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What Concerns are Secondary Mathematics Teachers Experiencing with the Implementation of the Common Core State Standards for Mathematics and Is There a Relationship Between the Concerns and Professional Development Received?

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WHAT CONCERNS ARE SECONDARY MATHEMATICS TEACHERS EXPERIENCING WITH THE IMPLEMENTATION OF THE COMMON CORE STATE STANDARDS FOR MATHEMATICS, AND IS THERE A RELATIONSHIP BETWEEN THE CONCERNS AND PROFESSIONAL DEVELOPMENT RECEIVED?

by

Suzanne Therez Jennings

Abstract of a Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

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ABSTRACT

WHAT CONCERNS ARE SECONDARY MATHEMATICS TEACHERS EXPERIENCING WITH THE IMPLEMENTATION OF THE COMMON CORE STATE STANDARDS FOR MATHEMATICS AND IS THERE A RELATIONSHIP BETWEEN THE CONCERNS AND PROFESSIONAL DEVELOPMENT RECEIVED?

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Using the Concerns Based Adoption Model (CBAM) as the theoretical framework, this mixed-methods study utilized three research methods, quantitative, profile interpretation, and qualitative to answer the research questions to investigate the concerns teachers were experiencing during the first year of implementing the Common Core State Standards for Mathematics (CCSSM) and to determine if professional development affected those concerns. The Stage of Concern questionnaire which included two open-ended questions was employed to survey 88 secondary Mississippi mathematics teachers. MANOVA was used to investigate any differences in the means of the relative levels of intensity present within the subgroups which are inconclusive. The profile interpretation methodology of the CBAM revealed a beginning user profile for the whole cohort which exhibited intense concerns at the personal level coupled with intense management concerns. The profile revealed a tailing up at the refinement stage; this behavior indicated that teachers have intense personal and task concerns and are looking for a way to refine the implementation process. The themes that emerged during the qualitative analysis of the open-ended questions consisted of accountability, adjustments in learning, implementation, leadership, resources, student ability,

assessments, frustration, teacher training, time, and understanding the CCSSM. Although the effect of professional development overall was inconclusive, teachers who received minimal professional development revealed a non-user profile but exhibited positive tendencies of wanting information to properly implement the standards; whereas, teachers who received sporadic professional development showed anxious tendencies consistent with teachers struggling with the implementation harboring the possibility of abandoning the implementation. Teachers who have received intensive professional development including the use of reflective professional learning communities and instructional coaches revealed a beginning user profile with intense collaboration concerns reflecting the desire to use collaboration to refine the implementation. Professional development, focused on information and task management, is necessary to ensure that the implementation of the CCSSM continues with fidelity.

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DEDICATION

Embarking upon and completing this educational experience could not have been possible without the unconditional love and undying support of my husband, Johnny, and my family. Together we experienced the joys of new learning experiences and the exhaustion of perseverance to complete the process. Your support, encouragement, and faith have carried me through the process. I am also grateful to my coworkers who have supported and encouraged me especially during the data gathering process. I thank God for the gift of teaching and the ability to share this gift with others.

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CHAPTER I

PROBLEM

Introduction

Primary and secondary education in the United States are currently undergoing comprehensive reform with the implementation of the Common Core State Standards (CCSS) in language arts and mathematics. As education leaders across the nation are grappling to enact career and college readiness reform in the guise of the CCSS, it is essential to understand the beliefs and concerns of the teacher during the implementation process. Research studies have shown that curriculum reform initiatives are likely to fail if pre-reform teacher efficacy beliefs are ignored as teachers who believe their pre-reform methods are effective are unlikely to embrace new reforms (Charalambous & Philippou, 2010; Christou, Eliophotou-Menon, & Philippou, 2004). Also, teachers' concerns and beliefs about their content knowledge and teaching methods as well as their access to professional development programs affect the fidelity to curriculum innovations (O'Sullivan, Carroll, & Cavanagh, 2008; Tunks & Weller, 2009).

The purpose of this study was to investigate and understand the concerns of secondary level mathematics teachers during the initial stages of implementing the Common Core State Standards of Mathematics (CCSSM) and to determine if a relationship existed between the concerns and professional development during the initial stages. Data gathered from this study is relevant as it could be used to project levels of use in subsequent stages of the curriculum implementation. These projections can be used by education leaders to design interventions and effective professional development aiding teachers in the continued implementation of CCSSM. Also, the results can be

used by future change facilitators to understand the relationship between teacher concerns and professional development.

A mixed-methods study was used to investigate the concerns of secondary math teachers during the initial year of implementation of the CCSSM and to discover if a relationship existed between the stages of concern and the type and amount of professional development received that targets the CCSSM. Hall and Hord (2014) state that a key time to monitor the implementation progress is halfway through the first year of implementation. Even though implementation of the CCSSM is a nationwide occurrence, this study was conducted only on Mississippi teachers for convenience and because each state is working from a different baseline to begin the implementation. Since this study was conducted during Mississippi's first official year of CCSSM implementation, the timeliness of this study was within the realm of the literature.

Theoretical Framework

The Concerns Based Adoption Model (CBAM) is a robust and empirically grounded theoretical model for the implementation of innovations. CBAM was designed to measure, describe, and explain the process of change experienced by teachers involved in attempts to implement curriculum innovations (materials and instructional practices) and to discover how the reform process is affected by interventions from persons acting in change-facilitating roles (Anderson, 1997). The essential elements of the model include basic assumptions about change, concepts on the Stages of Concern (SoC), Levels of Use (LoU), and Innovation Configurations (Anderson, 1997). The model is fundamentally descriptive and predictive, rather than prescriptive, of teacher attitudes and behaviors in the process of implementing educational innovations (Anderson, 1997).

CBAM was introduced by Gene Hall and associates from the Research and Development Center for Teacher Education in the early 1970's (Hall & Hord, 2001). CBAM was conceived because the adoption of innovations had not been sufficiently studied within the context of the developmental process in which the concerns of the individual adopter and the relationship of these concerns to the use of the innovation are vital to the implementation of the innovation (Hall & Hord, 2001). The original groundwork for frameworks addressing innovations is built on agricultural studies synthesizing the research, development, and diffusion models from the problem-solver perspective (Hall, Wallace, & Dossett, 1973). The work of Fuller (1969) also influences the development of CBAM in her descriptions of three phases (pre-teaching, early teaching, and late teaching) of teacher concerns. Fuller conducted in-depth studies of concerns of student teachers to extend her descriptions of the phases to a model consisting of four levels: Unrelated, Self, Task, and Impact (Hall & Hord, 2014). In her studies, Fuller observes that pre-service teachers' concerns were mainly of the Self and Task variety; whereas, experienced teachers' concerns were in the Task and Impact categories. Although teachers have concerns at all levels of the model, they tend to concentrate in one particular area (Hall & Hord, 2014). Concern is defined as a mental exercise encompassing questioning, analyzing, re-analyzing, searching for alternative responses, and predicting consequences (Hall & Hord, 2001).

The assumptions about educational innovations inherent within all stages of CBAM include: (1) change is a process, not a one-time event; (2) change is performed by individuals; (3) change is a profoundly personal experience; (4) change involves an unfolding process of feelings and skills; and (5) change can be prompted by interventions

directed toward the individuals, the innovation, or the contexts involved (Anderson, 1997). The SoC describes the feelings and driving force of the teacher in regards to the innovation. There are seven levels: Stage 0, Awareness or Unconcerned; Stage 1, Informational; Stage 2, Personal; Stage 3, Management; Stage 4, Consequence; Stage 5, Collaboration and Stage 6, Refocusing or Refinement (Anderson, 1997). Stage progression is not always linear and embedded within each stage is its level of intensity (Hall & Hord, 2001). The Levels of Use framework focuses on teacher behavior patterns as they implement the innovation. The levels are comprised of Level 0, Nonuse; Level 1, Orientation; Level 2, Preparation; Level 3, Mechanical; Level 4A, Routine; Level 4B, Refinement; Level 5, Integration; and finally Level 6, Renewal (Anderson, 1997). The third dimension of CBAM is the Innovation Configurations (IC) which describes variations in the ways different teachers have implemented the innovation (Anderson, 1997).

Hall and Hord (2014) build upon Fuller's work and preserved the ideas of Unrelated, Self, Task, and Impact but clarified them by delineating stages within each category. Table 1 describes each concern and its relationship to Fuller's model. As noted in Appendix A this table was used with permission SEDL, an affiliate of the American Institutes for Research (AIR).

Table 1

Stages of Concern about an Innovation

Type of Concern	Stage of Concern	Definition and Expressions of Concern
Impact	Stage 6 Refinement	The focus is on the universal benefits of the innovation, including the possibility of modifying it or replacing it with a more effective model. Concerns are focused on what would make the innovation better.
	Stage 5 Collaboration	The focus in on collaborating with others to make the innovation more effective. Concerns are focused on the coordination efforts to work with others to improve effectiveness of the innovation.
	Stage 4 Consequence	The focus is on the impact the innovation will have on those who are receiving the innovation. Concerns of teachers relate how this innovation will affect their students.
Task	Stage 3 Management	The focus is on the processes and tasks required to use the innovation. Concerns of teachers are related issues of efficiency, organizing, managing, scheduling, and time demands.
Self	Stage 2 Personal	The focus is on the implementer's concerns about the demands of the innovation and their ability to actually implement it. Implications about decision making, potential conflicts with existing structures, financial, or status implications are prevalent. Concerns of teachers are about how this will affect them personally.
	Stage 1 Informational	The focus is a general awareness and learning more about the innovation. The concerns are related to learning more about the innovation. They are not worried about themselves in relation to the innovation.
Unrelated	Stage 0 Unconcerned	There is no focus about the innovation. Concerns about other things are more intense.

Note. Adapted from *Measuring Implementation in Schools: The Stages of Concern Questionnaire*, by A. George, G. Hall, and S. Stiegelbauer, 2006, p. 8.

This study used the CBAM to study the concerns of teachers in the initial stage of implementing the Common Core State Standards for Mathematics (CCSSM) and their accompanying Mathematical Practices. The study also investigated any relationships between teacher concerns and the amount and type of professional development they received that specifically targeted the CCSSM. Understanding teacher concerns is necessary as individual concerns of teachers can impact reform implementation. The SoC model provided the tools to gain an understanding of teachers' beliefs and concerns in relation with the expected behaviors of the reform which in turn will aid in implementing the reform process with fidelity (Tobia, LaTurner, Litke, & Butler, 2013). Ideally, under the auspices of a closely facilitated implementation, the developmental path of concerns during the implementation of an innovation moves from early Self-concerns to Task-concerns during the first years of use progressing ultimately to Impact concerns after three to five years (Hall & Hord, 2014). Unfortunately, this progression can be arrested and redirected if change facilitators do not provide effective support or interventions during the implementation (Hall & Hord, 2014). The SoC framework provided the structure needed to analyze and interpret teachers' concerns during the initial phase of implementing the CCSS.

An implementer of an innovation will have concerns at each stage, and may have intense concerns at more than one stage. This array of concerns can be illustrated graphically by using a concerns profile by representing the SoC on the horizontal axis and the relative intensity of concerns on the vertical axis (Hall & Hord, 2014). The peak stages show the more intense stages; whereas, the valleys show the lower levels of intensity (Hall & Hord, 2014). It is possible for a person to exhibit multiple peaks of

concern during various stages of implementation. For example, during the initial stages of an innovation a person will have high management concerns (Stage 3), but if he or she was an inexperienced teacher, they might also have intense concerns at the personal level (Stage 2) as they are afraid the implementation might affect their job evaluation (Hall & Hord, 2014).

If the implementation of an innovation is facilitated effectively, a hypothesized pattern to the evolution of concerns unfolds and takes the form of a "wave motion" of intensities (Hall & Hord, 2014). Figure 1, used with permission as noted in Appendix A, illustrates the ideal "wave motion" of SoC over a period of years is where the initial implementation had high levels of intensity at the Informational and Task concerns then progressing in the early years with a decrease in these early concerns and an increase in the Management concerns; and finally, progressing to full implementation where the early concerns have decreased and the more intense concerns are of the Impact variety (Consequence, Collaboration, and Refocusing) (Hall & Hord, 2014).

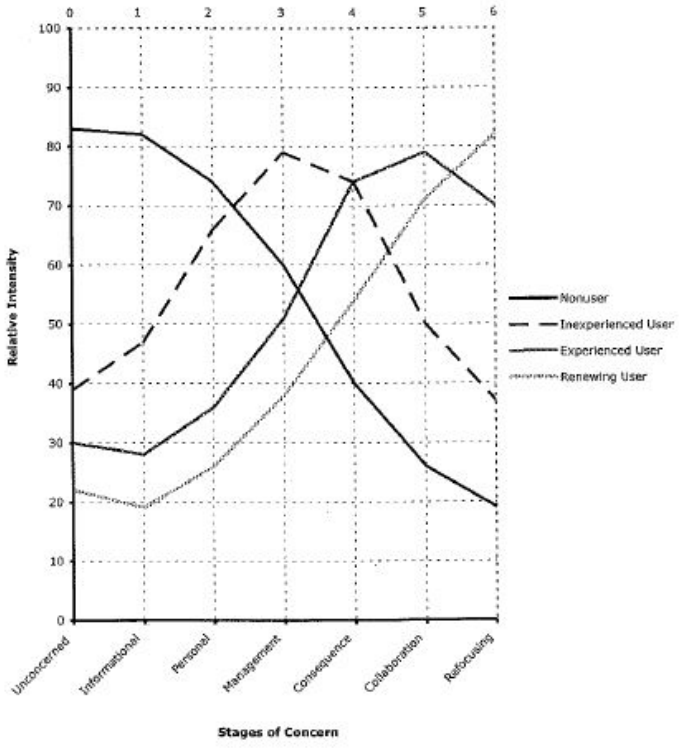

Figure 1. Stage of Concern wave motion (George, Hall, & Stiegelbauer, 2006, p. 36) (Copyright © 2006, SEDL, an Affiliate of American Institutes for Research.)

Within the construct of the CBAM there are three ways to assess concerns which include an informal semi-structured interview process, an open-ended concerns statement, and the SoC questionnaire (SoCQ) (Hall & Hord, 2014). To maintain anonymity and to obtain a larger sample size, this study only used the tools of the SoCQ and the open-ended concerns statement. The SoCQ is the most rigorous method for measuring concerns as raw scores are calculated for each stage and then converted into a graphical representation of the data creating a concerns profile (Hall & Hord, 2014). The open-ended statement allows the respondent to express their concerns in their own words; thereby, allowing the researcher to delve deeper into the concerns (Hall & Hord, 2014). The open-ended statement verified the results of the concerns profile.

As the results of this study could be used to inform interventions and professional development to aid in the process of future stages of implementation of the innovation, it is important to align the interventions with the concerns of those engaged in the implementation process (Hall & Hord, 2014). For example, when teachers are involved in the first year of a standards-based innovation, such as the CCSSM, they are likely to be exhibiting intense concerns at Stage 3, Management (Hall & Hord, 2014). Teachers with intense task concerns are not interested in the philosophy of the innovation, they want methods and resources to help them implement the innovation on a daily basis; whereas, teachers at the Impact level of concern are more interested in the abstract and subtleties of the innovation (Hall & Hord, 2014).

Statement of the Problem

In order to align interventions and professional development with the levels and stages of concern, it was important to understand how the implementation was affecting the various groups involved in the change. An inexperienced teacher might have different concerns or more intense concerns than the veteran teacher (Hall & Hord, 2014). Since professional development targeted towards the concerns affects the level of intensity (Hall & Hord, 2014), did a teacher with a higher degree have fewer concerns than a teacher with only a bachelor's degree? Teachers trained via traditional methods to include teaching internships have more formal training on the intricacies of standards-based instruction, instructional strategies and mathematical content; did they exhibit lower levels of intensity than teachers certified through an add-on endorsement or alternate route? National Board Certification is a reflective professional development process; therefore, did National Board Certified Teachers (NBCT) exhibit concerns in the

further stages of the model progressing faster through the stages? At the time of the study, successful completion of Algebra I as well as a passing score on the Algebra I State Test were required for graduation. Did teachers of higher stakes courses such as Algebra I experience different levels of concern? Education is not funded equitably across the state; schools in areas with a stronger economy due to industry receive supplemental income from the area industries. Did teachers' concerns and levels of intensity vary by geographic location? Since properly aligned interventions and professional development can affect teacher concerns and the fidelity of the implementation of the innovation, did the type and amount of initial professional development the teacher received affect their early implementation concerns?

This study investigated the concerns teachers experienced during the initial phase of implementation of the CCSSM. The researcher also investigated if concerns and levels of intensity varied by subgroups differentiated by primary grade level taught, years of teaching experience, geographic location, highest degree held, method of mathematics licensure, National Board Certification, and the type and amount of professional development received prior to and during the initial implementation. Specific data targeting these subgroups will help change facilitators develop interventions and continuing professional development to aid in the future implementation years of the CCSSM and other education-based innovations and, most importantly, affect student achievement by improving instruction.

Research Questions and Hypotheses

Research question 1: What concerns did Mississippi secondary mathematics teachers experience during the implementation of the Common Core State Standards?

Research question 2: What relationships existed between the type of professional development received on the implementation of the Common Core State Standards and the concerns that teachers are experienced?

Hypothesis 1: There is no significant difference between the raw scores of each of the seven stages of concern based on number of years of teaching experience.

Hypothesis 2: There is no significant difference between the raw scores of each of the seven stages of concern based on the geographic region of the respondents' school.

Hypothesis 3: There is no significant difference between the raw scores of the seven stages of concern based on the highest degree held by teacher.

Hypothesis 4: There is no significant difference between the raw scores of each of the seven stages of concern based on whether or not a teacher is Nationally Board Certified.

Hypothesis 5: There is no significant difference between the raw scores of each of the seven stages of concern based on the way licensure was obtained (traditional, add-on endorsement and alternative route).

Hypothesis 6: There is no significant difference between the raw scores of each of the seven stages of concern based on the primary grade level taught by the teacher.

Hypothesis 7: There is no significant difference between the raw scores of each of the seven stages of concern based on the level of professional development received that targeted the CCSSM.

Definition of Terms

Change Facilitator: A person working directly with the people responsible for implementing the change who must accept the challenge of affecting reform in a personalized and caring way (Hord, Rutherford, Huling-Austin, & Hall, 1987).

