IMPROVING PERFORMANCE: EXAMINING THE LINK BETWEEN
SELF-EFFICACY AND SUPPORT FOR SECONDARY FEMALE MATH TEACHERS

by

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EDUCATIONAL LEADERSHIP

ABSTRACT

The purpose of this study was to explore the possible relationship between teacher self-efficacy among secondary math teachers in Alabama and administrative support, teacher/colleague support, and support through resources. The study also examined whether gender or race related to teachers’ sense of self-efficacy. Examining self-efficacy for secondary math teachers is an important step in the strategic support of these individuals and improving student achievement in mathematics. Indeed, a closer look at district and school level support factors related to the self-efficacy of teachers is warranted, given continuing concerns over student math performance. A quantitative study of 105 Alabama secondary math teachers was conducted using an online survey instrument composed from the Teachers’ Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) and the Organizational Health Inventory for Secondary Schools (Hoy, W. K. & Tarter, C. J., 1997). No significant relationships were found between teachers’ sense of efficacy and gender, administrative support, or resource support. Significant relationships were found between teachers’ sense of efficacy and race and teacher/colleague support. There should be a focus on offering support for minority secondary math teachers. Collaborative opportunities involving training, planning, data-driven decision making, sharing resources, and sharing experiences should be increased. There is a call for administrators to serve as instructional leaders as well as managers.
DEDICATION

This dissertation is dedicated to my awesome God who made it apparent from the very beginning that He was and is in control of my life. It is also dedicated to my family. My husband, Reggie, has been an anchor for me; he listened to my grumbling, encouraged me when I was discouraged, and pushed me when I wanted to stop. My children, Justin and Johnathan, never complained when I carried my “bag” filled with articles to read and papers to grade to their games. I am sorry I missed some of your plays or sometimes could not make it to the games at all. This dissertation is also dedicated to my mother, Ida Zimmerman, and sister, Laurie Nesbitt, who sent their blessings to me across state lines.

To God be the glory for the things He has done and for the angels He has placed in my life.
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<td>ALSDE</td>
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<td>ARI</td>
<td>Alabama Reading Initiative</td>
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<td>AYP</td>
<td>Adequate Yearly Progress</td>
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<td>No Child Left Behind</td>
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<td>Organization for Economic Cooperation and Development</td>
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I. Introduction

Educational leaders continue to express concerns over the declining status of America’s education system, when compared to other nations (Zeitvogel, 2011). High-profile reports on the U.S dropout, graduation, and economic outlook percentages (Alliance for Excellent Education, 2008) show the United States’ high school graduation rate positioned low on the list of developed nations in the Organization for Economic Co-operation and Development (OECD), including Australia, Canada, China, Finland, Denmark, Italy, Japan, Ireland, Poland, Norway, United Kingdom, Switzerland, and Korea. When comparing 15 year olds in member countries, the United States ranked 15 out of 29 in reading literacy, 21 out of 30 in science literacy, 24 out of 29 in problem solving, and 25 out of 30 in math literacy. The top performer in math was China, who scored over 100 points above the OECD average score. The United States scored 9 points below the average (Programme for International Student Assessment, 2012). This low standing is important because math appears to be a critical educational content area directly linked to students’ job readiness and national economic competitiveness (Johnson, 2011). In addition, math is also needed for basic living skills like paying for goods and services that help keep the economy flowing (Ediger, 2009). Notably, the Obama administration has recognized the link between the U.S. economic survival and increasing student performance scores in mathematics and launched several initiatives to promote improved math performance in schools (Duncan, 2010).

Findings from research indicate teachers play a vital role in providing quality instruction and reinforcement to improve student mathematical performance (Moyer-Packenham, Bolyard, Kitsantas, & Oh, 2008). As a result of teachers’ overwhelming
significance to performance, school systems are investigating ways to improve teacher performance, including one central concept previously identified in the literature—self-efficacy (Bandura, 1977). Self-efficacy is defined as self-appraised beliefs in a person’s capabilities to exercise control over his or her level of functioning and environmental demands (Bandura, Barbarinelli, Caprara, & Pastorelli, 1996). It is well established that teachers’ self-efficacy is strengthened or weakened by the types of experiences encountered in a particular school climate (Bandura, 1977; Tschannen-Moran & Woolfolk Hoy, 2001). Some of the key elements of a favorable school climate include supportive and active administrators, worthwhile professional development, mentorship and collaboration opportunities with other teachers, and opportunities for leadership and advancement (Lussier & Forgione, 2010). These aspects relate to the organizational health of the school and are promising constructs since they are not necessarily connected to funding commitments. Interestingly, while there is much conversation in the popular press about merit pay for teachers, findings from research provide evidence that monetary incentives for teachers do not necessarily increase student performance (McCaffrey, 2012; Lussier & Forgione, 2010).

Recently, examining teacher self-efficacy and its influence on improving student performance has become a major focus of schools (Hoy, 2012; Elliot, Isaacs, & Chugani, 2010; Ozder, 2011). Teachers who have a positive sense of teacher self-efficacy believe they have the knowledge, skills, and dispositions necessary to positively affect learning outcomes for students of all ability levels (Tschannen-Moran & Woolfolk Hoy, 2001). Further, as Pajares (1996) observed, “Self-efficacy beliefs are strong determinants and predictors of the level of accomplishment that individuals finally attain” (p. 545).
Today’s student population is more diverse with various backgrounds, cognitive, and physical abilities being placed in inclusive settings; teachers are charged to perform given various situations. Teachers’ strength of convictions and beliefs, including their self-efficacy, influences how they confront and master difficult situations (Bandura, 1977; 1989).

In particular, the relationship between teacher self-efficacy and gender warrants further investigation. National statistics reflect that nearly 80% of public school classroom teachers are female (National Center for Education Information, 2012). This statistic also holds true for the state of Alabama (Alabama State Department of Education, 2012). With respect to secondary mathematics teachers, females represent over 75% of the population in Alabama (ALSDE, 2012). For these reasons if future research targets female math teachers and subsequently self-efficacy, it may bring to light short-comings linked to poor performance in this critical content area (e.g. math education). Identifying multiple and proven types of support may help increase teacher self-efficacy among female math teachers. Hence, a better understanding of the perspective of female math teachers may guide school systems and administrators in the creation of useful and efficient professional development initiative directly linked to learning outcomes in mathematics.

Historically, decisions about educational support allotments have been facilitated at the local level and included types of resources, curriculum, student assessment, student promotion, and student graduation as factors in their decision (Timar & Roza, 2010). However, in recessionary times, with increased cuts in local funding, states have had due to intervene and contribute more to education; this increased contribution has prompted
more control of resources at the state level. Perhaps not surprisingly, local school leaders have questioned if the state can make effective, efficient decisions about support selections and expenditures, given the differentiated needs of individual systems who must consider demographic, socio-economic, and teacher related dynamics. Against the backdrop of this tension between state and local control of resources, Timar and Roza (2010) used data from more than 20 research studies of California’s school finance and governance status to focus on possible barriers between providing needed support and being cost-efficient. Their study found that possible barriers included organizational instability, compromised leadership, a lack of action planning targeting improvement, little or no technical support, and program budgeting.

Previous research investigated support structures including peer support from teachers/colleagues where fellow teachers provided mentoring, encouragement, and shared experiences (Nitta, Holley, & Wrobel, 2010; Demi, Coleman-Jensen, & Snyder, 2010; Hardre & Hennessey, 2010; Woodrum, 2004; Wenger, 2005), administrative support where district and school level administrators made efforts to provide incentives to increase productivity (Arnold, Newman, Gaddy, & Dean, 2005; Gehrke & McCoy, 2007; Hult, Callister, & Sullivan, 2005; Walters & McNeely, 2010; Ward & Wolf-Wendel, 2004), and resource support where the teachers were provided adequate training and materials to aid with instruction (Algozzine, Grete, Queen, & Cowan-Hathcock, 2007; Cook, 2009; Cook & Boe, 2007; Freeman & Anderman, 2005). Research also investigated how structures influenced teacher self-efficacy beliefs in an early childhood setting where the classroom environments and applications are less formal and more flexible than elementary school and higher education (Kotaman, 2010). However, little
research has focused on these support structures with respect to gender and secondary-level mathematics, where achievement and testing take on higher stakes as students approach advanced subjects, graduation exams, and preparation for college and careers. These stakes are heightened for school leaders by federal accountability measures, such as Adequate Yearly Progress (AYP), mandated by the No Child Left Behind Act (NCLB).

**Purpose of Study**

The purpose of this study was to explore the possible relationship between teacher self-efficacy among secondary math teachers in Alabama, as measured by the Teacher’s Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) and administrative support, teacher/colleague support, and support through resources, as measured by the Organizational Health Inventory for Secondary Schools (Hoy, W. K. & Tarter, C. J., 1997). The study also examined whether gender, race, or socio economic status related to teachers’ sense of self-efficacy.

**Research Questions**

The researcher developed the following research questions:

1. Is there a relationship between self-efficacy and gender for math teachers in Alabama?
2. Is there a relationship between self-efficacy and race for math teachers in Alabama?
3. Is there a relationship between self-efficacy and perceived levels of administrative support for math teachers in Alabama?
4. Is there a relationship between self-efficacy and perceived levels of resource support for math teachers in Alabama?
(5) Is there a relationship between self-efficacy and perceived levels of teacher/colleague support for math teachers in Alabama?

(6) Is there a relationship between self-efficacy and the linear combination of gender, race, and perceived levels of administrative, resource, and teacher/colleague support for math teachers in Alabama?

**Significance of the Study**

Levels of self-efficacy should be evaluated within similar context; for teachers’ school dynamics like grade and age levels, class activities, and content demands collectively construct conditions (Bandura, 1989; Tschannen-Moran & Woolfolk Hoy, 2001). Examining self-efficacy for secondary math teachers is an important step in the strategic support of these individuals and improving student achievement in mathematics. As Tschannen-Moran, Woolfolk Hoy, and Hoy (1998) counseled, “Given the importance of a strong sense of efficacy for optimal motivation in teaching, we would do well to examine how efficacy is developed, when it is most malleable, and what factors may lead to its improvement” (p. 234). Indeed, a closer look at district and school level support factors related to the self-efficacy of teachers is warranted, given continuing concerns over student math performance. Because of limited budgets in recent years, it is important for school leaders to be as efficient and effective as possible when attending to mathematical instructional methods and resources that induce increased student performance.

The proposed study sought to determine if there was a significant relationship between teacher/colleague support, administrative support, resource support, gender,
socio-economic status and self-efficacy among secondary math teachers. Since 80% of K-12 teachers are females, schools may benefit on targeting the majority population. The researcher had not identified any other study that examined factors relating to teacher self-efficacy specifically focusing on gender and the mathematics subject area at the secondary level.

**Limitations**

The following limitations applied to this study:

1. A convenience sampling technique will be used for the actual study. Using an administrator email contact list provided by a gatekeeper, the surveys will be delivered to Alabama secondary math teachers. Since this is a non-probability sample, it will prevent the generalization of findings. However, the study will be useful to Alabama educational institutions and states with similar characteristics.

2. Also, data will be collected using a web-based survey. It will be the responsibility of site administrators to forward the link to the survey to qualifying participants (e.g. secondary math teachers). Some administrators may not forward the link or may forward it to the wrong teachers. This could potentially compromise the data.

