotes

or passages of significance. This was done for reduction of text mostly. If it seemed important, for whatever reason, I marked it. Saldaña (2016) suggested, if it appears to be important for whatever reason, it should be kept during the first cycle of coding. After the first round of interviews had been completed, I did the initial cycle of coding. The reason for having done so before the second round of interviews was two-fold. First, as Seidman (2006) argued, the initial coding established new lines of inquiry to navigate during second round interviews. Secondly, it was important for me as a new researcher to code as early in the research process as possible so that I had practice doing so prior to having completed all data collection (Saldaña, 2016). Both Seidman (2006) and Saldaña (2016) argued that there is no prescription in qualitative research for how many cycles of coding an empirical study may require in order to reach any conclusions; however, they both explained that little can be derived without a minimum of two cycles of coding. I completed three rounds of coding. During the first I reduced the text to big chunks of important passages. I made notes of initial thoughts and perceptions, and for further lines of inquiry. After the second round of interviews, I reduced the data again. This time I made a new interview data document with all the text not adding value to the study deleted. During the third round of coding I again identified any data that related to the three research questions. These data were then placed into a table. The table was developed in order to organize data by categories and emerging themes. Each participant's table included data that spoke to he or she's individualized experience. The fifth table was labeled Shared Significance; the data included in this table were categorized with emerging themes relating to shared experiences of multiple participants.

Limitations

This study does have its limitations. Maxwell (2013) discussed that limitations cannot be avoided, and therefore, need to be acknowledged and discussed throughout the entirety of a research project. The limitations that I faced in doing this research primarily had to do with candidacy for participation and time restraints. The pool of possible study participants was limited due to the nature of the program. Because Advanced Placement are elective courses that are traditionally more rigorous than most high school academic courses, the enrollment is typically lower. Due to this, there are fewer teachers in a school that has AP subjects rather than traditional high school courses. MGCHS currently has sixteen AP teachers. NMSI only targets AP courses in the areas of math, science, and English; for MGCHS this then includes the courses of AP Literature, Language and Composition, Statistics, Calculus AB & BC, Environmental, Physics, Biology, and Chemistry. With the exception of AP Language and Composition, all these courses were and are taught by a single teacher. This reduces considerably the number of candidates. Out of the ten candidates, only six have been there throughout the entire implementation of the reform initiative. While this has been a limitation, it has not jeopardized the study. The study has been an examination of how teachers perceived the implementation of this reform changed their teaching and whether or not they believe this change is sustainable; therefore, the only teachers able to participate in the first place were those involved in AP programs, which naturally limits the number of participants, no matter the selection of site.

Another limitation of the study was the time available to observe the sustainability of the reform. Ravitch (2014) argued that the issue with studying reform initiatives is that too often there is not a feasible way of assessing the sustainability of the reform, due to the length of the time a study of that nature would require. Ideally, if one desires to empirically study the sustainability of a program, one would do so over a prolonged period of time, such as that of five to ten years. If I were able to do this, no doubt I believe that would add to the value of this study, and likely lead to a better understanding of why reforms like this are able to sustain over long periods of time, or why and when they begin to fade away. The problem with performing this study over such a long period of time is that, for practical reasons, I cannot pay to participate in a dissertation study over the next five years. Another reason for not being able to conduct the study over a lengthier period is access to the site and study participants. While this is, by most standards, an appealing place to work, there is teacher migration and turn over. A study performed over a lengthier period of time than I proposed may have been jeopardized by the loss of participants. Because this research has been an examination of NMSI AP teacher experiences, I could not pick up a new AP teacher if the current AP teacher had left, justifying the need for a shorter window of time.

I also reiterate that a primary purpose of this study was to add to the field of information regarding not just reform implementation in general, but this reform (NMSI) specifically. Each year NMSI adds more schools to its growing list of participants. While the reform is expected to be around for a considerable amount of time, there will be many schools that might benefit from having access to a study like this prior to

deciding to participate. If this study had been carried out for a prolonged period of time, then that opportunity may not have existed. It is imperative, because of the growth of this program, that schools and districts are able to have access to more information regarding the impact this reform may or may not have on their teachers. While time constraints and the pool of candidacy may be limitations, they did not warrant a change to proposed guidelines and timeline.

Chapter II

REVIEW OF LITERATURE

Reform in American education has existed since the beginning of education in this country (Ravitch, 2010). The question of how to reform education has been around for as long as formal education has existed in the United States of America. However, for nearly 150 years no legislation had been drafted indicting a widespread need for change in the American education system (Ravitch, 2014). Then came the twentieth century, and with it the desire by many to seek out the "good ole' days" of education. Following World War I and the onset of the Industrial Revolution, Americans realized there was a dire need for citizens prepared to do industrial and farming work; therefore, in 1914 Congress passed legislation encouraging industrial and vocational education. In the 1930's, when the Great Depression enveloped the nation, the schools were blamed for not being able to entice more students to stay in school and out of the ranks of the unemployed. Reformers argued schools needed to entice students to remain in formal schooling. An aspect of the New Deal was devoted to offering training and education during the Depression to young people (Ravitch, 2010). As Americans entered World War II, reformers cried out that schools were not providing students with the tools they needed for work and life—they referred to this reform initiative as "life adjustment education." In the 1950s reformers claimed that it was time to return to a classical education, one devoted to time-honored subject matter disciplines. During the 1960's, reformers argued students were bored, and therefore schools had a new obligation to be more spontaneous with teaching style and provide more freedoms to students. Education became the centerpiece of

legislation of this period with the nation focused on desegregation. During the 1970s American education experienced the effects of reform ideas of the 1960s and early 1970s and therefore the pendulum once again swung back to an assertion by reformers for the return to the basics. American public schools were publicly put on notice in 1983, by the National Commission of Excellence when they labelled America as a "nation at risk" (Ravitch, 2014). This created an occasion for American public education readied for standards, testing, and accountability. Throughout the 1990s those on the forefront of academic change, such as Albert Shanker, president of the American Federation of Teachers (a union that included one million teachers), argued that the ailing American education system was due to low academic standards and accountability (Shanker, 1994). In 1989, the nation's governors agreed to develop and adopt six national standards by the year 2000 (Ravitch, 2010). These goals were to address the concerns with educating all students, adult literacy, college and career readiness, and high school graduation rates. This voluntary national set of standards eventually became proposals for a national set of standards throughout the Clinton administration. The attempt to roll out national standards came at a time when states were developing their own sets of standards; therefore, the idea of "one size fits all" did not sit well with the general public. The initial standards movement of the mid-1990s facilitated the eventual adoption of this concept, even though the initial release was a meek success at best. Throughout the 1990s more attempts at creating a national set of standards were brought forth, but accepted or implemented by very few (Ravitch, 2010). However, the standards movement remained relentless; and therefore regardless of initial acceptance, by the end of the twentieth century it had become obvious that a standards-based pedagogical approach was to be widely accepted and implemented. Not only would students be taught similar skill sets throughout the country (in theory), but at the turn of the century students were now expected to demonstrate proficiency in these areas, typically by taking a standardized

assessment. Students were to be prevented from moving on if they could not show proficiency in tested areas. The Bush administration took this conversation further, by making testing and accountability the federal agenda.

The passing of No Child Left Behind (NCLB) in 2001 made it, more than ever, the federal government's business to hold schools and all their stakeholders accountable for the education of our youth. This act was a likely result of the "unfounded belief that America's schools were locked into an arc of decline," (Ravitch, 2014, p. 39) and something needed "fixing." While the conversation of schools holding the responsibility to "educate all children regardless of their social circumstances or home life (Ravitch, 2010, p. 415) intensified in the aftermath of the *A Nation at Risk* report by the Reagan administration, the language of the NCLB legislation no longer suggested change, it mandated it (Muhammad & Hollie, 2012). If improvements were not made yearly, despite the conditions and demographics of the institution, then the institution lost part or all of their federal government funding. Improvement was no longer suggested, it was mandated, and therefore federal and state policy makers, district administrators, and school officials searched out plans to facilitate reform. This fear of budget cuts resulted in an influx of reform initiatives that were accepted by districts, and then implemented half-heartedly (Hall & Hord, 2006); consequently, they were not sustained once funding was removed (Muhammad & Hollie, 2012). Yet, reforms continued to be developed and accepted at an alarming rate (Ravitch, 2014).

Reform Implementation

Reform initiatives have only continued to increase in number since the transition from NCLB parameters. NCLB slid away during the Obama administration, but the roll out of the Common Core curriculum precipitated more efforts to reform schools than ever before. Muhammad and Hollie (2012) claimed that this change in education had been the most aggressive

in American history. With the introduction of such an aggressive reform to American education, have come many proposed initiatives and interventions across the landscape.

Implementation of reform is key to the success of innovation and interventions (Hightower, 2002). Implementation through districts plays an important role in the success of the innovation or interventions (Hightower, 2002). Ravitch (2010) discussed the example of the San Diego school district reform strategies of the middle 1990s, wherein the district emphasized a uniform way to teach reading, more intensive professional learning of teachers, and demotion of ineffective administrators and teachers. This, Ravitch stated, left teachers "upset by the heavy-handedness with which the reforms were implemented" (2010, p. 52). Ravitch summarized her point with the claim that while the San Diego school district reform of the mid 1990s raised reading scores, the teachers reported being bitter and dissatisfied by the reform practices. Ravitch concluded, as Hall and Hord (2006) did a few years prior, that how districts and schools implemented reform affected the perceived success of the reform. Hall and Hord (2006) and Ravitch (2010) suggested, therefore, reformers introduce top-down initiatives with room for interpretation by the district or school and continued recommendations and feedback from the affected personnel.

In 2016 David White and James Levin of the University of California, concluded a four-year study in which they examined how a group of teachers of a single public secondary school navigated the implementation of a reform. White and Levin (2016) used complexity sciences as their theoretical framework, treating the studied innovative college preparatory program as an adaptive, complex system within a larger system.

They claimed that their study provided a guide to help others to navigate the education reform, informed by complexity theory (Levin & White, 2016). The purpose of their study was to examine the process of implementing a new reform initiative that was designed to provide an alternative path for graduating high school students, and therefore encourage more underrepresented populations to seek post-secondary education. Levin and White found after eight years of implementation that while the individual goals and programs established by the case site were laudable, the larger design of the innovation, which encouraged more students to seek college degrees, did not leave graduates with "the ability to continue their education in higher education" (White & Levin, 2016, p. 52). However, the purposeful changes brought about by the ACCESS (Academic Commitment Creates Empowered Successful Students) program did over the course of four years yield results that indicated those students involved in it were better prepared for college, and as a result, more students from the case site were enrolling in college. However, the ACCESS program had inherent problems. White and Levin found that it created tension between ACCESS teachers and the guidance counselors—tension that seemingly intensified over the years of observation. The belief by the counselors was that ACCESS teachers were counseling students, even though the teachers did not have the credentials to do so. Through mediation by the authors and case site principal, they reached what White and Levin referred to as a tipping point, resulting in a change that promoted collegiality among the ACCESS teachers and counselors, rather than a mentality of one stepping on the toes of the other. The authors argued that change through implementing a reform occurs at critical points, and this was one of those points.

In conclusion of this study, White and Levin (2016) argued that top-down reform should begin in the classroom. The results of their four-year study has indicated a successful implementation of the reform and a strong likelihood for continued sustainability. This study has illustrated that a top-down reform innovation, led by teachers, can be successful; however, the authors argued that their findings cannot be duplicated due to their purposeful changes throughout, and therefore studies in which the researcher examines the teacher's experience during the implementation should be performed to provide more generalizability to this area of study.

Teachers are the most important tool in school improvement (Hall & Hord, 2006; Hightower, 2002; Ravitch, 2010). How schools and districts implement reform initiatives and interventions affects the teaching climate (Deal & Peterson, 1999; Hall & Hord, 2006). Sarason (1990) and Deal and Peterson (1999) all claimed that for reform initiatives to work, teachers must participate in the active decision-making of the reform effort. For reform initiatives to more likely succeed, teachers should be properly trained and be active players in determining what interventions and changes to consider (St. John, Manset-Williamson, Chung, & Michael, 2005). Levin and White (2016) acknowledged that teachers were not very involved in the aspects of implementing ACCESS. Teachers involved in this study could not, therefore, reveal much of their experience of implementation.

The field of education needs more studies focused on the experiences of teachers involved in implementing a reform in order to better understand practices to be avoided and practices to be implemented (Liang & Akiba, 2015; St. John, Manset-Williamson,

Chung, & Michael, 2005). The issue is that when a reform innovation is taken to scale, such as district-wide implementation, the time may be insufficient to "root innovation into the instructional culture" (Baete & Hochbein, 2014, p. 493). It is unreliable to rely on past studies only as a way of determining success; instead, researchers must continue to examine these innovations as climate, purpose, occasion, and strategies for implementation often change, and therefore likewise do the experiences had by teachers. Baete and Hochbein (2014) suggested as a result of their study on the effects of implementing a NCLB-related reform known as Project Proficiency, that future researchers should examine the implementation fidelity of reforms through classroom observations and document analysis, as Baete and Hochbein relied too heavily on the reporting of administrators rather than the teachers.

Teacher Professional Learning

Much focus in the last thirty years of education has been placed on the improvement of quality teaching (Deal & Peterson, 1999). There is a proven link between teaching practices and student performance (Abbott & Fisher, 2011; Goldhaber & Brewer, 1997; Munoz & Chang, 2007). Hattie (2009) completed a meta-analysis of over 500,000 studies focused on student achievement. Hattie concluded that the most powerful instrument in improving student performance is excellence in teaching. Ravitch (2010) claimed that to improve the state of education, districts and schools should focus on a more rigorous curriculum and on improvements to teacher professional learning. In order for teacher professional learning to have positive effects, the professional learning activities should be engaging, meaningful, influential, and focused on a teacher

improving in the field of his or her content (Deal & Peterson, 1999; Hall & Hord, 2006; Hightower, 2002; Hughes, 2012; Vries, Grift, & Jansen, 2013). Teachers should be involved in the decisions about professional learning and should be able to connect the professional learning with the real work going on in the classroom. Professional learning of this sort requires a substantial investment of financial resources by a district or school, and a considerable amount of investment of time by the teacher (Hilton, Hilton, Dole, & Goos, 2015). Therefore, it is important to understand what factors may lead to positive outcomes from professional development before investing time and resources for implementation. However, these factors are varied and there is little to no consensus on how to analyze the level of effectiveness of professional learning (Justi & Van Driel, 2006). This makes describing what factors are most effective in implementing professional learning activities a difficult task.

Some research has indicated reforms that include professional learning activities for school officials and teaching faculty are unlikely to be sustained if the initiative is not one collectively agreed upon (Fullan, 2001). As Stoll, Bolam, McMahon, Wallace, and Thomas (2006) claimed, a school or district seeking to implement and sustain a reform should introduce the reform through a teacher committee of sorts. Many studies examining the effect of professional learning on participating teachers have focused on initial implementation and results obtained during this period (Stoll et.al, 2006). In addition, professional learning of the past has traditionally focused on the effects the professional learning had on student outcomes, since essentially that has been the basis for the decision-making in professional learning activities; however, if teachers have been

the most influential factor in fostering student growth, then their well-being and job satisfaction in relation to the professional learning activities should be considered and studied (Stoll, et. al, 2006). After all, if the teachers are not satisfied with the design or practices of professional learning, then there will likely be less buy-in and a more likely chance that the professional learning activities will not have sustainable, positive effects on student learning.

Reform Sustainability

Seymour Sarason (1990) claimed that a common aim of educational reform is to lessen the degree of disparity for accomplishments between races and social classes, to make education more attractive to students, to promote learning that is applicable and relatable to a student's life and future, to develop more of a *citizen* identity in which students consider how the present contains the past as a way of increasing personal and social identity, and to relate schooling to future career options in a "fast-changing world of work" (p. 4). Many educators and reformers of the twenty-first century perceive reform initiatives as seeking to accomplish the same set goals as Sarason pointed out in 1990; however, often those responsible have implemented the reform half-heartedly, resulting in a failure to sustain (Kronley & Handley, 2003). This lack of sustainability has made more difficult the decision of schools and districts developing strategies and policies to guide decisions in education reform (St. John, et al., 2005).

Sarason (1990) claimed educators that resisted change did so because they may have believed the reform would be short lived. Sarason (1990) claimed that that this perception had led to a resistance towards change and an acceptance of top-down reform

models. Ravitch (2010) criticized the reform efforts of the past because the initiatives promised much more than ultimately was delivered, leaving many teachers with feeling the undertaking of implementation was not worth the effort. Ravitch (2010) explained that discussion of reform implementation should produce more than "promise and hope" (p. 10). Ravitch (2010) and Sarason (1996) both claimed that this need for more than a promise and hope has contributed to the explanation for why reform efforts have many times failed.

At times affecting the likelihood of sustainability is the lack of systemic implementation or full work-force involvement (Hall & Hord 2006). Sarason (1996) and Ravitch (2010) suggested for successful implementation, all stakeholders need to be involved in the decision to accept the conditions and procedures. Reform initiatives should also be systemic, considering the implications they may have on all levels of an institution. Selective participant innovation models may affect the relationships between teachers (Ravitch 2010). This exclusion may create, as Sarason (1996) posited, a resistance of the teaching faculty to the implementation of the reform.

While there have been studies focused on reforms, studies regarding sustainability are meager because not many reforms last long enough to study (Datnow, 2005). There have been those researchers, however, who have examined why some reform initiatives fail to sustain (Hargreaves & Goodson, 2006). Though they cited different factors such as teacher retention, school history, community involvement, and overwhelmed staff, all agreed that reforms over time are likely to diminish. In a qualitative study in which researchers examined the likelihood of long-term sustainability for a reading program

introduced as a top-down reform, they argued that the participating Utah schools were unable to sustain the same achievement measures as experienced during the five-year period of implementation (Bean, Dole, Nelson, Belcastro, & Zigmond, 2014). They claimed a reason for failure to sustain may be related to the teacher and administration turnover. Teachers may become disengaged from reform when the leadership is unfamiliar with the initiative (Bean et al., 2015). When there is a leadership turnover, or the leadership does not set an expectation of continued monitoring and reevaluation of the reform, then there is a strong likelihood that the reform will fail to sustain (Muhammad & Dufour, 2009).

This lack of sustainability for many reforms has in part resulted in what Sarason (1990) titled one of his texts: *The Predictable Failure of Educational Reform.* He and others, such as Deal and Peterson (1999) and Hall & Hord (2006), noted that without systemic implementation, and teacher involvement in procedures and analysis of results, reform initiatives time and time again may fail. Muhammad and Hollie (2012) argued that most school officials failed in implementing reforms during the years of NCLB because the teachers had not been cultivated for change. Muhammad and Hollie (2012) claimed that before a reform can be implemented, there must first be a culture established to accept change. In order to cultivate a culture ready to implement and sustain change, those responsible should ensure teachers and all stakeholders are involved in decision-making. To result in real, sustainable change, change should be systemic (Muhammad & Dufour, 2009).

Systemic change is change implemented system-wide, affecting the whole rather than parts (Deal & Peterson, 1999; Kronley & Handley, 2003; Sarason, 1996; St. John et. al, 2005). Reformers, educators, policy makers, and educational stakeholders have often implemented with the thought of targeting a singular area of concern (Kronley & Handley, 2003; Ravitch, 2010). The problem with implementation of this nature is that change in other areas of the system may result from change effected in the targeted area. If implementers do not consider this beforehand, unanticipated, and sometimes, unwanted results may occur. Teacher attitudes towards the reform itself may be affected due to the influence the reform has had on other areas of the system, areas perhaps not considered at the onset of implementation (Sarason, 1990). Sarason cautioned reform efforts were destined for a short life or imminent failure when a reform effort targeted to correct or improve only one area.

Hargreaves and Goodson (2006) examined the sustainability of a reform initiative introduced then removed from a sample of Pennsylvania and Utah elementary schools. The results revealed that once the reform funding was removed, so were many positions. During the period of reform implementation, 90.4% of schools reported having a part-time or full-time reading coach; whereas, after the implementation had been completed, only 53.8% of those positions continued to exist. Though school districts were encouraged to create or find funding to maintain operation of the key introduced interventions, many were unable to do so. Ravitch (2010) and Hord and Hall (2006) claimed that a component for the likely failure of sustainability is the removal of initial funding. Their study concentrated on results of a reform initiative being polled in the

aftermath of implementation and during the period of sustainability. This study illustrated that often during periods of sustainability there is a loss of motivation and support; however, the examination of how teacher perceptions or attitudes may or may not have contributed to the failure to sustain is evidently absent.

Reform in a school can happen in a number of innovative configurations, ranging from incremental changes such as new literacy strategies for social studies teachers or the way supplies are purchased, to a more comprehensive school-wide reform initiative that affects how an institution performs business (McLaughlin, 1990). Incremental changes are intended to complement or alter slightly existing structures without facilitating major changes to what are accepted as effective practices. Comprehensive reform strategies (CRS) are intended to alter and permanently change existing structures that are often thought to be ineffective. McLaughlin (1990) found after nearly a decade of research, reform was difficult because local factors influenced the sustainability of a reform; these local factors may change over time, resulting in strategically different settings for policy. Because local factors may be influential in the sustainability of reform initiatives, future studies will continue to add to an understanding of what factors are most influential.

Teacher Performance Pay

Many education reforms have included an incentive- and punishment-driven model. Rewarded were schools and districts that performed well on standardized assessments, whereas failure to demonstrate improvement resulted in reduction of funding or further intervention of an outside organization (Ballou, 2001). Merit pay or performance pay is defined as a raise in compensation based on criteria determined by the

employer (Ballou, 2001). Researchers have studied the perception of merit pay in education for over the past thirty years (Ballou, 2001; Ballou & Podgursky, 1993; Goldhaber, Choi, DeArmond, & Player, 2008; Hughes, 2012; Jackson, Langheinrich, & Loth, 2012; Podgursky & Springer, 2007). Despite researchers having demonstrated repeatedly that performance pay has not led to improving student success, reformers have continued to use this strategy (Hunt, 2005). Gratz (2009) claimed that the occasion and logical argument for performance-pay systems are in most part created by the following assumptions: A close causal connection between the economic well-being of students following school with their success during school, the declining of test scores and inferior performance indicating our schools are in crisis, a need for both increased numbers of teachers as well as teachers with more experience, better teacher performance if motivated appropriately, and the economic success of the country being dependent on the success of its schools.

Ballou and Podgursky (1993) surveyed teachers and evaluated existing literature against criteria of *conventional wisdom*. They asserted that their findings, based on the analysis of responses to the 1987-88 *Schools and Staffing Survey,* were robust. In their concluding statements of the study, Ballou and Podgursky suggested further research should be performed. Ballou and Podgursky (1993) and Podgursky and Springer (2007) claimed that performance pay models can be doable and successful so long as the right people are leading the implementation and the model is implemented systemically. Ballou and Podgursky (1993) noted that teachers in their study opposed performance-pay systems due to unfairness of teacher performance evaluations. Ballou and Podgursky

claimed this created dissension among the staff. Podgursky and Springer (2007) argued that more studies of the performance pay model should be performed because the decisions about what interventions or structures to include and the decisions on how to implement continue to evolve. He concluded by suggesting that the teacher experience through implementation is an imperative factor in determining level of success or lack thereof, and therefore future studies should include teacher interviews as a data collection method.

The success of a performance pay model depended highly on how facilitators of change introduced the system (Ballou & Podgursky, 1993; Jackson, Langheinrich, & Loth, 2012; Podgursky & Springer, 2007). Reformers and stakeholders when selecting merit-pay options are to have considered beforehand the probable effects of their choices on interventions and implementation procedures. The way performance pay is first introduced to the staff is, as Podgursky and Springer (2007) noted, influential in whether or not the staff willingly participates.

Podgursky and Springer (2007) drafted a working paper in which he discussed six systems of merit pay in America. Podgursky and Springer (2007) claimed that while there were many prior papers and studies on merit pay systems, the literature was "not sufficiently robust to prescribe how systems should be designed" (p. 33). Podgursky and Springer asserted that more experimentation and pilot programs were in order for further empirical research.

Gratz (2009) published a book titled *The Peril and Promise of Performance Pay* in which he claimed that the case for performance pay originates from the crisis in

schools and the beliefs that incentives will improve teaching and learning. Performance pay rests on generally accepted assumptions. If the underlying assumptions of performance pay are flawed, such as incentives for higher test scores, then the case for performance pay is weak; however, if the assumptions are correct then the case is strong. Gratz further claimed that in the current landscape of reform there is an increased willingness amongst different parties to work together on this, illustrating a gradual agreement on some assumptions associated with paying for performance. The agreement though is far from complete and therefore more studies into what characteristics of performance pay teachers find motivating and beneficial and what characteristics are unsavory or unsuccessful should be conducted.

Here in the United States there is an increasing interest nationally in using incentive pay programs (Liang, 2013; Podgursky and Springer, 2007). Some of the popular programs in the USA that policymakers have recently considered and implemented have targeted teachers who teach in hard-to-staff schools, assume extra duties, teach in the subject areas of shortage, improve their skill and knowledge, and perform well on teacher evaluations (Springer, 2009). Because of this funding there has been an increased interest in offering teachers financial incentives for recruitment and retainment; however, in spite of this growing interest, the knowledge of these programs is still limited (Podgursky & Springer, 2007). There does not exist much empirical work that has examined the use and characteristics of different financial incentives.

One of the more popular programs has been the offering of incentives to teachers willing to work in districts that have difficulty in recruiting and retaining teachers in

high-demand areas of instruction (Podgursky, 2009). Incentives were offered to encourage more college students to enter these fields of study (science, math, and SPED being the most common), in hopes of attracting new teachers in critical shortage areas and schools. Programs such as these are easy to administer and are flexible; however, they typically do not take into account individual performance and therefore can lead to concerns on the fairness of pay (Liang & Akiba, 2015). Another method is to base pay on skill or knowledge, such as awarding teachers incentives for obtaining new degrees or becoming National Board certified. While this type of program can be tailored for the district and school goals and demonstrates an emphasis on the development of a teaching faculty, the implementation of such a system of pay and the necessary evaluation can be cumbersome and problematic (Liang & Akiba, 2015).

There are also pay systems that award teachers for assuming additional responsibilities, such as being in charge of a club or participating in professional activities. Booker and Glazerman (2009) claimed that these programs do promote involvement and leadership and encourage teachers to take a more active role in achieving school goals; however, determining equity of pay amongst the many different roles may become problematic and discourage volunteerism (Booker & Glazerman 2009).

The other incentive-based pay system, and likely the most refuted, is the pay for performance system. In this system's case, teachers are rewarded based on student achievement on a performance evaluation system (often a state standardized assessment). These pay systems come under much scrutiny as it is difficult to determine an equitable

and fair evaluation system and, therefore, they may lead to concerns of fair distribution (Liang and Akiba , 2015). Because this system is growing in popularity, there are more districts attempting to find a workable model. There have been a number of empirical studies performed that illustrated a positive impact on student learning (Figlio & Kenny, 2007; Atkinson, Burgess, Croxson, Gregg, Propper, et al., 2009; Winters, Ritter, Greene, & Marsh, 2009). However, there are other studies that found no consistent impact of such pay systems on student learning (Fryer, 2011; Goodman & Turner, 2010; Springer, Ballou, Hamilton, Lockwood, McCaffrey, et al., 2010).

In 2015, Liang and Akiba published a paper in which they described teacher performance pay characteristics of midsize to large Missouri school districts. They noted, such as Podgursky and Springer (2007) had years prior, that there is very little empirical knowledge on the use of such programs. Liang and Akiba (2015) identified a limitation of this study being the number of schools represented (125 districts from one state in the country). They acknowledged that other states had been dealing with different top-down initiatives, different talent pools of teachers, different socio-economic issues, and other factors which could influence the decision for performance-pay systems and the implementation of such models (Liang & Akiba, 2015). In addition to a limitation of scale, Liang and Akiba (2015) also noted that their research was limited in contemporary relevance due to federal initiatives such as Race to the Top. Race to the Top may have also influenced acceptance of teacher performance-pay systems and how they were designed. This initiative provided waivers to districts that complied by including student achievement data as part of the compensation system. Therefore, as Liang and Akiba

(2015) acknowledged in their findings, there remained a need for more studies to examine how the terrain may have changed.

National Math and Science Initiative (NMSI)

Many of the reforms introduced over the past few years have been related to the concentrations of Math, Science, Engineering, and Technology (STEM) in an effort to remain globally competitive (Cannady, Greenwald, & Harris, 2014). The National Math and Science Initiative (NMSI), launched in 2007 out of Dallas, Texas, is a non-profit organization that has intentions of scaling up local programs to a national level, in hopes of encouraging more underrepresented populations of students to become interested in the areas of science, math, technology, and engineering. NMSI is a program developed out of the response to the National Academies commissioned report titled "Rising Above the Gathered Storm"(2005) in which the authors asserted that America's interest in STEM fields has decreased, while other countries in the world experienced an increase. Based on their findings, the authors suggested that in order to meet this need, a private organization should be developed to marshal private-sector support (*National Math and Science Initiative Annual Report, 2010*). Initially, Exxon Mobile provided a $125 million dollar grant to initiate the innovation; this was soon supplemented by another $125-million-dollar donation by other private organizations such as the Bill and Melinda Gates Foundation, Texas Instruments and CollegeBoard, and by several government agencies. The initiative thus morphed into a collaboration between public and private agencies. The program began as a public-private initiative in the area of Dallas, Texas, in 1995. Within a year, Dallas area schools experienced an increase in AP course participation of

nearly 198%. In 2008, the program was relaunched as a nation-wide initiative. The program has continued to grow ever since. Following the 2016 year, NMSI released an Achievement Report, boasting results that extended to 1.5 million students and over 1,000 high schools nationwide (National Math and Science Initiative, 2013). Because of the perceived success of NMSI's *College Readiness Program* (CRP), which began in the early 1990s in just nine high schools in Texas, it is now over twenty years of age. For the 2016-17 school year, NMSI was able to scale up the program nationally, much in thanks to adding an additional $20 million in funding from the U.S. Department of Education's Investing in Innovation program. This funding supported the outreach to an additional 60,000 students (National Math and Science Initiative, 2013).

NMSI has claimed that this initiative replicates on a national scale programs and interventions that have been proven to improve rigor in public education and student performance in STEM related fields. This is done through interventions holding teachers, students, and stakeholders accountable based on performance and a rigorous demand for results. The goals of NMSI and their CRP initiative have been to raise teacher capacity and aptitude, and by doing so, ensure more students are college and career ready leaving high school. The initiative is a three-year program that includes funding, oversight, support, advocacy, and an expectation for a minimum threshold of success. In doing so, the initiative by design intends to have implemented a number of interventions. NMSI coordinates the funding, the implementation, planning, and management of the Program. This includes content-focused teacher training, student tutorial opportunities, additional time on task, incentives, cultivation of teacher mentors and new AP teacher training, and

measurements of accountability for results. NMSI plays an active role in monitoring the initial implementation of CRP. Schools must meet implementation milestones, by dates set by NMSI, in order to receive funding. NMSI has organized these milestones into five categories: content focused teacher training, teacher and student incentives, open enrollment, increased time on task, and master teacher mentoring and vertical teaming (Holtzman, 2010).