Concerns: The definition of concerns as described in the CBAM is this:The composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task is called *concern*. Depending on your personal make-up, knowledge, and experiences, each person perceives and mentally contends with a given issue differently; thus there are different kinds of concerns. The issue may be interpreted as an outside threat to one's well-being, or it may be seen as rewarding. There may be an overwhelming feeling of confusion and lack of information about what "it" is. There may be ruminations about the effects. The demand to consider the issue may be self-imposed in the form of a goal or objective that we wish to reach or the pressure that results in increased attention to the issue may be external. In response to the demand, our minds explore ways, means, potential barriers, possible actions, risks, and rewards. All in all, the mental activity composed of questioning, analyzing, and reanalyzing, considering alternative actions and reactions, and anticipating consequences is *concern* (Hall, George, & Rutherford, 1979, p. 5). To be concerned means to be in a mentally aroused state about something. The intensity of the arousal will depend on a person's past experiences and associations with the subject of the arousal, as well as [on] how close to the person and how immediate the issue is perceived as being. Close personal involvement is likely to mean more intense (i.e., more highly aroused) concern which will be reflected in greatly increased mental activity, thought, worry, analysis, and

anticipation. Through all of this, it is the person's perceptions that stimulate concerns, not necessarily the reality of the situation (Hall, George, & Rutherford, 1979, p. 5)

Impact concerns: These concerns focus on the impact of student learning and how to improve learning.

Innovation: The actual change taking place (Hall & Hord, 2014).

Intervention: Actions and events designed to affect change (Hall & Hord, 2014)

Relative Level of Intensity: The degree of concern as measured at each stage in the SoC.

Self concerns: These concerns do focus on teaching but are related to how "it" will affect them.

Stages of Concern: A set of seven specific categories of concerns about the innovation.

Task concerns: These concerns focus on the "how to" portion of the innovation.

Unrelated concerns: These concerns do not focus on teaching or educational-related issues.

Delimitations

Secondary mathematics teachers in the State of Mississippi who responded during the study.

Assumptions

An assumption inherent within the Stages of Concern are:

1. change is a process, not a one-time event;
2. change is performed by individuals;

3. change is a profoundly personal experience;
4. change involves an unfolding process of feelings and skills;
5. change can be prompted by interventions directed toward the individuals, the innovation, or the contexts involved (Anderson, 1997)

The researcher assumed that teachers would respond accurately and truthfully.

Justification

The purpose of this study was to understand teacher concerns and efficacy beliefs in the early stage of CCSSM implementation. Information gathered from this study could be used to project levels of use in subsequent stages of the curriculum implementation. These projections can be used by change facilitators (state, district, and school) to design appropriate and effective professional development aiding teachers in the continued implementation of CCSSM.

CHAPTER II

LITERATURE REVIEW

Introduction

Currently primary and secondary education in the United States is undergoing comprehensive reform with the implementation of the Common Core State Standards (CCSS). The initial phases of the reform are focused on English and Language Arts (ELA) and Mathematics. As state education agencies, school district administration leaders, principals, and teachers are grappling to enact the reform; it is essential to understand the beliefs and concerns of the teacher during the implementation process. Charalambous and Philippou (2010) and Christou, Eliophotou-Menon, and Philippou (2004) find that curriculum reform initiatives might fail if pre-reform teacher efficacy beliefs are ignored; as teachers who believe their pre-reform methods are effective, are unlikely to embrace new reforms. Also, teachers' concerns and beliefs about their content knowledge and teaching methods as well as their access to professional development programs affect the fidelity to curriculum innovations (O'Sullivan, Carroll, & Cavanagh, 2008; andTunks & Weller, 2009).

Teacher Beliefs

Definition

The overarching goal of education is positive student learning experiences. To begin the process of understanding student experiences, one must first understand a pivotal factor in their learning experience, the teacher (Philipp, 2007). Understanding teacher learning experiences, beliefs, and concerns are essential in understanding their affect on student learning. Throughout the literature, beliefs and affect were terms used

frequently and consistently. Beliefs are defined to embrace conscious and unconscious ideas and thoughts about oneself, the world, and one's place within that world, refined through the social constructs of one's world (Cross, 2009; Green, 1971; Pajares, 1992; Thompson, 2004). Simply stated, beliefs are filters through which one views the world (Pajares, 1992). In the same fashion, Raymond (1997) defines mathematics beliefs as individual perceptions regarding mathematics founded upon personal experiences in mathematics including beliefs about the nature of mathematics and the learning and teaching of mathematics. Philipp (2007) further delineates the difference between beliefs and affect as beliefs are the lens through which one looks when attempting to understand the world; whereas, affect is the inherent tendency one adopts toward some aspect of his or her world. Furthermore, Philipp asserts that the feelings teachers experienced as a learners carryover and become an integral factor in their belief system of mathematics and learning; and thereby, affect their instructional practices.

The Web of Belief Systems

Teacher belief systems are not a segregated entity; rather they are part of a complicated intertwined network with incongruous representations and connotations (Beswick, 2006; Speer, 2005). Green (1971) describes manifold dimensions of belief systems to include but not limited to centrality, clustering, and the basis of the held beliefs. Green's dimension of centrality is a function of the number and strength of a belief's connections to other beliefs; this inter-connectivity makes it difficult to change centrally-held beliefs. Green (1971) further elicits that beliefs may be held evidentially, meaning beliefs are based on evidence and may change if evidence to the contrary is challenged; or, beliefs may be held non-evidentially which are invulnerable to evidence

making them resistant to change. Therefore, it is scarcely possible for beliefs to change, unless they are deemed to be inadequate; inasmuch it is unlikely that beliefs will be deemed inadequate, unless they are disputed and not integrated into existing belief structures (Pajares, 1992).

In continuing the process of unraveling the web of teacher belief systems, teacher beliefs can be categorized into professed beliefs which are those stated by teachers, and attributed beliefs which are inferred based on observations or other data sources (Speer, 2005). Within the belief system there are two categories: Things that we "just believe" are considered to be beliefs, whereas, things that we "more than believe--we know" are classified as knowledge (Leatham, 2006). Understanding the web of beliefs systems is relevant as attention to belief systems is essential to inform educational practice (Pajares, 1992).

Inconsistencies in Belief Systems

The complicated, intertwined nature of belief systems sometimes reveals contradictions between beliefs or between teacher beliefs and practices. According to Green (1971), clustering of beliefs occur when beliefs are held in isolation from other beliefs; often portraying inconsistencies in one's belief system which explains why it appears that teachers hold contradictory beliefs (Beswick, 2006; Cross, 2009). Due to the complicated nature of beliefs, numerous data sources are required to get an accurate portrayal of the beliefs (Speer, 2005). Pajares (1992) claims that because of the interconnectedness of teacher belief systems; studying the beliefs in relationship to the aggregate will provide clarity when inconsistencies appear. In contrast to early belief researchers, Speer (2005) claims that discrepancies between professed and attributed

beliefs may actually be nonexistent; rather the discrepancy might just be a lack of shared understanding between the researcher and the teacher.

A deeper understanding of teaching practices may be realized if inconsistencies in beliefs and practices were explored rather than just noted (Leatham, 2006). Apparent inconsistencies between beliefs and teaching practices are part of a complex web of external contributing factors (Raymond, 1997). Teachers contend that an accumulation of external factors contribute to discrepancies between their professed beliefs and their teaching practices; thus, teaching style is governed by the cumulative effect of these factors regardless of the beliefs held by the teachers (Raymond, 1997). Teachers identify contextual factors such as accountability testing and student behavior to rationalize inconsistencies in their beliefs and practices; yet previous research has not delved into how these factors actually affect teaching practices (Agudelo-Valderrama, 2008).

Another inconsistency found within belief systems is noted in Beswick's (2011) study which suggests that teachers, regardless of experience level, can hold contradicting views of mathematics as a school subject and as a discipline. One explanation for this disparity, according to Green (1971), is due to the failure of integrating newly held beliefs on mathematics as a school subject with the previously grounded beliefs of mathematics as a discipline. Alternately, Beswick (2011) claims that basis of the beliefs of mathematics as a discipline are not central, thereby causing the failure of the integration process. Beswick further claims that the disparity exists because mathematics educators are provided opportunities to reflect on their teaching practice, but rarely to reflect on the discipline of mathematics (Beswick, 2011).

The Effect of Beliefs

Mathematics educators and researchers have brought to the forefront the importance of teachers' beliefs on pedagogy and mathematics classroom practices (Cross, 2009; Pajares, 1992; Philipp, 2007; Raymond, 1997; Thompson, 2004). Although research on teacher beliefs is complicated and controversial, there is no doubt of its potential to inform education research and thereby affect teaching practice (Leatham, 2006). Teachers' beliefs, views, and perceptions influence teachers' decisions and behaviors in an intricate, yet subtle manner (Harbin & Newton, 2013). Leatham (2006) characterizes conception as a general category encompassing beliefs, knowledge, understanding, preferences, meanings, and views. Accordingly, beliefs are episodic and experiential, defined as conceptions, personal ideologies and viewpoints, and values that shape practice and focus knowledge; thus, beliefs influence decisions on the importance of knowledge, teaching practices, and goals (Speer, 2005). Teachers' conceptions and instructional practices have a distinct yet subtle complex relationship to each other that are affected by a myriad of factors (Thompson, 2004).

How a teacher conceptualizes mathematics has a direct influence on her teaching practices. Therefore in order for true change to be actualized, a more refined understanding of the types of beliefs teachers hold is paramount as well as an understanding of how these beliefs are related to each other (Cross, 2009). Cross not only confirms the idea that teachers' beliefs about mathematics affect the design and implementation of lessons, but also, provides further insight into its implications in professional development and teacher education. Beliefs evolve with practice and influence teachers' decisions on lesson design and practices; conversely, Swan (2007)

demonstrates that new types of tasks challenged and influenced teachers' beliefs and practices. Hence, actions within the classroom are a result of teacher beliefs filtered by experience (Pajares, 1992). Teachers' beliefs about mathematics education and curriculum affect their orientations towards a curriculum which serves as a frame that influences how they integrate the teaching materials into their teaching practices (Remillard & Bryans, 2004). Accordingly, teachers with similar orientations toward a curriculum ended up in similar implementation of the curriculum regardless of their differences in views about mathematics teaching and learning (Remillard & Bryans, 2004).

Concerns as Related to Curricula Reform

The Role of Beliefs in Curricula Reform

Consequently, teachers' beliefs are the lenses with which they interpret curricular innovations and serve as the beacon to guide their lesson design, student interaction, and implementation of innovation principles (Rogers, Cross, Gresalfi, Trauth-Nare, & Buck, 2011). Roehrig & Kruse (2005) avow that teacher beliefs play a significant role in the implementation of reform-based curricula; whereas, teacher knowledge becomes secondary as it relates to the impact of the reform. To emphasize, in a mixed study of implementing a curriculum reform in chemistry classes, the results indicated that the teachers exhibiting the highest levels of reform-based practices held the strongest reform-based beliefs; however, a lack of content knowledge did inhibit the teachers' ability to create reform-based lessons (Roehrig & Kruse, 2005).

As students' perceptions and beliefs originate from engagement in classroom activities, it is crucial to understand the teachers' struggles and frustrations they encounter

when implementing curricula reform (Stickles, 2011). It is the beliefs, rather than methods or curriculum, underlie practices at a level to make a significant difference in education reform (Beswick, 2007). Student-centered classroom practices do not dictate specific teaching approaches; therefore, persuading teachers to adopt teaching strategies without considering their belief systems will not result in successful reform (Beswick, 2007). Even though providing evidence to influence teacher beliefs is an important component to sustain the reform process, it must be understood and recognized that new practices are filtered through the old belief system (Cross, 2009).

The Paradigm Shift

Reform occurs when a paradigm shift occurs due to the acceptance of new ideas or data replacing dominant theoretical views (Speer, 2005). Drake (2006) posits that curriculum reform often requires teachers to modify their instructional practices to teach in a way foreign to their current teaching methods and to the way they originally learned the concept. Consequently, teachers' individual stories of mathematics learning affect their interpretation and implementation of curricula reform (Drake, 2006). Restructuring of one's environment is directly related to the structure of the beliefs and knowledge held by the individual (Cooney, Shealy, & Arvold, 1998). Hence, improvement in mathematics achievement can only occur if classroom practices undergo a paradigm shift to reflect reform recommendations (Cross, 2009). Internationally, educational programs are struggling to maintain a paradigm shift in teaching beliefs from computational to a more student-centered curriculum focused on conceptual understanding (Chiu & Whitebread, 2009; Desimone, Smith, Baker, & Ueno, 2005). Whereas, U.S. teachers tend to target computational strategies more toward low-achieving students which is in

contrast to other countries who maintain an equitable level of instruction at the conceptual level (Desimone, Smith, Baker, & Ueno, 2005).

Oftentimes there is a disconnect between the actual intent of curricular reform and what the teacher believes the reform to be. For instance, in Rogers' (2011) study, the teachers claimed to have experienced a paradigm shift to a more student-centered curriculum because they were limiting their use of direct instruction; but that practice did not necessarily translate to using more effective practices to support students' reasoning processes. Teachers respond to curricula reform tasks in a myriad of ways including mutating the tasks to fit into their present belief systems, simplifying the tasks to meet the ill-perceived ability of their students, allowing the tasks to empower and release their true beliefs in teaching, and increasing their self-efficacy beliefs due to increased student achievement (Swan, 2007).

Barriers to Reform

Although literature is consistent in the premise that teacher beliefs affect curriculum implementation, it exhibits inconsistencies on which aspects of curriculum instruction teacher beliefs have the strongest impact. Teaching experience (Christou, Eliophotou-Menon, & Philippou, 2004), local issues such as time restraints and high stakes testing (Tunks & Weller, 2009), the amount of time spent with the innovation (Charalambous & Philippou, 2010), and the inevitability of teachers misconstruing the original intent of the curricular innovation (O'Sullivan, Carroll, & Cavanagh, 2008) are all factors researchers found to affect the fidelity of curricular reform. Research indicates that often teachers never reform their teaching practices to reflect the innovation, rather,

they change the innovation to adapt to their established practices (Khoboli & O'toole, 2012; O'Sullivan, Carroll, & Cavanagh, 2008).

Teachers with strong beliefs in one particular area of mathematical knowledge can hinder their learning of other areas constructing a barrier to curriculum reform; consequently, beliefs can preserve ingrained teaching methods even in the face of reform (Drageset, 2010). Similarly, Raymond (1997) implies that deeply held, traditional beliefs about the nature of mathematics may possibly contribute to the perpetuation of the more traditional style of mathematics teaching, even though the teacher holds reform-oriented teaching beliefs. Teaching and learning beliefs form a cohesive unit stemming from teachers' conceptions about mathematics; thus, if beliefs about the nature of mathematics were to undergo a metamorphosis, the derivative beliefs would begin the transformation process (Cross, 2009).

Beliefs are not the only obstacle teachers are encountering in trying to maintain fidelity in the reform process. Other deterrents include curriculum coverage, time, parental resistance, limited professional development opportunities, physical and mental resources, low student motivation, and institutional factors (Chiu & Whitebread, 2009; Cross, 2009; Swan, 2007). As a result of coping with constraining influences of the systems within which teachers' work, new curricular materials are being used less frequently than the original intent of the innovative design (Swan, 2007). Success of curriculum materials in affecting teacher change and curricular innovation depends largely upon a convergence of the teachers' belief system (Collopy, 2003). Namely, individual resources, perspectives, concerns, beliefs and professional identity of teachers

attribute to the differences in the way teachers implement the same curriculum (Remillard, 2005).

The Effect of Professional Development

The Call for Professional Development

Professional development is a systematic process designed to elicit change in beliefs and attitudes of teachers, classroom practices and student learning outcomes (Guskey, 1986). As reform-based curricula often require a paradigm shift in teachers' belief systems, it is essential to incorporate professional development opportunities that consider teacher beliefs and knowledge (Roehrig & Kruse, 2005). Each teacher harbors their own concerns regarding a change, and can be at different stages of readiness for adopting an innovation (Hord & Roussin, 2013). Professional development programs aid the teacher in progressing linearly through the stages of concern related to the change process, thereby, making it more likely that the teacher will implement the intended reform (Khoboli & O'toole, 2012). Likewise, Charalambous and Philippou (2010) and Tunks and Weller (2009) concur in their findings that teachers exhibit high levels of use of innovation reform when it is supported with professional development. Therefore, it is imperative that change facilitators establish professional development opportunities for teachers that provide continuous support via coaching, listening, trust building, discourse, observations, and collaborative opportunities (Charalambous & Philippou, 2010; Tunks & Weller, 2009).

Just as students do not achieve their full learning potential by the teaching strategy of "telling" (Smith, 1996); teachers do not respond positively to just being "told". Therefore, persuasion will not result in a paradigm shift in teacher beliefs; rather

opportunities for professional development which include task development and reflection will result in the modification of teacher beliefs (Swan, 2007). The Norton and McCloskey (2008) study purports that more explicit support is required for teachers to sustain a paradigm shift in teacher beliefs and practices to manage constraints such as extant curriculum and class size. Research has shown that in-service mathematics teachers need to undergo sustained and continuous professional development designed to illustrate the social and constructive components of mathematics (Cross, 2009). Although most teachers participate in professional development activities, the activities do not provide a long-term sustained support for change, leaving teachers alone to meet the challenges of curriculum reform (Sztain, 2003). Without long-term curriculum support teachers will rely on their own beliefs and interpretations to implement curriculum reform which leads teachers to shape curriculum reform to their own beliefs (Sztain, 2003).

Differentiated Needs of Teachers

Teaching experience is an important factor to consider when designing professional development geared toward reform (Cross, 2009). Additionally, literature revealed that veteran and beginning teachers had different stages and intensities of concerns (Christou, Eliophotou-Menon, & Philippou, 2004). For example, the beginning teacher was concerned with practical problems of implementing a curriculum which contrasted with the veteran teacher who was more concerned with collaboration and student impact (Christou, Eliophotou-Menon, & Philippou, 2004). In another study, beginning teachers were more likely to pilot the curriculum as it was designed; whereas, veteran teachers tended to assimilate the curriculum into their established patterns as

noted in previous research studies (Remillard & Bryans, 2004). Accordingly, professional development intervention strategies must be designed for beginning teachers to address their concerns of task management (Christou, Eliophotou-Menon, & Philippou, 2004). Additionally, Beswick (2011) posits the need to conduct research on experienced, in-service teachers as their belief structure may be compromised if integration of their belief system fails due to centrality, clustering, or basis.