3. Since the survey is web-based there may be potential technical difficulties like poor internet connections or blocks to sites, inhibiting teachers’ ability to complete the survey.

4. Further, most of the survey questions are in a multiple-choice format. Even though a forced entry safeguard will be in place prohibiting respondents from submitting until all questions are addressed, there is the possibility that respondents will mistakenly select alternative responses.
5. Finally, because of time limitations, this research will be conducted during the beginning of the first semester of school. There is no uniformity between school districts in when the school year begins. Some teachers may have more experiences that may influence their perception of school health and self-efficacy beliefs. The first semester for teachers is usually a time where they are initially assessing their resources, student dynamics, and their teaching ability.

Assumptions of the Study

The following assumptions were made regarding this study:

1. The Alabama Mathematics Course of Study will used by each participant to guide instruction.

2. Participants will at least hold a bachelor’s degree in math or a related field.

3. Administrators will send the survey link used for data collection to appropriate potential participants.
Definitions of Key Terms

1. **Accommodations**- options provided in instructional delivery and assessment that increases the accessibility of content for student with disabilities; there is no change in curriculum standards.

2. **Adequate Yearly Progress (AYP)** - a term associated with the No Child Left Behind Act (2002) where states must set performance standards and administer assessments that measure student performance according to the standards; each state is allowed to set its own criteria for making adequate yearly progress towards meeting standards.

3. **Administrative support** - Assistance provided to teachers by administrators in the form of instructional leadership, the provision of resources, scheduling, and constructive feedback,

4. **Collaboration** - An interactive process where teachers work together as equals and engage in shared decision making toward shared goals; a key component of peer support.

5. **Differentiated Instruction** - instruction that takes into account students’ variations of cognitive and physical abilities, learning style preferences, background knowledge, and preparedness.

6. **Self-efficacy** - a belief that one can produce an intended or desired outcome.

7. **Incentives** - Extrinsic measures that motivate someone to act in accordance with goals or norms; typically part of administrative support.

8. **Modifications** - an adaptation of curriculum in a class setting used to provide instruction for students on higher or lower grade levels.
9. Organizational Climate- a set of characteristics that describes an organization, distinguishes one organization from other organizations, is relatively enduring over time, and influences the behavior of the people in the organization.

10. Organizational Health- an organization’s ability to function effectively, to cope adequately, to change appropriately, and to grow within.

11. Organizational Structure- The hierarchical framework of an organization that establishes levels of authority, rules, processes, and duties for the members.

12. Professional Learning Community- A professional learning community is made up of team members who regularly collaborate toward continued improvement in meeting learner needs through a shared curricular-focused vision.

13. Resource Support- Assistance provided to teachers in the form of technology, instructional materials, and training.

14. Secondary education- grade levels that include grades 6-12.

15. Teacher/Colleague Support- Assistance provided to teachers in the form of peer mentoring, collaboration, and observations.

16. Universal Design- UDL shapes general education curricula to be effective for students with a wide range of abilities and disabilities. A UDL-designed curriculum provides options and alternatives that can be easily customized to the individual student. From the outset, UDL builds flexibility into all aspects of the curriculum: the goals, materials, instruction, and assessment.
II. Review of Literature

Theoretical Framework

Theoretical frameworks are used to logically structure information during the investigative process of research; they serve as conceptual lenses researchers use to make connections between previous studies and new data (Creswell, 2007). These connections may lead to new findings. As a conceptual frame, relevant studies focusing on constructs of organizational health to include administrative support, teacher/colleague support, and resources support, along with descriptive information about Alabama’s assessment policies in regards to federal and state mandates were used to examine possible relationships with teachers’ sense of self-efficacy.

Primarily, it was Hoy who developed the concept of Organizational Health. However, he and Tarter (1997) honed in on secondary experiences. Chester Barnard (1948) laid the foundation with his development of Organizational Theory. He said that the efficiency of an organization rest with how well it satisfied its members’ motives. If the goals of the organization can be met while simultaneously satisfying the needs of its members, cooperation between the two would last.

Hoy (1997) examined the components necessary at the school level to meet these motives or incentives. He broke down the school in terms of its climate and health. This is comprised of technical, managerial, and institutional dimensions. These dimensions were further broken down into subparts. This study focused on administrative, resource, and teacher/colleague support. A healthy school is one where all these constructs positively work together. The selected areas of study were chosen because of their
relationship to established accessibility in schools, especially with educational budgets continuously being threatened.

Bandura (1977) helped to lay the foundation of self-efficacy. He believed people could positively control events based on their sense of belief in self and their roles and capabilities. He advised the need to contextualize these requirements. Hence, Woolfolk-Hoy and her student Tschannen-Moran (1998) looked deeper into self-efficacy as it related to teachers. Teachers who see themselves as competent and view needed resources as being accessible, held stronger beliefs in self and were able to capitalize on student achievement.

**The Health of the Schools**

Finding ways to improve the working culture and climate within organizations (e.g. public schools) has been a constant focal point of school improvement initiatives (Barney, 1986; Harris, 1994; Cummings & Worley, 2005). Various organizational theories have sought to identify specific factors that measure sustained organizational satisfaction and employee productivity. Chester Barnard (1948), a lead theorist in organizational improvement, saw connections between an organization and its members. Barnard noted that the efficiency of the organization was dependent on how well it satisfied its members’ motives. If the goals of the organization could be met while simultaneously satisfying the needs of the members, cooperation between the two would last; these needs are driven by incentives or inducements (Barnard, 1948). Barnard (1938) described inducements as, “material inducements, personal non-material opportunities; desirable physical conditions; ideal benefactions; associational attractiveness; adaptation of conditions to habitual methods and attitudes; the opportunity
of enlarged participation; and the condition of communion” (p. 142). However, Barnard stressed how non-monetary incentives were more powerful and longer-lasting. The right incentives and efficacy expectations are major determinants of how teachers perform (Bandura, 1977). It is the organizational leaders’ responsibility to provide and balance such incentives (Barnard, 1948).

Much of the organization’s ability to provide incentives described by Barnard is dependent on the organization’s health and employer-employee climate. Schools as organizations, involve unique dynamics because of the nature of their clients (e.g. students), resources, and employees. How teachers view their surroundings and interact with their colleagues, principals, students and other involved entities defines the organizational (e.g. school) climate (Hoy, Tarter, & Kottkamp, 1991). Administrators and teachers of healthy schools work together in pursuit of their missions and are able to effectively deal with conflict from outside influences (Hoy, 2012). The components of a healthy climate include, “strong administrative leadership, high performance expectations, a safe and orderly environment, an emphasis on basic skills, and a system of monitoring student progress” (Hoy, Tarter, & Kottkamp, 1991, p.2). Therefore, a healthy school climate promotes student achievement.

Wayne Hoy (1991) developed the Organizational Health Inventory for Secondary Schools in an effort to measure social and organizational needs conducive to a healthy school environment. Hoy (1991) identified three levels of institutional control: technical, managerial, and institutional levels of support; each level included defining aspect. They are academic emphasis, morale, cohesiveness, principal influence, principal consideration, principal initiating structure, resource support, and institutional integrity.
Aspects at the technical level influence teaching and learning; the managerial level influences the mediation and coordination of internal affairs; and the institutional level influences the school and its environment. Harmonious levels of these support dimensions result in a healthy school. The school is better equipped to deal with outside issues and focus on internal goals.

Figure 1

*School Climate Constructs*

A positive work and learning environment is essential to distinctive levels of satisfaction amongst administrators, teachers, and students. A healthy work environment for administrators and teachers evolves as the levels of openness, colleagueship, professionalism, trust, loyalty, commitment, pride, academic excellence, and cooperation develops (Hoy, Tarter, & Kottkamp, 1991). Moreover, a healthy work environment fosters stability, safety, and performance for teachers. Research by the National Center for Education Statistics (2012) revealed, “Talented, well-trained teachers are most
effective in environments that support their work and professional growth” (p. 1). This information links the environment or climate to efficacy.

Silverman and Davis (2012) indicated:

Teachers who report a higher sense of efficacy, both individually and as a school collective, tend to be more likely to enter the field, report higher overall satisfaction with their jobs, display greater effort and motivation, take on extra roles in their schools, and are more resilient across the span of their career. (p. 1)

A healthy school environment starts with healthy relationships between faculty where honesty, respect, open communication, and risk-taking are essential components of the relationship (Styron & Nyman, 2008). This type of environment promotes personal and academic growth among the faculty and student achievement. Using the Organizational Health Inventory for Middle Schools (Hoy & Sabo, 1998) and the Organizational Climate Description Questionnaire for Middle Schools (Hoy & Sabo, 1998), Styron and Nyman looked for differing characteristics between high and low performing middle schools in relation to the schools’ health and climate. Student test performance scores determined whether schools were classified as high or low performers. The results of the study detected a higher score in organizational structure for lower performing schools. Organizational structure includes aspects like interdisciplinary teams, common planning times, and advisory periods (Styron & Nyman, 2008). The higher score may be a result of lower performing schools’ efforts to change their school’s standings by implementing organizational structures and practices associated with higher student performance. The study uncovered that collegial behavior where teachers
positively interact personally and professionally were higher in higher performing schools. This type of behavior promotes collaboration amongst teachers. Higher performing schools scored lower on directive behavior. Administrators allow more teacher autonomy and support proactive, innovative decision making by teachers. There is a higher level of trust in teacher expertise. Implications from the study further revealed a need for administrators to provide ongoing professional development to expand the teachers’ knowledge base, esteem, and instructional practices. This is further substantiated by Brown and Medway (2007) who maintained that organizational health positively influences the overall environment and management of schools.

Teacher behavior is tied to school environmental traits (Sezgin, 2009). The organizational health based on these traits strongly influences teacher experiences (Sezgin, 2009). For schools to operate effectively there must be a commitment from key players, including the teachers. This commitment is manifested by collaborative actions geared towards the pursuit of shared organizational goals and beliefs. Sezin (2009) researched the relationship between organizational commitment and organizational health. Organizational commitment was measured using The Organizational Commitment Scale (Balay, 2000). The scale included dimensions of compliance, identification, and internalization. Compliance refers to actions taken because of foreseen extrinsic incentives, not because of mutual beliefs. Identification refers to personal fulfillment based on the success of the school; teachers want to stay connected to the school because of the collegial relationships they have developed. Internalization refers to shared individual and school values. The dimensions of organizational health
used in the study included academic emphasis, institutional integrity, professional leadership, resource support, and morale.

Academic emphasis refers to the academic expectations from the school and students. Institutional integrity deals with the protection of the school environment from outside influences. Professional leadership refers to the behaviors from the principals; their demeanor and expectations. Resource support involves the accessibility of instructional and extra materials and morale refers to the interactions and attitudes amongst teachers.

The study established organizational health as a meaningful paradigm for conceptualizing teacher commitment. Institutional integrity, professional leadership, and morale were significant predictors for compliance and internalization. Teachers in schools whose organizational health is high for these predictors experience higher levels of internalization and lower levels of compliance. They are influenced more by their values or beliefs rather than extrinsic incentives. The study also found that professional leadership was a significant predictor of identification. Behaviors and expectations from principals influenced teacher satisfaction and relationship maturity.