Before NMSI's College Readiness Program was introduced nation-wide, it began as the Advanced Placement Incentive Program (APIP) in Texas. The goals of APIP were to raise participation in AP courses for underrepresented populations of students, and therefore increase the likelihood of college readiness. To generate more participation and facilitate growth in success raters, APTIP was a plan that offered financial incentives to students who successfully participated in an AP course and passed the exam (National Math and Science Initiative, 2013). Clement Jackson conducted two studies that examined the effects of implementing APTIP in sampled Texas schools. The first study examined effects on AP course enrollment and test participation (Jackson, 2010). Jackson (2010) argued that the findings from this examination indicated that the incentives offered to students and teachers did have a positive effect on student success, as measured by scores on AP/IB exams, high school graduation, SAT/ACT performance, AP course enrollment, and college matriculation. Jackson (2010) claimed that teachers increased AP course enrollment, guidance counselors promoted the programs more, and students had more incentive to take the courses, as a result of implementing APTIP. He suggested that more than the monetary incentives for teachers and students were at work,

ultimately increasing the AP course enrollment and test participation. However, Jackson (2010) acknowledged that this study had its limitations and therefore more studies, examining the implementation and sustainability of this program (now the NMSI College Readiness Program), should continue. The second study focused on longer term outcomes (students who previously attended an APIP school) and found positive results on college GPAs and college persistence (Jackson, 2010). While Jackson (2010; 2014) included survey instruments for eliciting teacher perception, he claimed that interviewing a sample of those teachers surveyed may have led to a better understanding of how the interventions in combination led to a perception of successful implementation. Jackson (2007) also argued that this study was limited due to a focus on year one and two of implementation, rather than being carried through the years of sustainability.

In 2010 Deborah Holtzman also concluded a study on the APTIP program, although, after it had initially been expanded as an initiative of NMSI. She examined the extent to which the implementation of APTIP increased participation in AP programs and increased scoring of a 3 or higher on AP tests by comparing 64 schools across six states that implemented the program to 128 other similar schools that had not implemented APIP. Holtzman examined the effects of the program after its first year only, using a regression-based method to select the comparison schools and a comparative interrupted time series designed to analyze the data. Holtzman's (2010) findings were consistent with Jackson (2010). Holtzman's findings suggested that the implementation of APIP did have a positive effect on students participating in terms of AP course enrollment and test participation. Due to the limitation of time constraint in this study, Holtzman (2010)

asserted that future studies are critical to understanding the longer-term implications of implementing reforms such as APIP and CRP. Holtzman (2010) claimed that future studies into implementation and sustainability, studies into non-AP outcomes such as high school graduation rates and college completion rates, and what specific interventions associated with the initiative were most effective should be performed. Both Jackson's (2010) and Holtzman's (2010) studies, taken together, provided evidence of effectiveness of the program. Although these studies resulted in findings of positive impact for the program, their designs failed to yield a causal estimation of the program's positive effects nor how likely sustainability of CRP may be after the initial three years of implementation.

Brown and Choi (2015), on behalf of the National Center for Research on Evaluation and their partnership with the National Math and Science Initiative, conducted a study employing a modeling approach of potential outcomes to estimate causal effect of the NMSI College Readiness Program on test taking and qualifying AP scores. They claimed their study extended and complemented the before mentioned studies. Brown and Choi pulled data from 287 treatment schools implementing NMSI during 2015 and 10,097 non-treatment schools. The results of this study indicated substantial and significant increases in both test taking and the earning of qualifying scores for all students. They found that the effects of the first year persisted into the second year, but diminished somewhat in the third year.

Phelan and Brown (2017) conducted a research study of the National Math and Science Initiative titled *ALSDE/A+ College Ready LTF Teacher Implementation*

Evaluation Study. Phelan and Brown (2017) examined the implementation of a program that included NMSI's Laying the Foundation (LTF) practices and resources, along with strategies and curricula developed by experienced Alabama teachers. They claimed their study measured the success and impact of professional development (LTF curricula and teaching strategies) on student success. Phelan and Brown (2017) measured student success in a matched set of control and treatment schools. They included logs and observations, teacher feedback, and teacher surveys to determine the level of fidelity in implementing aspects of the initiative. Two standardized tests, ACT and Aspire, were used as student data, along with perceived effectiveness reported by teachers, from the control schools and treatment schools. Phelan and Brown were interested in the fidelity of implementation of the LTF component of NMSI's initiatives during the three-year period of oversight.

LTF is "a professional development program grounded in comprehensive teacher training and student support" in an effort to raise interest and aptitude in Advanced Placement courses (Phelan & Brown, 2017, p. 3). The program goals are to improve the quality of instruction and increase enrollment by providing training in teaching strategies. Brown and Phehan concentrated on high schools involved in the first year of implementing LTF, on teachers of mathematics, English language arts (ELA) and science. The approach of the LTF program has been developed by experienced teachers and content experts by providing hands-on training led by expert classroom teachers. LTF training emphasizes best-practices, research-based instructional strategies. The

program is comprised of a summer institute (one-week training focused on pedagogy and content) with additional trainings offered throughout the year (Brown & Phehan, 2017).

Brown and Phehan (2017) measured the level of fidelity for implementing the interventions and strategies of the program with the following metrics: Productive struggle by students, problem-based approach to learning, student discussion beyond recall of facts, productive noise levels, collaborative work, student engagement, and timely implementation of scope and sequence. Brown and Phehan's study measured the "impact of LTF lessons and strategies on student academic success" (2107, p. 6). Participants maintained logs that indicated fidelity in implementation, by exploring topics of: Proportion of class time spent on LTF-related activities, skills emphasized during instruction, assessment strategies, and teacher perceptions on student learning. In addition to the logs, Brown and Phehan (2017) also included teacher surveys and observations as collected data.

Ultimately, though this study added to the discussion of implementation and sustainability of NMSI-introduced programs and initiatives, it was not comprehensive enough to consider those findings robust; more studies, similar to this yet that target answers to other questions, should be performed. Brown and Phehan (2017) argued that further exploration of high and low implementing teachers should be performed, to better estimate the level of fidelity in implementing LTF and other NMSI initiatives by these teachers. They claimed that these additional analyses may further explain the extent to which professional learning was implemented, helping to determine levels of effectiveness under which circumstances. Brown and Phehan acknowledged that the lack

of teacher interviews and few observations limited the scope of their study and therefore that those elements should be expanded for future studies.

What these studies did not examine was the perception of the teachers. Since studying the sustainability, due to time constraints and other factors, is difficult, an alternative is to interview teachers, having them reveal through narrative and story-telling their perceptions of implementation as it relates to the possibility of sustainability after oversight. The studies commissioned by NMSI thus far have been conducted as examinations of implementation and oversight, not considerations of sustainability once NMSI oversight has stopped. Therefore, there remains still a lack of research concerning this reform. The program has annually self-published a report that discusses the quantified data of district, school, teacher, and student success. In other words, they have published reports that discuss student success rates in passing Advanced Placement exams after having participated in the reform. National Math and Science Initiative has not yet participated in a study that qualitatively examines teacher perceptions of the initiative. In a conversation with the regional director in August 2016, I sought approval from NMSI to move forward with this research. He acknowledged the value of my proposal and encouraged me to proceed with the study. This assurance from him has further motivated me to pursue this topic.

NMSI has emphasized results of students who had earned qualifying scores through participation. The end number NMSI used as a measure was total qualifying scores, ignoring the pass percentage (NMSI Approach, 2017). While a teacher's overall number of qualifying scores may increase due to increased enrollment, their pass

percentage may go down. The studies so far performed have been examinations of student success, measured by overall enrollment and overall qualifying scores; these studies lack consideration for a change in a teacher's overall pass percentage. A change in pass percentage could have negative consequences for teacher attitude, teacher position, and teacher instruction. While the focus has been, is, and should continue to be on the student outcomes, one seeking a better understanding for what interventions are most effective should examine teacher perception. As stated earlier, if the teacher is the most important intervention for a student's education, then it should be the teacher explaining what has worked and what has not (Ravitch, 2010).

Chapter III

RESEARCH METHODS

To address the proposed research questions, qualitative research was chosen as the paradigm. This approach is most appropriate because I sought to better understand the implications of a phenomenon of implementing and sustaining a top-down reform. Patton (2002) explained that the purpose of qualitative research related to studies such as this is "to generate or test theory and contribute to knowledge for the sake of knowledge" (p. 10). Iacono, Brown, and Holtham (2009) claimed that when research is quantitative, the participant's point of view may be lost; therefore, qualitative analysis is more appropriate when the concern is to understand the experience from the perspective of the participant. Maxwell (2013) encouraged readers to connect their research methodology with their personal, practical, and intellectual goals. The research questions reflect the goals the researcher seeks to achieve. The goal of the present study has been to better understand how the NMSI reform affected the AP teachers of a high school that prior to the intervention perceived itself as being *successful* when measured against district and state scoring criteria. Reform initiatives are often designed to help "failing schools" achieve gains in academic success (Ravitch, 2010). That made studying the implementation at MGCHS unusual in that for years prior it had been known as a *National School of Excellence* (District Accreditation Report*,* 2014).

Conducting a qualitative inquiry study presents obstacles for the researcher in that the researcher must select the appropriate data collection methods and procedures. This is because the researcher of a qualitative inquiry study seeks to understand the essence of the phenomenon, and being that each phenomenon is unique, each research occasion then requires a unique approach. The way the researcher achieves changes with the intention and design of the study (Kahlke, 2014). As Kahlke (2014) argued for example, there are times when the research questions of a study do not fit neatly into the design of a single methodology. The researcher then must adopt data collection strategies, data analysis techniques, and presentation for reporting, to create a unique approach intended for a unique study.

In this chapter, the researcher further described the phenomenological approach utilized and included additional information on population, participants, instrumentation, data collection and analysis, and research procedures.

Phenomenology

Phenomenology stems from the foundational question "What is the meaning, structure, and essence of the lived experience of this phenomenon for this person or group of people" (Patton, 2002, p. 104). Van Manen (2014) explained that the origin of the term phenomenology is formed like the terms "sociology," "biology," "psychology," and so on for terms of this nature. The second part of each of these terms (logos) refers to the scientific inquiry into the "domains of the subjects of the psyche, social, or bios" (Van Manen, 2014, p. 27). The first part of the word refers to the domain of the study.

In the case of phenomenology, phenomenon is not a subject such as is the case with physc (psyche), bios (life), and social (society, community), but rather is something that is experienced, and can only be unpacked as something that is "let to be seen." (Van Manen, 2014). Van Manen explained phenomenology as something that shows itself to be seen from itself; this means phenomenologists aim to uncover the experiences that are hidden. Van Manen (2014) presented that phenomenology is an inquiry that involves the aspects of showing and hiding, and that it is the phenomenologist's purpose to discover prereflectively how one experiences the world.

Phenomenological studies rely on the premise that a lived experience can only be reflected upon after the occurrence. That reflection, though, should be described as the phenomenon that had been experienced by the participant, not by what sense of the experience the participant has following the experience (Van Manen, 2014). Patton (2002) explained that a lived experience is what takes place in a person's consciousness. Anything that one can ever know must "present itself to consciousness" (Patton, 2002, p. 104). One cannot reflect on a phenomenon during the experience, but must rather reflect on it after it has occurred. For example, if a person is distraught over a traumatic event and takes the time to, during the event's occurrence, reflect upon why he or she is distraught, then that person has already begun to affect that original feeling, thus changing the experience that has entered the consciousness.

The researcher seeks to capture and describe how certain people experience a phenomenon and the meaning they attribute to it. Phenomenologists are not necessarily concerned about what humans decide, but instead the experience they have while making

decisions related to the phenomenon (Vagle, 2014). While a scientist or mathematician's purpose may be to discover and then provide a more precise explanation for how something works, phenomenologists seek to slow down and discover how things are experienced through living the life (Vagle, 2014; Van Manen, 2014). Vagle (2014) explained that phenomenologists study the lifeworld, meaning the world as it is lived by humans. Vagle (2014) further clarified that phenomenologists do not study the world as it is "measured, transformed, represented, correlated, categorized, compared, and broken down" (p. 22). The focus then of a phenomenologist is not to study the individual, but rather study how a particular experience (phenomenon) exists and appears in the lifeworld, as described by individuals.

The studied phenomenon may be a relationship, culture, program, organization, job, or emotion (Patton 2002; Savin-Baden & Major, 2013). Van Manen explained that a most important characteristic of phenomenology as a research method is for the researcher to study a prereflective phenomenon. This can include any ordinary, daily activity that we experience through living. Experiences such as gardening, walking to the store, talking on the phone, playing with pets, having a conversation, public speaking, watching a movie, waiting on a parent, are all prereflective from the perspective of a phenomenologist (Van Manen, 2014). However, one cannot discuss a phenomenon of occurrence until after it has occurred; therefore, it is the researcher's role to ensure that interviews related to the studied phenomenon lead participants into a conversation of how they felt, what they thought, and how they were influenced, in the moment of occurrence (Savin-Baden & Major, 2013). Phenomenology is a research approach that breaks

through what we take for granted and digs for the meaning of our experiences (Van Manen, 2014).

Just as there are no prescribed data collection procedures for a phenomenological study, there is no one singular approach to performing phenomenological work as a whole (Vagle, 2014; Van Manen 2014). The question(s) for which a researcher seeks better understanding will, in most part, determine the methodological choices the researcher makes in regards to a phenomenology (Vagle, 2014). For beginning researchers this decision can be daunting and may cause them to lament over not having a "single, unified way to craft phenomenological research" (Vagle, 2014, p. 52). Vagle encourages new researchers to accept this as an opportunity rather than an obstacle: An opportunity for the researcher to play with the phenomenon and inquiry ideas about it. However, as Vagle (204) also argued, while it is a great opportunity to become more versatile as a researcher through practicing different phenomenological approaches, new researchers need a starting point. Vagle explained the subtle differences between some of the more widely used approaches and encouraged his readers to consider the information they seek to uncover, how that information should be gathered and analyzed, and how eventually it may provide a clearer understanding of the studied phenomenon. To do this, the researcher refers to the research questions (Vagle, 2014; Van Manen, 2014).

The traditional, and most widely used approaches to crafting phenomenological work are descriptive and interpretive (Vagle, 2014). And while there is no prescribed approach to performing a phenomenological study, Van Manen (2014) and Vagle (2014) have suggested that new researchers begin with one of these two approaches (so long as

they are appropriate for the research questions), due to their longstanding use in the field of philosophy, and more recently fields of human sciences such as healthcare and education. Descriptive and Interpretive phenomenological approaches are well established and are the most commonly practiced in the fields of social sciences such as education (Vagle, 2014).

Descriptive phenomenological research is often credited to Edmund Husserl, a German philosopher (1859-1939). Husserl established the school of phenomenology and is still regarded and referenced widely in contemporary research in the human sciences. Husserl argued that experiences were not something that befell us, but rather something that occurred to and because of us, and therefore may have a transformative effect on our being (Vagle, 2014). A cornerstone of this approach is that the researcher is to promote a reflective experience post phenomenon, for participants, but refrain from interpreting anything that is not directly evidenced in the text (Van Manen, 2014). Giorgi (2009) argued that through this approach the researcher does not try to go further than what is given, but rather "attempts to understand the meaning of the description based solely upon what is presented in the data" (p. 127). This means that the researcher analyzing collected data must resist the urge to interpret ambiguities presented in the data by participants, unless there is direct evidence for the interpretation in the data itself. In other words, descriptive phenomenological researchers are not motivated to clarify speculative factors (Vagle, 2014).

The interpretive phenomenological approach does encourage the researcher to identify his or her thoughts and perceptions based on ambiguities found in the data.

While a researcher performing a descriptive phenomenological study may ask "what is the lived experience of feeling lost?", a researcher using the interpretive approach would ask "what is the experience of feeling lost?" As Finlay (2008) explained, researchers using the descriptive approach would seek out an understanding of the general structures that underlie the experience (phenomenon) of feeling lost; whereas a researcher using the interpretative method would look inward, attending to his or her own feelings about the experience throughout data collection and analysis. This does not entail that the researcher must be a participant in the study, but has lived the experience and therefore can reflect on her or his own experiences as they relate to the experiences of participants (Finlay, 2008). The researcher, as a result, creates a synthesis of the experience based on data gathered from participants combined with researcher experience and interpretation (Vagle, 2014).

As the researcher I sought to determine the essence of a lived experience through and after the initial implementation of a top-down education reform; therefore, a form of interpretive phenomenology was appropriate as it took advantage of not only the participants' experiences, but my own experiences as they relate to the phenomenon. I then was able to use that history as material for interpreting the comments and responses of participants (Van Manen, 2014). I also had been through the implementation of the NMSI reform and therefore have a unique perspective that was advantageous during data collection and analysis. For example, when interviewing a participant there were several instances when I offered clarification about program design and how it was likely

introduced at this school, due to the similarities of my experience in implementing the reform at another school.

Van Manen's approach to phenomenological research, as described by Vagle (2014), is one intended to discover how we find ourselves in the world. This finding ourselves in the world is a constant and therefore requires a continued exploration. This means, as Van Manen (2014) has explained, phenomenological research is intended to study a phenomenon as it was experienced in the moment and to recognize that the described and interpreted experiences will likely change depending upon environment, occasion, participants, and history (Van Manen, 2014). So while a researcher may find other studies in the field that resemble the one he or she is proposing to research, there will likely be fundamental differences making each study unique.

There are no prescribed methods for collecting data for a phenomenological study (Merriam, 2002; Vagle, 2014; Van Manen, 2014). Van Manen (2014) claimed that there is no prescribed method to phenomenology because there is no prescribed method to identifying human truth. While there are a number of ways phenomenological researchers collect data, the collection approach central to any phenomenological study is the in-depth interview (Merriam, 2002; Patton, 2002; Savin-Baden & Major, 2013). Research questions determine how to collect evidence (Maxwell, 2013; Merriam, 2002; Vagle, 2014). There then is no one source to go to for phenomenological collection techniques; i.e., no one researcher or text will inform a phenomenological researcher of how he or she should collect data for a specific study. These decisions are made based on the research questions and the information the researcher desires to gather; therefore, a

phenomenological researcher shall argue decisions for collecting data in a certain manner over other collection methods. The argument for why to use certain collection methods over others, how those methods fit in the context of the research, and explanation of these decisions so that other researchers may also evaluate the results if desired, altogether add to the overall methodology (Vagle, 2014).

Units of Analysis

Qualitative Inquiry is both explanatory in nature—seeking to explain possible reasons for perceived change in a climate—and embedded in design. An embedded study, as Yin (2013) explained, occurs when the researcher uses multiple units of analysis to investigate a phenomenon. The researcher seeks verification for arising themes through cross analysis of the collected data from all units of study (Maxwell, 2013). Dauite (2014) claimed that narratives occur over "time and space," meaning that people narrate their stories according to dimensions of time, historically, the current landscape of a culture and space, and conditions of society that influence belief and perception. I evaluated documents such as memorandums between the participants and the NMSI organization, teaching instruments developed and/or used that were promoted by NMSI, and contractual agreements between the school site and NMSI. This evaluation informed the context of time and space.

Data from documents and other artifacts were obtained from three units of analysis, including the NMSI organization, district and school, and selected Advanced Placement teachers of the school site. During the process of analysis, the artifacts from the units informed developing themes and concepts of exploration when interviewing

participants, and when analyzing transcripts of interviews and observations. At the level of the NMSI organization I reviewed communication artifacts (e.g., memorandums between NMSI and district or site, training protocols and manuals, mission statement literature, annual reports of self-published data, and discussion of purpose) to construct possible links between the suggestions of the organization and the actions of those responsible for implementing at the school site. Artifacts such as the teacher-to-organization memorandum of agreements provided insight into the intended design and implementation of the program. The gatekeepers to these documents were the Assistant Principal of Instruction at the case site, the Gifted Coordinator for the case site school district, the Regional Director of NMSI, and teacher participants.

The next level of study was the school district of the site. The Middle Georgia County school district was one of the first districts to implement NMSI district-wide. Prior to this, NMSI traditionally chose a single site, with hopes that other sites in the district would follow their example once the selected site proved successful (National Math and Science Initiative, 2015). The district officials signed memorandums with NMSI, making agreements for how all schools in the district should implement the proposed interventions. The district had allowance in how to implement many of the suggested interventions and made decisions for doing so through targeted meetings and email correspondence with school leaders (the Assistant Principal of Instruction and the content NMSI lead teacher selected by the school site). Some data were collected through the Coordinator of Gifted Education for the district. She had been the lead contact between the NMSI organization and the district. Other artifacts included

documentation of NMSI-related meetings, teacher agreements, and the district Memorandum of Understanding (MOU).

The third level of study was the AP teachers of the site. The teachers are the members at the base of the hierarchy of influence in the NMSI chain of implementation, but are the most relevant and data rich unit to study. As Yin (2013) suggested, a researcher should start with the smallest unit of analysis and work up to have a complete understanding of what implications the researcher extracts from the data. Therefore, teachers involved in the implementation were expected to be the richest source of data regarding experienced phenomena.

There is no denying my presence at a similar site. My experiential knowledge of the reform implementation informed development of concepts. I created questions and areas of concentration based on my experiences with colleagues involved with the implementation at our place of work. I used this information, gathered at my place of work, as a means of providing insights for developing questions and areas of concentration for observing and interviewing the participants of the studied site.

Research Site and Gaining Access

The goals, outlined in MGCHS's *School Improvement Plan* for 2018, include to provide opportunities for stakeholder engagement, to provide professional learning opportunities using research-based practices, to provide high quality instruction, and to plan, facilitate, and monitor organizational practices. The MOU between the district and NMSI discussed the nature of acceptance being contingent upon alignment of reform with school improvement plans. Because MGCHS's plan has a scope of both teacher and

student development, they met the initial requirements for acceptance. Not only did this school meet the criteria for this study, it also offered a unique opportunity to examine how teachers of an academically successful institution navigated a mandated reform.

MGCHS administration were very accommodating in granting me access for this study. In place were gatekeepers. Maxwell (2013) defined gatekeeper as a person who can facilitate your study. There are two gatekeepers of this site that assisted in providing artifacts and introductions to possible participants. First is the English Department Chair, who teaches Advanced Placement English. She facilitated a relationship with participants by arranging introductions. The other gatekeeper for this site was the Assistant Principal of Instruction for MGCHS, who had seen over NMSI implementation for three years. Prior to that, she served as the Math Department Chair. She provided me with literature related to NMSI implementation, and made suggestions for participant selection.

Before entering the site, necessary permissions were gathered from the site principal. District research guidelines dictated researchers start with permissions from the site and then get county approval. I emailed and sent hardcopy letters seeking permission from the principal. The letter explained the purpose and design of my study. Once I had received permission to enter the site, I sought and was given the necessary permissions from the Middle Georgia School District, and *Institutional Review Board* of Valdosta State University. (Appendix A).

Sampling

Quantitative and qualitative research participant selections differ greatly in approach. While quantitative research relies mostly upon set criteria and rigid guidelines for sampling (random sampling), qualitative research, because of its aim to understand through the perceptions of the participants, works best with purposeful sampling. Maxwell (2013) suggested a number of reasons why purposeful sampling is necessary and often unavoidable in qualitative research. These reasons included to purposefully capture the heterogeneity of a group; to represent the typical case of a setting, people, or circumstance; to select individuals who are critical to testing themes and concepts; to illuminate differences through particular comparisons; and to select participants with whom you can build productive relationships, which may lead to answering of the research questions (Maxwell, 2013).

Patton (2002) claimed that there is, in qualitative research, a sort of trade-off between breadth and depth. The purpose of this study has been to discuss in great depth the experiences teachers had in implementing the NMSI reform and the sustainability of the initiative. Due to time constraints, money, and district policy, it was not feasible to interview all teachers involved in the implementation of NMSI. Dauite (2014) explained one component in telling meaningful stories of experience is the selection of key participants (stakeholders). Purposeful selection of participants was necessary to ensure there were those who could narrate a meaningful experience in context. When data collection began, it had been three full years since the implementation stage of the NMSI reform; the district was in the phase of sustainability. With typical teacher migration,

retirements, and promotions, the number of teachers who were directly involved in the NMSI implementation had been reduced. Van Manen (2014) described purposeful sampling for a phenomenological study as "the attempt to gain 'examples' of experientially rich descriptors" (p. 353). He made this point to argue that a phenomenological researcher should perform a purposeful gathering of participants based on their ability to provide experiential descriptions. In other words, the sample size for a phenomenological study should be determined in part by how description-rich each participant may be, rather than attempting to saturate the gathered data by introducing many participants. In other qualitative approaches, such as ethnography, the researcher seeks to find commonalities in arising themes across transcripts and observations of many participants. A phenomenological researcher, however, may only find a single instance of a theme being seen in the experiential data (Van Manen, 2014). Whereas other qualitative approaches demand a finding of the sameness of repetitive patterns such as language, ideas, and reactions, a phenomenologist may look for that moment when "an insight arises that is totally unique to a certain example (sample) of a lived experience description" (Van Manen, 2014, p. 354).

The research included four teachers: Two English teachers, one science, and one math. These three content areas were the only ones in which the reform was implemented. Two English teachers were selected, as the English courses went through some of the most aggressive changes during the implementation stage of the NMSI reform. For example, the AP Lang program for this district underwent a major change and encouraged a much higher enrollment by students; therefore, more English teachers

were added as AP Lang teachers. The four selected teachers were able to provide description for how the grant policies, procedures, and implementation strategies affected the faculty, as they represented the subject areas experiencing the most impact. The pool of candidates for participation in this study was limited due to the number of Advanced Placement teaching positions at the site. In selecting participants I first spoke with the Gifted Coordinator of the district and the Assistant Principal of Instruction, who were both administrators for overseeing district and site implementation. They advised on which potential participants might be able to provide the most data-rich interviews due to experiences with the grant. I then contacted teachers identified them as strong candidates for the study, and explained their possible role in the study, their time commitment, and the confidentiality terms. The four that were suggested as data-rich candidates agreed to be participants in this study; thus the participant list was finalized. At this point in the process, each participant selected a pseudonym to protect his/her identity.

Data Collection

Yin (2013) explained that qualitative research of this nature deals with situations in which there will be many variables, relies on multiple sources of evidence, and "benefits from the prior development of theoretical propositions to guide data collection and analysis" (p.11). Maxwell (2013) asserted all studies have threats to validity, and to combat those threats researchers must openly reflect on their biases and triangulate data through a variety of data collection procedures. Vagle (2014) explained that phenomenological researchers should first develop a data collection and analysis plan, but be willing to adjust and explore new ways of collecting data, in order to open up the

studied phenomenon. The researcher makes the best educated decision at the time; but because one does not know how participants will have experienced a phenomenon, and because every phenomenon is unique, the researcher must be flexible in this regard and be open to change in an effort to gather the richest data (Vagle, 2014; Van Manen, 2014). In this section I discuss how I collected and analyzed data, and protected participant confidentiality. Data collection procedures included observing participants in their teaching environment through recorded sessions, one-on-one interviews, and review of NMSI-related documents.

Observation

In order to better understand the complexity of a phenomenon studied, observation of that phenomenon in the original environment is an effective approach (Patton, 2002). Researchers conduct observations of participants and events to better understand experiences by not "using only the insights of others obtained through interviews" (p. 22). Patton argued that observation is an appropriate choice for data collection in order to perceive how the environment and other contextual factors influence the participant experience. Observations are an opportunity for the researcher to gain access to the "way phenomena circulate among relations" (Vagle, 2014, p. 85). Vagle (2014) explained that phenomena do not simply belong to the person having the experience, but rather to the relations of all in the lifeworld in which the participant is a part. Because of my interest in better understanding the experiences of teachers involved in implementing and sustaining NMSI initiatives, I observed participants in their environment. The purpose of this observation was to, in part, determine the extent of

alignment between what NMSI has suggested and teacher practices during the phase of NMSI reform sustainability. Observing teachers engaged in teaching was appropriate for this study because the goal is to understand not only the experience of teachers involved, but also how the environment may have played a role in the implementation. Viewing participants in the landscape of their experience gave some context when analyzing interviews and related documents (Patton, 2002).

In order to prepare each participant, there was a preconference prior to the observation. This preconference took place immediately following interview one. The conference was necessary to ensure that the participant was comfortable with the video equipment. The preconference was an opportunity to explain to each participant my intentions, explaining that I was only intending to observe the teacher. Teachers were informed this observation was not to be an evaluation of teaching, but rather an opportunity to witness moments of influence from the reform. Also, a teacher's classroom can look quite different from one day to the next. There are those days, no doubt, in which a teacher must lecture for much of the class session, and those days in which students are working independently on a formal assessment. Therefore, the preconference served as an opportunity to discuss when would be an appropriate time to observe in which there was likelihood that the teacher incorporated lessons, approaches, documents, and such, in relation to the NMSI reform.

Middle County School District guidelines restrict employees conducting research to doing so when not officially on the job. This made conducting observations of multiple participants an impossibility. For this reason, the observations were recorded

using a video camera that I provided. While there would have been benefits for having a 360 panoramic view of the environment, I planned for this when interviewing the participants. I took field notes and pictures during our one-on-one interviews (in the participant's classroom) which included description of the physical environment; therefore, the physical features of the room, its furnishings, equipment, and layout, were noted for purposes of analysis when reviewing recorded footage.

Also, district policy restricts the use of students in performing research. For this reason, participants were given clear instructions—both during our verbal conference and in a follow-up "how to" email, for the camera to be positioned in a way in which students were not seen. While recording teachers that are engaging, energetic, and simply are on the move when teaching can make capturing the presence difficult, the teachers were instructed to stay in sight of camera when possible, but not to allow it to influence their normal practice and approach. Participants were to press record and go to work.

Participants were asked to film three sessions of thirty minutes each. Each session was to be independent from the others either by (a) recording separate classes (ideally on different days), (b) recording delivery of different sessions, and/or (c) recording different instructional practices. The participants recorded the footage and saved it to a provided USB drive, titling each session by date, class period, and subject. All participants provided the requested ninety minutes of recording teaching.

One limitation to the recorded footage was not being able to see student reactions when responding to a prompt by the teacher. Seeing student interaction informs an understanding of the environment (Hall & Hord, 2006). While the audio of each

recording was great, only interactions with students closer to the camera could be captured. There were times when a participant would engage with a student not in close proximity of the camera, and that conversation then would be washed out by other talking or noises coming from the environment. However, there were ample opportunities to capture the teacher speaking with the whole group, small groups, and individuals. While not being able to observe in person had its limitations, the amount of footage, the sensitivity of the audio equipment, and the work done to plan for the observable sessions worked in tandem to reduce the impact of these before-mentioned limitations. Recorded sessions are more beneficial than unrecorded in-person observation because of the ability to review each session unlimited times.