Also of concern, United States teachers develop conceptual understanding of mathematics more through teaching experiences rather than their teacher education programs which makes it imperative for professional development activities to target this discrepancy (Desimone, Smith, Baker, & Ueno, 2005). A solid foundation of efficacy beliefs challenges teachers to conceptualize their efficacious beliefs with positive learning results, to draw upon past successes in teaching, and to recognize their effectiveness will vary (Smith, 1996). To aspire to teach to the best of one's ability, the teacher must build and maintain beliefs that link their teaching actions causally to their students' learning (Smith, 1996).

Professional Development Designed to Foster Reform

Professional development, designed to aid in the implementation of curricular reform and support a paradigm shift in teacher beliefs, must recognize the extent to which teacher beliefs influence how they implement new curriculum materials (Rogers, Cross, Gresalfi, Trauth-Nare, & Buck, 2011). In order for reform to take root and grow, teachers need to take ownership of the process by being educated in the reform process and assuming the role of change facilitator; thereby, assuming the role of continuous curriculum constructors (Agudelo-Valderrama, 2008). To fully understand a teacher's

willingness to participate in opportunities to learn, their beliefs that constitute their identity need to be realized and targeted (Collopy, 2003).

Professional development opportunities should reflect the current teacher concerns and beliefs, as their concerns are the lenses with which teachers view reform. Once these concerns are recognized, interventions can be prescribed to facilitate successful innovation implementation (O'Sullivan, Carroll, & Cavanagh, 2008; Drake, 2006). Professional development design must diagnose and target one of two assumptions prevalent in eliciting change in teacher beliefs: (1) beliefs change before practices, or (2) beliefs change after positive evidence of learning outcomes (Guskey, 1986). Historically, experiences with professional development have been unsuccessful due to teachers' beliefs and practices being resistant to change; but a professional development program, focused on task development supported with video and other guidance and incorporating a reflective component, has proven successful in creating and sustaining a paradigm shift in teacher belief systems (Swan, 2007). The interactive viewing of video clips with the researcher and the teacher provide the opportunity for the teacher to resolve evident inconsistencies between beliefs and practices enabling a more authentic understanding of the relationship between teacher beliefs and practices (Speer, 2005).

Equally important, teachers value a professional development design that covers an extended period of time (participation of a period of many weeks), collaboration with peers, and the opportunity to reflect and learn mathematical content (Norton & McCloskey, 2008). Teachers value time spent collaborating with colleagues entering discourse centered around solving problems encountered in their individual classrooms

(Walen & Williams, 2000). Likewise, professional development opportunities should also address teacher content knowledge. Understanding teachers' instructional decisions require having cognizance of teacher knowledge combined with an understanding of their decision making process to invoke and use their knowledge (Speer, 2005). As teachers increase their content knowledge and its connections to reform standards, they become more comfortable with implementing curricula innovations (Stickles, 2011).

The Reflective Tool

Teachers who actively reflect upon their teaching practices and affect, have a belief system that is integrated and synonymous with their teaching practices (Thompson, 2004). Reflection is an action that requires both an action and a participant (Cooney, Shealy, & Arvold, 1998). A person adept at reflective practices integrates voices, takes into consideration various positions, and accepts their own beliefs with a firm commitment (Cooney, Shealy, & Arvold, 1998). Reform requires the fluidity and flexibility of knowledge of a reflective practitioner where mathematics knowledge is rooted in rationality (Cooney, 1999). Thus, time, opportunities, and stimuli should be provided for teachers to develop a reflective practice that recognizes teacher change as learning (Beswick, 2006). Consequently, research has found that reflective practices, initiated in teacher preparation programs and continuing through in-service teaching practices, are the key to improving mathematics instructional practices and resolving inconsistencies between beliefs and practices (Raymond, 1997). Therefore, in order for lasting change to root itself in teachers' practices, teachers must undergo continuous professional development challenging their beliefs and fostering a reflective spirit (Cross, 2009). The primary mode of human functioning is focused on task completion which is

generally unreflective, thereby making reflective practice challenging to enact (Walen & Williams, 2000). To guide teachers in developing reflective practices, professional development presented in the form of case studies provide opportunities for teachers to reflect on their own practice, identify areas of concern, and collaborate with colleagues to work towards solutions (Walen & Williams, 2000).

Also of significance, reflection is closely tied to individual concerns and is a movement from within the realm of the concern (Walen & Williams, 2000). Thus, Walen and Williams purport that reflection provides a venue for each teacher to identify and recognize concerns and their relationship to their individual teaching practice. Even though individuals are concurrently experiencing the same innovation, their concerns might be different due to knowledge, experience, or other factors (George, Hall, & Stiegelbauer, 2006). Reflection affords the individual the opportunity to understand their feelings in the midst of change.

Generating a Vision of Change

Adopting Reform

Minute educational reform will occur if teachers are not convinced of its value (Beswick, 2006). Beswick (2007) reflects upon the research that exists on the importance of teacher beliefs to mathematics reform focusing on description of beliefs and comparative studies between teacher groups; but little research targets information on using beliefs to improve mathematics education. Classroom practices of mathematics teachers are a fusion of their knowledge, their sense of purpose, their philosophy of teaching and learning, and their commitment to the community in which they teach (Cooney, 1999). The learning process is firmly rooted in the belief structure of the

teacher, either in beliefs rooted in rationality or in the result of telling (Cooney, 1999). Beliefs need to be challenged when they present barriers against learning or development (Drageset, 2010).

Call for Research

Philipp (2007) surveys the literature available on teacher beliefs and concludes that both quantitative and qualitative studies are needed in assessing teacher beliefs. Most of the studies were qualitative based on case studies and interviews. Although qualitative analysis does provide a more in-depth insight into how teachers interpret and implement reform by revealing subtleties into their concerns and efficacy beliefs (Charalambous & Philippou, 2010), the research is lacking in large scale quantitative studies. Supporting the claim for the need of both large scale quantitative research and small scale qualitative research, results of staff development research indicate that large group learning opportunities based on quantitative data must be followed up with individual or small group interactions based on qualitative data (Hord & Roussin, 2013).

Studies on belief systems have found that belief systems grounded on reasoning are strengthened by developing specialized content knowledge (Drageset, 2010). Also, prior school experiences are a dominant factor affecting instructional practices with in-service professional development opportunities being the second greatest influence (Harbin & Newton, 2013). Designers of in-service professional development need to consider the dominance of prior school experiences on teacher practices and the difficulty of breaking that cycle (Harbin & Newton, 2013). Likewise, change facilitators must consider the multitude of ways curriculum materials will communicate with the teacher when adopting a specific curriculum, and follow up with targeted professional

development (Remillard, 2005). To elaborate, in a study investigating teacher orientations during a curricular innovation, even though all the teachers wanted their students to be successful, each harbored divergent views of success which led to different approaches in their teaching strategies (Rogers, Cross, Gresalfi, Trauth-Nare, & Buck, 2011).

A consistent thread running through the literature on teacher beliefs was that recognizing, understanding, and acknowledging said beliefs are critical to understanding their affect on student learning. Research on beliefs and concerns, as related to curriculum reform, is abundant and suggest an obvious connection between concerns and implementation of innovative reform with fidelity. A key to ensure successful innovation implementation is continuous professional development targeted toward teacher concerns and knowledge.

Strategies for Reform

Successful implementation of curricula reform cannot hinge on cursory teacher preparation tactics (Charalambous & Philippou, 2010). As previously mentioned, research indicates the need for continuous and substantial guidance and support (Charalambous & Philippou, 2010). Change facilitators can serve as a guide and provide benchmarks for the journey of change (Hord & Roussin, 2013). Providers of professional development should be transparent about their own beliefs and those that support their practices and recommendations (Beswick, 2006). Hord and Roussin (2013) propose six strategies to aid change facilitators in guiding the innovation implementation:

1. Creating a shared vision of the change;
2. Planning and identifying resources necessary for the change;

3. Investing in professional development/professional learning;
4. Checking or assessing progress;
5. Providing assistance;
6. Creating a context conducive to change process (p. 10).

The Common Core Challenge

Implementation of the CCSSM requires innovative reform tactics that are indeed a paradigm shift in many teacher belief systems. Thereby, reform of this magnitude will elicit substantial teacher concerns. Successful implementation of CCSSM relies on professional development that is intensive, ongoing, connected to practice, focused on student learning, addresses specific content, aligned with school improvement goals, and fosters teacher collaboration (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). To allow CCSSM to root itself in education, all stakeholders including teachers, administrators, students, parents, politicians, business and industry partners, and community members require education in the process of change (Marrongelle, Sztajn, & Smith, 2013).

Conclusion

Curriculum innovation is a very tenuous and complicated process interwoven with many variables, each one affecting the other. The underlying root of the process is the belief system of all stakeholders involved in the innovation. Consequently, successful educational innovations have inherent beliefs about change: change is based on learning and improvement is based on change; successful change requires social interaction; individuals must change before the school changes; change has an effect on emotions and behaviors of humans; change occurs more readily if people recognize the benefits of

change; and the change leaders role in the process is one of facilitator (Hord & Roussin, 2013). Even with all of the research being conducted on beliefs, concerns, and their relationship to the change process as well as the need for continued and sustained professional development to support the change, few studies have been conducted at the secondary level delving into the relationship of concerns, specifically prescribed professional development, and the successful implementation of the innovation.

CHAPTER III

METHODOLOGY

Overview

The purpose of this study was to investigate and understand the concerns of secondary level mathematics teachers while in the initial stages of implementing the Common Core State Standards of Mathematics (CCSSM), and to determine if a relationship existed between the concerns and type and amount of professional development received. A mixed-methods approach was chosen to provide a well-rounded view of the concerns teachers have during the implementation of the CCSSM innovation. Three methods of analysis were performed on the data gathered: quantitative which included means, frequencies, standard deviations, and a multivariate analysis of variance; a profile analysis including peak stage interpretation, and a qualitative analysis. As noted in Appendix B, the research was conducted under the auspices of the Institutional Review Board.

Using the Concerns-Based Adoption Model (CBAM) as the theoretical framework, the researcher investigated the concerns held by Mississippi mathematics teachers during the initial phases of the implementation of the CCSSM. The essential elements of the model include basic assumptions about change, concepts on the Stages of Concern (SoC), Levels of Use (LoU), and Innovation Configurations. This study only focused on the SoC element of the model. The primary tool for the research was the online version of Stages of Concern Questionnaire (SoCQ) included in Appendix C, which included two open-ended statements. The SoCQ was used with permission as noted in Appendix D.

Data gathered in this study was analyzed quantitatively via a MANOVA research methodology looking for any relationships present within the stages of concern between subgroups. Using the graphical profile analysis and the SoCQ percentile data provided by the SEDL online data collection program the researcher performed an interpretation of the Peak Stage Scores and a Profile Interpretation (George, Hall, & Stiegelbauer, 2006). This interpretive analysis was performed for each individual response and each subgroup. The researcher assigned a user profile to each respondent and subgroup. The profile interpretation included the highest SoC, the second highest SoC, the Lowest SoC, and a user-profile (non-user, beginning user, and experienced user). The first open-ended question on the questionnaire was analyzed holistically to verify the profile assignments garnered from the Peak Stage analysis and the Profile Interpretation. Both open-ended responses were analyzed qualitatively to search for themes within the concerns data as a whole and also by subgroups and the assigned profiles. To achieve trustworthiness this study used multiple data resources and methods of interpretation (Patton, 2002).

Research Design

Research Questions and Hypotheses

Research question 1: What concerns did Mississippi secondary mathematics teachers experience during the implementation of the Common Core State Standards?

Research question 2: What relationships existed between the type of professional development received on the implementation of the Common Core State Standards and the concerns that teachers are experiencing?

Hypothesis 1: There is no significant difference between the raw scores of each of the seven stages of concern based on number of years of teaching experience.

Hypothesis 2: There is no significant difference between the raw scores of each of the seven stages of concern based on the geographic region of the respondents' school.

Hypothesis 3: There is no significant difference between the raw scores of each of the seven stages of concern based on the highest degree held by teacher.

Hypothesis 4: There is no significant difference between the raw scores of each of the seven stages of concern based on whether or not a teacher is Nationally Board Certified.

Hypothesis 5: There is no significant difference between the raw scores of each of the seven stages of concern based on the way licensure was obtained (traditional, add-on endorsement and alternative route).

Hypothesis 6: There is no significant difference between the raw scores of each of the seven stages of concern based on the primary grade level taught by the teacher.

Hypothesis 7: There is no significant difference between the raw scores of each of the seven stages of concern based on the level of professional development received that targeted the CCSSM.

Independent variables. The independent variables, which are nominal categorical variables, were the stages of concern. There are seven stages of concern: Stage 0, Awareness or Unconcerned; Stage 1, Informational; Stage 2, Personal; Stage 3, Management; Stage 4, Consequence; Stage 5, Collaboration and Stage 6, Refocusing or Refinement (Anderson, 1997).

Outcome variable. The outcome variable was the relative level of intensity the teacher experienced at each stage of concern. Even though each stage is distinctive, they

are not mutually exclusive (Hord, Rutherford, Huling-Austin, & Hall, 1987). An individual will likely exhibit some degree of concern at each stage, but the measured level of intensity at each stage will vary as the innovation is implemented (Hord, Rutherford, Huling-Austin, & Hall, 1987). These variations of intensity levels identify the developmental nature of the individual concerns which can be categorized into three dimensions--self, task, and impact (Hord, Rutherford, Huling-Austin, & Hall, 1987). To obtain the relative intensity the SoCQ was scored by converting raw scores for each concern into percentile concerns (George, Hall, & Stiegelbauer, 2006).

Status variables. The data for the status variables was collected through the demographic section of the SoCQ. Status variables that addressed the subgroups included the nominal categorical variables: the primary grade level taught by the teacher (7, 8, Algebra I, above Algebra I); the level of college degree held by the teacher, specifically bachelors, masters, specialist, or doctorate; did the teacher obtain their mathematics endorsement through a traditional educational program, an add-on endorsement, or alternate route licensure; the geographic region the teacher teaches in delineated by Mississippi congressional districts; and the level of professional development for CCSSM the teacher received. The binary categorical variable investigating the subgroups included whether or not the teacher is National Board Certified. Also, a discrete interval variable of years of mathematics teaching experience, specified in five year intervals (0-4, 5-9, 10-14, 15-19, 20-24, and 25 plus years), was included in the study.

Participants

Participants in this study consisted of 88 secondary mathematics teachers from 29 public school districts across the state of Mississippi spanning grade levels seven through high school. Focusing on Mississippi teachers was not only a convenience sample, but a necessity for this study: each state's standards were different and each state implemented the CCSS in different ways. Therefore, concerns of teachers across the nation will vary depending on the rigor of their former standards. A minimum of 100 teachers were to be recruited from across the state representing each grade level (7 to 12) and congressional district within the state of Mississippi. Letters were sent to superintendents requesting permission to anonymously survey mathematics teachers in their districts.

Instrumentation

Validity and Reliability

The instrument used in this study was the Stages of Concern Questionnaire (SoCQ) Form 075 which was initially developed and validated in 1974 to quickly score the seven Stages of Concern about an innovation (George, Hall, & Stiegelbauer, 2006). Before initial publication of the instrument, the SoCQ was tested team of researchers at the Research and Development Center for Teacher Education at the University of Texas at Austin for estimates of reliability, internal consistency, and validity with several samples of varying sizes and through 11 different innovations (George, Hall, & Stiegelbauer, 2006). Since 1974 the SoCQ has been used and psychometric properties tested a myriad of times both for educational and non-educational innovations (George, Hall, & Stiegelbauer, 2006).

To test the SoCQ for validity, the research team used intercorrelation matrices, judgments of concerns based on interview data, and confirmation of expected group differences and changes over time as outlined in the 1955 strategy of Cronbach and Meehl to test for validity (George, Hall, & Stiegelbauer, 2006). After extensive research, a 195-item pilot checklist was generated, but the research team was skeptical about the ability to measure stage 0, unconcerned, so the initial document only contained items for stages 1 to 6. During factor analysis it became evident that stage 0 was indeed measurable and readily identified (George, Hall, & Stiegelbauer, 2006).

The research team wanted to ensure that the SoCQ was a tool with a high internal reliability. Table 2 shows the alpha coefficients of internal consistency for each of the seven Stages of Concern scales. The coefficients reflect the degree of reliability among items on a scale in terms of overlapping variance computed using a stratified sample of 830 teachers in 1974 (George, Hall, & Stiegelbauer, 2006). Stage 0 does have a coefficient below the minimum desired score of .70, but inclusion of Stage 0 in this study makes sense as most participants in the study will not be Stage 0, unconcerned, as they are currently in the implementation stages of the Common Core.

Table 2

Internal Reliability Ratings

Coefficient of Internal Reliability for the SoCQ							
Stage	0	1	2	3	4	5	6
Alpha	.64	.78	.83	.75	.76	.82	.71
Test-Retest Correlations on the SoCQ							
Stage	0	1	2	3	4	5	6
Alpha	.65	.86	.82	.81	.76	.84	.71

(George, Hall, & Stiegelbauer, 2006, p. 20)

Procedures

Assent and Consent

A letter was emailed to every superintendant of a public school within the state of Mississippi requesting permission to survey their mathematics teachers. If no response was elicited, the email was followed up with a phone call. Superintendents were sent a summary of the results upon completion of the study. The benefits of participation provided the district with a direction for possible professional development for their teachers. The administration of the survey was anonymous, and there was no means to identify the respondents; therefore, there was no need for written consent from the participants. The respondents informally waived their consent by voluntarily completing the survey. A statement was included on the email accompanying the link to the online survey stating that completion of this survey constitutes consent to use their data.

Distribution of Survey

Once assent was obtained, the link to the electronic survey was sent to every mathematics teacher in that school district. The process varied by district depending on the requirements of the district. Either a group email was forwarded to each teacher, or the researcher sent the email to each individual teacher. When the teacher accessed and completed the online survey, it was automatically submitted to the SEDL corporation. The researcher was notified by email that a response to the survey had been logged. There was no identifying information attached to the survey response.