Further confirmation of the influence of organizational health constructs came from Shen, Leslie, Spybrook, and Ma (2011) who used nationwide data to explore if there was a relationship between the administrators’ education level and work experience and teacher job satisfaction. They also evaluated if there was a relationship between the school process and job satisfaction. School process refers to the organizational structure, policies, attitudes, values, and expectations (Shen et al., 2011). The study uncovered a significant relationship between school-level factors and job satisfaction. Collegiality
among staff and working conditions had a strong positive relationship with job satisfaction. Also administrative support, classroom autonomy for teachers, school influence, and student behavior positively related to job satisfaction.

In a robust school environment, students and teachers understand and consistently make an effort to fulfill school expectations. Their understanding and belief about situations are built around dramatic exchanges related school ideologies and functions. A healthy school environment equips schools to deal with these dramatic episodes and can help teachers establish a positive perception of the school overall. Teachers do not see ineffectiveness as a norm for their school. In a robust school, teachers and students see a possible crisis, gain an understanding of that crisis based on their viewpoint, and act out of genuine concern. Licata and Harper (1999) extracted a significant relationship between teacher perceptions of school organizational health and the robustness of their school environment. How teachers understand and respond to the bustle of the school schema is related to their perception of the school’s organizational health.

**Support through School-level Administrators.**

Administrators serve as instructional leaders over faculty and staff; they coordinate services, catapult relationships, and play a major part in the development of school climate and culture (Hoy & Miskel, 2008). Administrators must contend with changing demographics, societal values and morals, financial constraints, and political implications on education. Administrators’ successful navigation through these factors heavily weighs on trust between them and the teachers (Goddard, Salloum, & Berebitsky, 2009). Building trust with teachers and establishing a sound relationship has been linked to student achievement (Walsh, 2005). Edgerson and Kritsonis (2006) further substantiated the relevance of administrator influences when they analyzed school
climate and culture as they relate to the development of principal-teacher relationships. They also examined how these relationships contributed to student academic success. The results from their study revealed a relationship between positive school climates, fostered by healthy engagements between administrators and other entities within the school, and increased school productivity.

Wood (2005) also connected the administrator’s supporting role in creating healthy productive school environments by using a qualitative case study approach to explore the position principals have in conducting standards-based teacher induction program in large, urban settings developed as a means of supporting novice teachers. Data were collected from principals, site-level induction program coordinators, mentors, and novice teachers. The results from the study revealed that principals acted as school culture builders, instructional leaders, and coordinators of mentors. Another important finding is how principals act as advocates for novice teachers and support teacher retention.

Relationships between principals and teachers can help positively transform the climate of schools. Principals serve as pivotal symbols within the school climate; they oversee allocations of local funds, networks with the central office and community, student and teacher scheduling, and professional development activities. Price (2011) sought to understand why and how principal and teacher relationships create desirable outcomes of satisfaction, cohesion, and commitment in schools. She also investigates the interpersonal and organizational outcomes resulting from attitudes and interactions between principals and teachers.
The study found that relationship building is important for principals and teachers in developing positive attitudes; having a shared definition of expectations was important for successful relationship building. More autonomy given to principals from the district level strengthens principal-teacher relations; principals are more committed to their organization. The improvement of relationships and increased principal commitment significantly improved teacher satisfaction, cohesion and commitment; this leads to an improved working environment that promotes affective responses from the entire faculty.

Principals can show their commitment by paying attention to teachers’ needs and providing resources to meet those needs. Professional development has been cited as providing more benefit than any other school resource; investing in teacher development is an efficient means of increasing student achievement (Kent, 2004; National Research Council, 1999). The effectiveness and sustainability of professional development are contingent upon its duration, intellectual level, focus, and connection to research based practices (Kent, 2004). Professional development can help establish collaborative and committed relationships among faculty. All of these factors could be mediated by the school-level administrator. Administrators are involved in the budgeting, planning and implementation of professional development. They are at the forefront of decision making at the local level.

Research findings have disclosed strong evidence that student mathematics achievement is positively affected by on-going support and professional development of teachers (Graham, 2007). The consistent provision of needed support and professional development is mediated by school leaders who are able to contextualize specific school needs. Amid their teachers, administrators can help identify ineffective instructional
practices leading to poor student performance and help identify possible research-based alternatives; generic professional development does not provide the knowledge and skills needed for improved teacher performance (Kent, 2004).

In an effort to understand professional development features that impacted leadership skills and teacher capacity, Koellner, Jacobs, and Borko (2011) studied 12 teacher leaders and 54 math teachers from the middle school level. Both qualitative and quantitative data were used as means for data collection and analysis. From the study there appeared to be three prominent features school leaders should consider in order to employ high-quality mathematics professional development. School leaders should promote professional learning communities, where teachers are actively and collaboratively engaged, encourage increased mathematical content knowledge for teachers, and adapt professional development so it reflects local goals and initiatives.

Further confirming the power of administrative induced professional development, Mullen and Hutinger (2008) explored the role of the administrator in facilitating and supporting faculty study groups formed to address improved student achievement. Their study established how administrators are vital in creating conditions that foster teacher and student improvement. Specifically, administrators can help develop specific goals linked to the school’s vision and mission, establish guidelines for teacher interactions/collaboration, and oversee the implementation process by helping to analyze data, acquiring needed resources, and assisting with scheduling.

Administrators can help support teachers by being instructional leaders. Instructional leaders seek to improve instructional quality and student achievement by modeling instruction, encouraging teachers to improve their performance, assessing and
providing appropriate professional development activities to assist teachers, and providing additional resources (May & Supovitz, 2011). In a study by May and Supovitz (2011) it was hypothesized that principal instructional leadership range from school-wide efforts to more targeted efforts to address specific teacher needs. It was also hypothesized that broader leadership efforts were less likely to produce sustaining shifts in instructional practice; significant shifts in instructional practice would more likely result from targeted approaches.

Participants were administrators, general education, and special education teachers from a southeastern urban school district at the elementary, middle, and high school levels. The results showed that principals who participated in the study engaged in instructional leadership practices for an average of 3 to 5 hours per week for over 2 years. Principals generally combine broad and targeted instructional leadership practices because of the number of teachers and need for intense intervention in some cases. In the areas of reading and mathematics, those teachers who had targeted instructional leadership contact with the principals reported a change in their instructional practice. Broader contact did not result in significant changes.

Support through Resources.

Providing resources geared towards specific content is a means to increase teacher efficacy (Evans, 2011). General resources help, but those that can aid in content based instruction boost teachers’ confidence and competence in improving student performance. In a mixed methods study using a mathematic content knowledge test taken by teachers, questionnaires, and reflections from journals, Evans (2011) explored differences in content knowledge for teachers before and after they participated in a
reformed-based mathematics methods course done during in-service training. The participants included secondary mathematics teachers. He also explored if there were any differences in their attitudes towards mathematics, self-efficacy, and teaching and learning mathematics.

Evans (2011) found that there were significant improvements in teachers’ mathematics content knowledge after the course; the effect size in content was large. The mathematics teachers’ attitude towards content was more positive and they had more positive concepts of self-efficacy. It was also revealed that there was a positive correlation between attitudes about mathematics and self-efficacy. The mathematics teachers felt their classroom experiences were enhanced by participating in the in-service. Time and textbooks were provided for them to work collaboratively to solve problems, discuss content, and present micro-lessons; they gained knowledge and skills on utilizing problem-solving and numeracy techniques. Subject-specific professional development strengthens teacher effectiveness; this is especially true at the secondary level (Moyer-Packenham et al., 2008).

Furthermore, Rasmussen and Marrongelle (2006) investigated the use of pedagogical content tools by teachers as a resource to address critical thinking and comprehension of complex mathematical concepts. The pedagogical tools included graphs, diagrams, equations, and verbal statements used to connect mathematics instruction and content understanding. Data were collected from students enrolled in a differential equation course at a midsized public university. For the purpose of the study, the classes, traditional taught using a lecture-style format, was re-structured using an inquiry focused format where the instructors incorporated pedagogical instructional tools.
Videos, student written work, interviews, and recordings of weekly project meetings that included the instructor, students, and at least one of researchers were used for analysis.

Rasmussen and Marrongelle (2006) extracted the use of mathematical pedagogical content tools contributed to student engagement and learning. They promote critical analysis of concepts, expansive dialogue, and justifications of claims. The instructors played a vital role in facilitating student engagement and the use of appropriate pedagogical content tools for specific problems.

Integrating technology into secondary mathematics instruction has become a lasting, affective strategy. Technology standards have been embedded into math curriculum standards because of their potential to enhance student learning. Although teachers are expected to use technology in their classrooms, the inclusion has been marginal because of insufficient access, institutional support, and teacher training. Teachers have a lack of confidence in the benefits of technology because of these pitfalls. However, as the access, training, and use of technology in for student learning in math classes increases so does the perception of benefits for teachers. Teachers’ beliefs change as with their practice.

In a study by Bennison and Goos (2010), participants included 485 secondary math teachers who completed the Teacher Technology Survey. The survey was used to identify professional development experiences and needs for secondary math teachers. Overall, 83% of the teachers indicated they received professional development related to computers, the internet, and graphic calculators. However, they needed more training in the use of these technologies, how to effectively integrate technology in their instructional practice, and assessment. They wanted time to explore and collaborate.
Respondents who received professional development on computers had more positive beliefs in technology; they were more confident in its use while teaching math, and could see its usefulness.

Also in support of technology use as a means of support for teachers, Varma, Husic, and Linn (2008) included middle and high school science teachers from Arizona, California, Massachusetts, North Carolina, and Virginia as participants in a study exploring ways to increase the number of teachers using high quality technology-enhanced inquiry science instruction as a pedagogical resource. Using a targeted professional development approach, they also sought ways to strengthen teachers’ understanding of technology, science instruction, and student learning. During professional development teachers were trained in the use of student web-based modules to reinforce instruction; the modules included benchmark assessments to check for comprehension. Teachers also received mentoring support to insure the proper implementation of the modules and received a continuing education credit, stipends, and a Technology-Enhanced Learning in Science certificate.

Using the benchmark assessments scores as data, the results indicated an increase in student learning from students who used the TELS learning modules. Teachers expressed enthusiasm about using the TELS program, but also mentioned several challenges in its use including outdated hardware/software, networking issues, and computer lab scheduling. However, by participating in the program, teachers reported that their instructional practices changed; the use of technology allowed for more interaction with students.
The use of high quality textbooks as a resource has been found to be a means to improve student learning in mathematics (National Council of Teachers of Mathematics, 2000). Teachers tend to rely on textbooks as a major resource for instruction. That is why the textbook selection process is very important. In the state of Alabama, textbook adoption committees that include teachers and administrators are used during the selection process (Alabama State Department of Education, 2012). Textbook companies send samples including supplemental companion materials to districts for adoption consideration; committees meet to analyze the choices and compare/contrast features and supplemental resources.

Tar, Reys, Barker, and Billstein (2006) suggested several considerations when choosing textbooks. There should be an emphasis in mathematics content; concepts should be developmentally appropriate and accessible for contrasting cognitive levels. There should be an instructional focus including differentiated student activities. Finally, textbooks should support teachers by providing instructional materials that enhance mathematics instruction.