When reducing data from interview transcripts, Saldaña (2016) suggested that researchers review the material as many times as needed, but at a minimum of two reductions. I applied this same principle when viewing the recorded observations. I viewed each session a minimum of three times, switching my lens of focus a bit for each round. For example, in the first round I paid more attention to the environment, teacher proximity, and the type of instruction delivered, whereas in the second and third rounds I paid closer attention to the material being delivered.

I developed an observation instrument through my experiential knowledge of the reform, from the MOU's between district, school, and NMSI, and from Hall and Hord's (2006) observation template for studying reform implementation. While it is appropriate for researchers to perform an observation without the aid of a structured guide, as in the form of field note-taking, new researchers, such as I, benefit from having a guide that

helps maintain focus during the observation. With some observation instruments the researcher is limited to what items they check a box for; however, with the narrative format, such as the one used for this study, the researcher has the opportunity to think through some of what is being experienced. Spradley (1980) urged this type of instrument for amateur researchers due to the instrument having flexibility, while yet containing the structure necessary to ensure a focused experience. I used a narrative-format instrument as I viewed each recorded observation (Appendix B).

The recorded observations informed some decisions for the second round of data collection. I completed a first round of transcription reduction, discussed later in this section, after viewing the recorded observations of participants. From this initial analysis, I generated questions and lines of inquiry for the final round of interviews. For example, I wrote the following question for Ashley Lynn (participant one) following the initial analysis of recorded observation: "I observed you working with a small group of students while the others wrote independently. Could you speak for a moment about that decision to separate your class?"

While observations were not the most data rich of the three approaches used, this experience did inform a better understanding for how the teaching climate may have changed due to the influence of NMSI. The observations provided me the opportunity to witness teachers *walking the walk* of the *talk they talked* during interviews.

Interviewing

Patton (2002) stated that interviews help determine factors that cannot be directly observed. I interviewed the selected participants in two interview sessions. The two

decisions in selecting an interview instrument is to either use one that has been previously developed and proven valid, or develop an interview instrument in regards to the purpose of the study. Either way, the researcher has the responsibility to draw upon existing literature for the use or development of any interview instrument (Patton, 2002). The works of Hall and Hord (2002), Maxwell (2013), Seidman (2006), Vagle (2014), and Van Manen (2014), my experiential knowledge, and literature related to NMSI all informed the design of my interview instrument. Maxwell (2013) and Seidman (2006) were used as the basis for the line of inquiry to ask, following their suggestions for qualitative research interviewing. Vagle (2014) and Van Manen (2014) are the phenomenological researchers I used to inform my study design. Their work informed my decisions for developing the semi-structured interview instruments. Hall and Hord's (2006) work in part informed the content of the questions, as their work had focused upon understanding the rollout of a reform effort through the lens of those participating in implementation. Also, experiential knowledge and the literature dealing with professional learning, merit pay, the National Math and Science Initiative, and reform implementation all informed the content of the semi-structured interview questions (Appendix C).

The interviews were semi-structured, as suggested by Seidman (2006). Yin (2013) remarked that while the researcher is to pursue a consistent line of inquiry, the questions asked should be fluid, and be responsive to the interviewee and occasion. Vagle (2014) and Van Manen (2014) argued phenomenological studies that include interviews as a data-gathering technique should do so with an unstructured approach. As Vagle (2014) explained, phenomenological research is not intended to be comparative or correlational;

therefore, it is not important to ensure all interviews are the same, or be able to argue why one interview was different than another. Instead, each interview should be treated as an opportunity to learn something new and meaningful about the phenomenon (Vagle, 2014). Vagle (2014) and Van Manen (2014) both suggested that phenomenological interviews can be unstructured; however, they cautioned that this may lead to minimal data gathered if the researcher is not practiced. Because I am a novice researcher, I used a semi-structured approach to both interviews.

The initial interview, round one, was a bit more conversational. I did this to develop a rapport with the participants, and to promote interviewee investment. As stated in Chapter One, part of my convincing of teachers to participate was their desire to learn of the outcome; therefore, it was important that I encouraged them to feel integral to the process throughout. While the informal, conversational interview may not be as efficient as a structured interview, the ability to personalize the line of questioning deepened the relationship between the interviewer and interviewee (Patton, 2002). Because qualitative studies do not take place in a laboratory, but rather in the setting of the participant's lived space of real-world events, I had to first establish a rapport of understanding, respect, and credibility (Yin, 2013). To accomplish this initially, I provided each participant with a letter of introduction and gave a few options for interview locations. All interviews took place in participants' classrooms.

I used a semi-structured interview guide for the interviews. The semi-structured design to interviewing participants helped ensure that I addressed the questions most relevant to the topic of study (Yin, 2013). The interview guide included topics and

subjects for exploration, but was not restricted to specific language for the questions. While I did have questions written out in their entirety, I rarely asked the question verbatim. Instead the questions reminded me of a target, and I then worded them appropriately for the occasion and audience. For example, while a question read "Discuss the impact financial incentives had on the number of students enrolling in your course," I reworded it for each participant, depending on my perception of their level of understanding of NMSI reform initiatives; i.e., the question became a series of smaller questions for some, beginning with "Tell me about enrollment numbers that first year teaching NMSI. Did your program grow any? What's a factor you think that led to that growth?" Not only did having this reference ensure I gathered data relevant to answering the research questions, it improved the validity of this research because it adhered to a predetermined set of topics (Patton, 2002; Yin, 2013). No doubt about it, having an interview guide assisted in maintaining the focus of each interview.

The prompts readied on the interview guide facilitated discussion, while not restricting the participants in how they responded. For example, a prompt such as "describe your first remembered professional learning experience" framed the discussion of professional learning, yet allowed the participant to select the experience to explore. Many of the questions related to the participant's involvement throughout the implementation of the reform. I used Hall and Hord's (2006) approach to discover the Level of Understanding (LoU) for the innovation or initiative (NMSI reform) in part as a guide when developing the semi-structured instrument. Hall and Hord referred to this as the LoU process. This process has the researcher, through interviews and observations,

focused on seven categories to determine the LoU of the innovation. The seven categories are: Knowledge, acquiring information, sharing, assessing, planning, status reporting, and performing. The interview guide prompts were then related to these categories. The instrument was designed after Loucks's, Newlove's, and Hall's (1975) Measuring Levels of Use instrument. (Appendix D).

During the first interview, Seidman (2006) suggested that the interviewer ask questions about the participant's life history. The purpose of this study was to better understand how the AP teachers of MGCHS perceived the process of implementing the NMSI reform. Therefore, the questions asked were designed to elicit participant reconstruction of experiences, in an attempt to answer how they came to view this reform. Seidman (2006) claimed a researcher needs context to explore meaning. The first interview in Seidman's (2006) suggested interview approach was necessary for developing the context of a participant's lived experience. Seidman explained that his approach to interviewing works best when the researcher can complete three ninety-minute interviews; however, he claimed, the researcher may revise the process to suit the needs of that particular study. Because the parameters of this study were to establish an understanding of experiences during, and shortly after, the implementation of NMSI, I elected to conduct two interviews with each participant.

Not only did I seek to establish rapport with the participant during the first interview, conversation also focused on the participants' experiences during the stage of implementing the NMSI innovation. I provided the participants with prompts for discussion, not limiting the direction of the interview with too narrowly-focused

questions. Responses in the first interview led to insights for further lines of questioning during the next interview (Seidman, 2006). During the second interview participants constructed meaning, to later unpack during analysis, of how their experiences in implementing the reform may have affected their perception of sustaining this reform. This was then the second purpose for the final interview. To highlight their experiences with sustainability of reform and their perceptions about sustaining reform after the NMSI organization had removed the financial support.

In summary, I elected to interview each participant twice. The first interview, a combination of Seidman's (2006) interview one and two, focused on the participant's past experiences with education reform, background of belief regarding reform and practice, and experiences implementing the NMSI reform. This interview took place during January 2019. The second interview took place February-March 2019. The line of questioning of the second interview concentrated on participant experiences and impressions of sustainability.

Data Analysis

A researcher conducting empirical research decides how data will be presented after final analysis. The two choices are to either describe the findings through an *etic* point of view or an *emic* point of view. Emic refers to developing categories or themes and revealing findings through the words and concepts of the participants, whereas etic is through the words and perceptions of the researcher (Maxwell, 2013). Patton (2002) explained that the participant observer not only attempts to describe the perceptions of a phenomenon through the words of participants, but also attempts to "feel what it is like to

be part of the setting or program" (p. 268). While I was not a participant of this study, the close relationship with the process of implementation and knowledge of the reform makes me more involved than that of a researcher on the "outside, looking in." With that said, to best tell the story of these teachers' experiences in implementing NMSI, I have reported from the emic point of view. To truly capture the essence of the phenomenon, the story should be told by those who lived in the landscape (Saldaña, 2016).

Saldaña (2016) and Maxwell (2013) claimed that data analysis should occur throughout the collection process, not just after all data has been collected. Vagle (2014) claimed that for phenomenological research, the researcher should make a few commitments during their analysis. The first being a whole-parts-whole process of reading. Vagle (2014) and Van Manen (2014) explained that researchers should first read all the collected data as an entire text, to gather the holistic view of the collection event. Researchers should then follow up with a line-by-line reading to develop initial thoughts and follow-up questions for participants. Next a second line-by-line reading should be performed in order to articulate the meanings of markings, notes in the margins, and the responses to any follow-up questions asked. The final line-by-line reading is done so that the researcher may convey thoughts about each part of the data. The researcher continues this for all parts for each participant. The other three commitments Vagle (2014) argued are: A focus on intentionality and not the subjective experience, a balance between writer description/interpretations and use of verbatim excerpts, and a realization that as the researcher and writer, he or she will not merely code or categorize, but rather be involved in the crafting of a text.

The collection of data for this study happened in two stages: During Spring 2019 I interviewed and recorded observations of participants in regards to their experiences of involvement with NMSI. Next, I interviewed participants for a second round regarding the sustainability of NMSI. Initial data analysis began between the two stages of data collection. After each interview and observation, I reflected upon my developing hypotheses, questions, concerns, and possible interpretations. To keep a record of my thinking and considerations, I wrote memos. Maintaining a record through writing memos has benefited this study greatly as it served as a record of thinking about analysis of the data (Maxwell, 2013), and helped concentrate planning for the next visit with each participant (Seidman, 2006).

Once I had collected all data, I divided the transcripts, observation notes, and artifacts into smaller sets of text. Saldaña (2016) stated that while there are two approaches to dealing with the text of data, either as one large single piece of text for each participant or into small chunks of text for each participant, new researchers should consider reducing the data into chunks, and then analyzing them by paragraphs or lines in order to "reduce the likelihood of imputing your motives, fears, or unresolved personal issues to your respondents and to your collected data" (Charmaz, as cited in Saldaña, 2016). To begin, I reduced the data into smaller portions of text, chunking it by topic of discussion. Saldaña (2016) explained that a researcher should never overlook the opportunity to circle, highlight, bold, or in some way acknowledge significant participant quotes or passages. Seidman (2006) argued that the researcher should interact with

transcripts with an open attitude. At this time of initial separation, some pre-coding was performed as a way of warming up for the first cycle of official coding.

As Maxwell (2013), Vagle (2014), Van Manen (2014), and Saldaña (2016) all suggested, I continued to read the collected data, line-by-line and holistically, until I felt I had reached a point of saturation. I read each interview transcript, one after another, for three rounds. There is no prescribed set of cycles a researcher must go through when analyzing qualitative data (Saldaña, 2016; Seidman, 2006). Both Saldaña (2016) and Seidman (2006) though argued that a researcher should work through a minimum of two cycles of coding, reducing the data after the first, before beginning the second. For each cycle I continued to reduce the data.

All transcripts were printed, leaving wide margins to the right in order to have a place to record notes, thoughts, concepts, and questions as they developed. There exists coding software that if used correctly can reduce the data and time spent during the analysis process considerably. However, with limited experience with such software, and being a beginner researcher it was more appropriate to work more intimately with the data by entering all transcription and then spreading the documents about, and by hand constructing concepts and categories.

Saldaña's (2016) suggested researchers consider cultural practices, roles and social types, organizations, emotional aspects or feeling, cognitive aspects or meanings, and hierarchical aspects or inequalities when coding. These considerations can be accompanied by questions that guide qualitative research, such as: "What are people doing?," "What are they trying to accomplish?," What is going on here?," "What is

learned from these notes?," "Why did I include them?." Thinking in these broad categories, and with such questions in mind, I was able to begin forming an understanding of what was happening within and across the texts.

I started this by coding generically, highlighting anything noteworthy during the first round of coding interviews and teacher artifacts. I created a Coding and Significance table to organize significant interview text (Appendix E). The table included three columns (categories, significant text, reflection/perception) through multiple tables. The tables were organized under the three labels of *Independent Significance, Shared Significance,* and *Environment.* This was a purposeful extra step that provided the opportunity to review all the interview text collected together. I was able to separate that text which was significant for the individual participant experiencing the phenomenon, and begin to identify commonalities across all the interviews. The Environment chart included any text I felt would lead to a better understanding of how the school's teaching and learning environment may have affected participant perception of the phenomenon. In moving the text into these charts I eliminated any text that did not provide insight related to the research questions, leaving only text viewed as significant.

Phenomenological research is not a method for identifying commonalities between participants, but rather identifying significance related to the phenomenon (Van Manen, 2014). Through the coding and labeling practice, I did not seek out a shared experience amongst the participants, but rather sought arising concepts as they related to the phenomenon. As Van Manen (2014) argued, there may be significance in a single statement, made by a single participant. However, much of what is significant may be

shared amongst interview participants. These shared perceptions were identified when reducing the data and moved into the second of three Coding and Significance charts.

Concepts were emergent and data-driven; the concepts were developed through my experiential knowledge of the initiative, my knowledge of the school district and MGCHS, and from the existing literature and data related to reform implementation. After all interviews and observations for a participant were completed, I drafted participant profiles. Seidman (2006) claimed that crafting profiles addresses the problem of how to share what was learned from the interviews because it allows "the interviewer to transform this learning into telling a story" (Seidman, 2006, p. 120). Yin (2013) suggested that an effective study is informing and entertaining. We are a society of storytellers; good empirical researchers are also good writers who understand this and develop a narrative voice in telling the story of their participants. Van Manen (2014) reminded new researchers that phenomenological research is not the reporting of data, but the telling of a story. Therefore, the profiles of each participant will inform the presentation of narratives that tell the experience of each participant involved in the NMSI reform implementation. Parts of texts that are related by themes or concepts will be combined in a condensed version of the interviews. Then, from reading this new version, I will decide which passages are most compelling. Saldaña (2016) asserted that a beginning researcher may have difficulty transitioning from the second cycle of coding to the final write-up. For this reason I will routinely refer to Saldaña's chapter titled "After the Second Cycle of Coding" for guidance after all coding, using the most

appropriate strategy to work toward the drafting of a profile for each participant (Seidman, 2006).

Validity

Maxwell (2013) argued that validity "refer[s] to the correctness or credibility of a description, conclusion, explanation, interpretation, or other sort of account" (p. 122). Validity issues are a concern in any study. Maxwell suggested that a researcher should remain aware of threats to validity throughout all stages of research, and therefore must argue against these threats as soon as the research process begins.

One concern of validity for this study was my presence as an employee and colleague of participants for this site. I have worked for MGCHS (2006-2010) and still work within the same district; therefore, there are some established relationships. Some of these relationships have been developed during county-wide professional learning related to the NMSI reform, possibly having an influence over participant responses. I explained in great detail the purpose behind this study; that it may have led to conclusions and recommendations regarding reform or program implementation and teaching practices, and considerations for those considering the grant opportunity, and likewise, those overseeing the grant. This transparency not only was intended to reassure the participants of purpose, but to explain the relevance this study may have to them. Patton (2002) claimed that participants may invest more in a study if they believe the study topic will yield results having a direct influence on their job role. I openly shared my interest in this topic prior to the start of the interview period. I explained how the study may relate to our roles as teachers and that their contributions may facilitate change

within the institution and district. Having a relationship with participants afforded me a greater opportunity to assess the responses because I could identify characteristics and mannerisms typical of each participant, which enabled me to ask follow-up questions that address these tendencies witnessed during the interviewing process. Yet, to address the concern of great mutuality between the researcher and participant, a semi-structured interview guide was used, giving way to a more formalized interview session.

Not only did the familiarity with the participants give way to further lines of inquiry for me as the researcher, but it also gave the opportunity for participants to ask for clarification of program design or the district implementation procedures. For example, during the second interview with participant number four (Rachel), I had asked "Is there an expectation for reporting back to NMSI the number of students who attend after-school tutoring opportunities?" Rachel was unclear, so she responded "I'm not sure, I don't think so. Did you have to report your attendance to anyone?" I went on to begin describing the sheet students completed, and before I had completed my first sentence her memory had been activated, leading to a discussion of the teacher accountability measures. My familiarity and experience with the reform in this case did not jeopardize the study, but rather enhanced it by leading to a rich description by the participant.

Interview transcripts were shared with participants following the first cycle of coding. Maxwell (2013) claimed that respondent validation is the best method for ensuring that the researcher has not misinterpreted the meaning of what participants said or did. Doing so is also an important way of identifying the researcher's biases and misunderstandings of what may have been observed. This is why the choice was made to

send transcripts after the first cycle of coding, which included a reduced text and initial researcher perceptions. Participants were given a window of time to review and respond with any questions or concerns regarding the text, and informed if no response was received, that the transcript would be understood to be accurate.

A qualitative study that is designed with intentions of understanding the perceptions of those involved requires rich data in order to be able to create a narrative that captures the essence of the participant (Seidman, 2006). By completing the two interviews of approximately 90 minutes each in length and observing each participant for two or three thirty-minute sessions, I gathered a more complete picture of the experience these teachers had while implementing NMSI and are having through the phase of sustainability. I was also able to frequently check back for clarity throughout the research process, as all interviews were transcribed verbatim (Saldaña, 2016).

The interviews and observations of teachers improved the validity of this study, as those participating were from a diverse range of individuals. There were participants from three content areas, who had a wide-range of differing educational backgrounds and experience. Furthermore, the validity of this study was strengthened through use of three methods of data collection: Observations, interviews, and document review. When researchers rely solely on a single method of collecting data, their study may be more vulnerable to errors associated with that particular method (Patton, 2002). Maxwell (2013) and Patton (2002) both argued that a researcher should use different collection methods as a check against one another. There are certain biases associated with each data collection method; therefore, by using multiple collection methods I was able to

reduce the likelihood that the inherent bias of the collection method influenced the interpreted results. For example, in interviewing participants the interpretations are based solely on what the participant has said about it how they have experienced the phenomena. This method then is best combined for this study with observation so that the researcher may be able to check for clarification between what the participant has said and what the researcher has observed. One participant mentioned, during interview two, an instructional strategy acquired through NMSI training was the deconstruction of College Board prompts; i.e., how to properly deconstruct and how to teach students to do the same. During one of the recorded observations I witnessed this teacher walking students through the deconstruction of a prompt, much in the manner described during the interview. Due to these multiple forms of data collection I was able to further confirm a concept that arose during the initial coding of the interview two transcript for this participant.

While this is a benefit for improving the validity of a study, Vagle (2014) and Van Manen (2014) claimed phenomenological researchers are concerned with identifying significant insights into the phenomenon, insights that may occur in a single moment during observation or interviewing. Therefore, phenomenological research is not restricted to triangulating data. While using multiple forms of data collection has improved the validity of this study, it is important to know that multiple data collection methods will not always result in triangulated data for a phenomenological study. I did not witness confirmation of all areas of significance perceived from the coding cycles of interviews. This does not invalidate a phenomenological study (Vagle, 2014).

Reliability

An organized electronic database of all the data was maintained throughout the study (Yin, 2013; Maxwell, 2013). The database is a collection of reduced interview data (Coding and Significance chart), memos, NMSI-related documents provided by MGCHS, and instructional artifacts provided by participants. Keeping a database such as this has made it more likely that a researcher could later reevaluate data. All the raw data will be kept for three years following analysis to verify results of this study. Van Manen (2014) explained reliability measures for a phenomenological study this way: "It is unlikely that a phenomenological study would be involved in measurement schemes such as…having different judges rate, measure, or evaluate a certain outcome. The point is that phenomenological studies of the same 'phenomenon' or 'event' can be very different in their results" (p. 351). Instead, a phenomenologist may choose to investigate the same phenomenon that has been discussed in studies before and repeatedly addressed in literature, but push to identify new insights. This database has been maintained so that future researchers may employ the same methods for studying this specific phenomenon. This by no means, however, ensures that any future findings will be the same, due to time passed, environmental influences, researcher subjectivity, and participant experience.

Subjectivity

Peshkin (1988, 2000) asserted that it does a researcher little good to determine his or her subjectivity retroactively. Instead, researchers should systematically seek out their subjectivity, prior to the data collection and analysis. Reasoning for this claim is because a researcher's subjectivity may likely influence the shaping of the inquiry and its

outcomes. I therefore have continued throughout the entire process to address my subjectivity. First, I have been quite involved with the implementation of the initiative for Wolverine High. This experience has given me experiential knowledge, which informed the design of interview and observation instruments. Like all interviewed participants, I too went into this study having mixed feelings about the implementation of NMSI. I believe that much of it was handled extremely well and therefore it was an overall benefit to our students, and then there were some things that I felt did not go so well. To combat my initial opinions and experience from having too great of an influence on how I interpreted the data, I wrote memos throughout the study. These memos were little barometer checks against my perceptions. Throughout data collection and analysis, the drafting of memos gave an opportunity for me to ask and respond to questions such as "I wonder why I felt differently than reported by these teachers; what was different about the way they implemented this certain intervention?" Therefore, my knowledge and previous experience with the program has been a benefit, and not so much a threat.

I am a believer that teachers should have more opportunities to make money. I am one of four children in my family. All four of us are self-sufficient. I have more education than the other three combined but make the least income per year. While I recognize my career affords me other benefits such as the satisfaction of serving a larger purpose, being surrounded by intelligent professionals, working with adolescents, and more, I cannot deny my envy when my brothers are taking major vacations each year, and I am left saying no because there are heavy student loans to pay. Likewise, it

disturbs me that some colleagues put in so many hours of planning, grading, reflecting, reorganizing, and working one-on-one with students, and get paid the same, or less than the teacher next door passing out worksheets willy-nilly. Better teachers should be rewarded. A change to teacher pay would be beneficial. I am a teacher who takes advantage of opportunities to make extra money when possible. For that reason, I have served as a consultant for the NMSI organization. I have traveled to various high schools in the southeastern United States area for extra employment during the school year. While this could have threatened the study validity, due to a subjectivity to preserve a position I held, once again the experience gained through serving as a consultant for a short time enhanced my understanding of what I had observed during the implementing of the reform at Wolverine High, and therefore contributed to my understanding of the experiences told by teachers of MGCHS. Prior to doing any research related to this study, I had contacted two separate administrative-level NMSI officials to discuss the idea for the study. As the NMSI organization prides itself on being research-driven, they fully supported the moving forward with this empirical study; that support alleviated any concern of status with the organization.

Lastly, I am a proponent of allowing students to achieve to the heights of their abilities. Educators and institutions of learning have an obligation to help make that possible. Middle Georgia County school district once had a policy that students must complete two courses labelled as gifted each school semester to remain as a gifted student. I have always had an issue with this. For me, I was considered gifted in English all through my education, but not gifted in any other area. Had I been made to take two

gifted courses, rather than just the one of interest, I may have dropped from the program and therefore never have received some of the educational opportunities afforded through the gifted English courses. Middle Georgia County, in partnership with NMSI, reduced that number to one as of the 2015-16 school year. This is a change I wanted to see happen, but not all may share that opinion. With that said, I have to own my subjectivity that we should not limit the desire of our students. A major premise of the NMSI reform is that underrepresented populations should be given more opportunities to take rigorous courses. In opening up the enrollment as they suggest, the culture of a classroom may change. This change has been welcomed and celebrated by some, but not all.

Peshkin (1988) claimed that a researcher should embrace his or her subjectivity, rather than try to conceal it. With this explanation, I am embracing my intimate knowledge of NMSI, my subjective leanings toward financial incentives, and my perception on student enrollment in rigorous and gifted courses. I acknowledge that if not openly stated and considered throughout the entirety of this study these feelings may threaten the validity of my findings.

Ethical Concerns

Throughout all interviews and communications with each participant, I acknowledged my own involvement with the NMSI reform. The point was to be very open about my involvement and illustrate to the participants that their worries are shared as a stakeholder of this reform. I provided a letter addressed from the site administrator explaining that the study was a quest for better understanding, in order to make recommendations for implementation of similar programs and interventions in the future,

not a hunt to separate the cheerleaders from the nay-sayers. This letter served as the administration's approval of the study.

I have used pseudonyms for participants, the school, and school district. I have not identified each participant by such information that may make it easy to discern the participant's identity (Patton, 2002; Maxwell, 2013). A master code list was be used to organize participant information, including pseudonym, participant name, and associated interview recordings and observations. Once all data had been recorded and appropriately labeled there was no need for the master list, so it was destroyed. All electronic data has been stored on a password-protected computer and USB storage device, which is kept in my residence at all times. Hard copies of any data are kept in a locked file cabinet in my residence.

I drafted narrative profiles of each participant based on the interview transcripts, NMSI-related artifacts, and observations. Participants were given the opportunity to read the final narrative and provide any feedback of confirmation for the described findings prior to submission of the final write-up. Three years after the dissertation publication, all data will be destroyed. While one cannot eliminate all risks in any empirical study (Patton, 2002), the risks for this study were minimal, due to the nature of the study and protections put in place for participants. Participants did not receive any financial compensation for their involvement and were permitted to leave the study at any point during the process.

Summary

In this chapter, research validity, reliability, subjectivity, and ethical concerns, along with research procedures and methods including design, instrumentation, population, data collection processes, and data analysis procedures were described. The purpose of this research was to study teachers' perceptions of their individual and shared experience during implementation of the National Math and Science Initiative. In addition to the impact during implementation, this research was also designed to study teacher perception of sustaining this initiative, once funding and organizational supervision had been removed. Using qualitative methods (phenomenology), including interviews and observations, the researcher goals were to provide insight to school leaders on the impact of the National Math and Science Initiative on the involved AP teaching population and make recommendations for implementation and sustainability of institutions resembling characteristics of Middle Georgia Central High School. This study sought to explore teachers' perceptions of their experiences when involved in the implementation period of the National Math and Science Initiative and now as they continue to navigate sustaining aspects of the reform initiative.

Chapter IV

FINDINGS

Introduction

The purpose of this study was to investigate (1) how Advanced Placement teachers involved with implementing the National Math and Science Initiative described their experiences, (2) how the environment of MGCHS contributed to four teachers' experiences during implementation, and (3) how four teachers perceived the likelihood of sustainability of the reform at MGCHS. The focus of this study was to understand how teachers involved with implementing this top-down reform initiative perceived the experience, and what, if any, factors of the environment impacted implementation and likelihood of sustaining the initiative. Interviews, observations, and teacher artifacts contributed to the participant profiles to follow. But first, I provide a description of the Middle Georgia School District's and Middle Georgia Central High School's conditional acceptance of the grant.

Middle Georgia County School District (MGCSD) and NMSI developed a plan that included interventions designed for students and teachers. In this section, I discuss some of the major interventions that NMSI detailed in its Memorandum of Understanding (MOU) with the district of July 2013. NMSI communicated an expectation for maintaining a culture of high expectations for teachers and students through the MOU between NMSI and MGCSD. The school district was required to actively recruit highly qualified teachers to participate in AP professional development and training. To

promote this, NMSI offered involved teachers stipends to attend trainings. These trainings encouraged, but never mandated, teacher participation. NMSI offered these trainings regionally. NMSI expected the district to permit teacher participation in these trainings, with the cost of attendance and travel covered by the NMSI grant. These trainings included content-specific training off site. One such training, during the first year of implementation, occurred in Oklahoma City, June of 2014. Similar summer trainings were offered all three years of implementation. Other professional learning opportunities offered included a one-day workshop in the fall of each year (2013-15) and a student essay scoring event offered in the spring. NMSI paid teachers a stipend at the end of the year for participation in all offered trainings. NMSI expected MGCDS to develop a plan for on-going collaboration and professional learning. Five times a school year each content area held a countywide vertical team meeting. These meetings lasted approximately two hours after normal work hours and were designed to address any needs for teaching that were content specific. Because this was a plan Middle Georgia already had in place, NMSI agreed to offer a stipend for teachers choosing to attend.

The district and NMSI also agreed upon interventions to meet the needs of students who had likely not yet been exposed to rigorous courses such as Advanced Placement. Students were encouraged to attend workshops throughout the year designed to teach them strategies in working with the material of that content area. These Student Saturday Sessions (SSS) as they were called were organized by the district in accordance with NMSI guidelines and expectations. NMSI hired and sent presenters to speak with the students on these days. The sessions happened outside of the normal school day and

each took five hours to complete. It was the responsibility of the school and teacher to encourage student participation. Teachers who attended with their students received a stipend at the end of the year.

Teachers also gained access to documents designed to assist students in achieving more academic success, documents that provided opportunities for remediation, scaffolds for instructional strategies, and plans for connecting content across domains. No two teacher trainings were alike, nor were any books, binders, or collections of documents so similar that they could be considered repetitive. These materials were an intervention that the officials of NMSI claimed should be used well after the implementation of the reform. In other words, the materials, teacher education, and tutoring concepts are all aspects of the reform that NMSI expected schools and districts to sustain after implementation, as a condition of grant acceptance.

NMSI developed a plan to pay students and teachers for academic success on the Advanced Placement test. This intervention was seemingly the strategy most celebrated by both the students and teachers. A student who earned a qualifying score (a three or higher on a five-point scale) on the Advanced Placement exam for any of the targeted areas of English, math, and science, would receive one hundred dollars; likewise, the teacher responsible for that content received one hundred dollars for every qualifying score. For many Middle Georgia County district teachers this meant receiving an additional check after that first year of implementation for upwards of several thousand dollars. For example, one AP Lang teacher at Middle Georgia County High School, between incentives for student scores and incentives for attended trainings, earned $5,300

for the 2013-14 school session, $4,500 for 2014-15, and $8,000 for 2015-16. The incentives for teachers included a threshold of qualifying scores to be met each year; if the teacher met that threshold, then that teacher would receive an addition $1,000 bonus. The threshold was for a targeted number of students qualifying on the designated exam, and would be increased by 25% each year after the first. In addition to offering stipends for participation, as a way of incentivizing student performance on the exam, NMSI also agreed to give $15,000 during year one and $10,000 each of the final two years of implementation, as support to purchase materials and resources for the school's AP programs.