Data Collection

Data collected for the study was accessed via the SEDL website. Once it was determined that all attempts at data collection was exhausted, the data was retrieved in

spreadsheet format. Also, profile graphs of individual respondents and subgroups were printed via the online portal. The graphs displayed each stage and its associated level of relative intensity. Responses to open-ended statements were retrieved in the spreadsheet document as well. The numerical data was separated from the scripted data and placed into two separate spreadsheets, retaining the demographic information in each spreadsheet.

Limitations

Obviously, the small sample size was a limiting factor in this study. Also, limiting the study to only one state implementing the CCSSM confined the study geographically. Additionally there are three dimensions to the Stage of Concern element of CBAM, and this study only addressed two of the dimensions, the SoCQ and open-ended questions on the survey. Interviews were not included in this study due to the desire to retain the anonymous aspect of the study and the attempt to increase the sample size to statewide data collection.

Data Analysis

Research Hypotheses

Quantitative analysis. Data collected was downloaded from the SEDL website into a spreadsheet. This data was then entered into SPSS. Statistical analysis of each hypothesis included frequencies, means, standard deviations, and multivariate analysis of variance, MANOVA with an alpha of .05.

Research Questions

Profile Interpretation. RQ1 was addressed by using the graphical profile analysis of each respondent and subgroup by analyzing the percentile scores for all seven stages

and interpreting the meaning of the highs and lows and their interrelationships. Percentile scores were obtained by converting the raw scores using the Raw Score to Percentile Conversion Table. Peak Stage Scores for the whole group and for each subgroup were determined by examining both the highest and second highest stage scores by using a data matrix to cross tabulate each individual's highest and second highest SoC (George, Hall, & Stiegelbauer, 2006). To obtain a richer clinical picture of the concerns, a Profile Interpretation for each individual, subgroup, and the whole group was implemented by examining the percentile scores for all seven stages and interpreting the meaning of the peak scores and their relationship to the whole SoC profile (George, Hall, & Stiegelbauer, 2006). Peak scores, the first and second highest scores, as well as lowest score and a user-profile (non-user, beginning user, and experienced user) were assigned to each individual and subgroup (George, Hall, & Stiegelbauer, 2006). An overall profile analysis of all respondents and subgroups was then be made. Each graph was analyzed for the presence of a 1-2 split which is when there is an obvious difference between Stages 1 and 2. A negative 1-2 split is when Stage 2 is higher than Stage 1; whereas, a positive 1-2 split is when Stage 1 is higher than Stage 2. A negative 1-2 split indicates possible resistance to the innovation; while, a positive 1-2 split indicates positives tendencies to continue with the innovation. The relationship of Stage 6 was also analyzed. If Stage 6 tailed up, this meant the respondent was looking to refine the innovation either to replace it or to improve the innovation to make it work better for the respondent. A tail down indicated the respondent was either so frustrated with the innovation that they decided not to continue use of the innovation, or they were still at the stage of working through the innovation. The positive or negative tendencies of Stage 6

depended upon the relative intensities of the other stages. Anxious users were identified if the analysis showed high levels at most of the stages. This analysis was compared to the results of the quantitative study of the research hypotheses looking for similarities and discrepancies.

Qualitative analysis. Once all the data has been analyzed quantitatively, a qualitative analysis ensued to delve deeper into the intricacies of concerns to gain a better understanding of the concerns teachers had during the implementation of CCSSM. Participants who responded to the open-ended questions were included in the qualitative analysis. The first open-ended question (OE1) asked "What do you think about the implementation of the Common Core Standards for Mathematics, what concerns do you have?" It was analyzed within the framework of CBAM as described by Hall and Hord (2014) by initially reading the statement and determining if the overall theme reflects one of the concern dimensions of Unrelated, Self, Task, or Impact. The statement was further analyzed by rereading the statement sentence by sentence, and assigning a SoC to each sentence. Finally, the whole statement was judged holistically to determine peak SoC. The actual script from each selected response to OE1 along with their assignments of peak scores, low scores, and user profile were entered into NVivo to be coded qualitatively. The qualitative analysis included the process of looking for themes using descriptive coding followed by elaborative coding within the realm of CBAM literature (Saldana, 2013 & Patton, 2002).

RQ2 was answered by analyzing the second open-ended response on the SoCQ. The second open-ended statement, "Describe the type and amount of professional development you have received on how to implement the Common Core State Standards

for Mathematics in your classroom including any concerns you have with professional development for the CCSSM", was qualitatively analyzed looking for themes using descriptive coding followed by elaborative coding within the realm of CBAM literature (Saldana, 2013 & Patton, 2002). The researcher ran queries within NVivo to sort the data from both open-ended questions by subgroup, profile, and themes to examine the data for any patterns and/or relationships prevalent within the data as a whole as well as within the subgroups and user profiles.

Results from the quantitative analysis, the analysis of the graphical profiles and profile interpretation, and the qualitative analysis of the open-ended responses were interpreted holistically to determine what concerns teachers exhibited during the initial phase of the implementation of the CCSSM; and to determine if any relationship existed between the professional development received and the teachers' concerns.

CHAPTER IV

RESULTS

Introduction

Secondary mathematics teachers from across the state of Mississippi were surveyed representing 29 school districts. A total of 88 responses were received with 87 valid responses used for the quantitative and profile interpretation. One response was removed from the quantitative and profile interpretation because responses to all survey questions were zeros; although this respondent did respond to one of the open-ended questions, therefore, this response was included in the qualitative analysis. Of the 88 responses, 69 respondents replied to the open-ended questions which were analyzed qualitatively.

Distributing the survey through the school systems proved to be challenging as principals were reluctant to burden their teachers with any more tasks than necessary due to the increased work load of this school year. Several superintendents and principals specifically contributed the increased work load to the implementation of the new standards. Response to the survey was much lighter than anticipated.

Descriptive Statistics

Whole Cohort

Each of the 87 responses was analyzed quantitatively, and the mean raw score and standard deviation was computed for each stage of concern. Five questions from the survey were associated with each of the seven Stages of Concern for a total of 35 questions. Each question was a Likert-type scale with possible responses ranging from 0 (irrelevant) to 7 (very true of me now). The mean raw score represents the relative level

of intensity for each stage of concern. Table 3 details the mean raw scores and standard deviation for all 87 responses.

Table 3

Stage of Concern Analysis of Whole Group

Stage of Concern	Mean Raw Score	Standard Deviation
Stage 0	9.93	4.24
Stage 1	20.47	6.67
Stage 2	22.46	6.91
Stage 3	19.17	7.69
Stage 4	24.23	6.44
Stage 5	21.77	6.95
Stage 6	20.53	7.73

Subgroup Descriptive Statistics

Years of teaching experience. The whole cohort was analyzed by specifying the years of teaching experience for each teacher. The years were divided into five year intervals up to year 25 with the final interval representing teachers with 25 plus years of teaching experience. As noted in Table 4, 34 percent of the respondents had five to nine years of teaching experience, 17 percent being new teachers with zero to four years of experience, and ten percent representing the veteran teachers exceeding 24 years of years of teaching experience.

Table 4

Frequency Data by Years of Teaching Experience

Teaching Experience (years)	n	Percentage
0 - 4	15	17%
5 - 9	30	35%
10-14	14	16%
15-19	11	13%
20 - 24	8	9%
25+	9	10%

Table 5 details the mean raw scores for the relative levels of intensity of concerns and standard deviation of the survey responses grouped by Stage of Concern and by intervals denoting years of teaching experience. The mean scores for Stage 0 are fairly consistent with the exception of teachers with 10 to 14 years of experience which is lower at 7.57. A low score at Stage 0 indicates that the teacher is concerned with the innovation. The mean scores in Table 5 indicate that the majority of the teachers are concerned with the implementation of the CCSSM; but the teachers with 10 to 14 years of experience are showing an increased level of concern.

Table 5

Stage of Concern Analysis by Years of Teaching Experience

Stage of Concern	Teaching Experience (years)	Mean	Standard Deviation
Stage 0	0 - 4	10.13	4.29
	5 - 9	10.53	4.01
	10-14	7.57	4.03
	15-19	10.36	3.74
	20 - 24	11.00	5.45
	25+	9.78	4.44
Stage 1	0 - 4	19.47	5.90
	5 - 9	22.23	7.13
	10-14	18	7.62
	15-19	20.27	6.29
	20 - 24	20.88	5.36
	25+	20	6.22
Stage 2	0 - 4	20.73	5.75
	5 - 9	23.17	7.08
	10-14	21.29	8.79
	15-19	23.91	5.92
	20 - 24	22.38	7.35
	25+	22.11	6.79
	25+	18.33	5.05

Table 5 (continued).

Stage of Concern	Teaching Experience (years)	Mean	Standard Deviation
Stage 3	0 - 4	17.20	8.45
	5 - 9	20.03	7.80
	10-14	18.21	8.49
	15-19	21.27	6.68
	20 - 24	20.88	7.88
	25+	17.00	6.04
Stage 4	0 - 4	24.40	7.84
	5 - 9	25.60	5.74
	10-14	25.43	5.81
	15-19	23.46	6.07
	20 - 24	23.13	6.40
	25+	19.44	6.62
Stage 5	0 - 4	21.40	6.41
	5 - 9	23.00	6.88
	10-14	22.93	8.60
	15-19	20.18	6.57
	20 - 24	21.88	7.62
	25+	18.33	5.05

Table 5 (continued).

Stage of Concern	Teaching Experience (years)	Mean	Standard Deviation
Stage 6	0 – 4	20.27	9.95
	5 - 9	21.23	7.34
	10-14	19.71	8.90
	15-19	20.46	5.70
	20 - 24	22.25	7.85
	25+	18.44	6.33

Congressional District. The whole cohort was analyzed by the geographic location of their school as delineated by Congressional district. As evidenced in Table 6, the distribution of respondents was heavily weighted to the fourth Congressional district representing 53 percent of the respondents. The second Congressional district had the fewest respondents at 6 percent.

Table 6

Frequency Data by Congressional District

Congressional District	n	Percentage
1	20	23%
2	5	6%
3	16	18%
4	46	53%

Table 7 details the mean raw scores for the levels of relative level of intensity of concerns and the standard deviation of the survey responses grouped by Stage of Concern

according to the Congressional district in which their school is located. The mean scores for Congressional District 2 were high at Stage 1 and 2, Information and Personal. The mean scores of Congressional District 4 were lowest at Stage 4, Consequence.

Table 7

Stage of Concern Analysis by Congressional District

Stage of Concern	Congressional District	Mean	Standard Deviation
Stage 0	1	10.60	4.63
	2	10.60	4.51
	3	10.56	4.41
	4	9.35	4.03
Stage 1	1	17.95	6.22
	2	25.60	7.54
	3	19.19	5.49
	4	21.46	6.79
Stage 2	1	20.20	7.72
	2	25.80	5.81
	3	23.06	5.90
	4	22.87	6.90

Table 7 (continued).

Stage of Concern	Congressional District	Mean	Standard Deviation
Stage 3	1	19.90	6.84
	2	16.60	9.61
	3	19.94	7.22
	4	20.17	7.96
Stage 4	1	21.65	5.77
	2	26.60	5.50
	3	24.88	7.21
	4	24.87	6.40
Stage 5	1	19.20	6.57
	2	25.60	8.02
	3	20.06	6.10
	4	23.07	6.97
Stage 6	1	17.75	7.06
	2	26.20	6.26
	3	20.50	7.52
	4	21.13	7.97

Highest Degree Held. The whole cohort was also analyzed by the highest degree held by each of the respondents. Table 8 reveals that 53 percent of the respondents held Master's degrees, 44 percent with a Bachelor's degree, and only three percent holding a degree higher than a Master's degree.

Table 8

Frequency Data by Highest Degree Held

Highest Degree	n	Percentage
Bachelor	38	44%
Master	46	53%
Specialist +	3	3%

Table 9 details the mean raw scores of the relative intensity of concern and the standard deviation of the survey responses grouped by Stage of Concern according to the highest degree each respondent holds. At Stage 0, Unconcerned, the respondents with advanced degrees (Specialist or Doctorate) had the lowest mean at 5.67 and a high mean at Stage 1, Information. At Stage 4, Consequence, the teachers with the teachers with Master's degrees had the lowest mean at 22.11. The means of teachers with advanced degrees varied the most, but since they only comprise three percent of the sample, the validity of this variance is in question. Stages 3 and 4 showed a difference in the means between Bachelor's and Master's degree; whereas the other stages showed similar means.

Table 9

Stage of Concern Analysis by Highest Degree Held

Stage of Concern	Highest Degree Held	Mean	Standard Deviation
Stage 0	Bachelor	10.11	3.56
	Master	10.07	4.73
	Specialist +	5.67	2.08

Table 9 (continued).

Stage of Concern	Highest Degree Held	Mean	Standard Deviation
Stage 1	Bachelor	20.24	7.22
	Master	20.22	6.10
	Specialist +	27.33	6.11
Stage 2	Bachelor	21.95	6.91
	Master	22.67	6.96
	Specialist +	25.67	7.64
Stage 3	Bachelor	21.03	8.09
	Master	17.76	7.32
	Specialist +	17.33	2.52
Stage 4	Bachelor	26.45	4.95
	Master	22.11	6.95
	Specialist +	28.67	4.04
Stage 5	Bachelor	21.82	6.77
	Master	21.35	6.95
	Specialist +	27.67	9.24
Stage 6	Bachelor	20.92	7.81
	Master	19.74	7.68
	Specialist +	27.67	4.62

National Board Certification. The whole cohort was also analyzed by whether or not the respondent was a National Board Certified Teacher. Table 10 shows that only 15 percent of the teachers who responded to the survey were National Board Certified Teachers (NBCT).

Table 10

Frequency Data by National Board Certification

NBCT	n	Percentage
No	74	85%
Yes	13	15%

Table 11 details the mean raw scores of the relative levels of intensity of concerns and the standard deviation of the survey responses grouped by Stage of Concern according to whether or not the respondent was a National Board Certified Teacher. Overall, there were minimal differences between the means of NBCT's and teachers not holding the certification.

Table 11

Stage of Concern Analysis by National Board Certification

Stage of Concern	National Board Certification	Mean	Standard Deviation
Stage 0	No	9.80	4.15
	Yes	10.69	4.80
Stage 1	No	20.62	6.72
	Yes	19.62	6.56

Table 11 (continued).

Stage of Concern	National Board Certification	Mean	Standard Deviation
Stage 1	No	20.62	6.72
	Yes	19.62	6.56
Stage 2	No	22.45	6.80
	Yes	22.54	7.82
Stage 3	No	19.14	7.69
	Yes	19.39	7.96
Stage 4	No	24.28	6.60
	Yes	23.92	5.65
Stage 5	No	21.78	7.11
	Yes	21.69	6.20
Stage 6	No	20.54	7.76
	Yes	20.46	7.85

Method of Licensure. The whole cohort was also analyzed by how the respondent procured their mathematics endorsement on their teaching license delineated by the traditional route, as an add-on endorsement, or by the alternate route. Table 12 reveals that 57 percent of the respondents received their endorsement by the traditional route.

Table 12

Frequency Data by Method of Licensure

License	n	Percentage
Traditional	50	57%
Add-On	18	18%
Alternate Route	19	33%

Table 13 details the mean raw scores of the relative levels of intensity of concerns and the standard deviation of the survey responses grouped by Stage of Concern according to method the respondent procured their mathematics endorsement on their teaching license. The means were fairly similar at each stage, but Stage 3 showed the largest range of values from a low mean at 16.44 to a high mean at 20.74 for traditional route teachers.

Table 13

Stage of Concern Analysis by Method of Licensure

Stage of Concern	Type of Licensure	Mean	Standard Deviation
Stage 0	Traditional	10.38	4.02
	Add-On	10.22	4.86
	Alternate	8.47	4.09
Stage 1	Traditional	20.94	7.02
	Add-On	21.06	5.62
	Alternate	18.68	6.63

Table 13 (continued).

Stage of Concern	Type of Licensure	Mean	Standard Deviation
Stage 2	Traditional	23.24	7.26
	Add-On	20.67	5.90
	Alternate	22.11	6.84
Stage 3	Traditional	20.74	7.69
	Add-On	16.44	7.07
	Alternate	17.63	7.57
Stage 4	Traditional	24.54	5.78
	Add-On	22.28	8.45
	Alternate	25.26	5.85
Stage 5	Traditional	22.38	6.47
	Add-On	22.22	7.08
	Alternate	19.74	7.99
Stage 6	Traditional	21.32	6.69
	Add-On	17.89	8.73
	Alternate	20.95	9.11

Primary Class Taught. The whole cohort was also analyzed by primary class taught by the respondent. Table 14 reveals that 49 percent of the respondents teach Algebra I, 20 percent teach 8th grade math, 16 percent teach 7th grade math, and 16 percent teach a subject higher than Algebra I.

Table 14

Frequency Data by Primary Class Taught

Class	n	Percentage
7	13	15%
8	17	20%
Algebra I	43	49%
Above Algebra I	14	16%

Table 15 details the mean raw scores of the relative level of intensity of concerns and the standard deviation of the survey responses grouped by Stage of Concern according to the primary class taught by the respondent. Grade 7 teachers had the lowest mean at Stages 0, 1, 3, and 4. Teachers of upper level mathematics classes (geometry and above) had the lowest mean at Stages 2, 5, and 6. Grade 8 teachers had the highest mean at Stages 0, 1, 4, and 6; while Algebra I teachers had high means at Stages 2, 3, and 5. Stage 3 had the largest range of mean scores; while Stage 5 mean scores were more similar.

Table 15

Stage of Concern Analysis by Primary Class Taught

Stage of Concern	Primary Class Taught	Mean	Standard Deviation
Stage 0	7	8.62	3.78
	8	11.29	4.61
	Algebra 1	9.91	4.59
	Geometry +	9.57	2.68
Stage 1	7	17.31	7.28
	8	22.24	5.27
	Algebra 1	21.58	6.47
	Geometry +	17.86	7.07
Stage 2	7	20.85	8.17
	8	22.94	6.28
	Algebra 1	23.72	6.42
	Geometry +	19.50	7.41
Stage 3	7	14.46	4.98
	8	20.06	7.97
	Algebra 1	21.26	7.76
	Geometry +	16.07	6.89

Table 15 (continued).