**Support through Teachers/Colleagues.**

Teacher support through collaborative efforts is becoming a prevalent practice in k-12 schools (Graham, 2007). Teachers learn from each other and strengthen their resolve by sharing experiences concerning instructional practices and student needs; seeing others perform in adverse situations can generate expectations and greater effort (Bandura, 1977). Using fellow teachers and their expertise is a way to extend proven, innovative practices and develop sustaining relationships that foster teacher improvement; one way to facilitate this interaction is through professional learning communities. Professional learning communities are mostly made of teachers who set
common goals and work together to accomplish these goals through collaborative efforts. These communities are usually facilitated by fellow teachers and can be interdisciplinary or within the same discipline, depending on the goals; they help build friendships and emotional connections amongst teachers (Nathan, 2008).

Graham (2007) used a survey to determine if there was a significant relationship between professional learning community activities and teacher improvement; constructs of the survey focused on collective participation, content focus, active learning, and coherence. Interview data were used to describe the relationship between same discipline professional learning community activities and teacher improvement. Participants included 6-8 grade core academic teachers from a first-year middle school in a semi-urban setting. Three constructs, content focus, active learning, and coherence, were found to have significant positive relationships with teacher improvement; the teachers indicated increased levels for their knowledge base, instructional practices, and skill sets. The professional learning communities consisted of same-subject, same-grade level teams focusing on administrative concerns, curricular, and instructional practices; collaboration was indicated as the catalyst for improved teacher performance.

Youngs, Holdgreve-Resendez, and Qian (2011) also showed the importance of teachers working together when they used qualitative research methods with novice elementary teachers from Michigan and Indiana school districts to examine how program coherence influenced beginning teachers’ induction experiences. Teachers indicated collaboration with fellow colleagues was one of the most important aspects of a positive induction experience.
In addition, Guo et al. (2011) used preschool teachers to examine contextual relationships between self-efficacy and characteristics of teachers and classrooms. The researchers hypothesized that teaching experiences, teacher collaboration, teacher influence in decision making, and student engagement would have a significant positive influence on teachers’ self-efficacy. It was also hypothesized that student engagement and teacher self-efficacy would be significantly regulated by teacher characteristics.

Data were collected from a demographic questionnaire, Bandura’s (1997) Teacher Self-Efficacy Scale, the Teacher’s Sense of the School as Community Questionnaire (Battistich, Solomon, Watson, & Schnaps, 1997), and the Classroom Assessment Scoring System-PreK (Pianta, La Paro, & Hamre, 2008). Results only showed teacher collaboration and teacher influence significantly affected teachers’ self-efficacy. For those teachers who identified higher levels of collaboration in their programs, student engagement was positively related to increased levels of self-efficacy. Teacher collaboration appeared to be an essential characteristic in enhancing teacher self-efficacy.

Mentorships have been found to be effective modes to address math teachers’ needs, especially during the induction phase of the profession (Ormond, 2011). These needs include areas of curriculum content, course planning, instruction and assessment, reporting, behavior management, and school policies and culture. Mentoring relationships can function as catalyst to help with teacher retention, fostering professional community learning among teachers, and developing innovative content-specific teaching strategies (Fraser-Abder, 2005).

What appears to be a very important factor for the effectiveness of the mentoring process is the pairing between the mentor and mentee. Teachers should not merely be
paired based on years of experience, but also in accordance with content area and targeted needs (McConney & Maor, 2009; Friedrichsen, Chival, & Teuscher, 2007). These pairings may be school-based or distance mentoring via email or telephone; effective and time-efficient mentoring delivery may require flexible and diversified approaches (Ormond, 2011). However school-level administrators are crucial in facilitating the exchange. Administrators can assist with scheduling time for meaningful mentoring activities and fostering an environment where these relationships are encouraged and celebrated.

**Efficacy and the Teacher**

In archaic times, people relied on supernatural beliefs and practices to explain their control or lack of control of events. However, as discovery evolved and mankind gained knowledge of their role in outcomes, a new belief system emerged; ingenuity and drive surpassed the strength of influence from the supernatural (Bandura, 1997). This new belief in self was coined efficacy, a belief in ones capabilities to promote change and favorable outcomes. Efficacy is linked to differentiated sets of activity domains as they relate to associated cognitive, emotional, social, and behavioral sub-skills (Bandura, 1997). Optimal functioning resulting in favorable outcomes are influenced by both skill and efficacy; contextual requirements affect how preexisting skills coordinate with beliefs during functioning. People who have a weak sense of belief in their capabilities to perform certain skills are less motivated and do not put forth their best effort when performing tasks associated the activity domain; their commitment to goals falters (Bandura, 1997). Conversely, those with a stronger
belief are able to tackle difficult task and see challenges as a means to strengthen their belief.

General efficacy beliefs are not transferable across domains (Bandura, 1997; 1998). In terms of academia, functions and tasks associated with specific activity domains are factors of differing belief constructs. Performance demands for particularized situations partially influence how efficacy beliefs are structured; personal, social, and situational aspects dictate experiences. A positive sense of self-efficacy is contingent on how these demands are mediated; successful mediation yields a sustaining sense of efficacy (Bandura, 1997). Through this successful process, people are able to self-appraise their performance and build upon their efficacy beliefs; successes usually positively shape beliefs. However, performance alone is not enough to arbitrate efficacy beliefs since there are multiple dynamics that affect performance including their preconceptions of their capabilities, the perceived difficulty of the tasks, the degree of expended effort, the amount of outside help, the circumstances under which tasks are performed, patterns of failures and successes, and the memory of how past related experiences were organized (Bandura, 1997).

In a study by Raudenbush, Rowan, and Cheong (1992) it was hypothesized that there would be variations in teachers’ sense of efficacy based on intra and inter-teacher variations. Intra-teacher variations were tied to track assignments of a class, teachers’ level of preparation, student age, class size, and student engagement. Inter-teacher variations were connected to disciplinary background, school organizational environment, and teacher personal
background. It was further hypothesized that the effects of track on self-efficacy would be strong among mathematics and science teachers and that teachers who work in environments with supportive administrators, high levels of faculty collaboration, and high levels of teaching autonomy would have greater perceptions of self-efficacy than low-track classes.

For intra-teacher variations, results from the study found a positive relationship between class track and self-efficacy; teachers who taught higher tracked classes like honors-track had greater perceptions of self-efficacy than lower tracked classes like vocational and general-track classes. In terms of content, this effect is largest for math and science. Teachers also reported lower self-efficacy when teaching classes with younger students; freshman and sophomore classes were less mature and harder to engage. Teacher preparation did not appear to be a determinant. Also, a surprising finding was that class size was positively related to self-efficacy; teachers who taught larger classes had a greater sense of self-efficacy. Results concerning inter-teacher variations revealed greater faculty collaboration and teaching autonomy yielded a greater sense of self-efficacy.

People judge their belief capacity partly by comparing their performance with those sharing similar roles; this helps establish personal relevance of beliefs. Relating efficacy beliefs to teachers is a way to provide models of efficacy linking personal characteristics and predictive performance capabilities (Bandura, 1997). The individual sense of efficacy where teachers believe they are competent enough to successfully complete related curricular and extracurricular objectives is framed teacher self-efficacy (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).
Moyer-Packenham et al. (2008) maintained,

“Teacher beliefs included beliefs about students’ learning, such as beliefs about the way students learn content and beliefs about who can and cannot learn, and beliefs about content, such as teachers’ views on the nature of content and the best methods for teaching it” (p. 573).

The level of teacher competence to address these beliefs is based on the teachers’ appraisal of available resources (e.g. knowledge and skills of teacher, internal support from administrators and colleagues, materials) and how the availability, or lack of, will contribute to the successful obtainment of objectives (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).

Schools have the means to impact internal and external resources through their provision of support. Encouraging news for school systems is the cyclical nature of teacher self-efficacy. If school systems can find ways to increase teacher’s self-efficacy, there will be continuous improvement for teachers and subsequent student achievement. “Greater efficacy leads to greater effort and persistence, which leads to better performance, which in turn leads to greater efficacy” (Tchannen-Moran, Woolfolk Hoy, & Hoy, 1998, p. 234).

People typically assess their efficacy belief levels based on comparative performance indicators. The teaching profession is associated with a unique set of dynamics influencing perceived successful job performance. Teachers must consider student dynamics (e.g. demographic make-up, prerequisite skills, and cognitive ability), and available strategies and resources as they relate to the content to be covered (Woolfolk Hoy & Davis, 2005). Other contextual factors also play vital roles in the
development of teachers’ self efficacy beliefs; this includes requirements of the position and the level of personal teaching competence. Mastery experiences help to increase efficacy. Tschannen-Moran and Johnson (2011) explored antecedents, including preservice and in-service training, teaching setting, and demographics, that may be important sources of self-efficacy beliefs for literacy teachers. They found that the school setting significantly related to efficacy.

On the other hand, teacher quality influences efficacy as well. The notion of teacher quality encompasses many aspects including content knowledge, the effective use of pedagogy, and student outcomes. One identified way to promote improved teacher quality is through the National Board Certified designation route. Teachers who seek National Board certification undergo a laborious process where they must provide evidence of strength in their methods of instruction, assessment skills, professional activity involvement, and reflective practices. Many states provide financial incentives to teachers willing to complete the process; however, the benefit of the designation has not been extensively researched.

Stronge, Ward, Tucker, Hindman, McColsky, and Howard (2007) sought to find a relationship between the perceived teacher quality of National Board Certified teachers and student achievement. They also wanted to determine if there were differences in teacher efficacy and practices that could explain increased results in student achievement between National Board certified versus non-board certified teachers. Results from the study found that teacher impact on achievement was not significantly different for national board certified teachers vs. non-NBCTs. However, NBCTs appeared stronger on pre-instructional and dispositional variables (e.g. planning, grading, cognitively
challenging assignments). Differences were found between the teachers in terms of classroom management and personal qualities, but not in efficacy, instruction, or assessment.

Teacher quality is also characterized by competence levels in their teaching area. In a study by Chacon (2005), the researcher explored the sense of efficacy for teaching among a group of Venezuelan English as a Foreign Language middle school teachers. The level of English proficiency, use of pedagogical strategies to teach English, along with measures of teacher efficacy for the middle school schools were used in the analysis. Teachers’ sense of efficacy in this study pertained to their beliefs in their competence in effectively instructing and motivating all of their students, leading to increased performance in English. The study also considered years of experience and professional development involvement in the examination. The results concluded a need for teachers to increase their language, subject matter, and instructional skill base in order to strengthen their sense of efficacy. Vicarious experiences through observations and modeling add to the strengthening power.

Vicarious experiences start at the pre-service level. In a study by Fives, Hamman, and Olivarez (2007) self-efficacy was used to explore the extent to which preservice teachers, during their student teaching, experienced burnout. The class grade level and school-level support structures were also considered. Specifically, the study sought to determine if a relationship existed between preservice teachers’ efficacy beliefs, the learning climate, support from cooperating teachers, and reports of burnout. Also, did these factors change over the duration of the preservice teachers’ student teaching experience and if so, how? The study indicated that efficacy and burnout were inversely
related; higher levels of efficacy yielded lower levels of burnout. Perceptions of efficacy, burnout, and support for the preservice teachers were found to change over time; this is expected during the student teaching experience. Preservice teachers who received more support from their cooperating teachers earlier in the semester later experienced heightened levels of efficacy for instructional practices; they were less stressed and connected more with their students. Also, preservice teachers demonstrated different levels of burnout depending on the school level; elementary preservice teachers experienced less burnout than secondary student teachers.