The estimated contribution for implementation by NMSI, for Middle Georgia County district, was $723,800 in total for all three years. In addition to the costs to NMSI, there were other costs for which the schools of the district were responsible. Costs for substitutes during professional learning, AP test costs, and program logistical support were estimated by the district of Middle Georgia County at $88,863. These associated costs were agreed upon by all parties before moving forward with implementation. With this level of investment by both the reformers and the selected district, there was an expectation of measurable success. One measure of success is illustrated in NMSI's annual reports, was the improvement in numbers of students earning qualifying scores. However, little is offered in these reports in regards to how the teachers felt about the interventions and incentives and therefore how implementing a reform such as this may have affected their experience.

Participant Profiles

The four participants in this study will first be profiled individually. The concepts developed through the analysis of participant voices follow these profiles. The purpose of chapter four is to establish the concept and theme development, to be detailed in chapter five.

Table 1. Study Sample Overview

Participant	**Age**	**Race**	**Gender**	**Years teaching**	**AP Course**	
1	52	Caucasian	Female	31	Chemistry	
2	38	Caucasian	Male	11	Calculus	
3	41	Caucasian	Female	16	Literature	
4	41	Caucasian	Female	15	Language & Composition	

Participant 1—Ashley Lynn

Ashley Lynn is a science teacher of thirty-one years, and an AP teacher for twenty-five. All of her AP teaching experience is in the field of Chemistry. Ashley Lynn was a

veteran AP teacher by the time the National Math and Science Initiative had been introduced. However, she admitted that not always did she want to be a teacher.

> I was actually going to be become an engineer, and I tried for a while, and I tried pre-med and a couple of other things, and nothing made me happier than working with students, so that's what I did. . . I have thirty-one years teaching now. I have a Bachelor's of Science in Biology and Environmental Science, a Master's and Specialist's in Leadership, and I am broad certified, which is why I teach Chemistry. [Chemistry] was one of my favorite courses, so I started teaching it my first year, and have ever since.

Ashley Lynn recognizes that contributing to her desire to stay in the classroom, rather than move into administration, has to do with being able to teach AP.

> I [pursued a Leadership Degree] for the money. I mean, just honestly. That was back when you got the pay for it, so most of my friends did it and we all just did it for the pay raise. Never thought about leaving the classroom. . . I sometimes wonder if that's because [I] teach AP though. Because I don't have to jump through those hoops, and the difficult situations that a lot of these teachers have to do. I mean, we have our own difficult situations, but they tend to stimulate my mind. They don't make me feel like I'm being dragged down any.

Ashley Lynn enjoys her job immensely. She illustrates this in the numerous accolades she has received over the years, being recognized as Teacher of the Year and a STAR Teacher recipient, amongst others. She is celebrated by her colleagues and her students; this can be seen simply by walking into her classroom. On the date of our first interview, I observed a group of students speaking with Ashley Lynn. It was nice to be a wallflower for a moment and watch these students, not put up to this in anyway, explain their appreciation for their science teacher; in fact, one of the students explained that he had nominated Ashley Lynn for an award. Ashly Lynn was stoked to be nominated, and explained:

> The kid that just came in. You know, just a brilliant person, but quiet, introverted, very awkward with everybody. Just working with him as a person and pulling him out, and you know, just sitting down, the night classes, and stuff like that—getting out of the whole traditional classroom experience and having him relax and come out of his shell. You know, that kind of thing is special.

Likewise, during the formal observations of her classroom instruction, it became apparent that the art of teaching, and the interaction with students, is a passion for Ashley Lynn. In observing three different occasions, with the intention of capturing an essence of Ashley Lynn's experience of continued implementation and sustainability of aspects of the NMSI reform, I witnessed a teacher who cares deeply about her students' well-being. One student observed comes to mind when highlighting this about Ashley Lynn. This young lady I observed was having trouble grasping one of the concepts presented. The

young lady had not made Ashley Lynn aware of this necessarily, but Ashley Lynn knew she needed a little something extra (later confirmed in an email between Ashley Lynn and me); therefore, Ashley Lynn instructed the class to proceed to the next problem on a worksheet—a worksheet that, confirmed in an email, was designed by Ashley Lynn, but modeled after an NMSI resource—while she went off camera to work one-on-one with the young lady. This type of intuitive teaching illustrates more the caring for people in contrast to a focus on material.

Ashley Lynn claims it's not about the material, it's about the students.

> I mean, I'm sitting here thinking, you know, I've taught so many kids that it's hard to just talk about one or two. . . It's like the Principal always says, "It's not necessarily what you teacher, it's the connections that you make with them." And pulling them out and making them people; that's really the thing that's the coolest part to me.

Ashley Lynn loves working with teenagers.

> With every kid, there's just that connection, that bond, that. . . well, you spend time with them, having them show me what they're interested in, let me show them how that relates to what we're doing and stuff like that. It's just, that's what it is—it's the connections. So there was this one kid. . . I love this child, but he barely makes it ever. This [task] was it for him. This one [experiment] was it for him. . . As the period went along, he kept coming up with new cool ways to approach it, and seeing and learning. And you just saw. You saw that spark we talk about. And he walked out

> of there just going on and on about this being the most amazing day of [his] life. And it was just somehow, that opened up a door for him, and even still now, I'm seeing much higher things out of him. I think he just, he never thought he could do it. These are the moments!

A love for this profession is witnessed watching Ashley Lynn teach, in how others have spoken of her, in her embracing of the practitioner approach to delivery and planning, and in all else that she has done to ensure high levels of learning for all students, including the encouragement for open enrollment.

> And as I remember that year, three of the four [students] passed [the AP exam]. And then the next year [my second teaching AP], there may have been ten. And then I had the decision, that was unique at the time. I would take whoever I thought would not have a meltdown, which meant I ended up with classes of thirty and then two sections, and then three sections. And for that reason, because I'm willing to give all a chance at this course, I have more kids in AP than anybody in the district. . .[And there are some kids] that sit in this class, and do not take the exam, but sit in the class. They find that they can do it, and are then readier for the same work in college.

In offering open enrollment for her AP courses, however, Ashley recognized she would need to change her approach, and over time she did.

> There has always been this delicate dance between holding them accountable with a grade and beating down their morale. And that has

> been a huge challenge that I have fought a lot. And it used to be, you know, I would just fail the crap out of them. Fail them, fail them, fail them. . . and then the magic would happen. But, and even though they knew the magic was going to happen, it was so demoralizing to constantly get those failing grades. So, I've had to do a lot of things to fix that. And one of those [fixes]. . . was to use a curve like that suggested by NMSI—such as if you get 75% of the questions correct, you deserve [high score in the gradebook, because] that's a score of a five on the AP Chemistry exam.

Ashley Lynn views relationships as one of the more rewarding aspects of the teaching profession. These important relationships in the building do not just occur between teacher and student. Ashley Lynn values the relationships built with her colleagues of the school, the district, and those teaching AP Chemistry.

> Well, we used to be very close. When it was Roger, me, and Karen, we were the Three Amigos. We were tight. And then, you know, they both went off and did something else. But now, even with [some of the other district AP Science teachers] and I, we are pretty tight. But, you're right [these relationships aren't always present]. It's not always the case like us here in this district. And that's a shame. It's so fun to sit down with those people and talk and treat each other professional, and show respect, have fun, and all that stuff.

Many of these relationships have been developed through professional learning events offered by the school and district. However, Ashley Lynn noted that the introduction of the National Math and Science Initiative did some good for the district in regards to getting more teachers of the same subject to collaborate and improve their working relationships. Ashley Lynn welcomes opportunities to learn from other teachers, and she expressed the value in collaborating with colleagues.

> We had a lot of people from South Carolina and Kentucky that were working with us. And then, of course, working with the other AP teachers in the building, that's probably the best collaboration that we had, because you know, we began to see each other a lot more. We began to plan [together] much more; we began to see where the Physics overlaps with the Chemistry and actually. . . we planned [lessons] to teach at the same time, because we share a lot of students.

During NMSI training events, Ashley Lynn was able to build relationships with teachers from other parts of the country.

> And then when we went to the APSI trainings after that, we developed our own system of networking, but we were all new to it, so it wasn't that we were mentoring. It's just that we were all teaming up with each other and kept in contact with people from South Carolina, Oklahoma, and stuff like that. We stayed in contact for a year or two, and then everybody just finally [went] their own way again.

Ashley and the other AP Chemistry teachers in the district collaborated with teachers from all over the country during the Summer Institutes and two-day training events; however, the pool of participants was much smaller for some trainings, such as the mock scoring event. This, Ashley Lynn claimed, was one of the more beneficial offerings through the NMSI grant, and one that she continues to implement now that the grant has concluded.

> I enjoyed the group grading [events. They would] send me to Dallas to grade with fifty or more people. We now do fine [with that] at the county level. That's something that we've kept is the mock exams and the grading too, of course, which is invaluable. . . It's helping the other teachers learn to grade fast, so I'm all for being part of it for that reason… we have enough experience to look and say—Yeah. We'll count this. We won't count that—that kind of thing. The best part is just us talking it through and then seeing how a kid who I've never dealt with before, how they will phrase something and I've never seen it phrased that way. And that kind of thing. It's very helpful I think.

These relationships described above were developed by "working on the work." Meaning, through strong professional learning events were these teachers afforded an opportunity to dig in and work on tasks, approaches, strategies and the like, that would have an influence over their classroom teaching.

> It was also small, very little on grading. Mostly on: This is how we present it. Now you guys show me how to present it. Now how can we get this

> together and do well? And it was content, again. She would bring in and train us on the content.

This led the conversation with Ashley Lynn to talk of planned professional learning, and how some events tend to be better at facilitating collaboration, rather than being a *sit-and-get* session.

> I think professional learning is more technique on how to teach, how to manage, how to get the standardized test scores that you want. Which, you know, there's a purpose for all that. I get it. But I'm seeing that they're not spending any time, like we said before, talking about content. And if you did not have that, or you had it twenty years ago, it's really hard to stay up-to-date and do that. So we were really lacking in that part. NMSI gave us content, which gave us material to rally behind, together.

The teachers, from Ashley Lynn's perception, experienced more of a bond because the work mattered. Ashley Lynn made it clear throughout, that in order for quality professional learning to be experienced, those responsible for managing and delivering the training materials should be current teachers of that content, and should be credentialed as a veteran teacher with an abundance of approaches and resources to share. When the presenter held these characteristics, Ashley Lynn viewed the training as valuable.

> Again they sent Carlye. It was incredible. What made her site different—I'm talking from the NMSI website—than I think everybody else's, was [the layout]. She had it set up so we had a chapter, [such as] Chemical

> Reactions, and you'd go in and there'd be worksheets, quizzes, test questions, multiple videos, like hours long, on how to work the problems, how to teach it. And she gave you all access to the videos for the kids, so they would go and watch her working these problems. So if they were out, or if they were worried about a topic, I'd say, "Go watch Carlye." And they loved it because she and I present very similarly and we sound alike, so they were like, "It was just like listening to you!" Carlye, [NMSI trainer], was absolutely critical to this entire thing. This is why NMSI was more successful, I think, in the chemistry program than it would have been in the physics program because she gave us all kinds of resources to help, whereas I understand physics and biology had very little. So, you know, they didn't have equal treasures for the teachers, depending on the topic. The teacher trainers are the best of the best.

Ashley Lynn's perception of the teacher trainers was not the same perception she held regarding the Student Saturday Session presenters.

> The first session was awful because one of the presenters, we (district AP Chem teachers) were convinced, [had been drinking]. We were just standing in the back of the room like "Are you kidding me?" But after that, I mean, they were okay. Some of the presenters were much better than others were. But I can do the same thing.

Ashley Lynn asserted several times, throughout the two interviews, the importance of relationships in education, especially for the purpose of retaining more teachers in the profession. With that said, she spoke of the need for mentoring relationships.

> A mentor is there more than anything else for moral support—that's the most important thing. Giving you guidance on ways to go. But it's more the pick me up when you're down and giving you faith when you're ready to give up and that kind of thing; as well as showing you—giving you suggestions.

That mentoring relationship is imperative. Ashley Lynn believes so, regardless of the content for which the mentor is a teacher.

> I think [having a mentor] is critical. I really do. And it doesn't even really have to be a mentor in the same subject. It needs to be emotional and physical support and just a constant message of *you're going to be okay.* And then it is nice if it is somebody of the same content—they can give you materials. But that isn't necessary. It's a matter of emotional support more than anything else. . . Even if [a district] doesn't have a formal [mentoring program], there needs to be something to help out these teachers to give them that real-life "No this is what really is going on, and we are going to be okay."

Those wishing to become a teacher of Advanced Placement, often times (as is the case within this district), must have been teaching for a number of years (usually three or more), and must attend some formal training. After that, it has historically then been left

to the teacher to continue to develop within the content. Therefore, while a mentoring program has for many years existed for new incoming teachers of the Middle Georgia school district, one for new AP teachers has not. Ashley Lynn explained the need for AP mentor teachers.

> The first five years of AP are pure hell. Even if you have other people you can talk to. Because you know, I can remember thinking. . . did I even learn this in college? And now I have to teach myself before I stand up here with these kids with IQs far above mine and act like I'm the expert. So yeah, I think it's imperative that new AP teachers have AP mentors. Nothing formal necessarily, but someone that can keep you grounded…[For example], we had a AP Biology teacher that attended a training. She got everything and decided all that the teacher told them was gospel. When she came back, I was like "okay, that person works for AP Central. Now let me tell you the reality of the situations you're about to be in! (Laughing)."

Ashley Lynn noted that the National Math and Science Initiative did offer opportunities for mentoring, though at the time a formal mentoring program through NMSI seemingly was not promoted well. "The very end of NMSI being here, there were rumblings about the setting up of a mentoring program. It was like a—'hey, drop me an email if you want to do it.' I was like (sighs)." Rather, the mentoring was something that organically grew out of the relationships with other participants, from the same and other school districts, who also were in the NMSI reform program.

> We of course met with the head of science [curriculum for NMSI], Carlye. We met her right at the very beginning when there was a push for them to accept us. And there was open-ended call me anytime. Or, you know, drop me an email any time and that kind of thing. And she was very open to that, I understand. I never took advantage of it, but I know other teachers did.

Ashley Lynn cared so much about the relationships she has with her colleagues, both those of the same content and simply those that are in the building or within the district, that it seemingly influenced her decisions associated with the financial incentives offered as an NMSI grant participant.

> I used some of the NMSI money to help their supplies because they have no money to buy things, and they have consumables for their labs, too. So I supported them. So the money that came down, some of it, went to them. Also, the hundred dollars that we got, and I never told anybody this rather than those teachers, but because Chemistry is a two-year program, if they taught them the first year and I got the hundred dollars for that kid, they got fifty. I just felt it was right, because they worked just as hard as I did. And I wish we could have done more for the Social Studies teachers, because that really, really bothered me that they didn't get anything.

Ashley did not give all her money to the other teachers of course, and she spoke to the effect these financial incentives had on the quality of her teaching and to the growth of the AP Chemistry program.

> A hundred dollars for every kid who got a score of three or higher on the exam. I used to call them Benjamins, because it was like—yeah, you're my hundred dollar bill. But that really didn't motivate me. I was already doing most of what they were asking me to do. It was great. It was nice that somebody finally said—hey, good job. Here's a massive check. Go spend it on things you'll never be able to afford. But I would have done it anyways. I'm still doing things like the night classes, even after [the grant money is gone].

Ultimately, when it comes to the issue of teacher pay and one choosing this profession, Ashley Lynn believes:

> In the end, we enter this profession knowing the money we're going to make. We've accepted that walking into the door. So that's not it; I'm in this because it makes me happy. . . I have always said that a good teacher is not trained or taught. A good teacher is born. It is a part of your personality and you are self-motivated because it's what you're good at. I wish all the good teachers could be given financial awards for that. I used to believe that, you know, they should pay math and science teachers more—because they could get more in the private sector—to enter the profession, but I've seen a lot of people come from the private sector to teach and they don't necessarily make good teachers. So I'm not so sure that attracting people that didn't choose teaching in the first place into this profession is necessarily the way to go.

This, however, does not mean that Ashley Lynn believes there should not be more money available to those in the profession for the right reasons.

> I just wish somehow we could make this more lucrative for everybody that's in it. Give us pay raises. Find money for supplies. Which, you know, that's what NMSI came in and did that made it so awesome because it let every teacher know—"Hey, we see you. We appreciate what you're doing and we're going to help you as much as we can, at least for three years."

Financial incentives are often embedded in top-down reform implementation attempts, such as has been the case with the National Math and Science Initiative. Ashley Lynn mentioned that the financial incentive "was a nice atta' boy to receive" but it was "not the reason [I] became a teacher." And it was not the only reason she perceived the implementation of the NMSI grant a success. Ashly Lynn expressed that successful reform initiatives should be:

> Realistic. So many times, people come in with—okay, this is what we are going to do. And these are people that are planning this that are not educators and they have little idea. And so they try and implement these things not realizing that it is physically impossible to carry that out in a classroom. So those reforms suffer a quick death [laughing]. When a [reformer] comes up with some kind of—hey we are going to do this—isolated on his own and it looks good on paper, it generally doesn't work.

Ashley Lynn illustrated a premise that NMSI was introduced in the right way. She spoke of the many levels of introduction that took place, beginning with "an email from the District Gifted Coordinator announcing the application for the grant," and then meeting multiple times, including once with "the AP teachers and people from NMSI," to discuss details and "garner teacher support and feedback." Ashley Lynn described that during the meeting, representatives from NMSI explained:

> The whole process from beginning to end, about what NMSI is about, what they're going to do for us. And they went through the whole thing about how [they'll expect an] increase in your population. They explained that yes, your percent failure rate might drop, but you need to stop looking at that. You should look at how many kids pass. And so, they were just selling the program to us. I felt as if we had the ability and opportunity to say no, as teachers, to this grant if we so chose.

While speaking of top-down reforms in general, Ashley Lynn explained why she perceived the implementing of NMSI to be a success.

> The reason that some reforms, like NMSI, work really well is because they [approach it] as we see you. We understand you. We understand the industry and this is how we're going to get the industry to help you. So it's [not an isolated thing in which] one person is going to solve the problem. Instead, this person is going to pull in these people and these people and we're all together going to solve the problem. So it's these interconnected ones that work really well.

While there were some resisters in implementing the grant initiatives at first, Ashley Lynn viewed the conditions of the grant as generally acceptable.

> There were some naysayers, especially that first year. . . You know, I mean, it's just their nature is what I finally decided, because they had no problem accepting the money. And taking the training and the equipment and all that stuff. But they're going to complain about it the whole time. So I think, especially in the beginning, there was not anything they had to complain about. . . Most of us were all in.

Ashley Lynn also stated that some of the resistance may have come from a fear of being less effective as a teacher, or having teacher scores published.

> I had a course with a lot of kids. They were smart kids. I had a lot that took and passed the exam. So I guess if a teacher went into this and they weren't doing their job and they weren't willing to do their job, then they weren't going to get the money. I could see where they would start complaining bitterly about having to go through the training when they weren't going to get the payoff in the end. Plus, they would announce our scores. If you weren't competent, everyone would know.

But all in and all, Ashley Lynn viewed the implementing of the National Math and Science Initiative "as successful for the school and district" and believed that some aspects of the reform were going to be sustainable after financial support by the NMSI organization had stopped. For example, access to teaching materials might be still be available.

> Yeah, that stuff is still out there now. I can still get to all of her [Carlye] videos and all that stuff. And it's funny because even if I don't have the link, the Facebook—they're sharing it! So whether they like it or not, it's out there being shared. . . [Also, as NMSI left], there was mention that we were supposed to have access to some of it, but not all. Like I don't think we were supposed to [laughing] have copies of their SSS and all of that—but we do. I kept all of that. There though is a NMSI site for resources, that we no longer have access to. I've tried.

Ashley Lynn used NMSI grant money to purchase items for her course and department, and those items were still being used at the time of our interview.

> Balances, oh gosh. There is a real-time laboratory probe system that you can get where you put a temperature probe in it and it measures it in real time and graphs it right there for you. That system. [I also used the money for] chemicals and volt meters. I mean, just all kinds of things that I could never have afforded full sets of. All that stuff I and others in the department continue to use.

Ashley did mention they attempted to sustain some aspects of the program, such as the Saturday Sessions, but failed.

> We had decided, and tried it once afterwards, to run our own. I think it's better for you to review with your own kids if you know your material, because they're just a lot more comfortable with you. So I never really felt like that was great. And because I was still running night classes, they

> didn't feel like they wanted to give up their Saturdays for it very much. So that part of the program stopped once NMSI was gone. I do though take the super problems from Saturday Session materials, and use them to create my own super problems for use during the night class tutoring…I can now do the same thing, now that I have the super problems as a guide. . . We also continued the mock exam and scoring experience. That's something that we've kept is the mock exams and the grading too, of course; which is invaluable. It's helping other teachers learn to grade fast, so I'm all for being part of it for that reason. I would be doing it even if we weren't doing it as a district.

Ashley Lynn concluded her thoughts on NMSI and its sustainability by discussing the hypothetical second-go with the reform.

> If it circled back, I'd want it for the kids. I don't know that I'd go to the training unless I could be assured it was different, because that was the same training every year after a while. . . But I'd love it for the kids and I'd love it for the new AP teachers. But I think that they should give us a chance to opt out of the training if we've already had it.

Furthermore, Ashley Lynn spoke of the lasting influence the NMSI reform has had on the climate of Middle Georgia Central High School.

> [NMSI] removed barriers. And I think that's almost like a permanent thing because we took away the application. We took away the stigma of *this as an incredibly difficult course and you won't be able to do it unless*

> *you're gifted.* So that's a permanent plus for me. It did affect our pass rate, but I'm happy to think that people are no longer looking at pass rate. They're looking at how many kids passed, not the percentage. And that's awesome to know that five more kids got college credit than would have gotten the years before [NMSI].

Ashley Lynn not only spent a considerable amount of time discussing aspects of the reform, school climate, and thoughts of sustainability through our interviews, but allowed me to also witness her teaching in action. Ashley Lynn was recorded in the act of teaching during three different occasion. All occasions occurred over the course of a two-week period, for thirty minutes per recording. The purpose of the footage was to illustrate Ashley Lynn working with her students, using strategies, methods, approaches, and materials learned and gathered during the implementation of NMSI. During the second observation, Ashley Lynn taught a lesson which was seemingly rather difficult for her whole group to grasp. Rather than speak to this being necessary and mandated by College Board, Ashley Lynn simply got the half of the class that understood going on the task, and then pulled the other half to do some remediation. I witnessed two aspects of the NMSI reform highlighted in this moment: First, Ashley Lynn used an NMSI document to help scaffold the instruction with these students; secondly, Ashley Lynn spoke to how capable the students were and that all that was needed was a little more practice with it and they would master the concept.

Participant 2: Labrock

Like Ashley Lynn, Labrock was not always interested in pursuing education as a profession.

> I was a math major and chemistry major; I thought I was going to medical school, but that didn't work out. I ran out of money going after a PhD. Once I realized and accepted that, I looked for another "noble" profession; teaching was that profession.

Since then, Labrock has been doing something he is passionate about.

> There is that one reason I became a teacher. There's, you know, the sort of sappy like, *I do it for the kids,* but the truth is I have a meaningful impact on a lot of kids' lives, like I have kids that get a hold of me years down the road. . . You know I'm never going to say something that is going to [necessarily] change them, but just putting them in the right position, that's it.

Labrock also loves the content he teaches.

> From the day I got to Middle Georgia Central High School, it was something I wanted to teach. I love Calculus, it's my thing. I mean, it really is. I absolutely enjoy Calculus, I like the mathematics of change.

This love for his content and for teaching in general can be witnessed when watching Labrock in his classroom. During two of the three observations Labrock could be seen spending the first couple of minutes talking and joking with his students. Not one-on-one off to the side of the room or from behind his desk, but rather sitting on his stool at the

front, and talking with all the students. Labrock, like participant one (Ashley Lynn), explained that the relationships built in the classroom are his reason "for staying in this capacity, rather than seeking out a role such as administration." However, he too indicated that the relationships keeping him in the profession are not just those between the teacher and students, but also those with other colleagues and professionals. When speaking of mentors, Labrock explained that it is the encouragement of others in the field that leaves an impact.

> [Mentors] are those who's been there before. Taught the same sort of thing and has worked through those—has seen the challenges you're going to face and can sort of, like encourage you through them. A bad mentor doesn't keep up with you, check on you. . . . [For example], my mentor [when I first began teaching] was great. She was really helpful. I taught in her class once because I floated. So she could watch me teach and suggest "here's how I would handle things", and those type of things, and that was super helpful.

Labrock sees the value in AP teachers having a mentor, because with AP courses there:

> Is a lot of content and there is a lot going on and it's so different [than a regular ed classroom]. When I first started teaching Calculus I was pretty cocky because I had taught it at the college level. I needed someone to bring me down to Earth. . . . I found that person through working with NMSI teachers in our cohort.

However, Labrock only vaguely remembered official mentoring opportunities offered by NMSI, having explained "I don't think I was in any formal NMSI mentoring program, I can't remember ever doing any of that."

Unlike the other participants, Labrock completed his AP training, preparing him to teach the course, by attending NMSI events only—not College Board events. Labrock was a first year AP teacher, during the second year of NMSI implementation at Middle Georgia Central High School. Traditionally, College Board had set up Summer Institutes to train new AP teachers; however, the district and school-level administrators believed the NMSI training events in "Virginia Beach and in Indianapolis suffice[d] as the initial training." The Summer Institute in Virginia City was the first NMSI professional learning event Labrock attended. In recalling some of the other professional learning events offered by NMSI, Labrock had mixed feelings.

> So I remember doing the two-day training. . . . I guess I did that twice. The first one was not very memorable. The second one was held by the Director of Mathematics for College Board. He was real good at answering questions about the [exam]. He worked through some problems. It was mostly figuring out what I have to teach. . . . It was great!

Labrock included in his explanation the value of the SSS—consultants flown in on a Saturday to work with AP students—as professional learning opportunities for himself.

> I would go to those SSS and they were really helpful. Seeing someone else teach to my students and sometimes I would be like, ok, that's what

> I'm already doing. Or sometimes it would help show me how to do a better job with some material. I mean there were times when I would learn maybe how to simply say it better. While I don't like spending Saturdays away from my family, [these events] were good for me as a teacher to see how to teach things and watch other teachers, because I would just sit in the back and watch and listen. While half of it was confirmation of what I'm doing right, there were times I would see a new way to present the problem and now I do it that way.

When speaking of a professional learning experience organized and facilitated by NMSI personnel, Labrock had the following to say in regards to the impact scoring student responses as a group had on the learning climate of his classroom:

> I really appreciate getting feedback from other teachers. And showing them hey, see, this is really what's going to happen. . . this is how it is going to be graded. I didn't grade this paper. That's the rubric telling you this is what you have gotten, not me telling you I think this is what you got [as a score]. And these are things you can work on. Students became more positive and willing to accept criticisms or coaching.

Not everything Labrock had to say about NMSI professional learning events was positive. Like Ashley Lynn, Labrock questioned how some of the presenters were qualified to do the work.

> I think they find good people to do [the SSS]. I thought most of all ours were good. There was one person, but she apparently had a bad day. So,

> yeah, mostly they were really good, but there were one or two not invited back. I really don't know how [NMSI] found them.

To Labrock, the success of teacher professional learning hinges not only on the quality of a presenter, but the material. Labrock mentioned that from the NMSI sponsored training events, such as the Fall Two-Day event, he gained an understanding of how to better design appropriate, scaffolded tasks for his students of AP Calculus. This, he stated, was because "the trainings offered by NMSI tended to focus on content, and how to design content, rather than generic pedagogical theory stuff we so often get in other trainings." This type of training seemingly has been sustained through Labrock's instruction. One can see the resemblance in tasks provided by NMSI and tasks created by Labrock, when held side-by-side. He both showed and explained this.

> I mean, the test that I just gave out [to students] and just showed you, like it's—they modeled how to create a test that looks like the AP exam. And so this is the test that I used in class today.

Labrock explained that professional learning is most valuable when the material is "tangible, something I can immediately take back to the classroom and implement."

The professional learning offered by NMSI was something that Labrock has seen as being sustained since the grant funding expired.

> NMSI gave us teachers the opportunity to get together as teachers of the same content, from across the district, state, and nation. And while I don't stay in contact with teachers outside the system, I know others do. I see that in our system we have continued our professional learning days, [the

> fall one-day planning day, and the mock exam scoring day in spring], and I think most people, myself included, are still providing the extra tutoring time outside of class.

Because of the training mandated as conditional acceptance of the grant, new positions were created to handle the workload. For each participating content area, a content lead was designated. For AP Calculus, Labrock served as the content lead. Having this role served as leadership training of sorts, in bettering his ability to plan for and facilitate teacher professional learning.

> The plan was to work through and talk about previous multiple choice assessments that had been released. What we did was took the 2017 assessment and we just went through it and categorized the problems, to get an idea of where to focus our attention going through the year. . . . We had done it several years ago. Like, in one of our professional learning [events] from NMSI. I had set that up. That was just something that I thought we need to do. And that would help. I got a lot of confidence building in preparing goals and tasks for our district teachers for these professional learning events. I continue to do that now that NMSI funding has stopped.

Participant one, Ashley Lynn, had mentioned that NMSI preferred teachers of an AP course to teach the feeder course when possible. Labrock had the opportunity to teach the feeder course and mentioned that working with kids for two years was nice because

"you get to train them…they get used to you and you don't have to redo all that first-of-the-year stuff."

AP Calculus is a difficult course. Due to the rigor, Labrock has embraced some of the expectations presented by NMSI, and continued to support them after the ending of grant funding.

> We do our mock exam outside of school hours. So you have to incentivize it to get them to come. I know other schools in our district allow teachers to give the mock exam during the school day. We do not. And I'm so glad ours doesn't. I need every minute in class to get practice. And if I can give them three hours after school. . . that's giving me three hours with them, that I wouldn't have to go over problems or work through things or do that sort of thing. . . the number one indicator of success is time-on-task. Like if kids do more problems they are more successful. Period. . . . I know it benefited their ability to be successful on the test. If nothing else, the time on task mattered.

An aspect of the reform was that of performance pay. Labrock had some positive and negative responses over the concept of paying teachers for student success.