Stage of Concern	Primary Class Taught	Mean	Standard Deviation
Stage 4	7	21.31	7.74
	8	25.59	6.18
	Algebra 1	25.35	6.26
	Geometry +	21.86	4.90
Stage 5	7	21.62	7.84
	8	21.71	7.51
	Algebra 1	22.00	6.34
	Geometry +	21.29	7.93
Stage 6	7	17.46	8.40
	8	22.65	7.97
	Algebra 1	21.84	7.67
	Geometry +	16.79	5.09

Professional Development Received. The whole cohort was also analyzed by amount of professional development each respondent received on the implementation of the CCSM. Table 16 reveals that 46 percent of the respondents received sporadic professional development, while 38 percent of the respondents received ongoing professional development either by district specialists, outside consultants, or school coaches.

Table 16

Frequency Data by Amount of Professional Development

PD Received	n	Percentage
None	3	3%
Minimal	11	13%
Sporadic	40	46%
Ongoing	24	28%
School Coach	9	10%

Table 17 details the mean raw scores of the relative levels of intensity of concerns and the standard deviation of the survey responses grouped by Stage of Concern according to the amount of professional development the respondent received on the implementation of CCSSM. Teachers who received no professional development had the lowest means at Stages 1, 2, 3, and 6. Teachers with ongoing professional development had low means at Stages 0 and 5; while teachers with intensive professional development had a low mean at Stage 4. High mean scores varied among the stages with teachers receiving minimal training having highs at Stages 0 and 1; teachers receiving sporadic training having highs at Stages 2, 3, and 6; teachers with ongoing training had a high mean at Stage 4; and teachers with intensive training had a high at Stage 5. The mean scores at Stages 0, 4, and 5 were similar; whereas, the mean scores at Stages 1, 2, 3, and 6 were more spread out.

Table 17

Stage of Concern Analysis by Amount of Professional Development

Stage of Concern	PD Received	Mean	Standard Deviation
Stage 0	None	11.33	6.81
	Minimal	11.82	5.29
	Sporadic	10.03	4.38
	Ongoing	8.63	2.76
	School Coach	10.22	4.49
Stage 1	None	16.67	10.21
	Minimal	22.55	4.55
	Sporadic	22.10	6.91
	Ongoing	18.13	6.46
	School Coach	18.22	5.14
Stage 2	None	16.33	11.24
	Minimal	23.00	6.13
	Sporadic	23.40	7.21
	Ongoing	22.46	6.10
	School Coach	19.67	6.82
Stage 3	None	14.00	8.00
	Minimal	17.36	7.95
	Sporadic	20.68	7.54
	Ongoing	18.46	7.10
	School Coach	18.33	9.47

Table 17 (continued).

Stage of Concern	PD Received	Mean	Standard Deviation
Stage 4	None	22.67	8.50
	Minimal	23.09	6.93
	Sporadic	24.65	6.70
	Ongoing	25.13	5.01
	School Coach	21.89	7.98
Stage 5	None	21.33	7.09
	Minimal	20.55	7.90
	Sporadic	22.78	7.30
	Ongoing	19.96	6.51
	School Coach	23.78	5.02
Stage 6	None	16.33	7.37
	Minimal	20.00	9.02
	Sporadic	22.15	7.07
	Ongoing	20.04	7.68
	School Coach	16.67	8.75

Quantitative Statistical Analysis

Description

Data gathered in this study was analyzed quantitatively via a MANOVA research methodology looking for any relationships present within the stages of concern between subgroups.

Results

Hypothesis 1: There was no significant difference between the raw scores of each of the seven stages of concern based on number of years of teaching experience. The relationship between the subgroups delineated by years of teaching experience as shown on the multivariate test was not significant with $F(35, 395) = 0.91$, $p = 0.62$. This result implies that the means of the relative level of intensity of concern at each stage of concern exhibited in Table 5 did not vary significantly within the subgroup intervals of teaching experience.

Hypothesis 2: There was no significant difference between the raw scores of each of the seven stages of concern based on the geographic region of the respondents' school. The relationship between the subgroups delineated by the Congressional District of the respondent's school as shown on the multivariate test was not significant with $F(21, 237) = 1.194$, $p = 0.257$. This result implies that the means of the relative level of intensity of concern at each stage of concern exhibited on Table 7 did not vary significantly within the subgroup based on Congressional districts.

Hypothesis 3: There was a significant difference between the raw scores of the seven stages of concern based on the highest degree held by teacher. The relationship between the subgroups delineated by highest degree held by the respondent as shown on the multivariate test was significant with $F(14, 158) = 2.653$, $p = 0.002$. The individual ANOVA's on the Tests of Between-Subjects showed that there was an effect at Stage 4, Consequence, with $F(2, 84) = 6.119$, $p = .003$. A Tukey HSD post hoc test showed the difference within the subgroups was between respondents who held bachelors and masters degrees. The mean difference between the two groups was 4.3387 with $p = .005$.

This result implies that the means exhibited in Table 9 revealed respondents with bachelor's degrees had a higher relative level of intensity of concern at Stage 4, Consequence, than the respondents who held a master's degree.

Hypothesis 4: There was no significant difference between the raw scores of each of the seven stages of concern based on whether or not a teacher is Nationally Board Certified. The relationship between the subgroups delineated by whether or not the respondent was a National Board Certified Teacher as shown on the multivariate test was not significant with $F(7, 79) = 0.178$, $p = 0.989$. This result implies that the means exhibited in Table 11 reveal that the relative level of intensity of concern at each stage of concern did not vary significantly within the subgroup based on National Board Certification.

Hypothesis 5: There was no significant difference between the raw scores of each of the seven stages of concern based on the way licensure was obtained (traditional, add-on endorsement and alternative route). The relationship between the subgroups delineated by the method of procurement of the mathematic endorsement on the respondent's teaching license, as shown on the multivariate test, was not significant with $F(14, 158) = 1.441$, $p = 0.14$. This result implies that the means exhibited in Table 13 reveal the relative level of intensity of concern at each stage of concern did not vary significantly within the subgroup based on the respondent's teaching license.

Hypothesis 6: There was no significant difference between the raw scores of each of the seven stages of concern based on the primary grade level taught by the teacher. The relationship between the subgroups delineated by primary class taught by the respondent, as shown on the multivariate test, was not significant with $F(21, 237) =$

1.018, $p = 0.443$. This result implies that the means exhibited in Table 15 reveal the relative level of intensity of concern at each stage of concern did not vary significantly within the subgroup based on the primary class taught by the respondent.

Hypothesis 7: There was no significant difference between the raw scores of each of the seven stages of concern based on the level of professional development received that targeted the CCSSM. The relationship between the subgroups delineated by the amount of professional development the respondent received on CCSSM, as shown on the multivariate test, was not significant with $F(28, 316) = 1.247$, $p = .186$. This result implies that the means exhibited in Table 17 reveal the relative level of intensity of concern at each stage of concern did not vary significantly within the subgroup based on the amount of professional development received.

Profile Interpretation

Introduction

Research questions. A profile interpretation of individual responses and the whole cohort, as well as user profiles and subgroups based on demographic data, was utilized to answer the research questions.

Research question 1: What concerns did Mississippi secondary mathematics teachers experience during the implementation of the Common Core State Standards?

Research question 2: What relationships existed between the type of professional development received on the implementation of the Common Core State Standards and the concerns that teachers experienced?

Profile analysis. An Individual SoCQ Participant report for each of the 87 responses which included demographic information, responses to the open-ended

questions, a table detailing the responses to each question grouped by Stage of Concern, raw score and percentile scores for each of the Stages of Concern, and graphical analysis detailing each respondent's relative intensity for each SoC was obtained. Percentile scores were obtained using the conversion chart which was used with permission as noted in Appendix E. Each report was analyzed and assigned a user profile of either non-user, beginning user, or experienced user. Each graph was analyzed for the presence of a 1-2 split and a tailing up or down at Stage 6. Anxious users were identified if the analysis showed high levels at most of the stages. Open-ended questions were analyzed by assigning a SoC to each sentence, then assigning a single SoC to the entire response based on a holistic evaluation of the entire response. Within each user profile, the responses were sorted into positive tendencies, negative tendencies, or anxious tendencies based on a holistic analysis of the relationships of the intensities of each stage as well as the 1-2 split, Stage 6, and response to open-ended questions. Once user profiles were assigned to each respondent, a profile interpretation analysis was conducted on the whole group, each user profile, and each subgroup as demarcated by the demographic information collected on the survey. The profile interpretation included analysis of the graphical profile, comparison of peak and second-highest stage scores, and low stage scores.

Whole Cohort

As noted in figure 2 analysis of the whole cohort revealed a beginning user profile with a peak score at Stage 2 in the 78th percentile, a second-highest score at Stage 3 in the 73rd percentile which was closely followed by Stage 1 in the 72nd percentile. The

low stage was at Stage 4 in the 48th percentile. A weak negative 1-2 split was present and there was a tailing up on Stage 6.

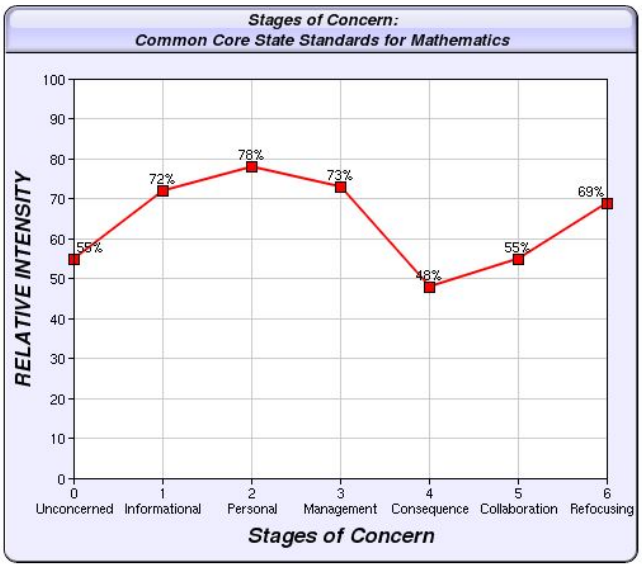

Figure 2. Stage of Concern graphical analysis of the whole cohort.

In order to compare the peak scores and second highest peak scores, a matrix which cross-tabulated these scores was analyzed as displayed in Figure 3. Most of the peak scores were coupled with an adjacent second highest SoC which shows a linear progression of working through the stages synonymous with the wave motion of user profiles. Of interest, respondents with a peak stage score at Stage 3, Management, tied for second highest score at Stages 1, 2, and 6. Stages 5 and 6 were coupled with non-adjacent stages of Stage 1 and Stage 3, respectively.

Highest Stage of Concern	Second Highest Stage of Concern								
	0	1	2	3	4	5	6	Percentage of participants	Number of participants
0 Unconcerned	0	33	25	25	0	0	17	13.8%	12
1 Informational	0	0	42	11	0	11	37	21.8%	19
2 Personal	15	30	0	20	10	25	0	23.0%	20
3 Management	12	29	29	0	0	0	29	19.5%	17
4 Consequence	50	0	50	0	0	0	0	2.3%	2
5 Collaboration	13	63	13	13	0	0	0	9.2%	8
6 Refocusing	0	33	11	44	11	0	0	10.3%	9
								Total	87

Figure 3. Matrix cross-tabulation of highest to second highest Stage of Concern.

User Profile Analysis

Table 18 shows the raw score averages and the percentile scores for each stage. Of the 87 respondents, 31 or 36% were classified as non-users and 56 or 64% were classified as beginning users. Of note, no respondents were classified as an experienced user.

Table 18

User Profile Analysis

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	n
Raw Score Averages								
Non-User	14	20	23	21	23	19	20	31
Beginning User	8	21	22	18	25	23	21	56
Percentile Scores								
Non-User	81%	72%	80%	80%	43%	44%	65%	
Beginning User	40%	75%	78%	69%	54%	59%	69%	

The peak stage score for the non-user was Stage 0 in the 81st percentile, with a second-highest score tied between Stages 2 and 3 in the 80th percentile, and a low stage score at Stage 4 in the 44th percentile. Whereas the peak stage score for the beginning user was Stage 2 in the 78th percentile, with a second-highest score at stage 1 in the 75th percentile, and a low stage score at Stage 0 in the 40th percentile. Figure 4 illustrates a comparison between the relative intensity levels of each user profile. An obvious difference between the profiles occurs at Stage 0 which is a peak score for the non-user and a low score for the beginning user. The two profiles are similar at Stages 1 and 2. The non-user has a higher level of intensity at Stage 3; whereas the beginning user has higher relative levels of intensity at Stages 4 and 5. Both profiles tail-up at Stage 6 with similar levels of intensity, although the non-user's tail up is steeper than the beginning user. The non-user has a negative 1-2 split; where the 1-2 split is barely distinguishable for the beginning user.

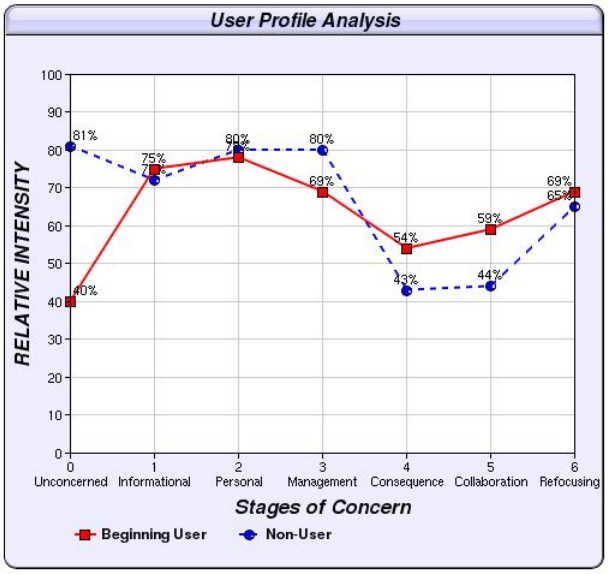

Figure 4. Graphical analysis of the user profiles.

Table 19 reveals that 47% of the whole cohort exhibits negative tendencies towards the implementation of the CCSSM; while 15% of the respondents revealed anxious tendencies regarding the implementation. An analysis of these tendencies between the user profiles show that 54% of the beginning users show positive tendencies, while only 10% of the non-users show positive tendencies.

Table 19

Tendency Analysis of User Profiles

	Tendencies			
	Positive	Negative	Anxious	n
Whole Cohort	38%	47%	15%	87
Beginning Users	54%	30%	16%	56
Non-Users	10%	77%	13%	31

Subgroup Profile Analysis

Years of teaching experience. Table 20 details the percentile scores for each SoC for the subgroup based on the years of teaching experience. Teachers with zero to four years of teaching experience had a peak SoC at Stage 2 in the 76th percentile, a second-highest peak at Stage 1 in the 69th percentile, and a low score a Stage 4 in the 48th percentile. Teachers with five to nine years of teaching experience have a peak SoC tied at Stages 1 and 2 in the 80th percentile and a low SoC tied at Stages 4 and 5 in the 59th percentile. Teachers with 10 to 14 years of experience have a peak SoC at Stage 2 in the 78th percentile, a second-highest peak at Stage 3 in the 69th percentile, and a low SoC at Stage 0 in the 40th percentile. Teachers with 15 to 19 years of experience have a peak SoC at Stage 2 in the 83rd percentile, a second-highest peak at Stage 3 in the 80th

percentile, and a low SoC at Stage 4 in the 43rd percentile. Teachers with 20-24 years of teaching experience have a peak SoC at Stage 3 in the 80th percentile, a second-highest peak at Stage 2 in the 78th percentile, and a low SoC at Stage 4 in the 43rd percentile. Teachers with 25 plus years of teaching experience have a peak SoC at Stage 2 in the 78th percentile, a second-highest SoC at Stage 1 in the 72nd percentile, and a low SoC at Stage 4 in the 27th percentile.

Table 20

Percentile Scores for the Subgroups Based on Teaching Experience

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	n
Percentile Scores								
0-4	55%	69%	76%	65%	48%	52%	65%	15
5-9	61%	80%	80%	77%	59%	59%	69%	30
10-14	40%	66%	78%	69%	54%	59%	65%	14
15-19	55%	72%	83%	80%	43%	48%	65%	11
20-24	61%	75%	78%	80%	43%	55%	73%	8
25+	55%	72%	78%	65%	27%	40%	57%	9

Figure 5 shows that the general shape of each subgroup is similar. Teachers with 25+ years of experience have a much lower level of intensity at Stage 4. With the exception of teachers with 5 to 9 years of experience, all of the subgroups exhibit an obvious negative 1-2 split. All of the subgroups exhibit a tailing-up at Stage 6.

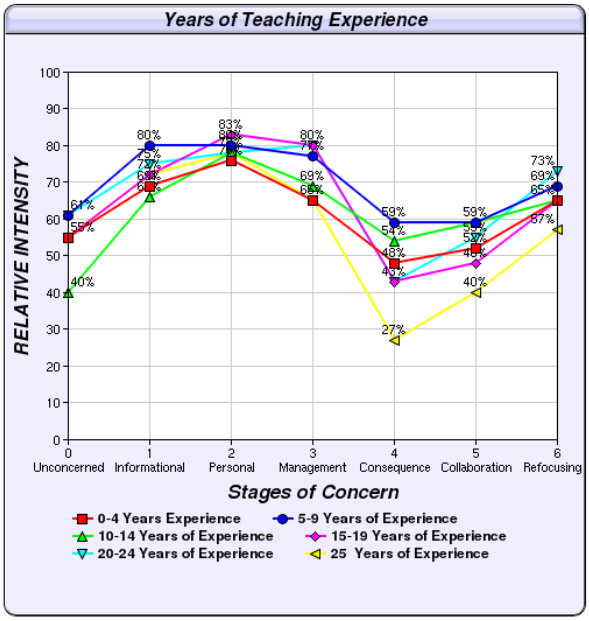

Figure 5. Graph of profile analysis of the subgroup based on years of teaching experience.

Congressional district. Table 21 details the percentile scores for each SoC for the subgroup based on the congressional district in which the school is located. The teachers from Congressional District 1 have a peak SoC at Stage 2 in the 72nd percentile, a second-high SoC at Stage 1 in the 66th percentile, and a low SoC at Stage 4 in the 38th percentile. Teachers from Congressional District 2 have a peak SoC at Stage 1 in the 91st percentile, a tie for the second-high SoC at Stages 2 and 6, and a low SoC at Stage 0 in the 61st percentile. Teachers from Congressional District 3 have a peak SoC at Stage 2 in the 80th percentile, a second-high Soc at Stage 3 in the 77th percentile, and a low SoC at Stage 5 in the 48th percentile. Teachers in Congressional District 4 had a peak SoC at Stage 2 in the 80th percentile, a second-high SoC at Stage 3 in the 77th percentile, and a low SoC at Stage 0 in the 48th percentile.