Likewise, at the preservice level, Dunn and Rakes (2011) examined the influence of preservice teachers’ efficacy and concerns regarding the implementation of learner-centered practices on preservice teachers’ learner-centered beliefs. The concerns were measured along seven stages. In the first stage there is a lack of concern; the second stage deals with the awareness and interests of an educational issue. The third stage involves the personal ability, competence, requirements, and role in addressing the issue. The fourth stage deals with logistics and the availability of resources needed to complete tasks related to addressing the issue. The fifth stage and sixth stages deal with the interest and collaboration needed to insure positive student outcomes. During the seventh stage there is an evaluation of the outcomes; if needed, initiatives are refocused and modified to promote positive change.

Results of the study indicated that for preservice teachers, teacher efficacy was positively related to learner-centered beliefs. Together, teacher efficacy and concerns related learner-centered education explained more of the differences
between preservice teachers’ beliefs about learner-centered education. Their belief in their abilities along with their degree of interest and involvement leading to positive outcomes helped to determine the degree of learner-centered practices they would utilize.

With the No Child Left Behind Act (2002) which advocates collaboration and inclusive practices, general education teachers are receiving more help meeting specialized needs of students from para-educators. Para-educators play vital roles in inclusive settings; they provide instructional support and direct services to students under the guidance of teachers. The Individuals with Disabilities Education Act (IDEA) has included and defined the role of para-educators within its personnel standards. Para-educators are viable additional resources for classroom assistance benefiting both students and teachers.

Shyman (2010) used the Teachers’ Sense of Efficacy Scale with para-educators to identify predictors of emotional exhaustion. Para-educators’ instructional roles have been increasing, possibly resulting in the same levels of emotional exhaustion associated with teachers. Emotional exhaustion results from a perceived overextension of work; it is a component of occupational stress and possible burnout. Constructs of occupational stress include job demands, role conflict, sense of efficacy, and perceived administrative support. It was hypothesized that role conflict and job demand aspects would be significant predictors of emotional exhaustion; all other constructs of occupational stress would play less of a predictive role.
Results from the study indicated the best predictors of emotional exhaustion, in descending order according to significance, were role conflict, emotional demand, sense of efficacy, and administrative support. Findings also supported the implication of para-educators sense of efficacy as it relates to the perception of their occupational aptitude; para-educators are less stressed by role conflict, emotional demands, and wavering administrative support if they have a strong belief about their capabilities to perform the job. Their capabilities are heavily dependent on relationships and support from their partners, classroom teachers.

**Secondary Math Teachers and Their Organization/School**

With the mandates from No Child left Behind (2002) and the Individuals with Disabilities Education Improvement Act (2004), math teachers are instructing a more diverse student population in terms of ability and learning preference. Students who historically were placed in separate classes or pulled for instruction are now in inclusive settings. Students at various math competency levels, higher or lower than the actual course assignment, are in the same class. Math teachers are asked to accommodate or modify their instructional delivery, assignment requirements, and assessment formats to address the specific needs of their diverse students.

This differentiated method may mean including instructional and assistive technology, using lessons that are universally designed, and collaborating with other support faculty (Little, 2009). Many textbooks companies are now providing extra examples, real-world application activities, interactive games, and visual simulations as instructional technology resources. For assistive technology, students are using
computers to access closed-captioned lesson formats, reading tools, and augmented
devices to help with physical impairments. Researched based practices are taking the
forefront instead of the traditional style of teaching math where teachers present content,
have students practice problems, and then complete an assessment (Little, 2009).
Universally designed lessons that include instructional styles and activities to address
kinesthetic, auditory, visual, and combination learners are now being pushed. The
universal design concept is an attempt to be proactive in addressing student diverse
learning needs. Special education and English Second Language teachers are working
with general education math teachers to provide support in the forms of recommendations
or teaching assistance in an effort to address ability and language needs. With all of the
mandates and need to specialize instruction contextualized by content, teachers of
different grade levels and content areas have different needs. This further supports the
necessity to examine organizational health constructs and efficacy beliefs specifically for
secondary math teachers in an effort to improve teacher and student outcomes.

**Alabama Schools’ Status**

Alabama has a single accountability system based on student performance in
reading and mathematics on the Alabama Reading and Mathematics Test and the
Alabama High School Graduation Exam. These tests are chosen by the state and are used
to assess baseline requirements as prescribed by the No Child Left Behind Act (2002).
Yearly progress in the state of Alabama is evaluated based on previous performance and
set goals for reaching proficiency; The No Child Left Behind Act (2002) gives each state
liberty to determine its own adequate yearly progress threshold. Alabama schools are
expected to make “adequate yearly progress” based on academic content standards,
assessments, academic related indicators, and student participation. The No Child Left
Behind Act calls for all students to perform at grade level in reading and mathematics by the end of the 2013-2014 school year (Alabama State Department of Education, 2012). Interventions by the state are predicated on the degree and duration of poor performance.

Adequate Yearly Progress encompasses multiple assessment components. Annual measurable objectives in reading and mathematics are measured separately per subgroup. The subgroups are determined by race, socio-economic status, and learning ability (e.g. special education). Students are expected to perform at least at the proficient level, which is Level III (e.g. Meets Academic Content Standards), or higher.

Accountability scores are based on students enrolled for a full academic year which starts on September 1st and must include the first day of state testing. Scores of limited-English proficient students, who were not enrolled in U.S schools for at least a year prior to testing, are not counted towards academic accountability but are counted towards the participation rate. Alabama Alternate Assessment scores for students with significant cognitive disabilities can be counted towards accountability scores, using parallel proficiency scales, as long as the number of students used does not exceed 1% of tested student population per school (ALSDE, 2012). Students deemed as having a significant cognitive disability have an I.Q. of 55 and below.

Other variables considered are the assessment participation, attendance, and graduation rates for the schools and systems (ALSDE, 2012). Data is collected for grades 3-8 and 11. Schools do not meet adequate yearly progress unless every subcategory/group meets AYP as well. If a school does not meet AYP for two consecutive years in the same area, it is identified for School Improvement. This would require the school to identify reasons why it did not make AYP (e.g. reading, math, or
additional indicator scores) and develop an intervention plan to address the area(s). This could be in the form of professional development or additional resources. More stringent requirements are evoked if performance does not improve over time. In 2008 and 2009, all schools systems made AYP in math. However, in 2010 four school systems did not for all students, blacks, special education, and free/reduced meals.

**Alabama Reading and Mathematics Test (ARMT).**

“The ARMT is a criterion-referenced test based on Alabama’s academic content standards in reading and mathematics” (Alabama State Department of Education, 2012). It is administered for grades 3-8. The math portion of the test is composed of multiple-choice and open-ended questions. Multiple-choice questions have only one right answer. Open-ended questions require students to include reasons, explanations, or a rationale along with their answers.

**Alabama High School Graduation Exam (AHSGE).**

“The Alabama High School Graduation Exam is a criterion-referenced test base on Alabama’s academic content standards (Alabama Course of Study) and is an assessment of required high school core course work” (Alabama State Department of Education, 2012); it is a graduation requirement. The exam is first given in 10th grade. The test is composed of multiple-choice questions counting one point each; there are 84 reading questions, 90 biology questions, and 100 questions for language, mathematics, and social studies.
III. Methods

The methods section is composed of two parts: first the purpose of the study and a brief history entailing reliability and validity information for the instruments to be used is provided; this information is then further substantiated using previous studies that used the Teacher Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) and the Organizational Health Inventory (Hoy & Tarter, 1997). The second part outlines the sample and procedures to be used to address the proposed study’s research questions. It includes the use of descriptive questions to address possible relationships between self-efficacy and administrative support, colleague/teacher support, resource support, gender, race, and socioeconomic status.

Purpose of Study

The purpose of this study was to investigate the possible relationship between teacher efficacy and administrative support, teacher/colleague support, resource support, gender, and SES among secondary math teachers in Alabama. Investigating the relationships could provide information that might add to the body of knowledge in the fields of teacher self-efficacy and mathematics education.

Research Questions

Specifically, a need exists to investigate the following questions:

1. Is there a relationship between self-efficacy and gender for math teachers in Alabama?
2. Is there a relationship between self-efficacy and race for math teachers in Alabama?
3. Is there a relationship between self-efficacy and perceived levels of administrative support for math teachers in Alabama?
(4) Is there a relationship between self-efficacy and perceived levels of resource support for math teachers in Alabama?

(5) Is there a relationship between self-efficacy and perceived levels of teacher/colleague support for math teachers in Alabama?

(6) Is there a relationship between self-efficacy and the linear combination of gender, race, and perceived levels of administrative, resource, and teacher/colleague support for math teachers in Alabama?

**Instrument History and Usage**

The Organizational Health inventory was originally developed by Hoy and Miskel (1991). The scale was later adapted to address the specific context of secondary and middle schools in 1997 and 1998 respectively. The original organizational health scale included 5 subtests: institutional integrity, collegial leadership, resource influence, teacher affiliation, and academic emphasis. The scale’s reliability, for each subtest, was .90 for institutional integrity, .95 for collegial leadership, .89 for resource influence, .94 for teacher affiliation, and .87 for academic emphasis. A factor analysis was completed to verify construct validity.

Later, the Organizational Health Inventory was adapted for the context of secondary schools in 1997; this scale will be used for the current study. Institutional integrity and academic emphasis held as pre-established sub-test from the original scale. However, new subtests of initiating structure, consideration, principal influence, resource support, and morale were included. Reliability for each subtest was .91 for institutional integrity, .89 for initiating structure, .90 for consideration, .87 for principal influence, .95
for resource support, .92 for morale, and .93 for academic emphasis. Institutional integrity represents a school that has veracity in its educational program, is not adversely affected by outside influence, and is able to successfully navigate through conflict and obstacles. Initiating Structure is behavior prompted by principal mannerisms and expectations reflecting high standards, a push towards achievement and supportive actions from faculty. With consideration, principals look out for the faculty’s wellbeing; the principal is supportive, pleasant, and communicates a sense of parity with faculty. Principal influence involves the principals’ influence and working relationships with district level leaders. Resource support considers the accessibility of classroom, instructional, and extra supplies. Morale deals with the interactions between teachers; they are friendly, trusting, enthusiastic, and confident in one another. There is a sense of comradeship and accomplishment from their jobs. Academic emphasis describes schools that drive towards increased student performance; teachers and students believe goals aligned with high standards are obtainable and work to create and maintain an environment conducive for this belief.