> You know, believe it or not, I am not a fan of the money grab aspect of the reform. I would rather them give me some extra money for doing what I do, rather than for student success on the test. . . . It did cause some animosity and I believe some kids took the test that should not have. The biggest problems was that there was a lot of animosity, particularly from

> the AP History teachers, and rightfully so. Like, why is my subject less important than yours? That was problematic. There's research about how to pay for, you know, performance-based incentives are detrimental. You made one hundred dollars for every kid that passed the exam and then if you reached a certain goal [number of students to pass], you earned a bonus of one thousand dollars. I like money (sigh). [But], like, I wish they would have just given you extra money rather than incentivize the test, because maybe we forced kids to take the exam that we knew weren't going to pass. . . . As far as motivating me as a teacher, maybe just a little bit. I was motivated a little bit to get the check. A little bit, yeah. Maybe.

Labrock also believes that the incentives offered to students were mostly beneficial; however, he wondered about the impact they had on students taking the test that may not have done so without the financial support of NMSI. Students who were in an NMSI-sponsored course received their test for free (at the time, a cost of $86 per student, or $53 for Free and Reduced lunch students).

> Well I guess it maybe didn't really hurt them to take the exam. I don't know. If it's free especially. Because, NMSI paid for all or part of the exam. But there were some kids that probably were not going to pass the exam. We knew it because of the mock scores and performance in class. And they come in hoping for a Hail Mary and, well, it didn't often happen.

The performance pay was an aspect of the reform that caused Labrock to step back and question the impact it may have on the students of Middle Georgia Central High School.

This conversation led to Labrock explaining his perception of what it takes to implement a top-down reform effectively. He highlighted this by speaking of a current reform going through the district.

> And what the administration did is they got a little group of us together. They found it at a, you know, a conference, and they were like, wow, this is really going to be great. And then they got a group of us together and I was on that little team. They picked our brains. They pitched it to us. And then we went to this little meeting and we talked about it. Well, poked holes in it. They sold us on it. From there we selected a teacher lead from each content. And then we went and started talking about it, you know, because we're going to gossip. And once they got us on board, I think we got a few other people on board. And then that really sort of got everyone a little bit behind it at least. And then they did a big announcement and talked about it. And they had some good structures in place.

In the end, Labrock made these comments regarding the acceptance and implementation of the National Math and Science Initiative:

> There was some good; like, [the NMSI grant and reform] gave kids that were doing the right thing more of a spotlight, and kids that were excelling academically, gave them more of a spotlight. That was good. And you know, it also [promoted] more administrative focus on the AP program, which is really good. And I'm worried that may be kind of falling away as

> we get further away from NMSI's [presence]. And extra help in making me a better teacher; you know I think it really did help a lot of kids. I got a ton out of it. I would be years behind where I'm now in terms of curriculum and planning. . . . If we could get NMSI back, [I'd want it for] the additional training, and I did love the SSS and the shared resources!

Participant 3—Rachel

Like Ashley Lynn and Labrock, Rachel also did not enter college with the intention of becoming a teacher.

> I found, I guess, a love for writing. It didn't happen exactly that way. [I had an English professor that encouraged me] to work in the Writing Center. And so, then that started it. I started taking composition theory classes and all of that. And eventually, when I was almost done with my Psychology degree, I changed over to English and earned my teacher certification.

Rachel, once having become a teacher, knew that this was what she wanted to do with her life, and explained her reason for entering and staying in this profession.

> I know everybody always says this, but the students obviously. Progress of students and seeing a change in students. I mean, I've had so many students start out and they were either just naïve in the subject matter or anxious about writing or presenting or you know, doing any of those things, and to watch them be able to grow in that amount of time. I mean, it's a very short span of their life. And to be able to see them make those

> strides in such a short amount of time is rewarding. And so, seeing those instances in students, for me, outweighs a lot of things. We know the statistics of why teachers leave, and this is what keeps me here right now.

Rachel highlighted her passion for teaching by speaking of a particular student.

> When she first came into my class, she was very shy, wasn't confident in her abilities and what she could do. She was not born in this country, having arrived sometime while she was in elementary school. So she struggled with language barriers and all of those kinds of things. So for her, writing in English, especially at the AP level, was going to be a challenge. And intimidating. And so I worked with her a lot, just on getting her ideas down, and then how to change it to make it what you want to say, really speaking from her experience because her experience was so different from most. . . . And so she started doing that and we started working together to change her writing and putting in those experiences. She soon became the president of our Future Business Leaders of America Chapter, and then served as the National President. Then she went to college. She was asked to do a couple of TED talks and she started a couple organizations up there for immigrants and immigrant families.

Beyond the relationships forged with some special students, Rachel spoke of building relationships with colleagues, through the means of mentorship, and what mentorship is supposed to be.

> Here [Middle Georgia County School District], it's a program in which they pair new teachers with mentors and the mentor is supposed to check in and mentor the [new teacher]. And that's really what it was for me as a new teacher with my first assigned mentor; just kind of a check-in, check-out process more so than a mentorship.

To Rachel, mentors should have the following characteristics:

> [Mentors should provide] what that person needs to grow. Help them learn how to set goals and how to reach those goals. I think if it's implemented the correct way, it is very important because I'm not sure, even currently, that teachers are necessarily getting all of the skills that they need coming out of college classes in order to actually enter the profession [prepared for]. . . . The theory of doing something is not the practice of doing something. Mentors should also be people that can talk to other people. You know, receive feedback, give feedback, and have that open exchange that results in a better education for students. Just being positive with the [teachers], reassuring them, but also always having open communication. . . be able to have those critical conversations.

Rachel believes that "all teachers entering the profession should have a mentor as part of their professional development." For Rachel, having a mentor should not only be a first-year teacher need, but also for those entering content areas new to them. Rachel began teaching AP Language and Composition, for the first time, just after NMSI had been introduced to the district (2014). She had been a teacher for better than ten years at that

point, and therefore would be considered by most as a veteran. In beginning this new role, Rachel "acted as a mentor and as a person who needed a mentor." In describing whether or not veteran teachers new to a subject like AP Lang n need a mentor, Rachel explained:

> You definitely need one. I definitely needed one. And in my position, it was very difficult because the person who had the course before me would not make a good mentor. So I had to branch out and look other places for that help, such as teachers from other schools in our district. Now, that also brings in a memory of NMSI. [NMSI] was very beneficial for me coming in because without Jean, [NMSI Language and Composition trainer], it might have been a complete mess. She was always there on email, always there at trainings and different things. She was able to give me insight in how I could take something that I've never taught before and blend it with something else. She was not necessarily a mentor I was paired with, but I leaned on her. I don't think NMSI formally paired anyone with a mentor. I also mentored an AP Lang teacher here at our school. [She started teaching during year two of NMSI implementation] and had went to the training, [but was] still kind of like—oh my gosh! I think it was a good experience in that, once I started mentoring somebody else, I had to reflect on my own practice. I found that having conversations often—and I mean like almost every day—needed to happen in order to make the transition easy for the person coming in

> because they had never taught an AP course. My role was to be positive with them, reassure them, but also always have open communication and say, you know, when something does not look right or when, you know, you needed to have a critical conversation.

As a result of these experiences, Rachel explained that "mentoring, both as the mentor and the one being mentored, should be treated as professional development." She believes that all those involved in a mentoring situation should treat it as an opportunity for growth. Of course, this is only one opportunity for teacher professional learning. Other professional learning opportunities can also be beneficial. Rachel described the difference between influential professional learning and that which is poorly delivered or "not thought out well enough prior to its introduction."

> Well, I think that professional learning, as it's given to us right now, whether it's AP or otherwise, really is: We [reformers] see these things that you could be doing or are not doing, and now we want you to do them, so do them. . . . The fault with professional learning is that it's never readdressed. We tend to just say, Okay, we used it. And so I feel like there's never any follow-up to professional development that actually is used to develop the professional. It's like doing research and then never going anywhere with it.

Like Labrock, Rachel received her initial AP training and professional development through opportunities offered as an aspect of the NMSI reform.

> It was more cost effective because the school didn't have to pay for my training, due to the NMSI grant—so that's how I was trained. And the training was beneficial. They covered most of the things I had questions about and really set it up for what we were going to have to deal with as we went through. After the training I felt like I had a better idea of what to do. . . . I felt I was able to transfer [what I learned] to my students based on the training that I received.

Rachel explained that much of the professional learning hosted by NMSI was participatory in nature, and this led to her ability to implement the materials and strategies into her courses immediately.

> We had these packets that we went through and talked about the different types of essay. We looked at what types of essay they were. We looked at student samples. We worked together as participants to figure out why they got the score they did. We went over the score categories. We did a lot of that together, so that was not really a sit-and-get. That was participatory. That was timely.

The trainings were beneficial to Rachel, so long as the presenter was a person she felt encouraged and supported by.

> I really felt like Jean's, who was [one of the lead NMSI ELA presenters], teaching style and mine were similar, and so a lot of the examples that she gave or the things that she included in the training were things we could use or take to the classroom. Those were things that I actually could use

> or do and be successful. So I felt supported in that she was always there. And whenever I emailed her, she was always there.

Rachel was not NMSI's content lead for the district. However, the ELA SSS offered by NMSI were hosted at Middle Georgia Central High School. For this reason, Rachel was recruited to help with the set up. Serving as part of the set-up and operations crew limited Rachel's opportunity to hear the NMSI presenters working with her students.

> So I didn't do a lot of the sessions where I actually went in and observed the session, mainly because we were behind the scenes setting up the sessions. And so there were times where I wish I would have had that opportunity to be a part of that. . . . [Instead] we were pulling chairs, making copies, wrangling students. We were required to be here, earlier than everybody else. We had to make sure that the people were going to be fed, everybody's booklets were printed out and distributed accordingly, make sure we had space in a room and enough chairs. We would often have over 500 students show for these events, so they were a logistical undertaking. . . . It was also challenging because when the presenters came in, they weren't always familiar with the equipment that was in there. So I didn't get a lot out of that [professional learning] experience…But having to set everything up was a learning experience for me on that scale.

So while, due to logistics, Rachel had mixed feelings about the SSS as teacher professional learning, she felt it was meaningful for the student participants.

> But overall, they did benefit from it. They would come back and say "Okay, you talked about it this way and then they talked about it this way, and we thought this was good." And I'm like "Okay, let's try it that way." But a lot of the comments that came back were just, I would say, about the actual presenters themselves in that they gained more from the people that they felt they connected with better. They would say things like "you know, he's very conversational. I felt like, you know, really, we had a rapport going on." And so they felt they got a lot out of sessions with approachable, effective presenters. If it were just a sit-and-get session, then they were less enthused.

Rachel incentivized student participation in these SSS, offering a replaceable homework score for each one they attended. As a result of this, and as she said, "a result of the district expectation being that we send all our students," Middle Georgia Central High School experienced a high turnout for each Saturday session they hosted. Rachel mentioned that incentivizing these events worked well, but the fact they got to "eat pizza, all they wanted, and even take a box home with them often" was a huge attractor to get students in the door. She tried to incentivize her after-school tutoring opportunities in a similar way, offering extra credit for those who attended. She explained, however, "I could not offer a tutoring session for all students—something that would resonate with everybody; therefore, I hosted informal, stop-by tutoring opportunities. It was almost like having office hours. Some students took advantage of it, but these opportunities went underutilized."

Incentives for participation were not limited to the students. Teachers received monetary awards for their participation in trainings and SSS, and for getting students to pass the exam. The idea was to pay teachers for their students' performance. Rachel, like the other participants, had mixed feelings about the concept of performance pay for teachers.

> I remember getting a paycheck for the number of students that scored a qualifying score on the exam. I don't think that really motivated me as much in the grand scheme of things I guess. I was more excited about getting those kids who didn't have the opportunity to a point where they were better writers. Even if they didn't score a passing score on the exam, I was happy. . . . I mean, [the money] was nice. Especially with the number of students I taught, we were talking about a pretty hefty check, so it was nice. But I'm not sure that it really affected what I did in the classroom. Like it was never a thought that if I get more students to pass this test, I'd get more money. So while the incentive was nice, it didn't drive what I did in the classroom.

Rachel also mentioned that the financial incentive created some uncomfortable conversations with teacher colleagues—teachers who were not afforded the opportunity to earn those incentives.

> Oh, they knew too. Yeah, and so I mean, there were always comments about it. You know, like *"Oh you got your check yet? How big was your check? Where you going to spend all your money? Sure wish I got paid more for my job.*"

Not only did the financial incentives have some unintended consequences, Rachel discussed how implementing the open-enrollment policy affected some of the student population. The unintended consequences were a result of blending two courses, in order to make it possible for more students to participate in the AP program. AP Language and Composition required the most aggressive change in order to increase the enrollment. Traditionally, the English courses for Middle Georgia Central High had been set as a track for regular education students, and those considered gifted/honors (by testing in) were on another track. This led to the limiting of students who could participate in AP Language and Composition. In the state of Georgia, all high school students must take and pass American Literature. This course is generally reserved for the eleventh grade, as is AP Lang. If a regular education student wanted to take AP Lang, then that student would have to forgo American Literature until the senior year of high school, or take both American Literature and AP Lang during the junior year.

Those in the gifted/honors program, however, had the opportunity to take American Literature during the tenth grade, which put them on pace to take AP Lang as a junior. As a result, many regular education students did not select to take AP Lang. Upon the recommendation of NMSI, Middle Georgia Central High School (and all high schools of the district) merged American Literature and AP Lang together, and have since taught it as a combined course so that all students have the same access. To make room in the schedule, the administration removed the other English course option (Honors British Literature) from the schedule. This resulted in the gifted/honors population

having only three options: Dual-enrollment in college, AP Lang/American Literature, or regular education American Literature. Rachel saw this as an issue for some.

> They blended American Literature and AP Language. That was a whole issue in itself. Now I had to cover two contents within the same class period. And plus, they put between 28-30 students in each of my AP classes; I taught it all day long. . . . There were a lot of gifted students—gifted in other areas than English—that were in there. They didn't want to be there. And so we opened up the opportunity, but we also forced some to take the opportunity, [due to the way our master schedule worked]. I think it's a good thing to open it up to the people who want to do it. I'm not so sure opening it up and forcing people into it is a good idea. When we force people into a situation like that, you don't always get the outcome that you hoped to, even if you have a student capable of making a qualifying score on the exam. If students take the exam, even if paid for, they then have to take it seriously. And this is where there was another dichotomy in that the students that were capable of doing it were not necessarily motivated to do it.

Rachel, having been in education now for nearly two decades, has seen her share of reforms come and go. She explained, when it comes to implementing reforms:

> Usually whenever you implement any kind of reform, it's top-down. It's usually a small group of people at the top who trickle down what the reform is going to be. And then you have very small groups of chosen

> people that come in at the different levels. They make the decisions for everybody else. And I think when those groups are very small, or isolated in terms of different possibilities of bias—let's just say it: They ostracize those voices. For a reform to work, it's important to get more voices involved. . . . When you increase the base [of those who help make decisions based on the reform], the buy-in to the program is stronger, resulting in a more successful implementation. That's how it was with NMSI; it was a pulling in of teachers from all those subjects. And because it was a big grouping of people who were now buying into this program for all these different reasons, you now had a foundation of people that's so large that the implementation of the program was going to be a lot more successful.

When describing the overall perception of effects from implementing the National Math and Science Initiative, Rachel described why she believed this district and school welcomed the reform:

> [We] accepted the conditions of the grant, I believe, to open up opportunities for people to become part of an AP program. To widen the effects of the AP program, or at least admittance to it, so people had the opportunity to excel where maybe they didn't before. The NMSI [reform] program has been funded by different private and public organizations. They provided all of the money that is needed to expand programs and incentives for students and teachers.

Rachel explained that there are components of the National Math and Science Initiative that have been, and may continue to be, sustainable, while also there are aspects of the reform that the school or district could no longer support once the grant funds had ended.

> As far as the SSS offered to students go, we still use the stuff, [materials from those sessions]. But, we no longer organize those Saturday events. It's too much financial to deal with and too many moving parts. We met as a district once to discuss, once NMSI had left, and decided we could no longer offer the SSS.

Rachel has the perception however, that many aspects of the initiative have stuck around, resulting in a change to how things are now done in regards to selecting and supporting students in Advanced Placement.

> I believe it has been a good thing to open up those opportunities to people who wouldn't normally fit the characteristic or fit the mold for how we characterize gifted students and what they're capable of and what that looks like. At first, and still currently, we have had an influx of African-American students taking AP Lang; they would never have normally been in that course prior to NMSI. And so I think it's a good thing to open it up to people who want to do it.

Rachel explained she valued the materials a great deal, and as the three-year implementation of NMSI was coming to an end, she admitted to gathering as many materials as she could. She worked with the other AP Lang teacher at her school, and together they "pulled everything. Like everything [we] could find, see, whatever—if it

was associated with NMSI, it was pulled and saved to a hard drive." However, it was not just the materials Rachel was retaining, Rachel described her current teaching practices as a lasting effect of the training required of all participants implementing NMSI.

> A lot of the things they had were very useful to me. Especially the two-day [training events] or when we went and read the student samples and learned to score them quickly. Those are priceless and timeless.

Rachel has continued to use many of these materials she had gathered. During the last of three formal observations of Rachel teaching, two aspects of the reform were witnessed as being influential in her instruction. First, she had students discussing in groups a shared novel they had read. These novels, she told me during our second interview, were purchased with funding provided from the NMSI grant. Secondly, students were prepared to write formal rhetorical analysis responses to these novels. The "thinking work" for these responses was being prepared through group discussion and individual recording on a document that included the NMSI logo at the top. She used an essay drafting document to walk students through what she expected out of a rhetorical analysis. This use of the document was most notable because the group she was working with were regular education tenth grade students, not AP Language and Composition students.

Participant 4—Lauren

For as long as Lauren can remember, she's wanted to be a teacher.

> I am a fourth-generation teacher. I've taught 18 years, mostly with this system. I've taught all four grade levels. I've always loved English. I

> loved to read and write. I wasn't an English major; I was an Education major because that was much more my comfort zone. I've always wanted to teach. In fact, when my sisters and I would play make-believe, I was always the teacher keeping them on task!

Lauren is proud of her chosen profession.

> I really enjoy teaching people about topics or processes. It's enjoyable to me. And I mean, let's face it, teaching is a noble profession. It's not as maligned as a lot of people want to portray. I would say that wide and vast majority of people totally respect what we do and they respect us as people and they appreciate somebody who's helping their child. And that feels so good.

When Lauren transitioned to teaching Advanced Placement for the first time, she had some apprehension, but luckily had a support system.

> I might have been a day ahead of the kids because I was reading all of that stuff and Googling everything I could find. And it was terrifying and very cool at the same time because I started to step into that space where it's okay if I didn't have all the answers. . . . And I had some very, very, very kind people around the district who helped me because I was a singleton here, and lots of support and lots of materials. That helped me tremendously.

Having a strong support system, which was to include formal mentorship, explains some of why Lauren has come to enjoy so immensely the craft of teaching.

> I had some really super mentors. I had great people who looked after me. I had a really good department chair. . . . I took over her schedule. And she gave me everything. She was like—this is how we do this, this is how we do that, and so on. I mean, she just literally held my hand through the whole thing and it was still pretty rough. . . . I had people who fostered leadership abilities in me that I didn't think I had. . . . My department chair here at MGCHS was also great. She actually talked me into getting certified to teach gifted. She also talked to me about being department chair [as she was moving on to a new role]. She just was very full of praise. She made me think that I could do this.

Lauren explained the importance of having mentors early on in her teaching career, in having experienced both being mentored and mentoring others, she has developed a perception of what effective mentoring entails.

> I think a mentor has to be someone who has strengths in several different areas. They have to sort of have the total package. They definitely don't need to be perfect, but they need to in general be able to manage this job, which is a lot of plate spinning. I know a lot of people who are very strong content-wise and instructional-wise, but they have horrible classroom management or vice a versa. They run their classroom like a well-oiled machine, but the kids don't really learn much. They check a lot of boxes. Also managing the emotional aspect of this job is very difficult because you have to care about this job or you should not be doing this

job, and you have to care a lot more than somebody who works for an insurance company, for example.

Without a doubt, Lauren feels mentoring is essential.

> Oh gosh, it's so important! It should be a law, honestly. I mean I've been mentored. I was mentored by lots of different people. I have done mentoring in the past. I'm doing it now actually. Surprise.

A mentor's role is to be supportive of instruction, a source of resources and materials, and someone to help keep the emotional toll of this role in check. Lauren explained that this role is more than a job, and requires much emotional investment from those that serve in this capacity; mentors are supposed to help those newer to the profession navigate all aspects of the teaching profession.

> Teaching is a profession: So like medicine, you go into medicine with a lot of expectations and the reality can be very jarring and very discouraging. Education is the same thing and so when you go into this job, it is not a job you leave. It is not a job that you do because you have to get a paycheck. It is a job you have to be emotionally invested in. And when you put your emotions into something, you have to be able to draw a line at some point and that's not clear for people who are doing this for the first time—even in the first three years, or five years. So I cannot express enough how important it is to have somebody just to ask: Where are the grownup bathrooms? How do I fix the copier? So gosh, it's so important to have a sounding board. It's so important to have somebody who, you

know, has their ducks in a row, but is absolutely still able to own being human and messing up.

Lauren feels that her experiences with some "great mentors" have fostered her love for this profession and, likewise, have paved the way for her own approach to serving as a mentor for new teachers. The role of mentoring is challenging, but rewarding.

> I am mentoring three new English teachers at the moment. It's been really great. But it has also been a learning experience. I've had to work on my wait time [before responding]. I've been trying to navigate having some crucial conversations about how we prepare for helping our team and what it means when you don't. So it's been challenging. It's also been very rewarding to see them kind of start to take more responsibility as members of the team. They are now often running our meetings the way we run them, and that's really cool to see. So, in all it's been more draining this year, but the reward has been equal to that, so that's been really nice.

Mentors should also encourage teachers to set goals and be willing to accept new challenges. This encouragement by those mentoring Lauren led her to believe she would be a good Advanced Placement teacher.

> We had an opening for AP Lit, and she (the gifted coordinator) came to me and was like, "I really want you to teach this class." And I was like, "No ma'am. I'm good. Thank you very much. I appreciate your confidence, but that's going to be a no!" I had never even taken AP Lit or

> Lang. I thought, those kids are way smarter than I am. So I didn't want to do it, but she encouraged me and talked me into believing I could do it.

Encouragement is one factor that led Lauren to believe she was ready to teach Advanced Placement; she acknowledged that quality professional learning was also fundamental to her feeling of preparedness.

> [The NMSI Instructors] were all either current teachers in the classroom or recently retired. And all of them were very professional and treated us as professionals, which was very nice. They all totally integrated things that brought our buy-in and gave us a feeling like no matter how long or short we had been teaching the class, we had something to offer and that we had the ability to teach it well and that our students were going to be successful.

Lauren expects professional learning to provide "the highlights. Like, the thing that's going to impact kids the most, and access, and things to take back to the classroom the next day, or at least the next unit." Relevance of material and credibility of presenter have contributed to the positive experiences of Lauren's participation in professional learning.

> I think some of the best professional learning I have ever had has been listening to another teacher for the most part…hearing from somebody who taught this, like, this past week. This is how I did it. These were the pitfalls that the kids fell into. This is how I helped them out. These are the examples. That's professional learning that I can take right back.

Lauren felt the trainings offered by NMSI were beneficial due to the content, as much so as the presenters.

> Best practices. Activities. Scaffolding. It was all relevant. It came from, you know, actual teachers! I mean, they were you. So you'd be like, okay, so what do you do about the kid who blah-blah-blah-blah. I mean, you could ask all the scenario questions and at the same time get awesome stuff to bring back. . . . I very rarely went into a session where I wasn't like—ooh! Let me write that down; let me take this handout.

Like Rachel, Lauren explained that SSS offered to students were also designed to be professional learning for the teachers involved in the grant. However, due to other responsibilities, she perceived them as less of a contribution to her growth throughout the program.

During implementation Lauren served as the content lead for the district. As such, it was her responsibility to organize and help facilitate the SSS. It was her responsibility to ensure the NMSI presenters had all the resources needed to successfully present the material, the students were assigned to the right locations, and program teachers were delegated roles or assigned a room for observation. Lauren, "regretted that [I] could not attend many sessions, because of all the running [I] had to do throughout. Those I attended though, were great. The presenters were great, very qualified."

Lauren wants students to have access, and looks to remove barriers to provide that access.

> We've gone through a huge shift here. I'm so proud of us. But for many years, we equated behavior with learning, and if you can't bring a pencil by gosh, then you're not going to be fit or whatever. And I kind of got to that moment sooner than some of my peers, and it totally showed in the way kids were successful. I wasn't going to let them get in their own way anymore, and that was super gratifying.

The school changed policy to promote participation and access during the implementation period. Lauren supported these changes.

> When's the last time somebody misjudged your potential or your ability to do? And I understand too that sometimes an open door policy [for AP courses] can somewhat slow the pace of what you might be used to, or what you might think is the right pace, but being exposed to AP pacing and AP material and AP expectations is a great thing for the kid. It's awesome. I'm really, really, really, really glad that we aren't like that anymore. And it's conquered a lot of elitism in our building too, from an adult perspective, which I'm really happy about.

Lauren believed one of the positive results of the NMSI reform, that she sees evidence of being sustained, was the shift in acceptance policies and what characteristics constitute a student qualified for Advanced Placement.

> Establishing a real AP program instead of offering AP classes. For sure a culture change in terms of who should or shouldn't quote, unquote take AP. The elimination of the prerequisites. The teacher recommendations

> for AP versus the AP teacher picking and hand-selecting. A sort of breakdown of the sacred cow mentality. . . . I just think it was a huge mindset change. I mean, I know that's a total buzzword, but really, a culture and mindset change. You know, you don't realize the way you think about something until someone else is like, maybe you should think about it this way.

Lauren perceived a change in teacher responsibility for student results as an effect of NMSI.

> And a real expectation from administration that if kids aren't doing well in your class, whether it's a co-taught class or an AP class, we need to see what you're doing about it. . . . And I don't know that before NMSI that there was a whole lot of focus on AP classes for that reason. And there certainly wasn't nearly the expectation on the AP teacher to do anything more than expect kids to rise on up. . . . [Expectation] forces the AP teacher to do what a regular classroom teacher does, which is to be willing to understand that people are going to have gaps. People are going to need more of this and less of that. So that mindset, I think, has definitely been sustained.

Lauren has continued in a leadership role for the AP English cohort of the Middle Georgia school district. In doing so, she has continued to develop professional learning modeled after similar professional learning events previously offered by NMSI.

> [When we get together to score free response as a group], there is definitely a tuning protocol to begin. We model these trainings after the NMSI model. . . . It did feel a little shaky after they (NMSI presenters) weren't there. But I'm just so thankful that we still get that time and the money is devoted to us being able to do that.

There were components of the reform that Lauren wanted to see sustained, but viewed the obstacles as being too great.

> I would like to have seen SSS continue. Total pipe dream. No clue how it would actually be implemented. That, I think, was a huge help for the kids too. At the end of the day, sometimes they need to hear a voice besides yours. . . . Hearing other adults talk about the course and the exam and the materials and what the author's trying to do and all that kind of stuff, it just validates their experience. I do miss that part.

Lauren not only has perceived there to be a change to the AP program, but in her own instructions as well, she continues to use existing NMSI resources, and develop new materials modeled after the NMSI approach.

> I also have paper versions of Summer Institute, two-day training, and all that stuff. I refer to it often. . . . I got some scaffolding practice workbooks that were suggested during some of the summer training. I got myself some teacher materials. . . . And even though I'm no longer teaching AP Literature and now teaching AP Language, I still often use these purchased resources.

In fact, this use of an NMSI resource was evidenced in one of the formal observations of Lauren's teaching. While Lauren went through the NMSI training intended to instruct AP Literature rather than AP Language and Composition, many of the AP Literature materials are designed to encourage thinking that is applicable to the goals of AP Language and Composition. Lauren explained during her second interview that she often has to modify these materials, but she still finds them very applicable. After grouping students by ability, Lauren instructed them to work through a deconstruction of an AP Language prompt. During this recorded period of instruction, Lauren explained to the students how the questions they were answering on the document are the same questions they should seek to answer each time a prompt is presented, and that they should do it with the aid of this document in the future. This scaffolded approach and the document itself, Lauren explained in a follow-up email to me, were modeled after the design presented by NMSI.

Successful implementation and sustaining of a reform such as NMSI, in Lauren's words, must have some characteristics prior to introduction.

> Number one, it needs a committed performer. If you don't believe it, your staff is going to know in about two seconds. You yourself have to believe that it's for the good of the kids in your building. Number two, you've really got to get your ducks in a row. You've got to think about the expectation from central offices and how that translates to your building. [Questions such as:] What is the long-term plan? What are the principal groups that I'm looking at and what are their concerns? How do I explain

> the pragmatics of the reform? How do I explain the research and backing of this reform? How do I get the key leaders on board? How do we create systems that are constantly looking for feedback and constantly flexible in terms of what the staff needs. You've got to involve your most vocal people, positive and negative, in that process. If you don't, you'll fail.

Emergent Themes

Seven major themes of understanding emerged from the analysis of these data. I have labeled these themes as: (1) these teachers expect clarity and validity when being introduced to a reform initiative, (2) reformers should consider the impact on teacher relationships and teaching environment prior to implementation, (3) professional learning should be subject-oriented, timely, and applicable, (4) those delivering professional learning should be engaging and thoughtful presenters, (5) these teachers of Advanced Placement see value in colleague mentoring, (6) financial bonuses are enjoyed, but may not be perceived as leading to more effective teaching, (7) some aspects of the NMSI reform are more likely to be sustained than others. These themes were identified as they were salient throughout the stories told during participant interviews. The themes are more elaborately expressed through the shared participant profiles that follow.

Shared Participant Profiles

These teachers expected clarity and validity in the presentation of a new reform. As Lauren stated, teachers "expect [introducers of a reform] to have all their ducks in a row." Lauren described being first introduced to the NMSI reform.

> He [NMSI Director] showed us the stats on students who took AP courses. He just made us think about, instead of making AP this sacred temple, wouldn't it be great if kids were exposed to AP material and AP level assignments and an AP trained teacher? The data supported his argument. He put a real focus on expanding the program, expanding teacher training, and expanding a focus on AP as a viable option for a lot more students. They showed us a lot of stats about how the United States isn't quite up in the global scheme of things as it should be, and a lot of interested parties were like: well, if all it takes to make this better is to throw some money and training at it, we can do that.

These teachers harbored some skepticism in first accepting the conditions of the NMSI grant; however, the data and explanation of the reform during introduction was convincing.

> (Lauren) And honestly, when he started throwing numbers of students who—like in other school districts where they had done it and the scores of their students and the college credits earned by their students, the money saved by the parents and not just from credit on the exam, but credits where they stayed in school because they were used to that high expectation, I was like whoa. You know, most of the time, a teacher's skepticism comes from "well, you're not a teacher, you don't do what I do. You don't deal with what I deal with. That wouldn't work for my grade." And so on. But seeing the data from a high school that was similar

to ours, and understanding that a lot of it came from the military aspect of wanting to support the military family and how this reform could affect them too.