Table 21

Percentile Scores for the Subgroup based on Congressional District

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	n
Percentile Scores								
CD 1	61%	66%	72%	65%	38%	44%	57%	20
CD 2	61%	91%	87%	65%	63%	72%	87%	5
CD 3	61%	69%	80%	77%	54%	48%	69%	16
CD 4	48%	75%	80%	77%	54%	59%	69%	46

Figure 6 reveals fairly similar shapes of each subgroup's graphical analysis but varying levels of intensity at each stage. Congressional Districts 1, 3, and 4 each display a negative 1-2 split, whereas Congressional District 2 shows a positive 1-2 split. Each of the graphs exhibit a tailing-up at Stage 6.

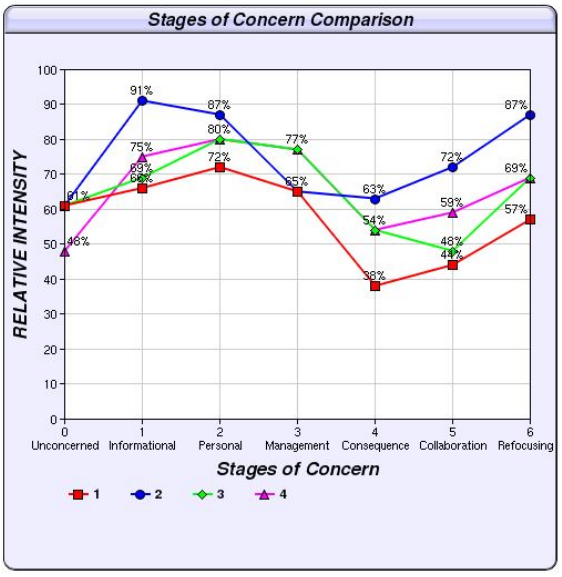

Figure 6. Graphical profile analysis by the subgroups delineated by Congressional District.

Highest degree held by the respondent. Table 22 details the percentile scores for each SoC for the subgroups based on the highest degree held by the teacher. The subgroups consisted of bachelor's degree, master's degree, and the combined group of specialist and doctorate. Teachers with Bachelor's degrees had a peak SoC at Stage 3 in the 80th percentile, a second-high at Stage 2 in the 78th percentile, and a low SoC at Stage 0 in the 58th percentile. Teachers with Master's degrees had a peak SoC at Stage 2 in the 80th percentile, a second-high SoC at Stage 1 in the 72nd percentile, and a low SoC at Stage 4 in the 38th percentile. Teachers with higher degrees had a peak SoC at Stage 1 in the 93rd percentile, a second-high peak at Stage 6 in the 92nd percentile, and a low SoC at Stage 0 in the 22nd percentile.

Table 22

Percentile Scores for the Subgroup Delineated by Degree Held by the Teacher

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	n
Percentile Scores								
Bachelor	55%	72%	78%	80%	59%	55%	69%	38
Master	55%	72%	80%	69%	38%	52%	65%	46
Specialist/Doctorate	22%	93%	87%	65%	71%	80%	92%	3

Figure 7 shows obvious differences in the shapes of the three graphical analyses. There were increased relative levels of intensity of the teachers with higher degrees. The subgroups of Bachelor's and Master's degrees each have a negative 1-2 split, but the higher degree subgroup has a positive 1-2 split. Each of the three groups exhibits a tail-up at Stage 6. There is a significant difference between the levels of intensity at Stage 4.

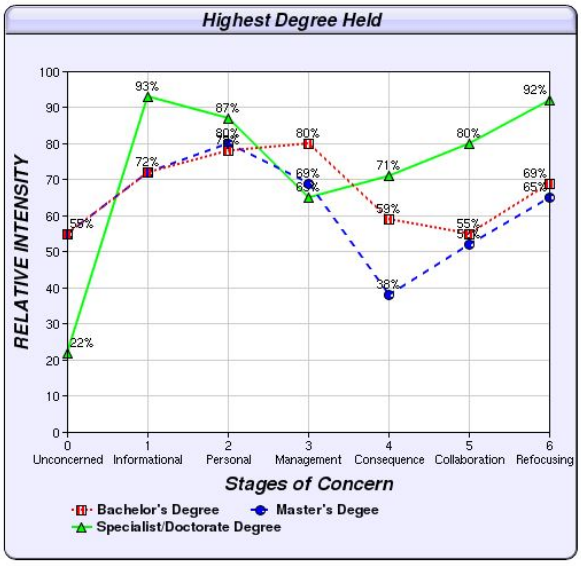

Figure 7. Graphical analysis of the subgroups delineated by the highest degree held by the teacher.

National Board Certification. Table 23 details the percentile scores for each SoC for the subgroups based on whether or not the teacher is a National Board Certified Teacher. Teachers without National Board Certification had peak SoC at Stage 2 in the 78th percentile, a second-high peak at Stage 1 at 75%, and a low SoC at Stage 4 in the 48th percentile. National Board Certified Teachers had a peak at Stage 2 in the 80th percentile, a second-high peak at Stage 3, and a low SoC at Stage 4 in the 48th percentile.

Table 23

Percentile Scores by the Subgroups Delineated by National Board Certification

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	n
Percentile Scores								
Not NBCT	55%	75%	78%	73%	48%	55%	69%	74
NBCT	61%	72%	80%	73%	48%	55%	65%	13

Figure 8 clearly shows very little difference between these two subgroups. Each group has a negative 1-2 split and tails-up at Stage 6. This analysis indicates that National Board Certification had no affect on the teacher concerns regarding the implementation of the CCSSM.

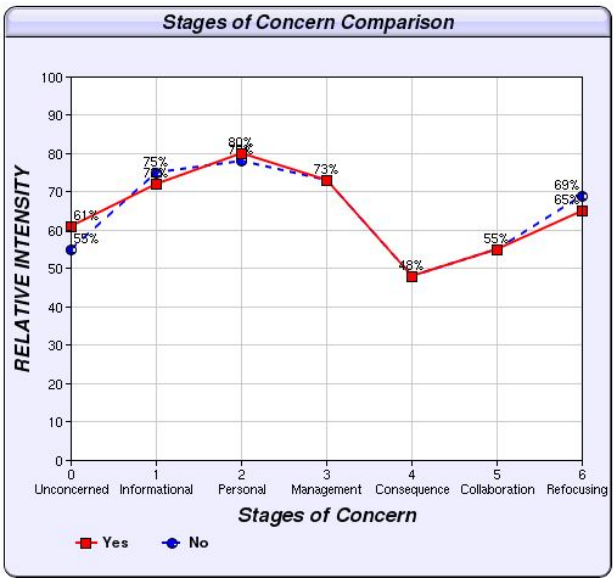

Figure 8. Graphical profile analysis of the subgroups delineated by National Board Certification.

Method of mathematics licensure. Table 24 details the percentile scores for each of the SoC for the subgroups delineated by the method that an endorsement in mathematics was received. Teachers who received their mathematics endorsement via the traditional route exhibited a tie for peak SoC at Stages 2 and 3 in the 80th percentile and a low SoC at Stage 4 in the 54th percentile. Teachers who received their endorsement by adding on to an existing license had a peak SoC at Stage 2 in the 76th percentile, a second-high SoC at Stage 2 in the 75th percentile, and a low SoC at Stage 4 in the 38th percentile. Teachers who received their teaching license via the alternate

route had a peak SoC at Stage 2 in the 78th percentile; a tie for the second-highest SoC at Stages 1, 3, and 6 in the 69th percentile; and a low SoC at Stage 0 in the 40th percentile.

Table 24

Percentile Scores for the Subgroups Delineated by Method of Mathematics Licensure

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	n
Percentile Scores								
Traditional	55%	75%	80%	80%	54%	55%	69%	50
Add-On	55%	75%	76%	60%	38%	55%	57%	18
Alternate Route	40%	69%	78%	69%	54%	48%	69%	19

Figure 9 shows similar shapes of the graphs of the traditional and alternate route subgroups each having a negative 1-2 split, although the alternate route's 1-2 split is much more pronounced. The subgroup of add-on endorsement neither shows a 1-2 split nor a tailing up at Stage 6. Overall, the traditional subgroup shows higher levels of intensity at each SoC.

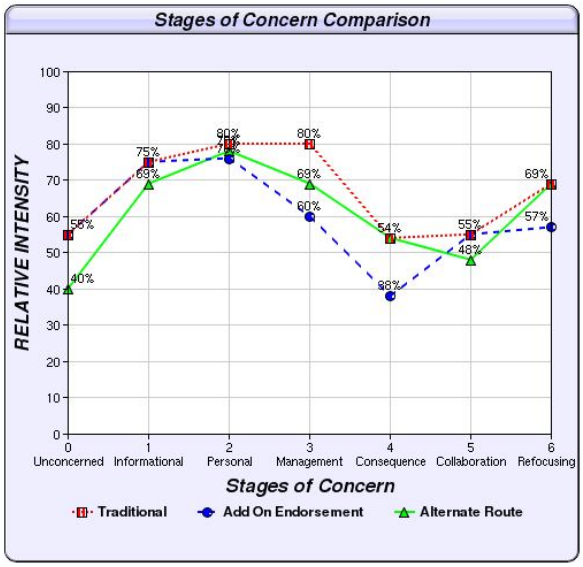

Figure 9. Graphical profile analysis of the subgroups delineated by the method mathematics licensure was obtained.

Primary class taught. Table 25 details the percentile scores for each SoC for the subgroups based on primary class taught. The subgroups consisted of Grade 7, Grade 8, Algebra I, and classes above Algebra I. The purpose for this grouping was to see if any differences between the profiles existed between the state tested and non state-tested classes. Only Grades 7 and 8 and Algebra I are state tested with Algebra I required for graduation. The peak stage scores for Grade 7 was Stage 2 in the 76th percentile; a second-highest stage score at Stage 1 in 63rd percentile; and a low score at Stage 4 in the 33rd percentile. Grade 8 peak stage scores tied at Stages 1 and 2 in the 80th percentile with a low score at Stage 4 in the 59th percentile. Algebra I peaked at Stage 2 in the 83rd percentile, with a tie for second at Stages 1 and 3 in the 80th percentile; and a low score at Stage 4 in the 54th percentile. Classes above Algebra I had a peak score at Stage 2 in the 72nd percentile, a second-high score at Stage 2 in the 66th percentile, and a low score at Stage 4 in the 38th percentile.

Table 25

Percentile Scores for the Subgroups Delineated by Primary Class Taught

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	n
Percentile Scores								
Grade 7	48%	63%	76%	52%	33%	55%	52%	13
Grade 8	61%	80%	80%	77%	59%	68%	77%	17
Algebra I	55%	80%	83%	80%	54%	55%	73%	43
Above AI	55%	66%	72%	60%	38%	55%	52%	14

Figure 10 shows that the profile graphs were basically the same shape with the exception of the differences in relative levels of intensity and Grade 7 and the classes above Algebra I did not tail-up where the other two classes did exhibit a tailing up at Stage six.

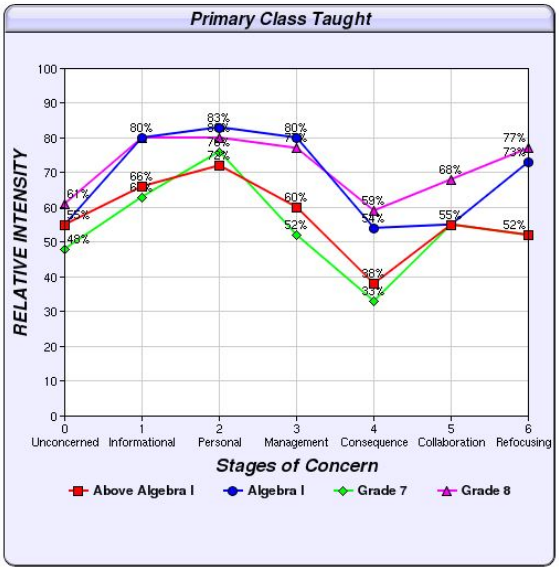

Figure 10. Graphical profile analysis for the subgroups of primary class taught.

Professional development received. Table 26 details the percentile scores for each of the subgroups based on the amount of professional development received on the

implementation of the CCSSM. The subgroup representing teachers who received no professional development had a peak SoC at Stage 1 in the 63rd percentile, a second-high SoC at Stage 0 in the 61st percentile, and a low SoC at Stage 4 in the 43rd percentile. The subgroups representing teachings who received minimal professional development had a peak SoC at Stage 1 in the 84th percentile, a second-high SoC at Stage 2 in the 80th percentile, and a low SoC at Stage 4 in the 43rd percentile. Teachers who received sporadic professional development had a tie for the peak SoC at Stages 1, 2, and 3 in the 80th percentile and a low SoC at Stage 4 in the 54th percentile. Teachers who received ongoing, continuous professional development had a peak SoC at Stage 2 in the 78th percentile; a second-high SoC at Stage 3 in the 69th percentile; and a low SoC tied at Stages 0 and 5 in the 48th percentile. Teachers who received ongoing, continuous professional development including having access to a school instructional coach had a peak SoC at Stage 2 in the 72nd percentile, a second-high SoC at Stage 3 in the 69th percentile, and a low SoC at Stage 4 in the 48th percentile.

Table 26

Percentile Scores for the Subgroups Delineated by the Amount of Professional Development Received

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	n
Percentile Scores								
None	61%	63%	59%	52%	43%	52%	47%	3
Minimal	69%	84%	80%	65%	43%	52%	65%	11
Sporadic	55%	80%	80%	80%	54%	59%	73%	40

Table 26 (continued).

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	n
Percentile Scores								
Ongoing	48%	66%	78%	69%	54%	48%	65%	24
School Coach	55%	66%	72%	69%	38%	64%	52%	9

Figure 11 shows that the subgroup that received no professional development on the implementation of CCSSM reveals the subgroup to be non-users with a positive 1-2 split and a tailing-down at Stage 6. The minimal subgroup shows the teachers to be beginning users with a positive 1-2 split but with a tailing-up at Stage 6. The teachers who received sporadic training showed early signs of beginning use but with no clear peak stage scores. The graphical analysis does show a tailing-up at Stage 6. The teachers who received ongoing professional development through the use of district curriculum specialists or consultants accompanied by a structured professional learning communities show a clear progression of the wave motion indicating a beginning user that is progressing linearly through the stages of concern. There is an obvious tailing-up at Stage 6. The teachers who received ongoing professional development with the addition of a school instructional coach and reflective, active professional learning communities displayed a graph with minor differences between Stages 1, 2, and 3 but also an increase at Stage 5 but a tailing-down at Stage 6. This indicates increased concerns for teacher collaboration consistent with the active, reflective professional learning communities. Comparing the graphs simultaneously it is obvious that the subgroups of minimal and sporadic training

have the highest concerns at Stage 1 as they are in need of more information regarding the CCSSM.

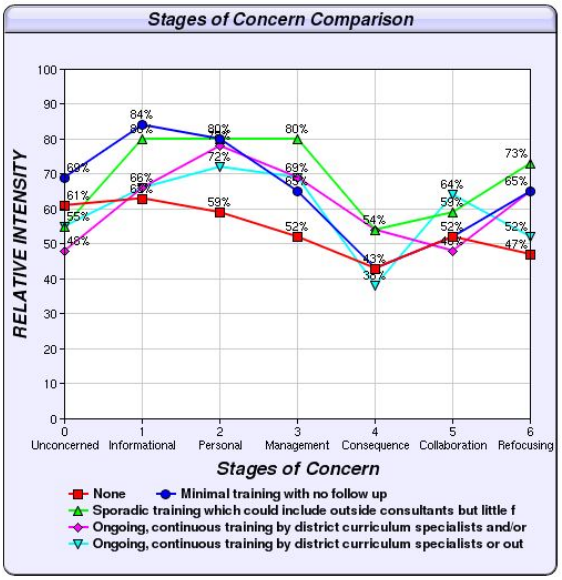

Figure 11. Graphical profile analysis of the subgroups delineated by the amount of professional development received.

User profile versus professional development. A query was run comparing user profiles and the amount of professional development a teacher received. Table 27 shows the matrix detailing the frequency percentages of each category. There were a higher percentage of non-user respondents who received none to minimal amounts of professional development. The respondents receiving sporadic training were equally dispersed between the two groups. There was a higher percentage of beginning users who received ongoing training; but a higher percentage of non-users who received intensive training which included school coaches and reflective professional learning communities.

Table 27

User Profile Versus Professional Development

PD Received	Non-User	Beginning User
None	3%	4%
Minimal	18%	9%
Sporadic	45%	46%
Ongoing	21%	31%
Intensive	12%	9%

Qualitative Analysis

Introduction

Research questions. A qualitative analysis of the responses to the open-ended questions was utilized to answer the research questions. Of the 88 responses to the SoC online survey, 69 teachers responded to the open-ended questions. All 69 responses were included in the qualitative analysis.

Research question 1: What concerns did Mississippi secondary mathematics teachers experience during the implementation of the Common Core State Standards?

Research question 2: What relationships existed between the type of professional development received on the implementation of the Common Core State Standards and the concerns that teachers experienced?

Qualitative analysis. Multiple rounds of coding were performed in the analysis. Initially, each response to the open-ended questions was coded via descriptive coding process. A second round of coding consisted of searching the descriptive codes for themes. Finally, a third round of elaborative coding organized the themes into Stages of

Concern as indicated in the CBAM literature. Appendix F contains the code book detailing the coding process. NVivo software was utilized to aid in the coding process. Once the codes were categorized by themes, queries were run to search for any patterns or themes evident in the responses and to look for connections between professional development and teacher concerns.

Themes

The themes that emerged during the second round of coding consisted of accountability, adjustments in learning, implementation, leadership, resources, student ability, assessments, frustration, teacher training, time, and understanding the CCSSM.

Accountability. Issues with accountability included concerns about students making the adjustment of testing via an online venue as opposed to paper-and-pencil tests; student apathy and lack of effort on the tests; teachers' evaluation based on the students' performance on the new rigorous tests; and issues with students, schools, and teachers being held accountable on the first year of testing during the first year of implementing a new curriculum. One teacher stated her concerns of the inequity between struggling schools trying to increase their prior accountability rating and the schools without rating issues, "Last year our school scores were based on the SATP2, therefore we focused on the 2007 Revised Framework while non-Title schools moved into CCSSM." Another teacher expressed concerns about Algebra I students being held accountable for a graduation requirement on the new curriculum, "Our Algebra I students will be tested on a level they are not prepared for. Last year they were taught traditional eighth grade math."