Finally the inventory was tailored for the middle school level in 1998. Since middle school represents the bridge between the elementary and secondary levels, the adapted middle organizational health scale reflected the connection. The reported subtest and their reliability scores are .93 for institutional integrity, .94 for collegial leadership, .94 for principal leadership, .93 for resource support, .94 for teacher affiliation, and .94 for academic emphasis. Consideration was also listed as a subtest, however a reliability score was not indicated. Construct validity for the secondary and middle school versions were confirmed using factor analyses.
The Organizational Health Inventory has been tested in multiple studies, one of which was by Licata and Harper (1999) who used the instrument with junior high and middle school teachers form urban, suburban, small city, and rural schools. A factor analysis yielded a seven subscale structure accounting for 74% of the variance; the reliability for the subscales ranged between .87 and .95. Pas, Bradshaw, Hershfeldt, and Leaf (2010) applied the OHI to general elementary education public school teachers. The reliability for the entire scale was at .94. Brown and Medway (2007) used the inventory with teachers from the 3rd through 5th grade; the reliability for the subscales ranged from .87 to .95. Styron and Nyman (2008) used the instrument with middle school teachers; the reliability coefficients for the subscales were .93 for institutional integrity, .94 for collegial leadership, .94 for principal influence, .93 for resource support, .94 for teacher affiliation, and .94 for academic emphasis. Korkmaz (2006; 2007), Cemaloglu (2006), and Sezgin (2009) used the Turkish version of the scale where it was adapted for linguistic and cultural reasons. Korkmaz’s (2006) study was used with 6th, 7th, and 8th grade teachers and denoted subscale reliability coefficients of .95 for collegial leadership, .95 for academic emphasis, .91 for resource support, and .69 for institutional integrity. Reliability for the entire scale was .95 and the validity coefficient was .91. For Korkmaz’s 2007 study, the participants included high school teachers where 6 subscales were indentified with reliability scores ranging between .82 and .92. Cemaloglu (2006) used primary school teachers to conduct a pilot study; five items were extracted. The reliability for the entire scale was .93. Reliability for the subscales was .60 for institutional integrity, .79 for initiating structure, .90 for consideration, .71 for principal influence, and .92 for resource support. Also, Sezgin’s (2009) study included primary
school teachers; a confirmatory factor analysis yielded a 5 factor structure. The reliability coefficients for the subscales were .70 for academic emphasis, .71 for institutional integrity, .78 for professional leadership, .77 for resource support, and .73 for morale support.

The Teachers’ Sense of Efficacy scale was developed by Tschannen-Moran and Woolfolk Hoy in 2001. A long form including 24 items and short form including 12 items were developed using three subscales substantiated by a factor analysis: efficacy in student engagement, efficacy in instructional practices, and efficacy in classroom management. Efficacy in student engagement focuses on a teacher’s belief that he/she can motivate and help students of all levels successfully engaged in learning, using creativity and critically thinking; students are able to do well in schoolwork. Efficacy for classroom management refers to a teacher’s belief that he/she can create a classroom environment where disruptive behavior is controlled, classroom rules are followed, and clear expectations of student behavior are defined. Efficacy for instructional strategies encompasses a teacher’s belief that he/she possesses instructional and assessment strategies conducive to the apprehension of student comprehension of content and skills. The alpha levels for reliability varied between the long and short versions; however, reliability for the entire scale and subscales was consistently high for both. For efficacy in student engagement, the reliability scores for the long and short form were .87 and .81 respectively; efficacy in instructional practices was .91 and .86; and efficacy in classroom management was .90 and .96. Reliability scores for the entire scale were .94 and .90.

Several studies have further tested reliability and validity for the Teachers’ Sense of Efficacy Scale. Leila and Soghra (2011) used the scale with elementary, middle, and
high school teachers. They found the reliability coefficient for the entire scale to be .89; the validity score was .94. Subscale reliability scores were .91 for instructional strategies, .90 for classroom management, and .87 for student engagement. Stronge, Ward, Tucker, Hindman, McColsky, and Howard (2007) used the scale with 5th grade teachers. The reliability subscale scores were .91 for instructional strategies, .90 for classroom management, and .87 for student engagement. Validity was assessed and accepted through correlations with other existing teacher efficacy measures. Haverback (2009) used the scale with preservice teachers. There was a high rate of validity indicated and reliability for the entire scale was scored at .88. Kotaman (2010) used preservice and early childhood teachers as participants. The indicated reliability for the entire scale was .93. For the subscales, the reliability scores were .82 for student engagement, .86 for instructional strategies, and .84 for classroom management. Hamman, Fives, and Olivarez (2007) involved student teachers and their cooperating teachers as participants. Reliability for the entire scale was .94; for validity, a parallel factor analysis yielded a single-factor solution versus three factors for preservice teachers. In an earlier study, Fives, Hamman, and Olivarez (2005) used student teachers to establish construct validity. A factor analysis produced a similar factor structure; reliability for the entire scale at .97. Reliability was also determined for the subscales: instructional practices (.91), classroom management (.90), and student engagement (.87). Fahy, Wu, and Hoy used secondary teachers in their study. The entire scale yielded a reliability coefficient of .81; a factor analysis validated the 3 construct designation. Dunn and Rakes (2011) used preservice teachers and found a reliability score of .94 for the entire scale. Shyman (2010) used the instrument with special education para-educators.
This study yielded one of the lowest reliability coefficients at .49 for the entire scale; face validity was deemed as acceptable.

**Teacher efficacy.** The sense of efficacy for teachers will be measured using the items from the short form of the Teacher’s Sense of Efficacy Scale developed by Tschannen-Moran and Woolfolk Hoy (2001). Each item will be measured using a Likert-type scale with fixtures at 1-“nothing”, 3-“very little”, 5-“some influence”, 7-“quite a bit”, and 9-“a great deal”; greater sense of teacher efficacy corresponds with higher scores. The following items from the scale will be used to measure the indicated construct:

- How much can you do to control disruptive behavior in the classroom?
- How much can you do to motivate students who show low interest in school work?
- How much can you do to get students to believe they can do well in school?
- How much can you do to help your students value learning?
- To what extent can you craft good questions for your students?
- How much can you do to get children to follow classroom rules?
- How much can you do to calm a student who is disruptive or noisy?
- How well can you establish a classroom management system with each group of students?
- How much can you use a variety of assessment strategies?
- To what extent can you provide an alternative explanation or example when students are confused?
- How much can you assist families in helping their children do well in school?
• How well can you implement alternative strategies in your classroom?

**Administrative Support.** Administrative support will be measured using the dimension “consideration” from the Organizational Health Inventory for secondary schools developed by Hoy and Tarter (1997). Pre-service teachers will indicate the degree to which certain behaviors associated with administrators occur in a school setting by marking 1-“rarely occurs”, 2-“sometimes occurs”, 3-“often occurs”, and 4-“very frequently occurs”. The following items from the scale will be used to measure the indicated construct:

- The principal is friendly and approachable.
- The principal treats all faculty members as his or her equal.
- The principal puts suggestions made by the faculty into operation.
- The principal is willing to make changes.
- The principal looks out for the personal welfare of faculty members.

**Teacher/Colleague Support.** Perceived support from and interactions amongst fellow teachers will be measured using the dimension “morale” from the Organizational Health Inventory for secondary schools. Pre-service teachers will indicate the degree to which certain behaviors associated with teacher interactions occur in a school setting by marking 1-“rarely occurs”, 2-“sometimes occurs”, 3-“often occurs”, and 4-“very frequently occurs”. The following items from the scale will be used to measure the indicated construct:

- Teachers do favors for each other.
- Teachers in this school like each other.
- Teachers are indifferent to each other.
- Teachers exhibit friendliness to each other.
- Teachers in this school are cool and aloof to each other. The morale of teachers is high.
- There is a feeling of trust and confidence among the staff.
• Teachers accomplish their jobs with enthusiasm.
• Teachers identify with the school.

**Resource Support.** The adequate provision of resources will be measured using the dimension “resource support” from the Organizational Health Inventory for secondary schools. Pre-service teachers will indicate the degree to which resources are available in a school setting by marking 1-“rarely occurs”, 2-“sometimes occurs”, 3-“often occurs”, and 4-“very frequently occurs”. The following items from the scale will be used to measure the indicated construct:

• Extra materials are available if requested.
• Teachers are provided with adequate materials for their classrooms.
• Teachers receive necessary classroom supplies.
• Supplementary materials are available for classroom use.
• Teachers have access to needed instructional materials.

**Proposed Study**

The researcher used a web-based survey via Survey Monkey to collect data. Having the participants complete a web-based survey will provide time to think thoroughly about responses and provide accurate information that represents them and not added interpretations that may come from more subjective research data collection methods. Also, surveys and questionnaires are used frequently to examine teacher characteristics, including practices and beliefs (Moyer-Packenham et al., 2008). Knowing the advantages and disadvantages of all survey delivery methods allows researchers to determine the best fit for their research design. In some cases, a combination of survey delivery methods is necessary to obtain pertinent data. For the proposed study, the advantages of using the internet to deliver a web survey outweigh the disadvantages. Even though there is a chance that all surveys will not be returned, the researcher will be
able to collect larger amounts of data, hopefully, in less time than the other methods
given the need to collect data from an extensive area of Alabama. Identified school
administrators will be able to send the survey, via an emailed link, to the desired teacher
population (e.g. secondary schools, math teachers). The survey format has, as a default,
forced completion of items to ensure all surveys questions are addressed. Also, data
collected through Survey Monkey can be exported to Excel files that are acceptable for
most statistical analysis programs.

The researcher will utilize a cross-sectional approach for delivering an inclusive
survey including demographic questions, independent variable questions from the
Organizational Health Inventory for Secondary Schools developed by Hoy and Felder
(1997) and dependent questions from the Teachers’ Sense of Efficacy scale developed by
Woolfolk Hoy and Tschannen-Moran (2001). The independent variables being measured
by the Organizational Health Inventory for Secondary Schools included; support by
administration, support from teachers as colleagues, and support through resources. The
dependent variable being measured by the Teachers’ Sense of Efficacy Scale was teacher
self-efficacy belief. A Likert-scale format was used for responses for the scale items.
The Likert-scale format included a sufficient number of responses to make sure the
participants had adequate choice coverage. Demographic questions were included at the
beginning of the survey for descriptive analysis to examine possible relationships with
regards to gender, race, and the socio-economic status of the schools. The survey was
delivered using a Survey Monkey secured web link. Secondary administrators from
Alabama schools received the invitation to participate in the study and were responsible
for forwarding the information along with the web-link to their math teachers. Using the
internet as a survey mode is promising for populations that have higher rates of internet accessibility and skill sets (Dillman, Smyth, & Christian, 2009). The teachers had access to a computer and the internet and could respond by clicking on their selection. If they skipped a question, they were prompted to return to the skipped item. This helped to prevent error associated with non-response (Czaja & Blair, 2005; Mangione, 1995). Table 1 provides the question sets for the survey.