Grants and reforms introduced, that are not systemic in nature, may affect the relationships amongst colleagues.

(Labrock) The biggest problem was that there was a lot of animosity, particularly from the AP History teachers, and rightfully so. Like, why is my, you know, subject less important than yours? I mean, particularly AP Econ; why would he not be getting [the financial incentives] too? I remember [the district] publicizing the bonus earnings by teacher during our yearly convocation. Everyone in the district knew that one teacher's scores and the money they were being paid for them. Not sure I liked having that out there. It was uncomfortable for many of us I think. (Ashley Lynn) Because we had our NMSI supply money, [we gave] other district supply money to non-NMSI teachers. So there were ways to get them some kind of financial awards but that's about it. And we, of course, were like, yeah, we feel you. . . . There was a lot of resentment and a lot of very vocal teachers, and none of us blamed them.

The feelings of resentment discussed above often stemmed from the opportunity to earn bonus checks for performance pay.

(Labrock) I do remember that there were some hurt feelings because not all subjects were included. I taught Debate class with one of our history

teachers and he expressed multiple times how unfair it was that I had this opportunity for more training and to earn bonus checks, and because he taught AP History, he was not included.

Labrock, Lauren, Rachel, and Ashley Lynn all commented that reforms, such as NMSI, should be introduced as an opportunity, not a mandate necessarily. Likewise, the reformers should be open to concerns, questions, and objections from those most responsible for implementation.

(Labrock) It was a total pitch. The first time we met with NMSI representatives, it was a total pitch. (Ashley Lynn) They wanted to get the teachers on board. And I'd say most of us were. (Lauren) And at the time it was understood to be only for a [single] high school; it was not a district-wide thing yet. They were only planning to pitch to other schools. But from my understanding, we said no, it's all schools or none. (Ashley Lynn) And they (district administration) said no, you're going to do it in all the schools in the district. And from that point forward, NMSI began to target districts rather than independent schools. (Ashley Lynn) It was interesting too, because rather than a single school, they accepted our whole district. I'm not sure they (NMSI) were ready for that, and it showed in some of their choices. Like, they would send hundreds of us teachers to Dallas, rather than fly the presenter to [Middle Georgia].

Teachers tended to have mixed feelings on the quality and impact of NMSI professional learning events.

> (Labrock) Content-specific professional learning is so much better than generic *this is good teaching*. That's what the NMSI stuff was. Like top to bottom, the NMSI professional learning (PL) was much better than pretty much any other PL I've ever been to, because it was specific to what I teach. (Lauren) It was great for the teachers who came. I think they got a lot out of those SSS. Logistics were tough though, there was a bunch of students and teachers to wrangle. (Rachel) And then there were not enough instructors, there were not enough chairs, there was not enough space. Some of us teachers had to lead sessions, rather than be a participant. (Ashley Lynn) [Summer Institute for year two] was exactly the same. And that was the problem. And the third year it was exactly the same again. And so, that was the one thing that I really regretted about the whole thing. We shouldn't have gone after year one. (Lauren) Some of the presenters at times were a bit of a snore though, so not much was gained attending those sessions.

If a district, or NMSI, is planning professional learning events for their teachers, these participants feel much consideration should go into selecting the presenter(s).

> (Labrock) It was the presenter that made the difference. Yeah it was the presenter. We had some bad, and some great. I don't think I learned much from the less-engaging presenters. (Lauren) And that was just the first

time I had heard somebody who was a high school teacher. I mean the stories he told of the personalities and the hurdles they encountered, I was just like, 'yes, you get it!'. . . . They were all awesome. That's just a true story. Everything we did from a training perspective was very clear and guided, but not watered down. It was facilitated well. (Ashley Lynn) The lady for Science, her name was Carlye. Stellar! She was unbelievably great. She showed us resources we had never seen before. And it was just a week of 'let's have fun' and we just had a ton of fun. And she was so supportive, giving us stuff left and right. We ended up having to ship everything home because we couldn't carry it on the plane. She was phenomenal. (Rachel) I really enjoyed the presenters, especially the one lady who led our Summer Institute and Two-day training events. She rocked and I stayed in contact with her throughout the whole grant period.

Participants want relevant, timely material delivered in their professional learning events.

(Lauren) We could hear from somebody who taught this, like, this past week. This is how I did it. These were the pitfalls that kids fell into. This is how I helped them out. These are the examples. Like, that's PL that I can take right back. (Labrock) And there were a lot of worksheets and that sort of thing. And all of those were really helpful, like everything hit with me. I mean, one of the presenters gave me her whole curriculum on a flash drive. I still use that stuff. (Lauren) And the mock read [training]: Aw,

man, I mean, that was huge for me! Because I can go to other training, but I need to see and talk with people who are doing in it in the classroom every day. And NMSI prioritizing that was huge. (Labrock) NMSI trained us on how to do a mock reading of an AP exam. It was really good. I mean, having not known how Free Response questions are graded, it's difficult to understand until you put it into practice. I immediately put this to practice. Those types of things were great.

A mentor in education should be, among other things, a great classroom teacher, be aware of school operations, be a resource-finder and sharer, and be a good communicator with adults.

(Lauren) A mentor has to be someone who has strengths in many areas. In general they need to be able to manage this job, which is a lot of plate-spinning. You've got classroom management, you've got instruction, you've got professional development, you've got best practices, you've got a lot of things to manage and you need to be good at managing those things in order to mentor someone else. (Rachel) [Mentors] should teach how to set goals and how to reach those goals. . . . They need to be able to talk to people; receive feedback and give feedback, and have an open exchange…Just being positive with them, reassuring them, but also always having open communication and acknowledging when something doesn't look right. (Labrock) Mentors should be people who have been there before. Taught the same sort of subject and has seen the challenges

you are going to face. Someone who checks in on you often. A bad mentor doesn't keep up with you. (Ashley Lynn) [Having a mentor] is critical. It needs to be emotional and physical support and be reassurance that everything is going to be okay.

It's not just nice to have a mentor; it's necessary.

(Lauren) It should be law. I was mentored by lots of different people. This is a job you have to be emotionally invested in. And when you put your emotions into something, you have to be able to draw a line at some point and that's not clear for people who are doing this for the first time, even in the first three or five years. (Rachel) It's important, real important, to have a mentor during your first few years of teaching. Shoot, it's important simply when you change a subject, such as elevating to Advanced Placement courses. (Ashley Lynn) I think it's imperative that new AP teachers have AP mentors. Someone who after all the training can say "Okay, that person works for AP central, now let me tell you the reality of that situation!" Even if there is not a formal thing for new AP teachers, there needs to be something to help out these teachers and give them the real-life [explanation].

While mentoring relationships were developed throughout implementation of the NMSI reform, NMSI reformers did not develop a formal mentoring program for these teachers.

(Ashley Lynn) They kind of mentioned a mentoring program in passing, but we never heard anything more of it. We just kind of did it on our own.

> We had networked with a bunch of people [from other districts] who were going through the grant also. (Labrock) Yeah I remember them saying "hey, we are going to have mentors for you if interested," but nothing was ever followed up. (Rachel) I don't remember them offering formal mentors, I just leaned on those in my district instead. (Lauren) Oh there were rumors of us getting mentors, but that never came to fruition is far as I understand.

All four participants indicated that the relationships, though not formal mentoring but involving collaborative partners of sorts, continued after the formal implementation period of the NMSI reform.

> (Labrock) There is working with the other teachers in the county, which is great! We email back and forth. We get together for a one-day planning event. And even now that NMSI is gone, we host our own mock reading. (Rachel) We still get together twice a year to plan and calibrate scoring practices. That was a NMSI thing that the district has continued.

Participants expressed an understanding that while the financial incentives were certainly enjoyed, they were not perceived as having led to more effective teaching.

Participants claimed that while they did certainly enjoy the extra money earned from students earning a qualifying score on the AP exam, they did not necessarily perceive it as having motivated them to be better teachers, or to work harder.

> (Lauren) I liked those checks at the end of the year. I mean, who doesn't like extra money. (Rachel) I really liked the money. I had a bunch of

students so I received great checks. (Labrock) The money we received was great. It afforded me opportunities to buy things otherwise I'd be unable to. We used part of it toward buying a new car. (Ashley Lynn) This was the first time in all my thirty years teaching that I received a bonus check for doing my job. It was nice, but I would have done my job the same as I had for the previous thirty years. (Lauren) In education we rarely get a bonus check of sorts, so it was real nice that there was a group of people out there saying we see you and we appreciate you. I don't think though that it led to me working any harder, or doing much differently. I'd say if I became better during NMSI, it is more attributed to the training we received, not the financial carrot dangling in front of us. (Labrock) Like I said, it was nice. I don't though believe it made me a better teacher. I would have changed due to the training, even without the offering of money. (Rachel) It definitely did not make me a better teacher. Sure, the money was great but we don't teach for the money, nor is money going to necessarily make us better at what we do. I love kids, that's why I push myself to be better. But, don't get me wrong, I wish I was still receiving those checks!

Participants also believed at the time of this study that certain aspects of the reform (four years after the end of the implementation period) were being sustained.

Some of this I witnessed through observations of their teaching and collection of teaching artifacts. For example, Labrock spoke of designing assessments modeled after how NMSI

had done so. He shared these assessments with me, and also explained that "during the initial training [he] got a bunch of worksheets and resources [he] continues to use today." Ashley Lynn was very appreciative of the Saturday session documents, because it gave her material to use during her after school tutoring once NMSI had left. Rachel continues to use the novels she purchased with NMSI money in all her classes, including non-AP. She showed me these novels during our interview. I witnessed her using some with her students during observation. Lauren "continues to use the packets they gave us. In fact, now that I teach Lang, I've gone to those teachers and made copies of all their NMSI materials they had saved." She explained, during one of the observations, that she was using a document that was not an NMSI resource, but one she developed using NMSI resources as a model. Rachel explained doing the same, commenting that she does not "actually go and pull those documents out all the time, but thinks there's a sense of internalizing how those documents were created; and once you see how it's done, you become part of how it's done and it's hard to set that aside."

One perceptible sustained aspect of the reform has been a change in the way the teachers, school and district administrators, and community stakeholders view the AP program.

> (Ashley Lynn) I'm happy that the open-door policy has stayed and that we've quit looking at percent pass rate and more into how many kids [in total] have passed. (Lauren) Removal of the sacred temple, for sure, has continued. A much higher notion of teacher accountability and examination…I cannot talk enough about the perception change of what NMSI did for parents and for students and for teachers that your kid can

> do it…NMSI really made us think about and look at equity and what we thought we were doing versus what was actually happening. (Ashley Lynn) Prior to NMSI, each [AP] teacher had their own application for the course they taught. All us AP teachers would sit down together to go over the applications, and then decide whether a student was worthy or not. If you didn't have a certain score, you were not worthy of AP. That just killed me. So the fact that that whole mindset got changed and these doors got opened was the best thing for the kids. Now it continues to simply be: If you're going to do it, we are not going to get in your way.

The participants also perceived a shift in how they work with one another, which, up to when this study was performed, has been perceived as sustained.

> (Rachel) I think that's one thing that NMSI did, was it brought the entire district together and not just an individual school. (Labrock) I didn't even know all the AP Calculus teachers in our district prior to NMSI, and there are only five of us. Now we meet twice a year, and occasionally email back and forth. (Lauren) NMSI prioritized meeting across the district. We learned to build somewhat of a similar pacing schedule, plan the mock exam, and so on. We still do this. (Ashley Lynn) Our two days each year together may not be exactly like what we did with NMSI, but the mindset of prioritizing time to collaborate is what has been sustained. I'm thankful for NMSI for that reason.

Without financial support, these four teachers perceived a loss in some aspects of the reform.

> (Ashley Lynn) As far as the sustainability, we just don't have the money to sustain what I felt like were important, powerful parts of NMSI. (Rachel) The SSS we would have liked to have continued, but it was too much of a beast without NMSI. (Lauren) We met and talked about how to keep things like the SSS, but ultimately decided not to because of the financial burden. (Labrock) I just think there were too many moving parts to continue our SSS. We also lost access to some materials. (Ashley Lynn) Oh yeah, we were supposed to have continued access to NMSI resources, but it wasn't long after NMSI left that we lost our credentials to enter their websites. . . . And the fact was that once [NMSI] was gone, so was the money, and there went the push. There was a surge in [student participation], but now the numbers have been reduced.

Chapter V

DISCUSSION

Introduction

This chapter presents the results after analysis of the phenomenological data. Within this chapter are offerings of answers to the initial research questions based on the data as reported in chapter four. Data that guided these understandings were primarily interviews. Observations and artifacts were used to confirm participant perception when applicable. The three research questions that guided the data collection were:

1. How do teachers involved with implementing the National Math and Science Initiative describe their experiences?
2. How does the environment of MGCHS contribute to teacher experiences related to the implementation of the National Math and Science Initiative?
3. What are the opinions of AP MGCHS teachers concerning sustainability of the National Math and Science Initiative for their school and district?

Research Question 1

This research question asks participants to describe their experiences while being expected to implement the NMSI reform. Interviews focused on aspects of teacher training, performance pay, student enrollment, and teacher-to-teacher relationships. From

the period of implementation, teaching artifacts were used to confirm some experiences and uses of materials.

Research Question 2

This second question focused on aspects of the school and district environment. The four participants were asked to discuss aspects of the school and district AP program, teacher training, community engagement, and teacher accountability. The purpose was to better understand if any environmental factors of MGCHS affected implementation and sustainability, and how the environment was affected by the reform.

Research Question 3

The third question focused on the years after the initial implementation of the NMSI reform. The four participants were asked to discuss their perceptions concerning what aspects of the reform they have witnessed being sustained, what aspects they may have liked to see sustained, and which aspects of the reform have disappeared since the removal of NMSI. At the time of this study, NMSI had disengaged from the system for four years.

Discussion

In summary, the seven major themes identified throughout analysis of the data were:

"Teachers expect clarity and validity when being introduced to a reform initiative," "reformers should consider the impact on teacher relationships and the teaching environment," "professional learning should be subject-oriented, timely, and applicable," "presenters of professional learning events should be thoughtful in their approach, and

engaging in their delivery," "teachers of Advanced Placement see value in colleague mentoring," "financial bonuses are enjoyed, but may not be perceived as leading to more effective teaching," and "only some aspects of the NMSI reform may be sustainable." From the interviews, participants' descriptions of their experiences related to the NMSI reform are included to further highlight these major themes and how they relate to the three research questions.

Theme 1

Theme 1 is labeled "Teachers expect clarity and validity when being introduced to a reform initiative." This question relates to RQ1, speaking to how these four teachers perceived the introduction of the NMSI reform.

Muhammad and Hollie (2012) explained that in order for any reform to work, those responsible for implementing need understanding for how it will be implemented, and why it is needed. When asked about how a school or district should introduce a top-down reform, all four participants spoke to this theme, acknowledging a need for understanding the purpose of a reform and proof of how and why it may work.

Reform efforts are best implemented with fidelity when those responsible for implementation are leading the decision-making (Deal and Petersen, 1999; Hall & Hord, 2006; Ravitch, 2010). Three of the four participants also perceived this as being a fundamental component for successful implementation. When asked the difference between what makes a reform stick and what factors may lead to its failure, the participants explained how a reform should be introduced.

Rachel explained

> So usually whenever you implement any kind of reform, it's top-down. So you have this very small group of people at the top who trickle down whatever reform it's going to be. Then people from all levels come in. And they make the decisions for everybody else. And I think when those groups are very small, or isolated, there may be bias. You ostracize voices. When you increase the base, the foundation of the number of people who could have buy-in to your program, then you are going to have more success in implementation.

Ashley Lynn stated

> It's not an isolated—this person is going to solve the problem. Instead, this person is going to pull in these people and these people and we're all together to solve this problem. When you hear about some guy who comes up with some kind of a—Hey, we're going to do this—isolated on his own and it looks good on paper, it doesn't work.

Ravitch (2010) and Fullan (2011) expressed that often times when a system introduces a reform, they do so without first preparing those responsible for implementation. As a result, it can leave the teachers feeling the reform is a "little heavy-handed, causing them to reject the idea from the start" (Ravitch, 2010). Without involving teachers in the decision-making process, failure to implement correctly is a strong possibility.

Ashley Lynn adamantly expressed this idea in the following comments.

> So many times people come in with—Okay, this is what we're going to do. And these are people that are planning this, and they are not educators, so they have no idea. And so they try to implement these things not realizing that it is physically impossible to carry that out in a classroom. So those [reforms] of course die. Quick deaths.

Lauren expressed a similar idea in stating

> You've got to involve your most vocal people. Those who can openly discuss the positive and the negative. You've got to get the teachers believing in it, and they only will if they get to be part of making the decisions. If you don't, you will fail.

Involving those responsible for implementation in the decision-making for implementing a reform will lead to more clarity in purpose (Fullan, 2011). In introducing the NMSI reform, NMSI and District personnel visited each school site (five sites for the Middle Georgia school district) and hosted a round-table discussion. This discussion was aimed at "proving validity for their purpose" (NMSI/MGCHS Memorandum of Agreement) and to permit the teachers to discuss with one another and the NMSI reformers the possible outcomes of accepting the conditions of the reform.

Rachel shared

> Well, it's like I mentioned before, this reform worked because they started with a group that was small and grew from there. You had this grouping of people who believed in it, and that helped the program grow.

Ashley Lynn explained

> The reason that some reforms, like NMSI, I think worked really well was because it was a—We see you…They started with, here's this initiative, are y'all interested? Then multiple meetings happened, and then there was a meeting between NMSI and AP teachers…And so, they were selling the program to us; it felt like they needed or wanted our input.

One question I asked of all participants was to recall a time when a reform was introduced, but in their perception was a failure when implemented. The participants were encouraged to highlight this occasion so as to compare it to how the NMSI reform was introduced.

Ashley Lynn explained

> So, yeah, that one was another one that was just unfounded. I understand what the thought process was, but, I don't think it ever really went off the ground. They talked about it in the fall and everybody laughed about it and kind of went "Nope, when you make me, then that will happen." And they never made us. I still do not really get why we were to try that reform.

Lauren shared a similar sentiment in the following comments.

> The first time that PLCs came around, they were rejected because the person leading the charge did not have an effective boss, and he himself was not effective in communicating the idea. It has now come full circle and everybody in the county is doing it and he probably is fighting mad because he has presented this a decade ago. But it wasn't explained well.

Rachel expressed a similar lack of understanding for another reform.

> Sometimes it's just too much and they don't understand that. Like, there were these Thinking Maps we were going to use as a district. So the district sent some people to training, spent a boat load of money on resources, and then said implement. The issue was that this reform was intended to change the way students think, and many of us didn't know how or where to start. So we didn't. And it failed.

Labrock explained

> The reforms or initiatives I remember that do not get off the ground are usually the ones that are introduced at a staff meeting, and then expected to happen without much follow-through. They always fail. There isn't a certain one that comes to mind, but I remember this experience many times throughout my career.

The more buy-in, the more likely implementation with fidelity will happen, which may lead to more likelihood of sustaining a reform (Fullan, 2011). In discussing how the district and school pitched the NMSI reform to the teachers responsible for implementing, Rachel shared:

Once the district was considering the grant, things moved very quickly. I remember there was a round table discussion that I was not part of, because I was not yet teaching AP. My counterpart, the AP Literature teacher, though was part of this discussion.

Ashley Lynn explained

> We felt like we actually had a say in whether or not this grant and reform would be a go. Maybe we did, maybe we did not, but it sure felt like we did.

Knowing why a reform is needed, and how it will impact those affected, is paramount to the success of a reform (Muhammad & Hollie, 2012). A component of NMSI's pitch to the teachers included data on how the reform may affect students and the teachers. Three of the four participants were at the initial pitch meeting and spoke in their interviews about the data shared and how that impacted them.

Lauren explained

> They showed us a lot of stats about how the United States isn't quite up in the global scheme of things as it should be. . . . And honestly, when he started throwing numbers of students who in other school districts where they had done this reform, and the scores of their students and the college credits earned by their students, the money saved by the parents and not just for credit on the exam, but credits where they stayed in college because they were used to the high expectation. . . . Seeing data from a high school that was similar to ours, they just made us think about, instead of making AP this sacred temple, wouldn't it be great if kids were exposed to AP material and AP-level assignments and AP-trained teachers? And I was like, you're right!

Labrock stated

> You couldn't argue with the numbers. The stats on kids attending and staying in college, the increase in number of students participating in Advanced Placement, and how teachers in other systems dealt with it, all proved to me it was worth trying.

Ashley Lynn explained

> We were all concerned with our pass/fail rate on the test. That mattered to our school and district. So they went through the whole thing about how, yes, we're going to increase your population and yes, your percent failure rate might drop, but you need to stop looking at that. You should look at how many kids pass—that sold many of us.

Theme 2

Theme 2 is labeled "Reformers should consider the impact on teacher relationships and the teaching environment." This theme relates to RQ1 and RQ2; therefore the data have bearing on the impact implementing the NMSI reform had on the participating teachers and their relationship with others in the building.

The interview data confirmed that there were some strained relationships due to the exclusive nature of this reform. I anticipated that this might be a result of implementing the reform because, as mentioned in chapter one, the school of my employment also had implemented the NMSI reform, and in our school I perceived some sense of discomfort from those excluded from the incentives attached to the reform implementation. When introducing reforms, Ballou (2001) and Ravitch (2010) have both

claimed that the reform should be systemic, as it may affect aspects of a school environment outside of what has been targeted. Reformers should be concerned with how the introduction of a reform, only targeted at a certain population, will affect others who are not directly involved (Deal & Patterson, 1999; Datnow, 2005; Hall & Hord, 2006; Ravitch, 2010). The NMSI reform was concentrated on improving student enrollment for AP programs in the areas of Math, Science, and English, leaving History teachers wondering why their subject was not involved. Ballou and Podgursky (1993) have performed extensive research on the impact performance pay strategies have had on the teaching and learning environments of systems and institutions implementing change. Their studies have concluded that more research should be done into how a performance pay system can affect teaching relationships, and that careful consideration should be made in how to implement reforms of this nature, as it is likely to affect the working relationships of teachers and administrators. Hall and Hord (2006) referred to this concept as experiencing the phenomenon between the "haves" and the "have nots." Those who "have" are likely to be more satisfied than those that "have not." Discussing how this affected those that did not receive the training, support, and resources of NMSI is outside the scope of this study; however, how the participants perceived the change in relationships was not. All four participants acknowledged that some teachers felt slighted for not being included.

Ashley Lynn explained

> I could tell the teachers who taught the feeder course to mine felt a little animosity toward the incentives I received, especially the money. I shared

> my money with Chemistry teachers. . . . I just felt it was only right, because they worked just as hard as I did. And I wish we could have done more for the Social Studies teachers, because that really, really bothered me that they did not get anything. . . . They were upset with NMSI and the district for leaving them out.

Labrock stated

> I do remember that there were some hurt feelings because not all subjects were included. . . . You know there is some research about how pay for performance, when not offered to everyone, can be detrimental.

Lauren explained her little experience with the change in relationships

> I probably heard a few narky comments about, you know—oh, so-and-so gets the hundred dollars or whatever. . . . Social Studies was pretty bitter about not being included. From the rest of the school? I didn't really feel much of that. I heard some grumblings, but that's about it.

Rachel

> They [non-NMSI reform teachers] knew [about the performance pay] too. There were always comments about it, such as: Did you get your big check yet? How big is the check? And comments such as, you're so lucky they pay you more for the same job.

Two participants also explained that there was some resistance from those who were involved in implementation. Muhammad and Hollie (2012) described this phenomenon of implementing a reform as distinguishing between the group of believers

and resisters. Resisters may eventually come on board, but they are going to be skeptical as to why a change is needed (Muhammad & Hollie, 2012).

Lauren explained

> There was also resistance to people looking at their numbers. There was definitely a change in terms of who taught what…Even I was a little scared and resistant at first of NMSI because I didn't know of AP as any other way than I had been trained; that's how it was when I was in high school.

Ashley Lynn described

> There were some naysayers, especially that first year. Most of us were all in. I mean, it's just in their nature is what I decided. They're going to complain about it the whole time. But I don't think there was really anything they had to complain about. I guess if a teacher went into this and they weren't doing their job and they weren't willing to do their job, then they weren't going to get the money, and everyone would know.

The effect to teaching relationships and the teaching environment can be positive of course; that is why so many systems across America continue to implement new reform innovations (Muhammad & Hollie, 2012; Ravitch, 2010). All four participants spoke to how the training and time together, brought upon by the expectations of the NMSI reform, strengthened their relationships.

Lauren explained

> [Prior to NMSI] we'd be doing our own thing. Don't get me wrong, I like autonomy, but there are some great teachers out there and I need to see that. It's not just for new teachers, it's not. In AP Lit we had every range, from first year teachers to veterans. And we all learned from each other. So I would say, without NMSI I wouldn't do any of the networking just because it would be a pipe dream. It would be something that we always want to do and you never get around to. I have more friends and know more people who teach my subject because NMSI prioritized that shared planning time.

Ashley Lynn described "The colleagues in this district, we were already tight, but we became much tighter. [Because] now we saw each other more and more and more, which made that a stronger bond."

Rachel stated

> [AP Lang blended with American Literature at the request of NMSI]. I and another teacher both were new to teaching AP Lang/American Literature. I found that having conversations often, and I mean like almost every day, needed to happen in order to make the transition easy. With the NMSI reform we were able to form a cohort of sorts, with not just those at our school or district, but from a much larger region. But definitely, the AP Lang teachers of the district now knew one another very well.

Labrock acknowledged

> I don't have a pre-NMSI like AP experience, because I started teaching AP while we were implementing NMSI. I don't think though I would communicate as much with the local AP Calculus teachers without the influence and organization of NMSI.

Theme 3

Theme 3 is labeled "Professional learning should be subject-oriented, timely, and applicable." The resultant data relates to the professional learning events the participants took part in during the implementation phase of the NMSI reform; thus, this theme relates to RQ1.

Rachel described the difference between what professional learning is and what it should be.

> I think that professional learning, as it's given to us right now, really is: We see these things that you could be doing, and now we want you to do them, so do them. It's heavy-handed. . . . The fault with professional learning is that it's never readdressed in how it was used in practice. There is no follow-up. Professional learning often is like doing research and then never going anywhere with it.

Ashley Lynn stated

> You know, Professional Learning these days is less about subject and content, and more about technique. Technique stuff is good. There's a

> purpose for it. But many of us are lacking content knowledge. We need that.

Labrock asserted

> Content-specific professional learning is so much better than generic, *this is good teaching* kind of thin. That's what the NMSI stuff was. Like top to bottom the NMSI professional learning was much better than pretty much any other professional learning I've been to, because it was specific to my course and content.

A common thread to theme 3 was the concept of professional learning being subject-oriented. When the professional learning is centered around the work of a teacher's instruction, then compliance and implementation is more likely (Justi & Van Driel, 2006). Because AP Language and Composition was to be blended with American Literature in compliance with NMSI acceptance guidelines, Rachel felt that some of the NMSI-provided professional learning was not specific enough to her needs.

> There were parts of the training that weren't as effective, only because we were blending American Literature with the AP Language. I had to try and apply some of the material to what was needed for American Literature, because they weren't doing that at the training.

Ashley Lynn explained

> They [NMSI presenters] would always bring labs and we would do labs. It was mostly on this is how we present it, now you guys show me how to

> present it. And it was content. She would bring in and train us on the content.

Lauren described that “Best practices worked. Activities. Scaffolding. The main place where I saw the most validity was the activities that addressed my biggest concerns of scaffolding.” Teachers want professional learning to be timely and applicable; something that can be implemented and used in their instruction. This, they would rather have, more than training on the theory of learning or something of the like. When speaking of the professional learning offered through NMSI, Rachel explained “NMSI prepared me to teach content. Like, no joke, I often left a training and the very next day taught a lesson learned during that training.”

Lauren described the timeliness of professional learning “NMSI rocked. All the stuff we learned ;came from someone who taught it, like that past week. I always left with something I could use right now.” Labrock explained the applicability of some NMSI training:

> The second training offered by NMSI was memorable. It was held by the Director of Mathematics for College Board. He was real good at answering questions about what was going to be on the test, what we needed to teach.

A component in making professional learning applicable may be the receiving and developing of materials.

Ashley Lynn stated

> The things Carlye gave us were useful in the classroom. We talked through how to present and when to present certain materials, but what was most effective for me was the access she gave us to materials.

Labrock commented

> Dr. B, he comes in and says here, here's my worksheet I give my students at the beginning of my class. And I give them this definition and I say now you try it. And that's a thing I now do. I thought that was really good, so I immediately began using it in my own instruction.

Lauren described

> The materials were just awesome. I mean, everybody was like, "Can I have a blank copy of this? Can I have a blank copy of that?" Because you're writing on it, but you're about to take it and use it on Monday. It's happening now.

Another component of the training opportunities for teachers was to watch and listen to outside presenters as they instructed students. Three times a school year, MGCHS would host SSS for students for AP Language and Composition and AP Literature. Administration appointed Lauren as the teacher responsible for organizing the events. Rachel contributed to this. NMSI encouraged and expected—teachers signed memorandums that outlined this—participation from program teachers. However, Lauren and Rachel were unable to attend sessions due to the busyness of organizing the event.

This seemingly disappointed Lauren and Rachel, as they viewed the material and instruction as being timely and applicable to their own instruction.

Rachel explained

> I wanted to observe the sessions, but I could not. I was too busy with the planning and logistics. That sucked, because I think they were really good teachers. I wish I could have observed them.

Lauren described

> I organized the SSS for students, teachers, and presenters. It was a beast. I don't think NMSI was ready for the number of participants we had show. So I didn't get to attend as many sessions as I would have liked, but I was able to find some time to participate. . . . The presenters though were very experienced, very professional.

Theme 4

Theme 4 is labeled "Presenters of professional learning should be engaging and credible." This theme relates to RQ1, thus the data is relevant to how the participants describe their expectations of, and experiences with, professional learning presenters. It also may relate to RQ3. This is because if the trainers were effective, then the resources, approaches, and practices presented will be used going forward, leading to sustainability of this reform aspect.

The participants all spoke to the quality of professionals responsible for delivering professional learning associated with the NMSI reform. NMSI hired current and former teachers and administrators to lead instruction in trainings. Using professionals still very

much relevant in the field of teaching led to buy-in by participants of the instruction delivered during NMSI training events.

Lauren explained

> These were teachers teaching us. Not administration or reformers, no they were teachers. They knew very well the lives we teachers have to live. They would talk about their own students and the struggles they had, and I would just sit back and think, "you get it."

Ashley Lynn described

> She gave us all kinds of resources to help. Things she was using in her classroom currently. . . . In fact, she had a website which was set up by chapters. . . . She gave you all access to the videos, which the kids could watch. This was all stuff she used with her current students.