Adjustment in learning. The teachers expressed positive concerns about allowing students time to adjust to the new curriculum and mathematical practices. One teacher stated, "My students do struggle with the new standards, however I believe in the future we will see great value what we are teaching today." Another teacher stated "I think it will take time for the students to get used to thinking more in class…"

Implementation. Within the theme of implementation several sub-themes emerged which consisted of speed and stages of implementation, gaps in the curriculum, and teacher readiness. A common thread running through many of the teachers responses was the method and speed in which the CCSSM was implemented in the state. One teacher stated that "It should have been phased in gradually." Another teacher stated "Had we waited and allowed common core to grow as the students who started their education in common core grow then we would be filling tiny pot-holes and not craters as big as the Grand Canyon." Concerns related to gaps in the curriculum included concerns about student academic readiness, and how to teach to fill those gaps. One teacher stated, "Math is a PROGRESSION of skills, when you skip parts of the progression; you create giant craters in students' knowledge that become almost impossible to fill." Another teacher expressed the concern, "That some of the students are barely able to perform the standards that they had previously learned and with the implementation of these standards it is like basically jumping two levels for them." One teacher stated, "I believe that a program should be implemented to help bridge the gap from rote memorization to understanding." In regards to teacher readiness, one teacher stated "The implementation of the Common Core Standards for Mathematics has been like learning to swim by being pushed into the deep end of a pool—succeed or perish."

Leadership. Two sub-themes emerged with the leadership theme, the anti Common Core movement and governing bodies. Teachers expressed concerns that the public voice of the contingent of people against Common Core will pressure the state into abandoning the implementation and reverting back to a less rigorous curriculum. Another teacher expressed concerns of public misinformation stating, "I would like those against the standards to explain what is wrong with any particular standard, and how it should be written instead of the typical political response." Several concerns emerged in the subtheme of governing bodies including the weak implementation plan of the state department of education and interference from legislature. One teacher stated, "The state of Mississippi has been very unorganized and slow in getting information to teachers." Another teacher expressed, "Non-educators should not be making the decisions for education."

Resources. Within the theme of resources three subthemes emerged: available resources, the lack of resources, and resource needs. Several of the teachers expressed concerns about their ability to organize and interpret the resources they do have available. One teacher stated, "What resources are available are written in such a way that only the people writing them understand what it is saying." Another teacher expressed concerns about the new Common Core textbooks, stating "Unfortunately, the textbook is not aligned with the PARCC framework, so there has been a lot of work on my end to align them." Teachers also expressed concerns regarding the lack of resources as one teacher stated, "WHY IN THE WORLD would we adopt something with very LITTLE resources out there." Another teacher expressed concerns about the quality of the resources stating, "Teachers are left trying to Google common core and we all know there is material out

there labeled common core that is not really accurate." Teachers expressed a need for supplemental resources, sample test items, and resources to prep students for computer testing.

Student ability. Teachers expressed concerns about the students' ability to adjust to the rigor of the CCSSM. One teacher expressed, "I am concerned that some of the thinking required of the students is way above the average student's ability." Another teacher commented, "I do understand that the Common Core Method requires deep thinking and thinking outside the box. While I appreciate this approach, some students are not intellectually equipped to handle such strict teaching methods." Another concern was the new calculator policy, "Students did nothing last year without a graphing calculator, and now this year are required to test partially without any calculator" and "They have forgotten how to do the basic four operations, especially with fractions and decimals." Another concern was related to the level of reading required with CCSSM, "I am concerned that student difficulties with reading will have a negative effect on math scores." One teacher did express encouraging feedback regarding the positive effect of CCSSM, "The younger generation is being trained to think differently which will serve them well as they continue their education. My current students struggle greatly with real-life problems; this will not be the case in the future."

Student Assessments. One-third of the teachers expressed concerns dealing with the assessments accompanying the implementation of the CCSSM. These concerns run the gamut from concerns about testing including college and career readiness, issues with the online platform, and question types; as well as concerns about PARCC and time away from instruction. Teachers expressed concerns that the PARCC test would not measure

college and career readiness as well as the already established ACT test. A concern about the online administration of the assessments was, "Mathematical problems on a computer screen mean that the students must be able and willing to transfer these problems from the computer screen onto a piece of paper." Teachers expressed concerns about testing because of the multiple approaches encouraged in CCSSM as stated: "while we are supposed to teach students to approach problems in many different ways, some questions are worded so that if you are not thinking the same way as the test writer, you will have a hard time answering and explaining the way they want you to explain." Concerns were expressed regarding the PARCC assessment, such as, "I think the PARCC assessment is not constructed well"; and further "The level of complexity of the questions frustrates many students and gives them the impression that they are 'no good at math' and discourages them." The teachers are also concerned about the amount of time the students are involved in the testing process: "One major concern, however, is the amount of testing that is done in relation to the standards. We're losing a ridiculous amount of instructional time due to testing…"

Frustration. Frustration was a common thread running through the themes to encompass both student and teacher frustrations. Teachers were concerned about how this implementation is affecting students. One teacher expressed this concern, "These gaps are generating fears and growing discouragement in students instead of encouraging math masters." Concerns about student frustrations include issues with rigor, perseverance, relevance, and testing. Teacher frustrations include intrusions on their creativity, issues with training, lack of leadership, lack of resources, and teaching. One teacher stated, "Stressed out teachers trying to figure things out on their own with almost

no help from administration or the state"; while another stated, "No one ever has the same answer to a question, which leaves confusion." One teacher summed up their frustration: "It's hard enough teaching our students to 'think' when they've never had to do so, not to mention teach them concepts that they are missing."

Teacher training. Teachers reported receiving training from various sources including consultants, curriculum trainers, district and school personnel, professional learning communities (PLC's), workshops, personal research, and the state department of education. Training described by the teachers was not consistent across the state and type of training received. One teacher stated, "My greatest concern is the amount of time along with the lack of adequate training." Some teachers received training on the curriculum their district used to implement CCSSM, but no training specifically on the actual standards. Many schools and districts provided training on Common Core in general, but no content specific training as noted by this teacher: "Most of my training has been general implementation where all teachers in all subjects were involved." Other teachers claimed, "My district provides professional development at least once every 9 weeks. We also have a math coach that is around to help about twice a week." Teachers had concerns about training received from the state as it was presented in a train-the-trainer format and required newly trained teachers to go back and train other teachers. One teacher expressed a concern as follows: "MDE does not offer accessible, on-going, targeted professional development for teachers to ensure we are knowledgeable of the content." Throughout the comments on training a common thread were concerns about training regarding 'unpacking' the standards. Teachers declared that these trainings were "a waste of time" and "not very helpful".

Time. Another common theme uncovered was time; time for implementation, time for instruction, and time for planning. Most of the teachers expressed the concern that time is needed to allow the CCSSM to be successful, as stated by one teacher, "it just takes time and perseverance to work through the issues." Several teachers expressed concerns on the amount of time it takes to plan CCSSM lessons. Numerous teachers were concerned with the amount of time required to teach CCSSM as it was intended, as evidenced by this comment: "A lot of the standards require students to go further into the objectives, and I believe that there is not enough time for students to successfully master these objectives at the level they are required."

Understanding the CCSSM. Aside from the implementation issues, some teachers had concerns with the standards themselves, a change in the teaching methods, and differences between the old and new standards. Concerns about the standards include their language, focus, and unclear framework. One teacher stated, "If they were easier to read and understand it wouldn't be such a shock to everyone." Another teacher stated "I do not agree with its laser-like focus on advanced algebraic topics." Several teachers relayed the concern, "skimming over the surface to cover everything and not mastering anything". Other teachers expressed concerns about the new teaching methods exclaiming, "there is nothing wrong with memorization" and "why can't I show it by doing the math".

Queries

Consultants. Teacher concerns associated with training associated with outside consultants include a lack of understanding on the consultant's part for the specific needs of the students as per one teacher, "Honestly, I have found this to be not very effective.

He does not know the perspective of our students." Training with consultants has also failed to meet the needs of the teacher as one teacher noted, "We need to be able to sit down and discuss our issues with people that can answer our questions. Instead we must do activities that do nothing to help us understand and prepare."

Teacher content. In perusing the data on professional development, a theme regarding concerns about teacher content began to emerge. A common theme was the concern of lower level teachers having issues with content as one teacher stated, "I am also concerned about teachers of younger students not having a clear understanding of the concepts that the standards are trying to accomplish as these teachers do not get a specialized degree in a particular subject to be taught as higher level teachers do." Another concern was the lack of specific content related professional development as related "some teachers need content understanding…little professional development deals with this."

Training needs. Teachers expressed several areas of need in regards to professional development. Teachers have expressed a desire to have lessons modeled for them; one teacher expressed their concern as "I would like to see someone teach one lesson or five lessons to show what common core really looks like." Another teacher expressed a desire for training to help the students make connections between concepts stating "need training on how to help students make the connections between linear, quadratic, and exponential equations".

Opinion of CCSSM. Although teachers had definite concerns about the implementation of the CCSSM, most of the respondents expressed positive concerns regarding the premise of the CCSSM. The teachers support the teaching for conceptual

understanding and the increased rigor. One teacher states that "the CCSSM allows students to gain a broader and deeper understanding"; while another states that "the mathematical practices truly change the dynamics of math classes and encourage students to think and talk about math. Only two respondents expressed a negative opinion of the actual standards. One teacher claimed the standards are "not user friendly", another said "it is AWFUL".

CHAPTER V

DISCUSSION

Summary

This study's main research question was to investigate and understand the concerns of secondary mathematics teachers during the first year of implementation of the Common Core State Standards for Mathematics. Using three methods of research, quantitative, profile interpretation, and qualitative, this study was able to acquire a clear snapshot of those concerns. Although the quantitative analysis, MANOVA, utilized to discover variances of means between subgroups and stages of concern, revealed limited information; the profile interpretation and qualitative analysis provided a clear insight into teacher concerns. A profile interpretation of the whole cohort and each subgroup was completed which revealed two user profiles, the non-user and the beginning user. Peak stage of concern scores, second highest stage of concern, and lowest stage of concern were analyzed for the whole group and each subgroup. Following the quantitative analysis and the profile interpretation, a qualitative analysis of the two open-ended questions was conducted to delve further into teacher concerns and to see if a relationship between professional development and teacher concerns exists. Even though the relationship between concerns and professional development was inconclusive, invaluable insight was gained into the training teachers have received with the implementation of the CCSSM.

Conclusions

Quantitative Analysis

The MANOVA only revealed a significant difference in variance between the means on the analysis of the subgroup delineated by highest degree held at Stage 4, Consequence, with teachers with bachelor's degrees having a higher relative level of intensity than those with master's degrees. Although the literature (Hall & Hord, 2014) indicates that the more experienced teacher will have higher concerns at the later stages, this did not translate to the level of education. The results showed that teachers with bachelor's degrees were more concerned with the effect of the curriculum on the students than those teachers with master's degrees. Consequently, literature states that intense self and task concerns often mask impact concerns (Hall & Hord, 2014). As only three respondents had a specialist or higher degree, further studies would be required to make a valid determination of their teacher concerns. Also, the small sample size and intense levels of concerns could have masked any possible differences among the subgroups.

Profile Interpretation

Whole cohort. The whole cohort displayed a beginning user profile with a peak SoC at Stage 2, Personal, coupled with a second highest SoC at Stage 3. This combination reveals that teachers' concerns are still in the "self" category but progressing to concerns in "task" category which is indicative of moving linearly through the stages consistent with the wave motion of user profiles. Teachers have intense concerns about how this implementation is affecting them personally to include accountability based on the new assessments and teacher evaluation instrument. A second highest SoC at Stage 3, Management, is indicative of the teachers' intense concerns of dealing with the task

components of the implementation. The whole cohort also had a high level of intensity at Stage 1, which indicates that teachers are concerned about gaining more information about the CCSSM. There was a weak negative 1-2 split between Stages 1 and 2 which is indicative of some doubt and the possibility of resistance to the innovation (George, Hall, & Stiegelbauer, 2006). The tailing up at Stage 6 reveals that the teachers are concerned about refining the implementation of the CCSSM. Considering the potential for possible resistance, care should be taken in professional development to harness this refinement to improve the implementation rather than abandon the implementation altogether. The profile indicates that the teachers are making a concerted effort to implement the CCSSM and are searching for more information, but the profile is showing signs of struggle. Teachers with peak Management concerns, also reveal high concerns at Information, Personal, and Refinement which indicate the teachers are looking for more information to refine the implementation. Teachers with peak Collaboration concerns, also have high Information concerns which indicate that teachers are collaborating to gain more information about the CCSSM. Teachers with peak Refinement concerns, also have high management concerns which indicate that the teachers are looking to refine the implementation to help alleviate task issues. Providing teachers with resources and aiding in task management are needed to continue the implementation of CCSSM with fidelity.

User profile. The two user profiles, beginning and non-user, were similar at Stages 1 and 2; but the beginning user had higher concerns at Stages 4 and 5 which suggest a linear progression of the user through the stages. The barely existent 1-2 split of the beginning user shows less resistance to the innovation. Both profiles show a

tailing up which indicates they are trying to refine the implementation. It is crucial for change facilitator administrators to identify and recognize the non-users, and target professional development to guide the non-user along the path of the user profile. Similarly the path of the beginning user, although positive, is tenuous and must be encouraged with professional development as well.

Subgroup analysis. Contrary to the literature (Hall & Hord, 2014), teaching experience did not show significant differences within the profiles. Perhaps the numerous confounding variables such as the paradigm shift in teaching practices, lack of information and resources, and negative media associated with the implementation affected this finding. Teachers from across the state revealed similar profile analyses distinguished only by levels of intensity. The analysis of the subgroups comparing the education level of the teachers was limited due to the small number of higher degreed respondents. The teachers with bachelors and masters degrees were similar at the self stages, but teachers with bachelor's degrees showed higher levels of intensity at the task and impact stages as evidenced on the quantitative analysis. Perhaps a more in depth qualitative study should be initiated to investigate this significant variance. Another surprising result was the negative findings of a difference between National Board Certified Teachers and those without the certification. The reflective nature of the certification process should have allowed NBCT's to progress quicker through the stages of concern. The non-significant findings of differences between the subgroups illustrate the overall intense concerns at the self and task levels of all teachers no matter their level of experience or education. These intense concerns in the early stages are masking the concerns of later stages, thereby, inhibiting the linear progression through the stages. The

negative findings associated with teaching experience and education reveal that professional development should target the "how" to include information, resources, and task management as opposed to training targeted at the "why" to include the philosophy of the CCSSM (Hall & Hord, 2014).

Effect of professional development. Teachers who reportedly received none to minimal professional development displayed a non-user profile with positive tendencies; whereas, teachers receiving at least sporadic professional development exhibited a beginning user profile. Teachers with sporadic professional development showed a profile consistent with anxious tendencies as they had no peak stage score; whereas, teachers with ongoing professional development revealed a strong beginner profile. Teachers with minimal professional development revealed a non-user profile, but showed positive tendencies indicating a desire to gain more information to properly implement the curriculum. Whereas, teachers with sporadic training showed anxious tendencies which indicate a frustration with the implementation and if not corrected could result in abandoning the implementation. An interesting finding was that of the teachers receiving the highest level of professional development including reflective professional learning communities and school instructional coaches had intense concerns at Stage 5, Collaboration. This finding is synonymous with the collaborative nature of reflective professional development including professional learning communities (Beswick, 2006; Cross, 2009; Raymond, 1997; Walen & Williams, 2000). The lower level of intensity of this subgroup at Stage 6 indicates that the teachers intend to use collaboration rather than refinement to continue the implementation of the CCSSM.

Qualitative Analysis

Pre-reform beliefs. Literature indicated that teachers are reluctant to change their practices, if they believe the pre-reform methods are efficacious (Charalambous & Philippou, 2010; Christou, Eliophotou-Menon, & Philippou, 2004). As indicated in the qualitative analysis, some teachers are resistant to change their methods as they are not convinced their old methods need to be changed. Also, the consistent appearance of a negative 1-2 split on profile analyses imply that teachers' efficacy beliefs are being challenged due to lack of self-confidence and possible doubt in their ability to implement the CCSSM with fidelity (Hall & Hord, 2014). Time appeared as a consistent theme in the responses. The teachers need time to see the benefits of the change in instruction style to take effect. Green (1971) and Pajares (1992) dictate that the teachers' old methods must be challenged before they will integrate new instructional methodology in their teaching practices. Training for these resistant teachers should include reflective conversations with teachers of younger students who are experiencing gains in achievement levels and problem-solving abilities. The gaps caused by the implementation process are clouding the vision of the teachers of upper level students, thereby, creating an atmosphere of discord and resistance.

Confounding variables. Teachers expressed numerous concerns regarding interference with the implementation of the CCSSM to include negative media and legislative mandates. Raymond (1997) contends that teaching practices will be affected by the cumulative effect of the external factors. Professional development targeting the high levels of intensity of Stage 1, Information, is needed for all stakeholders in the educational process. If this need is not addressed, the implementation is doomed to fail.

Another factor confusing the implementation is the blending of the implementation of the CCSSM and the new assessments associated with the CCSSM. Many of the teacher responses were focused solely on the assessments rather than the CCSSM. A qualitative study including the use of interviews is needed to clarify and separate the issues associated with the standards and assessments.

Student ability. Swan (2007) described teachers' tendencies to simplify tasks to meet the ill-perceived ability of their students; results from this study suggest a danger of this occurring with this implementation. Teacher comments expressed doubt of students' ability to reach conceptual understanding due to their lack of procedural knowledge. There is a possibility of a misdiagnosis of student ability due to gaps in student knowledge caused by the differences between the old and new standards. Teachers need training to distinguish between ability and gaps in knowledge to adequately meet the needs of their students. This misconception between ability and gaps could cause teachers to "water-down" the curriculum and fail to implement it with integrity.