Table 1

Survey Question Means of Analysis

<table>
<thead>
<tr>
<th>Question</th>
<th>Variable</th>
<th>Survey Item #</th>
<th>Proposed Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (male/female)</td>
<td></td>
<td>#1</td>
<td>Descriptive</td>
</tr>
<tr>
<td>What is your age?</td>
<td></td>
<td>#2</td>
<td></td>
</tr>
<tr>
<td>Are you? (African American, Caucasian, Asian American, Hispanic American, Native American, Biracial/Multiracial, Other)</td>
<td></td>
<td>#3</td>
<td></td>
</tr>
<tr>
<td>What is the name of your school system?</td>
<td></td>
<td>#4</td>
<td></td>
</tr>
<tr>
<td>What grade level do you teach?</td>
<td></td>
<td>#5</td>
<td></td>
</tr>
<tr>
<td>What mathematical content do you teach?</td>
<td></td>
<td>#6</td>
<td></td>
</tr>
<tr>
<td>What percentage of your school’s students receive free-reduced lunch?</td>
<td></td>
<td>#7</td>
<td></td>
</tr>
<tr>
<td>How much can you do to control disruptive behavior in the classroom?</td>
<td>Efficacy</td>
<td>#8A</td>
<td>Multiple Regression (Dependent variable)</td>
</tr>
<tr>
<td>Question</td>
<td>Code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much can you do to motivate students who show low interest in school work?</td>
<td>#8B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much can you do to get students to believe they can do well in school?</td>
<td>#8C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much can you do to help your students value learning?</td>
<td>#8D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To what extent can you craft good questions for your students?</td>
<td>#8E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much can you do to get children to follow classroom rules?</td>
<td>#8F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much can you do to calm a student who is disruptive or noisy?</td>
<td>#8G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How well can you establish a classroom management system with each group of students?</td>
<td>#8H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much can you use a variety of assessment strategies?</td>
<td>#8I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To what extent can you provide an alternative explanation or example when students are confused?</td>
<td>#8J</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much can you assist families in helping their children do well in school?</td>
<td>#8K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How well can you implement alternative strategies in your classroom?</td>
<td>#8L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The principal is friendly Health</td>
<td>#9A</td>
<td>Multiple</td>
<td></td>
</tr>
</tbody>
</table>

The principal is friendly

Health

#9A

Multiple
and approachable.
The principal treats all faculty members as his or her equal.
The principal puts suggestions made by the faculty into operation.
The principal is willing to make changes.
The principal looks out for the personal welfare of faculty members.
their jobs with enthusiasm.

| Teachers do favors for each other. | Health (Teacher/Colleague support operationalized by “morale”) | #9C | Multiple Regression (Independent variable) |
| Teachers in this school like each other. | Health (Administrative support operationalized by “consideration”) | #9D | |
| Teachers are indifferent to each other. | | #9E | |
| Teachers exhibit friendliness to each other. | | #9F | |
| Teachers in this school are cool and aloof to each other. | | #9G | |
| The morale of teachers is high. | | #9H | |
| There is a feeling of trust and confidence among the staff. | | #9I | |
| Teachers accomplish their jobs with enthusiasm. | | #9J | |
| Teachers identify with the school. | | #9K | |
| Extra materials are | Health (Resource) | #9L | |
available if requested.

Teachers are provided with adequate materials for their classrooms.

Teachers receive necessary classroom supplies.

Supplementary materials are available for classroom use.

Teachers have access to needed instructional materials.

support operationalized by “resources” #9E

Regression (Independent variable) #9H

#9K

#9N

**Study Population, Sampling Frame, and Sampling Plan**

The sampling strategy used was a convenience sampling; this type of sampling is used to represent specific locations (e.g. Alabama) and individuals (e.g. secondary math teachers) where the researcher has access and can obtain data with relative ease (Creswell, 2007). The target population included secondary female math teachers in Alabama. The sampling frame included randomly selected secondary math teachers who completed the survey from participating Alabama school systems. The sample size included at least 100 cases; it is recommended to have twenty times more cases than independent variables (Tabachnick & Fidell, 1989). School administrators received requests to participate in the research along with a cover letter and consent form through email by a gatekeeper who has established ties with Alabama schools through a nationally recognized math initiative grant. Further, the administrators from the Alabama school systems served as gatekeepers to decrease coverage issues and identify the participants and their email addresses in order to solicit survey participation. In the state
of Alabama, there are 5133 secondary math teachers. Of the population, 75.3 % are female. As a non-probability study, the proposed study was exploratory in nature and can later be expanded to include additional areas of Alabama. Czaja and Blair (2005) commented on how researchers can get a sense of what respondents are thinking, believe, or feel about a topic. This information can later be used to design a larger and more comprehensive study.

**Data Collection**

Questions on the survey were identified as types of support, measures of teacher self-efficacy, and demographic information. Czaja and Blair (2005) suggested that the research questions be listed and the survey questions should be listed by topic. Fowler (2009) further stated, “One should make a list of what should be measured to accomplish the goals of the project” (p. 116). This will strengthen the construct validity. The variables to be measured should be on the list. The research questions were derived through the literature review and survey items should reflect what needs to be measured to address the research questions.

Surveys from previous studies were used to acquire questions to support the demographic section for the current survey (Czaja & Blair, 2005; Dillman, Smyth, & Christian, 2009). The survey also included questions from Hoy and Feldman’s Organizational Health Inventory for Secondary Schools (1997) and Tschannen-Moran and Woolfolk Hoy’s Teachers’ Sense of Efficacy Scale (2001). Both surveys adequately measure the prescribed independent and dependent variables. It is also advantageous that both surveys have been tested for reliability and construct validity. Therefore, data was collected using the inclusive web-based survey containing demographic, relevant organizational health, and self-efficacy questions. Hoy and Woolfolk Hoy granted
permission for the surveys’ free use and outlined procedures for scoring and analysis. Czaja and Blair (2005) also said, “An advantage of borrowing questions from previous studies is that we can (or may need to) compare our results to previous findings” (p. 70).

To make sure questions are free from grammatical errors, professional jargon that is out of range for the proposed participants, ambiguity, and double or triple barreled responses, the researcher further evaluated the questions on the survey (Czaja & Blair, 2005; Fink, 2006; Mangione, 1995). Face validity and content validity was also addressed at this point. To assess whether the appearance and content of the survey can reasonably measure what is intended, 4-5 colleagues took the survey and provided feedback on the survey’s layout and questions.

To reduce response error, the researcher included safeguards where respondents were only allowed to give one response. Respondents were also automatically prompted to complete skipped questions before they submitted the survey. In an advance letter and the introduction to the survey on the web, the researcher included the suggested time needed to complete the survey and directives to be in a comfortable environment before starting the survey in an effort to minimize variations in testing conditions (Czaja & Blair, 2005; Ivankova, 2011).

Likert-type scale questions were the main types of questions. Likert-type scale questions are closed-ended and on a continuous scale. They are easy to complete and commonly used on attitude surveys (Dillman, Smyth, & Christian, 2009). Aligning the survey questions to the research questions, using questions from previous study surveys, and using question types that are easy to complete aided in the success of the survey’s administration and response rates (Fowler, 2009).
For this study the independent variables included the types of administrative support, teacher/colleague support, and resource support the respondents received. They were measured using item sets from a pre-existing survey from Hoy and Feldman (1997), who are leading researchers in organizational health. These topics reflected the intent of the current study. Variables were identified through the literature review where previous studies identified support structures as factors that influenced perceived success for elementary, science, technology, engineering, and math instructors. The proposed study used these factors to see how applicable they were as directed to gender and the content area of math. Furthermore, the dependent variable included the respondents’ sense of self-efficacy. Teachers’ sense of efficacy was also measured using Likert-type opinion questions using the Teachers’ Sense of Efficacy Scale developed by Tschannen-Moran and Woolfolk Hoy (2001), leading theorists on self-efficacy; respondents included secondary math teachers.

Previous studies focused on collegiate level instructors. However, little STEM research has been done at the k-12 level. By using secondary teachers, the researcher tried to understand how the indicated supports may relate to the k-12 level. As America continues to lag in the area of mathematics, there has been a call for action across grade levels in order to address the issue and raise levels of student academic performance (The White House, 2011). Demographic questions included a series of closed-ended, factual questions that provided the necessary data to filter responses (Fowler, 2009). This is needed to analyze data in regards to subject-matter, gender and socio-economic status; relevant data was accessible per school district since respondents indicated the school system where they were currently employed.
Survey Procedures

A web-based survey that included question sets representing teacher demographics along with the independent and dependent variables from Hoy and Feldman’s Organizational Health Inventory for Secondary Schools (1997) and Tschannen-Moran and Woolfolk Hoy’s Teachers’ Sense of Efficacy Scale (2001) was used. Secondary schools are defined as those who are solely identified as middle, junior, or high schools. Secondary administrators from Alabama school systems were sent an emailed request to participate in the research and henceforth served as gatekeepers. School leaders were first sent an advance letter to their math teachers by email to initiate contact, give notice that the survey was coming and was voluntary, explain why the questions should be answered, and tell who is being surveyed (Czaja & Blair, 2005; Fink, 2006). The advance letter explained the usefulness of the survey to motivate respondents and increase response rates (Mangione, 1995). A week later, the administrators were sent emails to include a web link and access instructions for the survey along with a well-crafted cover letter to all secondary math teachers in their school.

A cover letter included an introduction. Czaja and Blair (2005) indicated, “It gives the prospective respondent sufficient information about the study to satisfy the needs of informed consent” (p. 88). A consent form along with information about confidentiality was included in the cover letter. Respondents were told about coding procedures and who will have access to their responses (Fink, 2006). Detailed instructions for completing the survey were also included (Mangione, 1995).

Participants were given two weeks to respond to the survey (Mangione, 1995). They were to respond by clicking on their selection. If they skipped a question, they
were prompted to return to the skipped item. This helped to prevent error associated with non-response (Czaja & Blair, 2005; Mangione, 1995). There was no risk of inconvenience, danger or discomfort.

After two weeks the first follow-up email was sent. Subsequent emails followed every two weeks for two months to ensure an adequate number of attempts were made to secure data and improve the response rate (Czaja & Blair, 2005). This was necessary since the survey was self-administered and required a great deal of monitoring (Fink, 2006; Mangione, 1995). At least one hundred relevant, complete returns was deemed as an acceptable number of respondents (Tabachnick & Fidell, 1989).

Proposed Data for Analysis Technique

The proposed study examined whether administrative support, teacher/colleague support, and support through resources were good predictors of positive teacher self-efficacy for female secondary math teachers in Alabama school systems. It also examined the extent to which each factor influenced teacher efficacy. Since the purpose of the study was to examine possible relationships between support structures associated with organizational health, gender, socio-economic status and teachers’ sense of self-efficacy, a multiple regression was used for statistical analyses. “The general purpose of multiple regression (the term was first used by Pearson, 1908) is to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable” (StatSoft, 2012, p. 1). Survey Monkey allowed data collected from surveys to be imported into SPSS. SPSS statistical software was used to run multiple regression procedures. Also, a descriptive analysis was completed to determine the implications of findings for sub-groups including gender, race, and schools system.
Ethical Considerations

Researchers must be careful to adhere to ethical practices and responsibilities when conducting a study. The same regard should be paid to these responsibilities regardless of how small or large the study is. Consenting participants are entitled to these ethical considerations in order to ensure their safety and confidence in the procedure (Council of American Survey Research Organizations, 2004; Czaja & Blair, 2005; Fowler, 2009). Fowler (2009) stated, “It is the researcher’s obligation to make sure that interviewers have full and accurate information to give about the research” (p. 168). The respondents should not be misled in any way about the nature of the research. Clear directions should accompany any surveys given by an interviewer or self-administered (CASRO, 2004; Czaja & Blair, 2005; Dillman, Smyth, & Christian, 2004).

Confidentiality is a key element. Respondents should know that intentional steps are made to protect their identity, and that results based on their responses will only be used by involved parties that were previously disclosed (Czaja & Blair, 2005; Dillman, Smyth, & Christian, 2004). Later, if the research will be shared with others, the respondents must be informed first. Respondents should be allowed to respond to surveys at reasonable times and should not feel pressured to do so. Gentle reminders are appropriate, but non-response should not induce threatening conduct by the interviewers/researchers (CASRO, 2004; Czaja & Blair, 2005).

Respondents should leave feeling comfortable about participating in future studies (CASRO, 2004). Additionally, however, they should be given the opportunity to opt out of future research where they may be asked to participate again based on previous potential respondent lists (CASRO, 2004). Study procedures should include steps to test
for reliability and validity; respondents should be privy to the results (Czaja & Blair, 2005). These results should include information about the methods used.