Labrock stated

> I think what made all of the NMSI stuff—the two-day trainings—so good was that we could hear from somebody who taught this, like this past week. This is how I did it. These were the pitfalls that the kids fell into. This is how I helped them out. . . . Everybody I saw had clearly been teaching AP for a good while and had a very good sense of how to translate what the exam wanted students to do.

Rachel commented

> I really felt like Jean's, one of the NMSI [English teacher] trainers, and my teaching styles were similar, and so all of the examples that she gave

> or the things that she included in the training were things we could use or take back to the classroom. She being a teacher was nice. Not only did she know what we were going through, but she knew how to teach teachers.

Engagement in how material is presented is of the upmost importance when attempting buy-in from participants (Muhammad & Dufour, 2009). The participants of this study expressed satisfaction when the NMSI presenters were dynamic in their approach. The appreciated presenters were those that exhibited energy when delivering, and worked with the teachers rather than speaking to them.

Ashley Lynn explained

> The teacher trainers were the best of the best. Everyone I encountered was obviously somebody high up in NMSI. They were great. They engaged us the entire time, and they were dynamic in their delivery.

Rachel described how

> These were not just teachers who had good scores, these were people for the most part that could communicate to other teachers why these materials and delivery were effective. Honestly, they kept us moving, kept us talking the entire time. We couldn't, nor wanted to, tune them out because these presenters, well most of them anyhow, were so charismatic and engaging.

Lauren stated

> Honestly, for the most part, [presenters] were very dynamic. You could tell they really knew what they were doing and knew how to reach kids, and they make it engaging and they were good.

The participants did speak of a couple NMSI trainings as not being very beneficial or enjoyable, due to presenter lack of engagement.

Labrock explained

> I remember doing the two-day [training]. I guess I did that twice. The first one was not very memorable. The presenter mostly spoke to us, rather than with us. He read from the PowerPoint and really didn't work through much with us. He wasn't engaging I guess.

Labrock also had unbalanced experiences in attending the SSS. He explained:

> I would go to those SSS and they were really helpful. Seeing someone else teach to my students and sometimes I would be like, ok, that's what I'm already doing. Sometimes it would help show me how to do a better job with something. I mean there were times when I would learn maybe how to simply say it better…They typically found good people to do it. I thought most all of ours were good.

Lauren also mentioned that the SSS presenters were mostly engaging and thoughtful in their delivery, but there was an exception or two.

> I can count on one hand the number of times that either trainers didn't show up or that they were kind of like a little bit of a snore. The kids

didn't like those presenters. The teachers didn't seem to get much out of those sessions.

While Labrock (AP Calculus) and Lauren (AP Literature) found value in the SSS presenters, Ashly Lynn was harder to impress.

> As far as the SSS are concerned, I think it was just a who wants to do it kind of thing...Some presenters were much better than others…I don't know if [NMSI supervisors] even watched them teach ever. Because there were so many of them that were really, well, we Middle Georgia system teachers would have done a better job. A couple of times we were like "should we kick them out and take over?"

Theme 5

Theme 5 is labeled "Teachers of Advanced Placement see value in colleague mentoring." This theme relates to RQ1 and RQ3. Even though as Ashley Lynn mentioned, "there were rumblings [of a mentoring program] near the end of NMSI presence," not much came of a formal offering for mentorship. However, the interview data relates to the development of content teams, purposefully and due to proximity, that served as some form of mentoring during the implementation; this therefore appertains to RQ1. The data also relates to RQ3 because if aspects of the reform are being sustained, it is likely being done through the practices, approaches, curriculum, and mindset being passed from those teachers who were involved to those now in charge of teaching Advanced Placement.

One of the leading factors in teacher retention is teacher preparedness (Hughes, 2012). While some may suggest that higher pay will equal happier teachers and therefore keep them in the profession longer, research suggests that teachers leave the profession for reasons aside the pay (Goodman & Turner, 2010). One cited reason for a lack of teacher retention is teachers of five years or less of experience not feeling supported by colleagues. As Rachel explained "no one wants to take on a new course and feel like they are adrift alone, that they are existing on this island without any hope of rescue." Not only do mentors provide these lifelines in the form of resources, strategies, and other feedback, but they quickly become the emotional support many teachers need (Hughes, 2012). Mentors should not be only considered for those straight out of college, but for all who enter the profession for the first time. If a teacher moves from one curriculum to another, it may be beneficial to have a support system such as mentoring. If a teacher moves into another field—from English to Math for example—or from teaching to administration, a mentor may be beneficial (Hargreaves, 2004). The AP teachers interviewed for the purposes of this study commented on this desire for having good mentors in the teaching profession.

Rachel described how

> It's like I had said before; teachers come into this profession ill-prepared often times. I was. The theory of how something should be done is different than doing it. A mentor is there for that dose of reality—that real-world application explanation.

Labrock commented

> I really appreciate getting feedback from other teachers. . . . Someone who has been there and done that. It's got to be someone who's been there before and taught the same sort of thing and has seen the challenges you're going to face and sort of encourage you through them.

Lauren explained

> A mentor has to be someone who has strengths in several different areas. They have to sort of have the whole package. They need to be able to manage this job…Teaching is a profession. So like medicine, you got into medicine with a lot of expectations and the reality can be very jarring and very discouraging. Education is the same thing, and so when you go into this job, it is not a job you leave. It is not a job that you do because you have to get a paycheck. It is a job you have emotionally invested in.

The four participants recalled that a formal mentoring program developed by NMSI may have existed, but it was not promoted or implemented at MGCHS.

Lauren shared

> I just, I don't remember it being spoke of too much. I didn't participate in the mentoring program, but I think some in the district did. . . Not through NMSI. Another AP teacher at another school heard that we had someone new for either Lit or Lang and said they were available to mentor that teacher, but I'm unsure if that was NMSI or just a helpful teacher serving a need.

Rachel did develop a relationship with an NMSI presenter, and acknowledged it as a mentoring experience, but did not see it as a formal part of the NMSI reform. She commented "She was always there on email, always there at the trainings and different things. . . . I didn't see her as a mentor, more as an awesome resource." In regards to mentoring opportunities, Ashley Lynn explained "They kind of mentioned it in passing and we never heard anything. We kind of did it on our own because we had networked with all these people." Labrock mentioned "I was not in any formal NMSI mentoring. I can't remember being a part of that, or even if it was an option." Mentoring for teachers accepting a new subject, especially one that is more rigorous by nature, these participants believe should be afforded.

Rachel explained

> I didn't have a formal mentor for AP, but it would have been nice. I had to reach out to the other teachers in my district, and to NMSI presenters for a bunch of help that first couple years. We also had another inexperienced AP Language teacher. Neither of us had a mentor.

Ashley Lynn described how

> I think having a mentor, even for AP teachers, is critical. I really do. And it doesn't even really have to be a mentor in the same subject. It needs to be emotional and physical support, and just a way of saying "you're going to be okay." Even experienced teachers, navigating new territory such as a new subject, need this. . . . The first five years of AP are pure hell. Even if

> you have other people you can talk to. . . . I think it's imperative that new AP teachers have AP mentors.

Labrock reflected

> When I first started teaching Calculus I was pretty cocky because I taught it at the college-level. The AP exam though has different expectations than a college curriculum. I guess I needed someone to bring me down to Earth, to let me know that I wasn't going to be perfect, but I could be good enough. I would have liked to have an AP mentor teacher.

Lauren asserted

> Oh, gosh, it should be a law honestly. I've done mentoring. I was mentored by lots of different people. I have done mentoring in the past and I'm actually doing it now. . . . I needed it when I switched from AP Lit to AP Lang. For Lang, I've had an awesome group of people supporting me and who are just very open and very willing to help, and that's been a lifesaver for me. It's not formal; I don't call them mentors. But they are mentoring me.

Theme 6

Theme 6 is labeled "financial incentives are enjoyed, but may not lead to more effective teaching." This theme relates to RQ1 and RQ2. The analyzed data thus relates to how the participants viewed bonuses received for performance, and how that may have been impacted by the teaching environment. Ballou (2001) and Figlio and Kenny (2007) both argued that while performance pay could be offered in many different forms, the

results are often mixed. While some pay-for-performance plans may lead to an impact on student development, Ballou and Podgursky (1993) found that most systems end up impacting the working relationships of those eligible for incentives, rather than the students. Future studies should continue, in order to more closely examine the impact that different pay systems have on the teachers and students (Ballou, 2001; Ballou & Podgursky, 1993; Figilio & Kenny, 2007; Goodman & Turner, 2010; Gratz, 2009).

The NMSI grant has offered teacher incentives in the form of bonuses for student performance on the exam and for attending professional learning events. An aspect of this study has been to glean from the four participants individual experiences in being offered these bonus opportunities. Three participants made comments that they appreciated the opportunity to earn extra money. Labrock stated "The financial incentive was nice. It gave me money to take my family on a nice vacation, or to purchase things that I wanted but could not normally afford."

Ashley Lynn reflected

> It was great that somebody finally said, "Hey, good job. Here's a massive check. Go spend it on things you would never be able to afford." That's what NMSI came in and did that made it so awesome because it let every teacher know: Hey we see you. We appreciate what you're doing and we're going to help you as much as we can, at least for three years.

Rachel explained

> Yeah, it was nice. Especially at the number of students that we had enter the program. I sent a hundred and fifty kids to take the test. I mean, you're looking at a pretty hefty outcome from the incentives, so it was nice.

Lauren mentioned "I was very thankful to be given the extra money because it was a lot of extra time." If not equitable to all and implemented systemically, a performance pay system may impact the teaching environment, leading to undesired results (Gratz, 2009). The four participants described a downfall of the financial incentive.

Labrock described

> It's uncomfortable to know you, or others, are receiving bonuses while much of the faculty is not. That created some frictions, especially from the AP History teachers.

Rachel mentioned "Oh, they ([non-NMSI teachers]) knew it too. And so, I mean, there were always comments about it." Ashley Lynn explained "I wish we could have done more for the History teachers, because that really, really bothered me that they didn't get anything, really, their way."

Lauren stated

> I'm sure I probably heard a few snarky comments about it, such as "oh, so-and-so gets the hundred dollars. . . ." History teachers were pretty bitter. Pretty bitter. Not at us. At not being included. I really didn't feel much of it from other content teachers. I'm sure there were some grumblings, but no push back like we witnessed with the History teachers.

Possibly contributing to this perception, was the public displaying of the incentives earned. When first implemented, NMSI and the district publicized earnings of each teacher involved in the NMSI reform. This, as two participants acknowledged, led to some uncomfortable situations.

Labrock explained

> I do remember them publicizing the bonus earnings by teacher during our yearly convocation. Everyone in the district knew our scores and the money we were being paid for them. I remember thinking, Uhhhhhh, I don't know about this, not sure I liked having that out there.

Lauren described how "Publishing the information publicly was awkward for us teachers. It's ok to put out there our pass rate, but monetary earnings certainly causes some hurt feelings." Ultimately, what reformers, districts, administrators, teachers, and all stakeholders want to better understand is whether or not the teachers felt being offered monetary bonuses led to more effective teaching. Three participants claimed that while the incentives were nice, they did not see it as having changed their rigor or investment in teaching, or motivated them to teach differently.

Rachel explained

> I do not think that really motivated me as much in the grand scheme of things. I was more excited about getting those kids who didn't have the opportunity to a point where they were better writers. So even if they didn't score a passing score on the exam, we felt good. If they didn't pass, I didn't get the $100, but I still felt like we were successful…But I'm not

> sure that it really necessarily affected what I did in the classroom. I didn't think, "if I get more students to pass this test, then I'll get more money." So, while the incentive was nice, it didn't drive what I did in the classroom.

Ashley Lynn described how

> I used to call the students Benjamins, because it was like, yeah, you're my hundred dollar bill. But that really didn't motivate me. I was already doing most of what they were asking me to do. . . . I would have done it anyways.

Labrock mentioned, "Um, I don't know [if it influenced my teaching]. Maybe just a little bit. You were motivated a little bit to get the check. A little bit, yeah. Maybe." Lauren, however, did comment on how the financial incentive served as an external motivator for her:

> I don't know that money is not going to motivate anyone. I think money is certainly a motivator because it's the world we live in. I know it certainly motivated kids. . . . [And for me personally], I think it was a great motivator. I think it was a great thing. I certainly as a teacher found it motivating. . . . The concept of increasing student performance wasn't new to me, but the concept of being compensated for it was new. And it was a great motivator because I felt like it was a validation of what I was already doing…I think I worked harder at being a better teacher because I knew it'd result in more money.

Theme 7

Theme 7 is labeled "Some aspects of the NMSI reform may be sustainable." Data from the study is indicative of the sustainable nature of the NMSI reform once the financial backing and administrative oversight had been removed. This theme relates to RQ2, because participants spoke to how school environment has or has not led to continuing aspects of the reform. This theme also relates to RQ3 as it relates to which aspects of the reform have been sustainable for this school site.

Sustaining a reform entails that those responsible for initial implementation have continued to use or implement aspects of the reform (Hall & Hord, 2006). This can be the sustaining of an instructional approach, use of curriculum and materials, a shift in organizational structure and protocols, an intentional change in the physical environment, a shift in pedagogy, or a change in perceptions or expectations.

Financial Incentives

The financial incentive that was offered to the students ($100 for a qualifying score on the exam) was a great opportunity to celebrate the students for taking on the challenge of Advanced Placement. Each September, during the stage of implementation and oversight (2013-2016), NMSI representatives would travel to the school site and host an assembly. Parents, teachers, administrators, stakeholders, and the students being honored were all invited to witness the students receiving their checks.

Rachel explained "This was a point of celebration that put AP courses out there and acknowledged how proud all should be of the work it takes to pass these exams." In

addition to the financial incentive of earning a qualifying score, NMSI also paid for all students to take the exam, which as of 2019 costs $97 for each test.

These incentives proved to be too pricy for the district and MGCHS to continue to offer. Once the grant supervision and funding had ended, students again had to pay full price (with exception of Free and Reduced Lunch students) for each exam. Likewise, all financial awards for earning a qualifying score, for both student and teacher, were ended. All other monetary incentives for teachers also ended.

Time on task

According to Hattie (2009), a most influential factor in a student's academic growth is the teacher. Not much further down the list of importance is providing more time on task (Hattie, 2009). NMSI representatives responsible for overseeing implementation emphasized this point through some design aspects of the reform. Participating teachers were expected to provide additional learning opportunities—at a minimum of one hour per week—and host three SSS, for each AP course taught in the areas of English, math, and science. The SSS were each four hours in length, and focused on student preparation for the exam. SSS were planned and organized by the district and school sites, but were instructed by presenters hired and sent by NMSI. Some attempt was made to continue these sessions, but teachers and administrators of the district found it difficult to offset the financial burden.

Ashley Lynn described how

> We had decided, and tried it once afterwards; to run our own. And it was ok, but I think that it's better for you to review with your own kids. . . .

> [More recently] Chemistry talked about doing it, and when we polled our kids, my students said no. The thing is, there is no—I'm not going to buy pizza for everybody there you know? None of the gift cards. So there is no incentive for them to go. And they are not incentivized by the score.

A couple participants acknowledged that there still is an offer of additional time on task. However, Lauren explained that she treats that time like office hours, in which students can drop by with questions. She stated "Not too many students show up, and it is rarely a drill and skill type session, more of a conversation."

Ashley Lynn explained

> I offer night classes one time per week. And I did that because of their required face time with them. But, I did it to some degree before NMSI. I am still doing it now, a few years after NMSI.

To provide more time on task during implementation and in the years now after, MGCHS does not allow the mock exam to be administered during the school day. This was a request of NMSI. I know not all schools implemented this, as Wolverine High (another high school of the Middle Georgia school system) still chose to administer the AP mock exams during the school day. Requiring the exam to be given outside of the school day may eliminate the loss of class time for this practice.

A benefit of this, Labrock explained:

> When the mock must be given, students may not have gotten everything they need to know by then. So they won't take the entire time and there could be more efficient ways to use that time. And then I have gotten them

> after school, and it's giving me three hours with them; time in which I wouldn't have to go over problems or work through or do that sort of thing, like we do in class. . . . It's more time on task. Like, number one indicator of success is time on task. Kids do more problems, they are more successful. Period.

MGCHS, as of Fall 2019, is involved in implementing another reform known as the Professional Learning Communities movement. This reform entails that teachers develop plans to provide students opportunities for more time on task during the school day. Labrock explained "I offer tutoring for sure, but now we do it during the Academic Opportunity time during the school day."

Rachel stated

> We offer more time on task now that we have the Academic Opportunity time. Students must show for that. Time outside of the school day can be wasted, because not many students show. I don't do much before, after, or on a Saturday tutoring anymore.

These comments do convey a commitment to providing more time on task, but at the same time reflect a lack of sustaining more time on task out of the normal school operating hours, which was an aspect of the NMSI reform.

Collaborative planning and learning

If teachers are such an influential factor in a child's education, then it is logical that much effort, time, and resources should be afforded for the training of educators (Abbott & Fischer, 2011). Teacher participants of this study have indicated that the best professional

learning is that which is timely and applicable. All four participants spoke to the collaborative planning opportunities as professional learning, and how that has continued since the removal of NMSI.

Ashley Lynn described how

> Some of my fondest recollections of NMSI is of us working with other teachers. It led to some great collaboration and professional growth. We are still getting together formally, something we kept doing well after it was introduced as an expectation by NMSI.

Labrock explained

> There is working with the other teachers in the district, which is great! We email back and forth on occasion and we get together for that one planning day. . . . Even now that NMSI is gone, we host our own reading.

Rachel commented

> I think that's one thing that NMSI did, was brought the entire district together and not just an individual school. So instead of there being competition, which can cause rifts in relationships and things between schools, there was an increase in that collaboration. NMSI did that. We still have that.

Lauren claimed

> NMSI prioritized meeting across the district. Because almost everyone teaches AP as a onesie. I mean, they're a one-person PLC, which is

> miserable. They prioritized and required that we meet and that we build, you know, somewhat of a pacing schedule and that we do the mock exam.

All four participants discussed having worked with teachers from other systems while attending training provided by NMSI; however, Ashley Lynn mentioned those relationships fell away once NMSI had pulled support.

> We were all teaming up with each other and kept in contact with people from South Carolina and other areas, but not anymore. I think after a year or two, then everybody just went their own way again. I imagine that is typical of most schools involved with NMSI.

While some of the teacher relationships have changed because of distance, teacher migration, and lost points of contact, all four participants spoke to the two collaborative events held by the district each school year. The first event is a collaborative planning day to prepare for the school year—typically takes place in September—and the second is the delivery and scoring of the mock exams, which typically takes place in April. I can personally confirm, as an employee of the system, that these two pull-out opportunities were not afforded to the AP teachers of this district until the implementation of NMSI, and now it looks to be an aspect of the reform that will likely be sustained for years to come.

Resources

Each participating NMSI teacher received a yearly allotment to purchase resources and materials related to their AP subject. Participants of this study spoke to what they purchased with this money, and whether or not those resources were leveraged

for years to follow. In addition, NMSI gave materials in the form of curricula, worksheet templates, online platforms, videos, and contact with other professionals.

Rachel explained

> We were told we would have access to their online stuff for years after the grant. I attempted to login a year later and was unable to. I don't know why, and I didn't reach out to verify.

Lauren described how

> We were supposed to have access to the NMSI site up to a certain time period, and I've not accessed it recently, probably in the past two years. But for the first year after that, yeah I could.

Some of the savvy participants could see the looming likelihood of access to these materials eventually being restricted, so they grabbed as much as they could, while they could.

Ashley Lynn described how

> I kept those Saturday session materials. They wrote these super problems, which would be a math problem that started with a concept from the beginning of the chapter and they would run through every little twist and turn from the chapter in the end, so you have this giant problem that related all of the chapter together. These are gems; I still use them right before the exam.

Rachel explained how she gathered as many resources as she could, and how they have come to influence her teaching.

> Another teacher and I that worked together, as NMSI was leaving, we pulled everything [from the website]. Like everything we could find, see, whatever that's even associated with NMSI, we pulled it to a hard drive. . . Not that I actually go and pull those documents out all the time, but I think there's a sense of internalizing how those documents are created. And it's just like the grading. Once you see how it's done, once you become a part of how it's done, it's kind of hard to set that aside.

Lauren explained how she uses materials purchased with the NMSI classroom resources allotment.

> I got some scaffolding practice workbooks that were suggested during some of the summer training. I got myself some teacher materials. And even though I'm no longer teaching Lit and now teaching Lang, I still often use these purchased resources.

Labrock also has continued to use NMSI materials in his instruction. He explained

> I mean the test that I just gave out—they modeled how to create that test, so it looks like the AP exam. This is the one I just gave out in class. It uses secure material that has been scaled down some. I learned how to do that in NMSI trainings.

Ashley Lynn stated

> We have a strong Facebook page. It's not a NMSI page, it's an AP Chemistry page. And it's interesting because sometimes even the NMSI stuff is getting suggested, so that stuff is still very much alive…And it's

> funny because even if I didn't have the link to NMSI pages, teachers are sharing it on the Facebook page. They're sharing the password! So, whether they like it or not, it's being shared.

Labrock also has recently had a similar experience related to Facebook and NMSI. "People will post very good materials there, and some of the stuff that I've seen has come from NMSI."

Open-enrollment

As discussed in Chapter One, a focus of the NMSI reform is to encourage more students, especially those of underrepresented populations, to participate in Advanced Placement courses. NMSI has offered description of open-enrollment as an equitable opportunity to enter Advanced Placement courses (National Math and Science Initiative, 2015). Schools and districts accepting the conditions of the NMSI reform were expected to amend any policies that might limit student opportunities, outside of some restrictions related to prerequisite courses.

Ashley Lynn explained "It opened up these doors. That's probably the most important thing that happened. My course almost doubled. And it's still high."

Lauren agreed, having stated

> I just think it was a huge mindset change. Culture change. You know, you don't realize the way you think about something until someone else is like, maybe you should think about it this way. NMSI opened doors that have stayed opened.

In order for more students to have the opportunity to take AP Language and Composition, NMSI suggested this course be blended with the curriculum of American Literature. The district adopted this policy, which because of the difference in gifted pathway versus the college-ready pathway, now made it possible for more students to participate. Rachel explained how this impacted the total number of program participants. "The first year, when we combined American Lit and Lang, we went from let's say fifty students total, to two hundred students total."

Rachel further described how the nature of the gifted program has been a sustained change as a result of NMSI implementation.

> We had a change in our program, that's evident as soon as you walk in the door. It changed the way all of our gifted classes work. So, you know, you don't have to just be designated gifted to be in gifted. I think it also prompted a lot more teachers to become gifted certified, and so we saw an influx of people getting certified in order to meet the needs of now having almost the same amount of kids in gifted that we do in regular classes. So I think that is one of the effects remaining from the increase in number of students that we allow into AP courses as well.

Labrock has been the only AP Calculus teacher for MGCHS during implementation, and ever since the removal of NMSI support. He explained the impact to enrollment for this course.

> Yeah, it's very consistent. I mean, [in 2019] we are supposed to see another increase in kids taking the course. We saw the course grow some

> with NMSI supports in place, and since we haven't seen much of a reduction.

Perception of the AP Student

The Middle Georgia school system traditionally had in place a graduation track for students considered honors and a college-ready graduation track. As explained in Chapter One, NMSI required changes to course alignment, in order to provide opportunities to underrepresented populations. This changed the perception of what an AP student is for all four participants. These four participants explained how this reform brought about a change in perception that has been sustained after the removal of NMSI support.

Ashley Lynn explained

> I think that's almost like a permanent thing because we took away the application. We took away the stigma of these being incredibly difficult courses only for the gifted. . . . Non-gifted kids are smart too, and they can do it. . . . That's a permanent plus to me.

Lauren commented

> Removal of the sacred temple for sure. . . . I probably alluded to this, but I cannot talk enough about the perception change of what NMSI did for parents and for students, and for teachers that your kid can do it. Like, you can do it. You can do it. . . NMSI really made us think about and look at equity and what we thought we were doing versus what was actually happening.

Labrock exclaimed “The best thing we did was change our thinking on who is quote, unquote an AP student! We opened the doors to all who wanted a shot.”

Expectation of the AP Teacher

Once again, if the teacher is the most impactful presence leading to student success, then to change the expectations we have for students will likely begin with a change in expectations we have for teachers. The participants spoke to how NMSI required more accountability from the AP teacher. Accountability measures, such as conversations with the Assistant Principal of Instruction (the APIs then spoke with NMSI reformers to report progress of students and teachers), collaborative and intentional planning, and progression measures such as scaffolding instruction, were put in place at the request of NMSI. As a result, the participants shared a perception that teacher accountability, for student progress, at MGCHS was raised. This, as Ashley Lynn briefly commented, led to “a change in how we had to speak of the course. We had to prove what we were doing was effective. That wasn’t always the case.”

Lauren described

> A much higher notion of teacher accountability and examination. Because if you don’t teach a standardize-tested course, you tend to lose the sight of accountability because there’s not much measure and nobody really looked at AP scores, quite frankly. . . . There certainly wasn’t nearly the expectation on the AP teacher to do anything more than expect kids to rise on up. So, I think, has definitely been sustained.

Labrock commented

> We definitely had to discuss our scores more openly. We had to get better because of the training that was offered. We had to participate. I'm not saying those were not expectations before NMSI, but it felt more real during, and now after NMSI.

Rachel mentioned

> We've always been held to a higher standard here, but what I think changed was how we AP teachers were expected to work with kids of all abilities, the same as regular education teachers. Not that this is some newfound thought or anything, but policies that were in place made it such that there was not as much accountability for AP teachers when working with lower-achieving students.

Implications for Practice

The experience of four participants involved in implementing and sustaining the NMSI reform was examined for this study. Using the resultant data, implications for practice—implementation and sustainability—will be presented in this section. These implications relate primarily to the National Math and Science Initiative reform, and for schools considering implementation. However, implications of practice for implementing any similar top-down reform will also be presented.

Many researchers have conducted empirical studies examining the effects of performance-based pay systems (Goodman & Turner, 2010; Gratz, 2009; Perez, 2011; Podgursky & Springer, 2007; Springer et al., 2010; Winters et al., 2009). These

researchers have all concluded that more research into these pay systems should continue. The reality is that the teaching profession is losing qualified candidates at an alarming rate (Ravitch, 2010). As society looks to find solutions to a growing trend in education—nearly 50% of teachers leaving the field within the first 5 years of entering the profession—higher pay will continue to be a consideration (Perez, 2011).

While the sample size for this study is considered small, with a focus being on the individual experiences of four high school Advanced Placement teachers, it has revealed a perception, similar to other studies, that suggests paying teachers for performance will not lead to better teaching. The teachers involved in this study expressed an appreciation for the financial incentives offered. All participants celebrated this as being a nice gesture and one they were very thankful to have been afforded. However, when asked of whether or not they believe the financial incentive led to more effective teaching, none could answer with a definite yes. Likewise, when asked if the financial incentive encouraged them to invest more time and energy into the work of being a teacher, they agreed that it did not necessarily have that result. In fact, Labrock and Ashley Lynn spoke to the fact that the incentive may have led to decision-making not advantageous to all students. They explained that some students who were not prepared to be successful may have been encouraged to take an AP exam; however, because there was a chance of earning a financial incentive for the passing score, the teacher strongly encouraged participation. Ashley Lynn and Labrock believed this may have a negative emotional impact on the student.

Participants' descriptions of their experiences in implementing the reform were analyzed to identify this theme: "Financial incentives are enjoyed, but may not lead to more effective teaching." This theme may warrant consideration for how NMSI reform grant funding should be allocated in the future. The respondents spoke of their gratitude in having received the bonus, but also acknowledged that extra money for teaching resources, rather than personal payment, would have been welcomed.

What is especially noteworthy for consideration of any reform that offers performance pay is the impact to relationships amongst colleagues. Ballou and Podgursky (1993), Ballou (2001), and Figlio and Kenny (2007) have cautioned that performance-pay systems can lead to animosity amongst faculty and staff. Ballou (2001) cautioned that institutions should consider the climate of the institution prior to implementing any pay-for-performance system. Ballou (2001) also recommended that more studies of performance pay systems be done, as the differences amongst institutions, the continued evolution of these pay systems, and our understanding of implementation have continued to evolve, warranting a continued need for more and newer studies. Any reform that includes a pay-for-performance system should seriously consider first the impact it may have on the teaching climate, especially if the offerings of incentives are not systemic.

Muhammad and Dufour (2009) spoke to this idea in raising concerns of how reforms should be introduced. They specifically mentioned the idea of resisters, and the dissent they may cause during implementation. Muhammad and Dufour (2009) explained that resisters often come from those that may not understand why there is a

need for change, why they are targeted for change, or in the case of this reform, why they have not been included in the change. Hall and Hord (2006) referred to this as the difference between the haves and have-nots. The haves are offered the financial incentives and required to implement change; the have-nots are not offered the incentives and are not required to participate in implementing change.

The NMSI reform is not a systemic reform, as it did not include even all Advanced Placement subjects, let alone all subjects taught in the institution. Therefore, there were pockets of teachers not involved, and pockets of teachers within MGCHS that may have been unaware of the reform. Offering new pay systems may be attractive because of their relation to the private sector; i.e., opportunities to earn more money for the more work one does. Districts and schools may be enticed by the idea that more pay will result in higher student achievement and attract more teachers (Fryer, 2011). However, this type of reform may also lead to teacher unhappiness and dissension among the faculty, and therefore should be considered with much caution.

Future Research

Performance Pay

Ballou (2001) and Fullan (2011) have recommended that more studies of performance pay systems continue, as the differences amongst institutions, the continued evolution of these pay systems, and our understanding of implementation have continued to evolve. Any system considering a reform that includes a pay-for-performance system should seriously consider first the impact it may have on the teaching climate, especially if the offerings of incentives are not systemic. With more and more pressure being put on

public education to accept practices of the private sector, such as paying wages based on successful delivery of a product or service, it is important to continue to critically assess the impact these new approaches may have on all stakeholders.

All four participants indicated that there were some hurt feelings experienced during the implementation as a result of some being able to receive financial incentives, due to the subject they taught, and others not having that opportunity. Outside of the scope of this research was the experience of teachers who do not instruct AP courses in the areas of math, science, and English. Empirical research into the experiences and perceptions of non-NMSI participants, during the implementation and sustainability periods of the reform, should be performed so that we may glean a better idea of the holistic impact this reform may have on the teaching faculty of an institution.

Sustainability

The difficulty with studying sustainability efforts of any reform has much to do with time limitations. It is difficult to determine when a reform has reached the point of becoming sustainable, and then impossible to predict from that point if it shall remain sustainable (Datnow, 2005). Most researchers are unable to afford the time and resources necessary to conduct a study in which the sustainability for a reform is examined (Hargreaves & Goodson, 2006). This study included a time-frame ranging from the introduction of the reform through the three years after reform oversight had concluded (period of sustainability). A limitation of the study is the relatively short time-frame of the sustainability period.