Training needs. The intense levels of Stage 1, Information, indicate that teachers desire more effective training with the implementation, specifically content related training involving mathematical concepts and the connections between these concepts. Due to the newness of the standards and their embedded mathematical practices, the teachers feel isolated trying to learn new content, pedagogy, and connections within the content. Teachers are frustrated with the lack of experience exhibited by the providers of professional development. Also, each school has unique needs; therefore, outside professional development providers have been ineffective due to their lack of knowledge of individual school needs. A reoccurring theme was deficits in content knowledge of

teachers and the lack of training on the content. The CCSSM is intended to shift instruction from a procedural methodology to one of conceptual understanding; teachers are willing to make this change but are struggling because many learned mathematics via the procedural method. Teachers are being asked to teach mathematics content in direct contrast to the way they originally learned the material thereby fueling an atmosphere permeated with self-doubt.

Limitations

This study was limited by the low number of responses to the survey. As evidenced in the results, teachers are encumbered by overwhelming personal and task concerns. The current political climate supporting the anti-Common Core movement was an inhibiting factor for obtaining participants and for causing increased concerns. Although the confounding variables present within the state would prohibit this study from being generalizable across the nation; the study did provide invaluable insights into the concerns being experienced by teachers implementing new standards amidst the struggle of public opinion.

Recommendations for Practice

Reflective, ongoing professional development focused on task management and resources is indicated by the results. Teachers need help dealing with their intense personal and task concerns. Unless these concerns are addressed, teachers will never reach the stage of modifying their methods to affect the consequences of the standards towards their students and thereby affect student achievement. Although teachers are willing to embrace the new standards, their pre-reform efficacy beliefs need to be challenged with convincing evidence of the benefits of the new standards and methods of

teaching. Providing training opportunities involving reflective conversations with teachers of elementary level students detailing the advances of students' thinking skills as a result of the new standards and practices would be effective in combatting and possibly support the change process needed to affect pre-reform efficacy beliefs. Also, specific content training ingrained with the mathematical practices linking conceptual understanding and connections of the mathematical content is necessary to boost teacher self-efficacy beliefs. The qualitative analysis did reveal a teacher's concern for students, but the intense personal concerns are hindering the teachers to progress to Stage 4, Consequence. Reflective professional learning communities would provide the structure needed to afford teachers the opportunity to collaborate and discuss the effect of the instructional changes on the students and their achievement levels as well as providing the opportunity to modify their instructional strategies to address these needs. Care should be taken to ensure that teachers modify their practices to reflect the practices inherent within the CCSSM and not modify the CCSSM to meet their needs.

Recommendations for Future Research

A nationwide large scale quantitative study focused on all states implementing the CCSSM is warranted. An appropriate time for this study would be halfway through the second year of implementation to investigate whether or not teachers are resolving their personal and task concerns and progressing through the stages of concern. Although the open-ended questions provided an insight into teacher concerns, an extensive qualitative study to include interviews which would clarify teacher concerns clouded by the confounding variables. Although the open-ended questions did reveal teacher concerns focused at Stage 4, Consequence, the profile interpretation showed that this was the

lowest stage for the teachers. Conducting interviews as detailed as a third component of the Stage of Concern profile analysis is warranted to clarify and fully understand teacher Consequence concerns. Also, a Levels of Use study including classroom observations would be appropriate halfway through the second year of implementation to diagnose the levels at which teachers are implementing the standards and mathematical practices.

APPENDIX A

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Sincerely,

Nancy Reynolds
Nancy Reynolds for SEDL

January 27, 2015
Date signed

Agreed and accepted:

Signature: Suzanne Jennings

Jan 27, 2015
Date signed

Printed Name: Suzanne Jennings

APPENDIX B

INSTITUTIONAL REVIEW BOARD NOTICE OF COMMITTEE ACTION

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI.

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

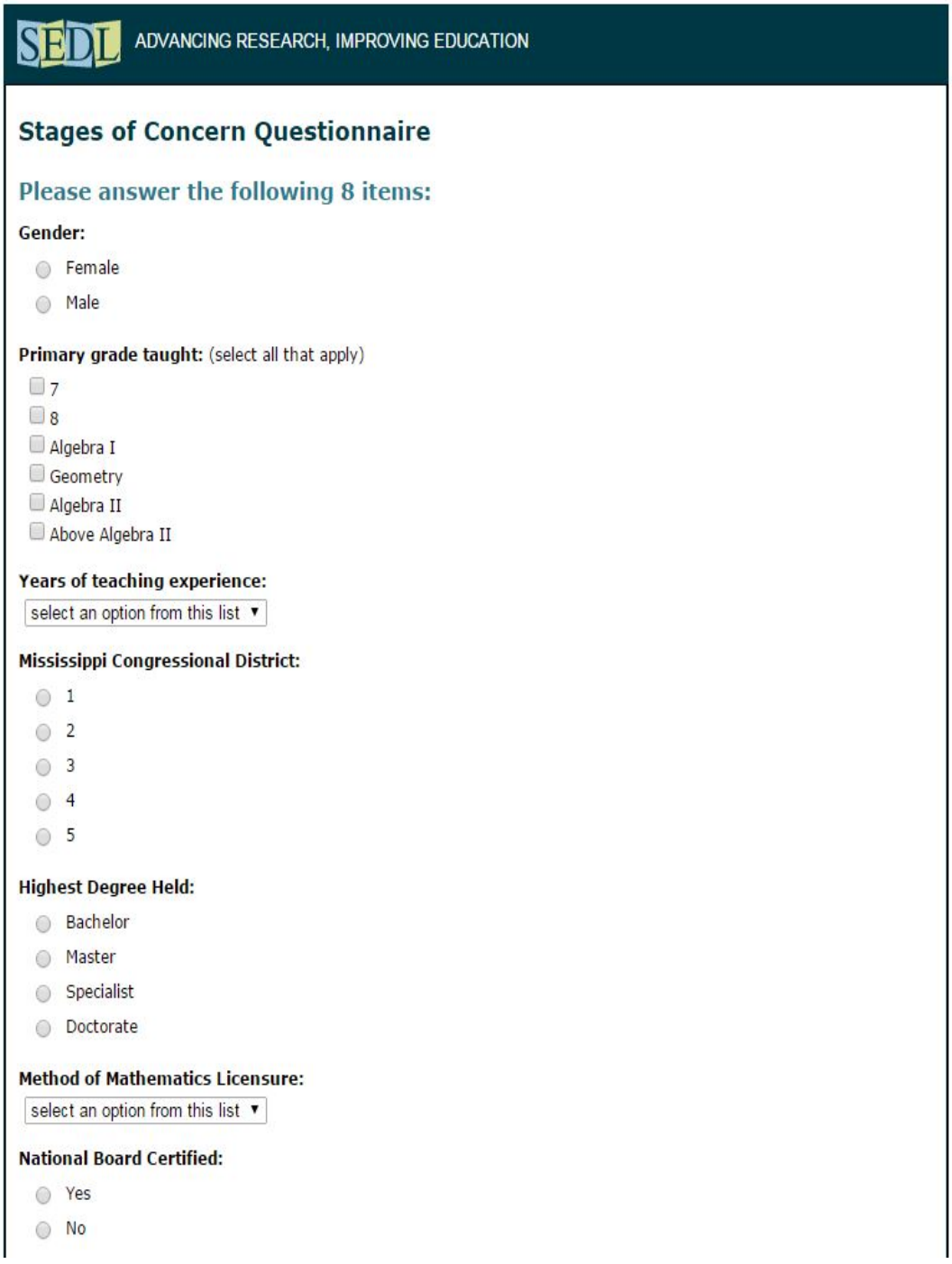
The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 15010604
PROJECT TITLE: Secondary Mathematics Teachers' Concerns with the Implementation of the Common Core State Standards for Mathematics and its Associated Professional Development
PROJECT TYPE: New Project
RESEARCHER(S): Suzanne Jennings
COLLEGE/DIVISION: College of Science and Technology
DEPARTMENT: Center for Science and Mathematics Education
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 02/27/2015 to 02/26/2016
Lawrence A. Hosman, Ph.D.
Institutional Review Board

APPENDIX C

STAGE OF CONCERN QUESTIONNAIRE



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Stages of Concern Questionnaire

Please answer the following 8 items:

Gender:

- ○ Female
- ○ Male

Primary grade taught: (select all that apply)

- ☐ 7
- ☐ 8
- ☐ Algebra I
- ☐ Geometry
- ☐ Algebra II
- ☐ Above Algebra II

Years of teaching experience:

select an option from this list ▾

Mississippi Congressional District:

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

Highest Degree Held:

- ○ Bachelor
- ○ Master
- ○ Specialist
- ○ Doctorate

Method of Mathematics Licensure:

select an option from this list ▾

National Board Certified:

- ○ Yes
- ○ No

Professional Development Received Targeting the Common Core State Standards for Mathematics:

- ○ None
- ○ Minimal training with no follow up
- ○ Sporadic training which could include outside consultants but little follow up and unstructured professional learning communities or faculty meetings
- ○ Ongoing, continuous training by district curriculum specialists and/or outside consultants with follow up and structured professional learning communities
- ○ Ongoing, continuous training by district curriculum specialists or outside consultants followed up by onsite school instructional coaches and reflective, active professional learning communities

Select one response for each question below.

Please respond to the items in terms of **your present concerns**, or how you feel about your involvement with **Common Core State Standards for Mathematics**. We do not hold to any one definition of the innovation so please think of it in terms of your own perception of what it involves. Phrases such as "this approach" and "the new system" all refer to the same innovation. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with the innovation.

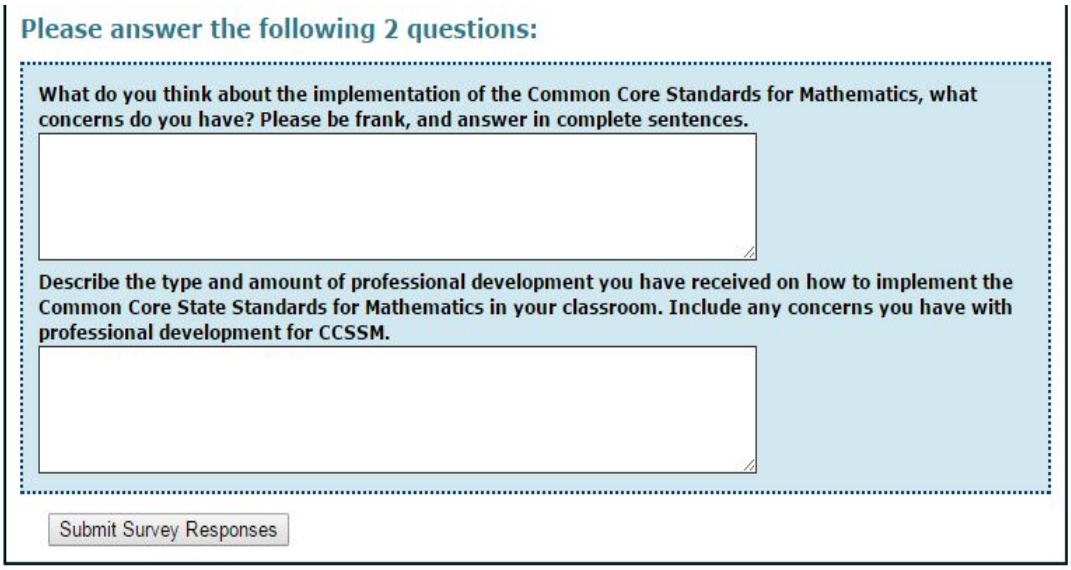
		Irrel-evant	Not true of me now	Somewhat true of me now			Very true of me now		
#		0	1	2	3	4	5	6	7
1.	I am concerned about students' attitudes toward Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
2.	I now know of some other approaches that might work better than Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
3.	I am more concerned about another innovation.	○	○	○	○	○	○	○	○
4.	I am concerned about not having enough time to organize myself each day (in relation to Common Core State Standards for Mathematics).	○	○	○	○	○	○	○	○
5.	I would like to help other faculty in their use of Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
6.	I have a very limited knowledge about Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
7.	I would like to know the effect of reorganization on my professional status.	○	○	○	○	○	○	○	○

		Irrel-evant	Not true of me now	Somewhat true of me now			Very true of me now		
#		0	1	2	3	4	5	6	7
8.	I am concerned about conflict between my interests and my responsibilities.	○	○	○	○	○	○	○	○
9.	I am concerned about revising my use of Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
10.	I would like to develop working relationships with both our faculty and outside faculty using Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
11.	I am concerned about how Common Core State Standards for Mathematics affects students.	○	○	○	○	○	○	○	○
12.	I am not concerned about Common Core State Standards for Mathematics at this time.	○	○	○	○	○	○	○	○
13.	I would like to know who will make the decisions in the new system.	○	○	○	○	○	○	○	○
14.	I would like to discuss the possibility of using Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○

		Irrel-evant	Not true of me now	Somewhat true of me now			Very true of me now		
#		0	1	2	3	4	5	6	7
15.	I would like to know what resources are available if we decide to adopt Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
16.	I am concerned about my inability to manage all that Common Core State Standards for Mathematics requires.	○	○	○	○	○	○	○	○
17.	I would like to know how my teaching or administration is supposed to change.	○	○	○	○	○	○	○	○
18.	I would like to familiarize other departments or persons with the progress of this new approach.	○	○	○	○	○	○	○	○
19.	I am concerned about evaluating my impact on students (in relation to Common Core State Standards for Mathematics).	○	○	○	○	○	○	○	○
20.	I would like to revise the Common Core State Standards for Mathematics approach.	○	○	○	○	○	○	○	○
21.	I am completely occupied with things other than Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○

		Irrel-evant	Not true of me now	Somewhat true of me now			Very true of me now		
#		0	1	2	3	4	5	6	7
22.	I would like to modify our use of Common Core State Standards for Mathematics based on the experiences of our students.	○	○	○	○	○	○	○	○
23.	I spend little time thinking about Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
24.	I would like to excite my students about their part in this approach.	○	○	○	○	○	○	○	○
25.	I am concerned about time spent working with nonacademic problems related to Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
26.	I would like to know what the use of Common Core State Standards for Mathematics will require in the immediate future.	○	○	○	○	○	○	○	○
27.	I would like to coordinate my efforts with others to maximize the effects of Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
28.	I would like to have more information on time and energy commitments required by Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○

		Irrel-evant	Not true of me now	Somewhat true of me now			Very true of me now		
#		0	1	2	3	4	5	6	7
29.	I would like to know what other faculty are doing in this area.	○	○	○	○	○	○	○	○
30.	Currently, other priorities prevent me from focusing my time on Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
31.	I would like to determine how to supplement, enhance, or replace Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
32.	I would like to use feedback from students to change the program.	○	○	○	○	○	○	○	○
33.	I would like to know how my role will change when I am using Common Core State Standards for Mathematics.	○	○	○	○	○	○	○	○
34.	Coordination of tasks and people (in relation to Common Core State Standards for Mathematics) is taking too much of my time.	○	○	○	○	○	○	○	○
35.	I would like to know how Common Core State Standards for Mathematics is better than what we have now.	○	○	○	○	○	○	○	○



Please answer the following 2 questions:

What do you think about the implementation of the Common Core Standards for Mathematics, what concerns do you have? Please be frank, and answer in complete sentences.

Describe the type and amount of professional development you have received on how to implement the Common Core State Standards for Mathematics in your classroom. Include any concerns you have with professional development for CCSSM.

Submit Survey Responses

APPENDIX D

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Sincerely,

Nancy Reynolds — Nancy Reynolds for American Institutes for Research

May 19, 2015 — Date signed

Agreed and accepted:

Signature: Suzanne Jennings

5/18/15 — Date signed

Printed Name: Suzanne Jennings

APPENDIX E

RAW SCORE TO PERCENTILE CONVERSION TABLE

D: Raw Score to Percentile Conversion Table

Five Item Raw Scale Score Total	Percentiles for stage:						
	0	1	2	3	4	5	6
0	0	5	5	2	1	1	1
1	1	12	12	5	1	2	2
2	2	16	14	7	1	3	3
3	4	19	17	9	2	3	5
4	7	23	21	11	2	4	6
5	14	27	25	15	3	5	9
6	22	30	28	18	3	7	11
7	31	34	31	23	4	9	14
8	40	37	35	27	5	10	17
9	48	40	39	30	5	12	20
10	55	43	41	34	7	14	22
11	61	45	45	39	8	16	26
12	69	48	48	43	9	19	30
13	75	51	52	47	11	22	34
14	81	54	55	52	13	25	38
15	87	57	57	56	16	28	42
16	91	60	59	60	19	31	47
17	94	63	63	65	21	36	52
18	96	66	67	69	24	40	57
19	97	69	70	73	27	44	60
20	98	72	72	77	30	48	65
21	99	75	76	80	33	52	69
22	99	80	78	83	38	55	73
23	99	84	80	85	43	59	77
24	99	88	83	88	48	64	81
25	99	90	85	90	54	68	84
26	99	91	87	92	59	72	87
27	99	93	89	94	63	76	90
28	99	95	91	95	66	80	92
29	99	96	92	97	71	84	94
30	99	97	94	97	76	88	96
31	99	98	95	98	82	91	97
32	99	99	96	98	86	93	98
33	99	99	96	99	90	95	99
34	99	99	97	99	92	97	99
35	99	99	99	99	96	98	99

APPENDIX F

QUALITATIVE CODE BOOK

Stage 1: Information

Opinion of CCSSM
- Negative
- Positive
- Public Opinion
- Teacher buy in

Understanding the CCSSM
- Concerns with teaching materials
- Differences with prior standards
- Issues with the standards

Stage 2: Personal

Accountability
- Concerns with tests
- Issues with accountability
- Student apathy
- Teacher evaluation

Teacher frustration
- Affect on students
- Creativity
- General frustration
- Issues with training
- Lack of leadership
- Lack of resources
- Teaching

Stage 3: Management

Implementation
- Gaps
- Negative
- Stages of implementation
- Teacher readiness

Leadership
- Anti Common Core
- Governing bodies

Resources
- Available resources
- Lack of resources
- Need for resources

Student Ability
- Difficulty with new curriculum
- Increased conceptual understanding

Student Assessments
- Concerns with testing
- PARCC
- Time from instruction

Teacher training
- Consultants
- Curriculum
- District/School
- Instructional Coach
- MDE
- Needs in training
- Negative generic
- Teacher content
- Training on assessments
- Unpacking the standards

Time
- Time for implementation
- Time for Instruction
- Time for planning

Stage 4: Consequence

Student Frustration
- General frustration
- Increased rigor causing frustration
- Perseverance
- Relevance
- Testing frustration

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