This study provided an opportunity to examine what efforts the district and school administration, along with AP math, science, and English teachers, had taken to continue the initiative. The findings from the resultant data were discussed as having shown some aspects of the reform being sustained, while other aspects—such as the Student Saturday Study sessions—had been halted. A question remaining then is how much of the reform will still exist for this institution, say in another three years; or, whether it will continue to be presented as the "way of doing things" to the teachers replacing those that exit for another institution or retirement. Also, all institutional climates differ, so it is difficult to conclude that aspects of a reform that have been sustained at MGCHS are likely to be sustained in another institution. To further validate the chances of sustainability, more studies into this reform at other institutions and districts sharing similarities to the Middle Georgia school system should be performed.

There are many more schools now, compared with when I had begun this study, that have implemented the NMSI reform (National Math and Science Initiative, 2018). Likewise, some schools and districts are now further into periods of sustainability, affording researchers an opportunity to continue examining what level of sustaining the initiative is taking place. More studies into the sustainability of the National Math and Science Initiative, due to the limitations of this study regarding time passed, are warranted.

The perception of non-AP teachers

The focus of this study was to examine how four teachers involved with the implementation of a National Math and Science Initiative reform navigated the

implementation and perceived the sustainability of reform aspects. Therefore, the nature of this study was focused on the experiences of those most involved with the reform. That being said, there is considerable previous research suggests for a reform to be sustainable, it should be introduced and implemented systemically (Baete & Hochbein, 2014; Hall & Hord, 2006; Ravitch, 2000). Likewise, a reform not intended to impact other areas of an institution may have undesired effects. For example, Ballou and Podgursky (1993) found that when a performance pay system was introduced, it had the desired effect of raising academic scores in the short run, but also hurt the faculty morale. The pay system created an unhealthy competition demotivated employees (Ballou & Podgursky, 1993). A system put in place to better motivate a pocket of teachers had an unintended, adverse effect on motivation for those not targeted by the reform. This study should serve as a glimpse into the possibility of others to come. All four participants of this study acknowledged that they experienced some discomfort amongst colleagues as a result of implementing the National Math and Science Initiative. This study therefore should be encouragement for future researchers to consider the impact implementation may have on all of the teaching faculty.

Conclusion

The four participants observed and interviewed for this study all mentioned that they had not known of the reform prior to introduction by the district administrators. They acknowledged being skeptical at first, but once data from institutions similar to Middle Georgia Central High that had implemented the National Math and Science Initiative were shared, they bought in and implemented with a high level of fidelity. The

reform has been considered a success by the participants of this study. This reform is promising in the way that advocates inclusion of all students capable of learning at a high level. The teachers involved in this study perceived the NMSI reform as having a positive influence on student achievement. However, there were shortcomings along the way and there have been lessons learned. For example, the performance pay aspect of the reform seemed to cause some contention amongst the faculty. The lack of inclusion in this reform may have led to some unintended consequences, investigation of which is outside the scope of this study. The most powerful understanding to come out of this study was the perceived change in the culture, in how teachers and administrators select students for AP courses. All four participants spoke of a lasting impact the NMSI reform had on the way they go about encouraging participation of all students in Advanced Placement courses. Structures that were previously in place, such as course sequencing, once had unintended consequences of limiting, or even eliminating a student's opportunity to take AP courses, have been removed or changed. As a result, the participants of this study have conveyed a message that the AP program of MGCHS is now inclusive of all students, and that change in mindset has changed none since the removal of NMSI supervision.

The findings from this study contribute to the literature in the way they illustrate how top-down reforms can be introduced and implemented in high-performing high school. Likewise, efforts for sustaining reforms in this school have been described in the resultant data. However, this study raises many questions concerning this type of reform, such as equity issues, changes in school climate, the impact of performance pay systems,

and approaches to teacher professional learning. This study hopefully lays the groundwork for future studies of the National Math and Science Initiative, performance pay systems, and reform introduction, implementation, and sustainability efforts.

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APPENDIX A

Study Permissions

Principal:

I am an English Teacher at Veterans High School. I am currently researching the National Math and Science Initiative (NMSI) implementation strategies and the perceived effect such implementation had on select teaching faculty in preparation for writing my dissertation at Valdosta State University. I would like to ask your assistance by allowing me to interview and observe content-area teachers who have been privy to the implementation of the above-mentioned education reform.

STEM initiatives are undoubtedly driving many of the choices made in education as of late. For this reason many education reform initiatives have been and will be implemented at the school, district, and state level in an attempt to lessen the "gap" research illustrates exists in the STEM fields of study. These initiatives provide school systems and researchers a unique opportunity to study implementing strategies and protocols, and what choices—if any—have led to a change in the teaching. My goal is to research the experiences of select Advanced Placement teachers who participated in implementing the NMSI top-down reform. This information will be used to better my understanding of implementation of NMSI and the sustainability of the initiative. With that better understanding, this study may add to the existing literature on reform implementation and likelihood of long-term sustainability for reforms of this nature.

With this I plan to tell their stories of experience in the final presentation of collected data. Houston County High School will be the case site, but two other levels of study will be included (NMSI organization and Houston County School District). I will collect data through interviewing and observing teachers teaching. I will also collect artifacts from the NMSI organization and school district. I am expecting to collect data beginning in fall of 2018. I will collect no data until your approval has been received from Houston County and the Valdosta State University Institutional Review Board.

First, I need permission to conduct research at your high school. I will interview selected teachers two times for approximately 90 minutes each time. I would like to conduct the interviews in the teacher's classroom or the media center conference room. Interviews are to happen during the fall of 2018 and/or spring of 2019. Additionally, I would like permission to observe a single class session of each participant teaching. I will conduct these observations in person. I will not include students in any portion of this study. I will use pseudonyms for the county, school, and participants.

If you approve the proposed research, I will need the letter of approval (attached) signed and returned to me. The Assistant Principal of Instruction for Middle Georgia High School and the district coordinator for Gifted Education, will also play an integral role in data collection.

I appreciate your time and attention to this matter. If you have any questions, concerns, or thoughts, please call me at (478) 972-4722 or email me at ikethompson@ikethompson.com or icthompson@valdosta.edu.

District Approval

DATE: November 5, 2018
TO: Ike Thompson
Wolverine High School
FROM: Karen Score
Director of Professional Learning
SUBJECT: RESEARCH APPROVAL REQUEST

Your request to conduct research for your graduate program at Valdosta State University is approved. The purpose of your study, "A Qualitative Study of the Teacher Experiences During Implementation and Sustainability of the National Math and Science Reform Initiative in a Middle Georgia High School", will be to determine the perceived effects of the implementation of the National Math and Science Initiative (NMSI) on select teaching faculty. The timeframe for this research study is one year from the date of system approval.

Thank you for submitting your IRB, proposal, interview questions, and the principal approval letters.

Please keep in mind that you will be responsible for compiling the data for your research. The staff at Wolverine High School, Middle Georgia Central High School, and the Departments of Assessment & Accountability and Technology Services is unable to compile data for your research. Board policy also prohibits the use of system email for personal research. Please also remember student and teacher anonymity is of utmost priority for this research project.

I have attached to this approval e-mail the Middle Georgia Schools Requirements for Conducting Research.

I wish you the best as you work toward earning your graduate degree. Please let me know if I may be of any assistance to you again in the future.

Valdosta State University IRB Approval

Institutional Review Board (IRB)
For the Protection of Human Research Participants

PROTOCOL EXEMPTION REPORT

Protocol Number:	03728-2018	**Investigator:**	Ike Thompson
		Supervising Faculty:	Dr. Lars Leader
PROJECT TITLE:	*An Interpretative Phenomenological Study of Teacher Experience during the Implementation and Initial Sustainability of the National Math and Science Reform Initiative of a Middle Georgia High School.*		

INSTITUTIONAL REVIEW BOARD DETERMINATION:

This research protocol is **Exempt** from Institutional Review Board (IRB) oversight under Exemption **Category 2**. Your research study may begin immediately. If the nature of the research project changes such that exemption criteria may no longer apply, please consult with the IRB Administrator (irb@valdosta.edu) before continuing your research.

ADDITIONAL COMMENTS:

- *Upon completion of this research study all data (transcripts, data lists, email list, pseudonym lists, etc.) must be securely maintained (locked file cabinet, password protected computer, etc.) and accessible only by the researcher for a minimum of 3 years. * Pseudonym & name lists are to be kept in separate files in an effort to maintain participant anonymity.*
- *The researcher must read aloud the Research Statement to participants at the start of each audio/video recording and documented in the transcript as having done so.*
- *Exempt protocol guidelines **prohibit** the collection, storage, and/or sharing of audio (or video) recordings. Interview/observation recordings must be transcribed and immediately deleted from the recording device.*

If this box is checked, please submit any documents you revise to the IRB Administrator at irb@valdosta.edu to ensure an updated record of your exemption.

Elizabeth Ann Olphie 12.06.2018

Elizabeth Ann Olphie, IRB Administrator

Thank you for submitting an IRB application.

Please direct questions to irb@valdosta.edu or 229-253-2947.

APPENDIX B

Observation Instrument

Researcher:
Researcher goals:
Researcher thoughts and initial reactions:
Participant Name (pseudonym):
Date:
Time of observation:
Duration of observation:
Location of observation:

Space

Classroom location:
Desk configuration
(researcher will take picture of classroom and then draft a diagram)
Teacher center:
Wall décor:
Furniture:
Other:

Actors
Who, where, when

Students
Number:
Demographics (gifted vs non gifted, race, gender):
Location of students during observation:

I. Time:
II. Time:
III. Time:
IV. Time:

Student Engagement:

1.
2.
3.
4.

Participant--Teacher

Event
Focused on the act taking place, not the actors performing the action

Teacher led or student led

1. Time:
2. Time:
3. Time:
4. Time:

Whole group presentation:
Document distribution:
(NMSI materials if applicable)
Use of technology:
Small group instruction:
(participation of what actors)
Facilitation:
(activity during facilitation)

Goals

Preconference, Planning Agenda, Essential Question

Teacher goals:

1.

Student goals:

1.

Shared goals:

1.

Were goals announced? How? When?

Feelings

Reactions expressed by participant (preconference)

Observations and reactions of researcher

Immediately following observation of participant

Preconference

1. Date for observation:
2. Location (in classroom or alternative, like Media Center):
3. Course: Class period: Number of students:
   Gifted: Not gifted: Male: Female:

4. Teacher (participant) will be doing _____ during observation:
5. Students will likely be doing _____ during observation:

6. Learning objectives/standards addressed by instruction to take place during the observation: 9

7. Concerns of the researcher's presence and/or expectations for researcher during observation.

APPENDIX C

Semi-structured Interview Instrument

Interview One: Semi-Structured Guide

You are being asked to participate in an interview as part of a research study entitled "An Interpretative Phenomenological Study of Teacher Experience during the Implementation and Initial Sustainability of the National Math and Science Reform Initiative of a Middle Georgia High School", which is being conducted by Ike Thompson, a doctoral student at Valdosta State University. The purpose of this study is to examine teachers' perspectives regarding the practices of implementing the National Math and Science Initiative, and the likelihood of sustainability not that supervision for the initiative has been pulled from the school site. The interviews will be audio taped in order to accurately capture your concerns, opinions, and ideas. Once the recordings have been transcribed, the tapes will be destroyed. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may choose not to participate, to stop responding at any time, or to skip any questions that you do not want to answer. You must be at least 18 years of age to participate in this study. Your participation in the interview will serve as your voluntary agreement to participate in this research project and your certification that you are 18 years of age or older.

Questions regarding the purpose or procedures of the research should be directed to Ike Thompson at icthompson@valdosta.edu. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have concerns or questions about your rights as a research participant, you may contact the IRB Administrator at 229-253-2947 or irb@valdosta.edu.

Becoming a teacher

1. Tell me about the moment you realized you would like to do this with your life.
2. How many years have you been an educator?
3. Tell me about your teaching history. Content? School(s)? Grade levels?
4. Discuss what led you to choose this content.
5. Why have you stayed in education?
6. We all have that teacher highlight reel…those kids we impacted, those moments of triumphs, maybe accolades we have received and so on…Share an experience that would has made your teaching highlight reel.

Becoming an AP teacher

7. Describe the application process for Advanced Placement at your school.
8. Tell me about becoming an Advanced Placement teacher. What led you to make that decision? Internal or external, or a combination of both?
9. Describe the experience of being an AP teacher during that first year.
10. How many years have you been an AP teacher?
11. Do you teach multiple AP courses? What other contents did you teach from 2013-2015?
12. How many years have you been teaching this AP subject?
13. Describe your initial training and preparation (prior to year one) for this AP course.

Professional Learning

14. Describe the purpose of professional learning.
15. Describe why you attend Professional learning.
16. Describe PL you have felt was beneficial. What type of PL? The target? Activities? Any PL that hasn't been beneficial—talk about that experience some.
17. Describe the Professional learning opportunities you are offered as a teacher of this school. As a teacher of this district.
18. What professional learning are offered to you as an AP teacher in the past year or two?

National Math and Science Initiative

1. Describe the purpose of the National Math and Science Initiative.
2. When did you first come to know about NMSI and the grant? Describe becoming involved with NMSI. What do you remember feeling? Thinking? Etc…as the grant was introduced.
3. When did you start participating in the NMSI innovation? What do you remember about NMSI's introduction to you and your colleagues?
4. Why do you think this district applied for the NMSI innovation grant?
5. Describe the support you know of that NMSI gave your school during implementation.
6. What does open-enrollment mean for a course necessarily mean? Discuss the effects the NMSI grant had on enrollment for your course.

7. Describe NMSI Professional Learning opportunities that were offered. Take time to describe each PL opportunity you can remember.
8. Explain what was the most beneficial PL offered by the NMSI organization.
9. Explain what the least beneficial PL offered by the NMSI organization.
10. Describe how NMSI affected, during the time of grant supervision, your teaching in the following areas:
    A. Planning
    B. Instructional decisions such as delivery and pacing
    C. Collaboration with colleagues
11. How had NMSI affected your in-the-classroom teaching? Please highlight an activity, assignment, task, etc. . . that you have used with your students that in some regards was facilitated by your participation in the NMSI innovation.
12. What is your perception of student success during grant supervision? Did students benefit? How so or why not?

Performance Pay

1. Describe the financial incentives offered to you by NMSI.
2. Describe how (if you have) you have used grant money for your class. What led you to the decision to use the money in this way? Describe the impact this money has had on your teaching and student learning.
3. Describe your thoughts on teachers being awarded bonuses for student performance.
4. How do you feel the financial incentives offered to you during NMSI implementation affected your teaching? Relationships with your colleagues? Can you describe a moment that highlights this affect(s)?
5. Describe how your school and/or district published or promoted the financial incentives offered through the NMSI grant.
6. Discuss why or why not you believe the opportunity to earn these incentives were equitable.

Final questions:

1. What changes can you describe that this reform may have had on the climate or culture of this school?

2. What suggestions would you make to better the implementation of the NMSI reform? Can you share an experience

Interview Two Semi-Structured Guide

Reform Introductions

1. Can you think of a time a district or school attempted to implement a new approach, strategy, change in how business is done, and at the time you felt that it wouldn't be long-lasting? Is that change still around? It can be something that you personally experienced, or something you simply know of.

2. What factors and/or conditions are needed for effective reform implementation? How does one go about maintaining the change implemented, after that initial surge?

3. From your perception, who were the key players in introducing and managing the NMSI reform? Were teachers involved in any of the administrative aspects of implementation? Such as SSS, score monitoring of others, etc…What involvement in the decision-making did you take part in?

Mentoring

1. What is the role of a mentor?

2. How important do you think it is for teachers to have a mentor in the first couple years of their career? Did you have someone you considered a mentor? Describe that experience.

3. Is it important then for teachers entering a new subject or content to have a mentor? Maybe they've taught past the statistical five-year point, but now have taken on a new course such as AP—in a measure of 1-10, one being absolutely no need and ten being that is should be mandated because of its importance, rate the need for a mentor for a teacher, of any years of experience, who is teaching a new course for the first time and explain that number.

4. Describe an experience in your career of being mentored or mentoring another teacher.

5. Did you have a mentor during your first year or two of teaching AP? Did the school and/or district promote/suggest that? If not a mentor, a person or persons teaching that subject that

6. Describe the mentoring opportunities NMSI offered.

7. Did you participate in any mentoring opportunities What led you to that decision? If you had been more aware, do you think you would have participated in that aspect of the reform?

NMSI

1. Looking back, discuss the value you see in your school and district having accepted the conditions of the grant.

2. While you didn't have a say ultimately in choosing to participate, do you remember what was your motivation to participate? What were some goals you had for yourself in accepting the conditions of the grant? What are the goals you set for your students?

3. Can you describe any moments you experienced of frustration, disappointment, due to NMSI supervision? Maybe dealing with their communication, organizing of events, allocation of funds, etc…

4. Do you still maintain contact with any of the network of teachers met during NMSI implementation?

5. Describe any changes to your course enrollment since the NMSI reform supervision seized in 2016.

6. How would you say your teaching has been affected as a result of NMSI grant involvement?

7. Describe the reporting that took place…who and how often did you have to report information regarding your implementation procedures, use of NMSI materials and funds, student participation, etc…?

8. Describe how (if you have) you have used grant money for your class. What led you to the decision to use the money in this way? Describe the impact this money has had on your teaching and student learning.

Student supports and incentives:

1. Describe the amount/rate of extra time on task you offered students during NMSI. What did you tutoring time look like? How often? Was this tutoring different than what you offered prior to NMSI? Do you continue to offer a similar tutoring opportunity for your students? How do you prepare material for it?

2. Besides the opportunity to earn college credit, what incentives were students offered to take an AP course during NMSI grant supervision?

3. The students were offered financial incentives associated with NMSI courses—describe the incentives you remember were offered and what kind of impact they had on enrollment. Impact they had on daily instruction, if any. Impact they had on participation in the test.

4. In your opinion, what is the impact on students who take, yet don't pass the exam?

5. Explain why you feel or don't feel every student who participates in an AP course should be required to take the exam.

Performance pay

7. Describe your thoughts on teachers being awarded bonuses for student performance.
   How should those incentives be offered? And for what services/successes?

Who should receive those incentives?
Explain why whether or not you believe the potential to earn more money may entice more new teachers to enter and/or stay in the profession?

8. Describe to me the monetary incentives that were offered to you related to student scoring? What about the training and hosting of SSS? Describe any and all financial incentives offered to you by NMSI.
9. Discuss how those incentives were first introduced to teachers, parents, and students.
10. Discuss the annual check delivery ceremony NMSI hosted for your school? When? Who would attend? What was the purpose in your words for hosting these annual events?
11. Discuss any effect these financial incentives offered to you during NMSI implementation may have had on your teaching. Motivation, resource allocation, etc…
12. What is your perception on the acceptance of this opportunity within the teaching faculty (during the years of 2013-2016)? How did all faculty react to learning about the monetary incentives?
13. Discuss why or why not you believe the opportunity to earn these incentives were equitable.
14. If you do mind discussing, round about what total monetary compensation did you receive for your level of involvement with the NMSI reform? You can answer by year, or as a total, or pass on the question altogether.
15. Describe how your school and/or district published or promoted the financial incentives offered through the NMSI grant.
16. Have you before, or since after, been offered other performance incentives related to AP or other courses you instruct?

Sustainability

1. Looking back to that time during year one, describe the need you felt this school had in choosing to participate? Describe how you felt to the likely success of the program; i.e., when introduced and the promises made, how'd you feel about the chance of those promises being kept?
2. Describe any innovations NMSI introduced that you felt at the time had a chance to be long-lasting in this school.
3. Describe a lesson that you have modified, using a resource from NMSI as the template or guide since the NMSI grant supervision stopped a couple years ago.

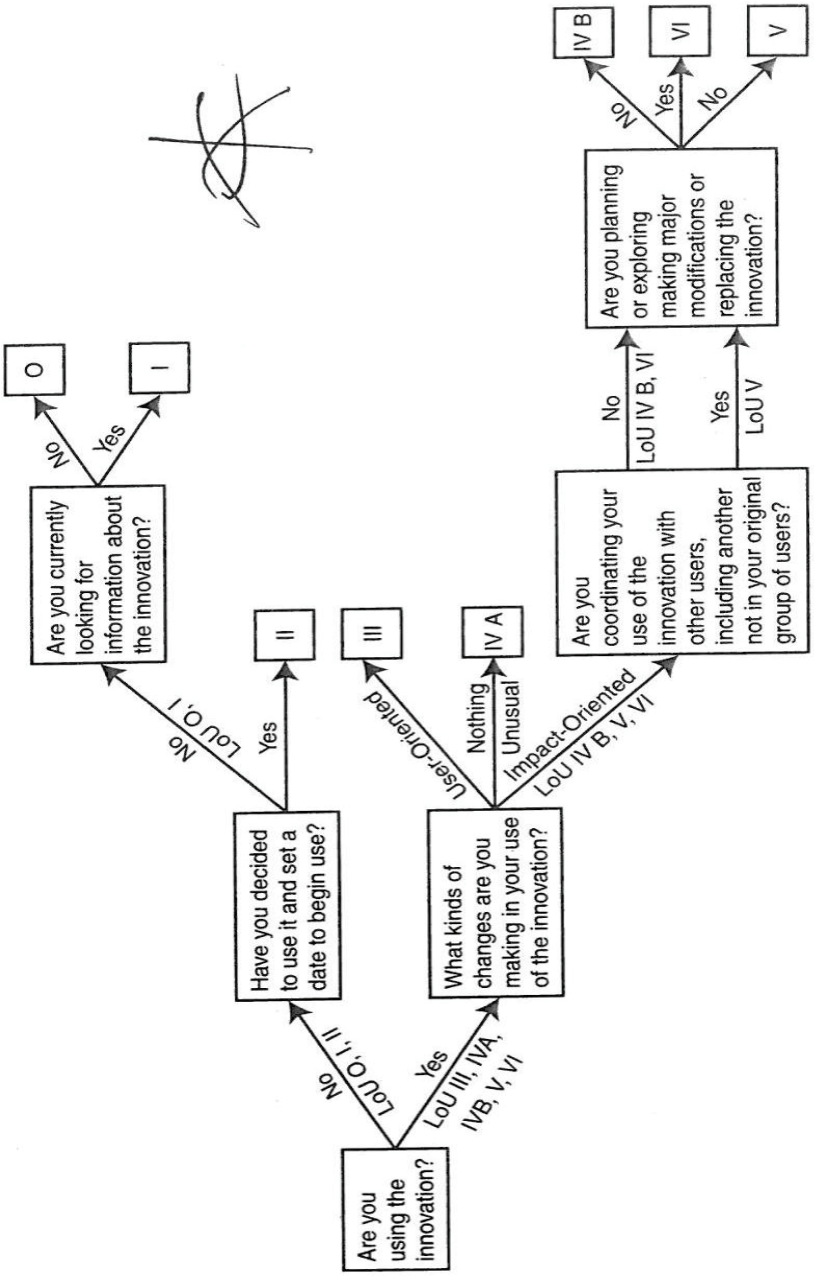
4. Do you still have any access to newer, updated NMSI materials? If so, how do you go about retrieving those resources? If not, do you know if you could access newer materials?
5. Are there any materials and instruments you wish you still had access to?
6. Discuss the role of non-AP teachers—were they involved in any decision-making? Any training?
7. Discuss any experiences, conversations that you had with colleagues who don't teach AP…
8. Describe the change in enrollment (if any) that has occurred for your AP course since the NMSI grant funds were removed (2016).
9. What suggestions might you offer on how innovations and interventions of the NMSI reform can be better implemented or supported?
10. Describe the contact have you kept with presenters, reformers, other teachers with whom you met and worked alongside of during the oversight by NMSI?
11. How has NMSI promoted a continuation of the program initiatives after the three years of direct supervision?
12. What evidence of NMSI having had been implemented exists in this school?
13. What parts of the initiative do you feel the school or district supported a continuation of? Are there any aspects of the initiative you personally would like to see continue?
14. Discuss your perception on the lasting impact the involvement with NMSI may have on this school and/or district.
15. On a scale of 0-10, 10 being that it is implemented with complete fidelity still yet today, and 0 being there is no evidence of NMSI innovations, how would you rate the current visibility of NMSI reform initiatives? Why or why not do you believe that will be the same in 2 years? What about 5?
16. Discuss why you would, or wouldn't be interested in having the NMSI grant reintroduced to your school.

AP day

1. Describe the purpose and activities involved with the AP teacher cohort pull-out day.
2. What guidance are you given, or the cohort leader given, in an effort to prepare for that day?
3. Do you and your cohort still deliver a mock exam of sorts?
4. Had you done that prior to NMSI supervision?

APPENDIX D

Flow Chart



Source: From *Measuring Levels of Use of the Innovation: A Manual for Trainers, Interviewers, and Raters* (p. 22) by S.F. Loucks, B.W. Newlove, and G.E. Hall, 1975: Austin: The University of Texas at Austin, Research and Development center for Teacher Education.

APPENDIX E

Coding and Significance Chart

This is a sample set of the coding and significance charts I created. I created a chart for each individual participant, and a chart of shared significance. Appendix E is a sample from the shared significance chart.

NMSI trainers	B.1.10: "Dr. B, he comes in and says here's my worksheet I give my kids at the beginning of my class….do it." L.1.21: "**Oh, gosh. They were all awesome. That's just true story.** I mean, they were – First of all, everything that we did from a training perspective was very clear, very guided, but not watered down. It was facilitated well." B. 2.23: "It was like one guy they got to do BC all the time and he was wonderful. I forget his name. Um…He's a UNG professor, and they loved him." L.22.54: "So that, you know, not only were they, you know, a classroom management person, but so that they could get the development themselves. Which I mean, if you're going to be here, you may as well pick up some good stuff while there's good stuff to be had. So that was – Other than the logistics of wrangling an entire county's worth of two AP classes, it was great for the kids. It was great for the teachers who came. I think the kids got some awesome stuff from the presenters. I think they got a lot out of it. I think they felt a ton of support because it was an expectation. It wasn't a – Well, you know, we got a Saturday session if you want. Why are you coming Saturday?" L.2.23: "There only – I can say – I can count on one hand the number of times that either people didn't show up or that they were kind of like – mmmmm – a little bit snore. But honestly, for the most part, very dynamic. You could tell they were really knew what they were doing and knew how to reach kids and they made it engaging and they were good." L.2.23: "L: I would assume they pull from the pool of people who've gone through their grant system. That would be my first guess.Or that they – I don't know. They probably recruit if I had to guess. They probably go, you know, to towns where they would have a big base population and see, you know, who, you know, is there.	***Note:*** *While some comments and perceptions during analysis were typed here in this section, most were made by the researcher with pen. This space was left mostly blank with that intention.* The presenters often treated teachers like teachers and students, often requiring them to go through the student experience. For the teachers and the students, the SSS presenters are very important in the overall acceptance of NMSI approach and practices

	They probably developed a rubric of criteria, like, ch-ch-ch, does this person, dah-dah-dah-dah." L.2.24: "No. It's fine. I – Everybody that I saw had clearly been teaching AP for a good while and had a very good sense of how to translate what the exam wanted them to do into student-friendly terms, student-friendly actions. A lot of engaging texts that you might not pull in your classroom but you're going to pull on a Saturday when you've got a room full of kids who are trying to wake up."		SSS were great in theory and practice, but the presenters made or broke this experience for students and teachers Recommendation: Promote more the opportunity for teachers to elevate into NMSI positions with the completion of the grant. This will continue to create a wider pool, proving more selection in great presenters, put more presenters regionally,
Performance Pay		B.2.30: "Yeah. I mean, that…I guess that's the thing. The biggest problem was that there was a lot of animosity, particularly from the history AP teachers, and rightfully so. Like, why is my, you know, subject less important than yours? I mean, particularly – Like AP Econ. Right? Why would he not be getting paid? Right? Like, you know…um…and…um…That was problematic. I don't know. There's some research about how pay for, you know, performance-based incentives are detrimental"	
Student Incentives		A.2.43: "Definitely. I was hoping it would be the financial reward for the kids. Remember [the county gifted coordinator] was really trying to get that money. I really wanted that to stay. I'm happy that the open	

	door policy has stayed and that we've quit looking at your percent pass rate and more how many kids passed. So all of that stuff. The NMSI curve. I'm glad that has stayed for the most part. The SSS have not stayed, but that's okay with me." B.2.37: "I mean, it's – I think it's just the selling point is the big thing. Like, so when they come in – Let us do this grant. Here's some money. And that would be the selling point to the school of getting it in the door. But other than…I don't know. Maybe there was a little bit of incentive. Like ten percent. Fifteen percent. Something like that." R.2.20: "We did have a strong turnout for SSS. I'd say probably eighty to ninety percent of our kids came."	
Teaching climate	B.1.23: "Making those kids more popular in the sense that we showed much pride in their academic success…that was good and maybe there's like, some focus on AP teachers…before the grant they were just AP teachers that did whatever they did, and they brought more focus to them, that came out of it. And highlighted the AP program…and getting more kids involved in it and engaged." L.1.26: "We'd be doing our own thing, and – You know, don't get me wrong. I don't want to be a robot. I want to have autonomy. But, you know. Y'all are great at what you do and I need to see that, and so…. And it's not just for new people. I mean, it's not. I mean, I can tell you in the AP Lit group, we had every range. I mean, we had, like, first year people to like, twenty or thirty year people, and we all learned from each other. So I would say I wouldn't do any of the networking just because it would be a pipe dream. It would be something – It would be like cross-curricular	LB spoke of this when asked about the impact of NMSI—all participants recognized that the reform had this impact.

	planning. It's something you always want to do and you never get around to." L.1.30: "My sense was – and Dale had kind of explained this because he talked about – and I won't get the math right because I teach English – but he basically gave us an illustration of a teacher who was very unhappy at a previous school about her scores and she basically went from a hundred percent pass rate to like, I don't know, seventy-one or sixty-one percent pass rate and she was irate. Just, "Look at – I had every single person in my class!" And Dale was like, "You had like twenty people in your class, and now you have like a hundred and twenty. So that many people got credit, but you're still mad." And just the ridiculousness of that example was like, that was their approach to us, was "Come on, now. Let's look at what's actually happening instead of a number." Now I will be honest and say there was pressure to meet – to beat your previous year's – I can't remember if it was enrollment and score average, or if it was one or the other. I can't remember. So that was a worry. But our administration, for the most part, was like, "We know this is going to go up because they are going to be more kids in here. So as long as you're going to all this and you're doing what we're asking you to do, you're going to be fine." I mean, that was how it was addressed to me." R.1.16: "The science and math areas obviously got more money to spend in the classroom than the literature teachers did, and I completely understand why.	