For the proposed study, the researcher first sought IRB approval. After approval was granted, an advance letter indicating the nature and intent of the study was sent to school system gatekeepers. Gatekeepers made sure that the school systems were willing to participate and sought their approval of the advance letter as well. Advance letters were then forwarded to potential participants. Letters included information about the voluntary nature, confidentiality, and web security. Those who agreed to participate were sent the survey link by their administrator to further assure confidentiality and anonymity. The link included a consent letter and anyone could refuse to take the survey with no penalty. Participants were allowed to complete the survey during any part of the day, whenever they were comfortable, but they had to complete the survey in its entirety during the session. At the conclusion of the study, the data collected was electronically stored using an SPSS file. The web link was deactivated and participants received follow-up information about the findings and their implications.

**Delimitations of the Study**

Several delimitations are noted for the study. The subjects were limited to those secondary public school math teachers who were located in Alabama school districts and whose administrators actually forwarded the link. The participants for the study may have ranged from first year to veteran teachers with varying degree levels, ranging from a bachelor’s degree to a doctorate. It is possible that some may be uncertified by the state of Alabama. Secondary was defined as the sixth through twelfth grade. However, in some smaller districts, the school may include k-12. This potentially caused discrepancies in teacher identification and survey administration.
IV. Findings

This chapter contains a report of findings derived from the statistical analyses utilized to examine study variables and answer research questions of this study. Descriptive analysis of the characteristics of the sample, a preliminary analysis to assess the reliability of the measures, and multiple linear regression analyzes to address each research question were completed.

Description of Sample

The sample consisted of 105 secondary math teachers in the state of Alabama. A total of 111 participants addressed the survey. Four surveys were incomplete and were, therefore, excluded from the analyses. Two surveys were completed by administrators and were also excluded since the study was intended for secondary math teachers only.

The description of the demographic characteristics of the sample included: gender, race, grade level, mathematical content taught, and the socio-economic status of the school. Seventy-six percent of the participants were female (n=105). A crosstab/Chi Square analysis was conducted for the sample and population of secondary math teachers in Alabama with respect to gender for generalization purposes. The proportion of males and females in the sample is not statistically different from the population, $\chi^2(1)=0.045, p=.83$.

Eighty percent were Caucasian (n=105) and approximately nineteen percent were African American. Less than one percent indicated they were biracial/multietnic (n=105). For the sake of the study, those who indicated they were African American or biracial/multietnic were combined to form a “Minority” category. A crosstab/Chi Square analysis was conducted for the sample and population of secondary math teachers
in Alabama with respect to race for generalization purposes. The proportion of Caucasians and minority teachers in the sample is not statistically different from the population, $\chi^2(1)=0.00$, $p=1.0$

Fifty-seven percent of the sample indicated they taught strictly at the high school level (grades 9-12). Forty-two percent reported they taught at the middle school level (grades 6-8); less than one percent reported they taught grades 6-12. The mathematical subject coverage included sixth-eighth grade general math, pre-algebra, geometry, algebra I, algebra II, algebra III, algebra II with trigonometry, algebraic connections, statistics, pre-calculus, calculus, and discrete math. Of those participants who were able to specify the social economic status of their school system based on the percentage of students who received free or reduced lunch, nine percent of the sample reported 1-10% of their students received free or reduced lunch, fifteen percent of the sample reported 11-20%, twelve percent of the sample reported 21-40%, nine percent of the sample reported 41-50%, and fifty-one percent of the sample reported over 50% of their students received free or reduced lunch ($n=81$). Table 2 provides descriptive statistics for demographic variables with respect to gender, race, grade level, and socio-economic status.

Table 2

<table>
<thead>
<tr>
<th>Characteristics of the Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Race</td>
</tr>
<tr>
<td>Caucasian</td>
</tr>
</tbody>
</table>
African-American  20  19
Bi-Racial  1  .9

Grade Level
   Middle (6-8)  44  42  105
   High (9-12)  60  57
   Mid/High (9-12)  1  .9

Socioeconomic status
   1-10%  7  9  81
   11-20%  12  15
   21-40%  10  12
   41-50%  7  9
   Over 50%  41  51

---

**Preliminary Analysis**

Internal consistency of reliability of each instrument was assessed. The subset scores used to compute the composite score for the Teachers’ Sense of Efficacy Scale yielded a Cronbach’s alpha that ranged from .860 to .910. Scores representing the independent variables, Administrative Support, Resource Support, and Colleague Support derived from the Organizational Health Inventory (OHI) for Secondary Schools yielded a Cronbach’s alpha that ranged from .829 to .963. Means, standard deviations, and ranges for each scale are presented in Table 3. The Cronbach’s Alpha signified strong internal consistency for each variable.
### Table 3

*Summary Statistics of Measures (N=105)*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Variable</th>
<th>Mean</th>
<th>Range</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TSE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engagement</td>
<td>27.00 (5.227)</td>
<td>2.50-9.00</td>
<td>.861</td>
</tr>
<tr>
<td></td>
<td>Instructional Strategies</td>
<td>30.076 (4.686)</td>
<td>1.50-9.00</td>
<td>.860</td>
</tr>
<tr>
<td></td>
<td>Classroom Management</td>
<td>30.333 (4.926)</td>
<td>3.00-9.00</td>
<td>.910</td>
</tr>
<tr>
<td></td>
<td>OHI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Admin. Support</td>
<td>16.276 (4.094)</td>
<td>5.00-20.00</td>
<td>.940</td>
</tr>
<tr>
<td></td>
<td>Resource Support</td>
<td>15.695 (4.375)</td>
<td>5.00-20.00</td>
<td>.963</td>
</tr>
<tr>
<td></td>
<td>Colleague Support</td>
<td>26.181 (4.879)</td>
<td>11.00-36.00</td>
<td>.829</td>
</tr>
</tbody>
</table>

Note: TSE= teachers’ sense of efficacy

### Analysis of Assumptions

For the purpose of generalization to the sample model, several assumptions were analyzed. The model was tested for multicollinearity of predictors, homoscedasticity and independent, and normally-distributed errors. Regressions coefficients are unstable when multicollinearity of predictors exist. Therefore, it is important to investigate potential problems relating to multicollinearity. This was done by examining tolerance and the variance inflation factor (VIF) through collinearity diagnostics. It is suggested that tolerance should be more than 0.2 (Menard, 1995) and the variance inflation factor should be less than 10 (Myers, 1990). Both suggested values were satisfied. See table 4.

### Table 4

*Coefficients (B)*

<table>
<thead>
<tr>
<th>Model</th>
<th>Correlations Part</th>
<th>Collinearity Statistics</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>.065</td>
<td></td>
<td>.983</td>
<td>1.018</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Race</td>
<td>.266</td>
<td>.931</td>
<td>1.075</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>Admin</td>
<td>.081</td>
<td>.377</td>
<td>2.971</td>
<td></td>
</tr>
<tr>
<td>Resource</td>
<td>-.130</td>
<td>.395</td>
<td>2.533</td>
<td></td>
</tr>
<tr>
<td>Colleague</td>
<td>.211</td>
<td>.366</td>
<td>2.730</td>
<td></td>
</tr>
</tbody>
</table>

Normality, linearity, and homoscedasticity between predicted dependent variable scores and errors of prediction should also be examined to avoid potential assumption problems. Tabachnick and Fidell (1989) suggested examining residuals scatterplots to test for assumptions. Histograms and normal probability plots also provide a means of testing for assumptions (Field, 2012). Hence, the scatterplot for the dependent variable teachers’ sense of efficacy was examined, providing evidence of no assumption violation for homoscedasticity. The histogram and probability plot suggested no assumption violations in regards to normality and linearity errors. See figures 2, 3, and 4.
Figure 2

Regression Standardized Residual Scatterplot

Scatterplot

Dependent Variable: TSES

Regression Standardized Residual

Regression Standardized Predicted Value
Figure 3

Regression Standardized Residual Histogram

Histogram

Dependent Variable: TSES

Mean = 1.38E-15
Std. Dev. = 0.976
N = 105
Figure 4

*Normal P-P Plot of Regression Standardized Residual*
Linear Regression and Multiple Linear Regression Analyses

Research questions from the study addressed the possible relationships of demographic variables and independent variables pertaining to organizational health to teachers’ sense of self-efficacy. Multiple linear regression analyzes were used to assess the possible linear relationship between TSES and each independent variable. For the six research questions of interest, there was one dichotomous independent variable (gender), one categorical independent variable (race/ethnicity), and three continuous independent variables (administrative, teacher/colleague, and resource support). The single categorical independent variable, race/ethnicity was recoded into a dichotomous variable, Caucasian and minority, for the inclusion of the multiple linear regression analysis. Multiple linear regression analysis was then used to assess the possible linear combination relationship between TSES and all of the independent variables.

Research Question 1

Research question 1 sought to answer if there was a relationship between self-efficacy and gender for secondary math teachers in Alabama. A simple linear regression between the teachers’ sense of efficacy variable as the dependent variable and gender as the independent variable did not reveal a significant relationship (F(1,103)=.216, p>.05) with $R^2$ of .002. Gender is not a significant predictor of teachers’ sense of efficacy (Tables 5 & 6).
Table 5

*Model Summary for TSE and Gender Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.046</td>
<td>.002</td>
<td>-.008</td>
<td>3.10749</td>
</tr>
</tbody>
</table>

Predictors: (Constant), Gender

Dependent Variable: Teachers’ Sense of Efficacy (TSE)

Table 6

*ANOVA for TSE and Gender Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>2.090</td>
<td>1</td>
<td>2.090</td>
<td>.216</td>
<td>.643</td>
</tr>
<tr>
<td>Residual</td>
<td>994.622</td>
<td>103</td>
<td>9.657</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>996.712</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent Variable: TSES

Predictors: (Constant), Gender

**Research Question 2:**

Research question 2 sought to answer whether there was a relationship between self-efficacy and race for math teachers in Alabama. A simple linear regression yielded a significant relationship (F(1,103)=4.544, p=.035), with an R² of .042. Thus, about 4% of the variation in teachers’ sense of efficacy scores can be explained by difference in gender. The estimated teachers’ sense of efficacy score will be within 6.089 points of being correct 95% of the time (Tables 7 & 8).
Table 7

*Model Summary for TSE and Race Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.206</td>
<td>.042</td>
<td>.033</td>
<td>3.04433</td>
</tr>
</tbody>
</table>

Predictors: (Constant), Race

Dependent Variable: Teachers’ Sense of Efficacy (TSE)

Table 8

*ANOVA for TSE and Race Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>42.117</td>
<td>1</td>
<td>42.117</td>
<td>4.544</td>
<td>.035</td>
</tr>
<tr>
<td>Residual</td>
<td>954.595</td>
<td>103</td>
<td>9.268</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>996.712</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent Variable: TSES

Predictors: (Constant), Race

**Research Question 3:**

Research question 3 examined whether there was a relationship between self-efficacy and administrative support for math teachers in Alabama. A simple linear regression between the teachers’ sense of efficacy variable as the dependent variable and administrative support as the independent variable did not reveal a significant
relationship (F(1,103)=3.368, p>.05) with $R^2$ of .032. Administrative support is not a significant predictor of teachers’ sense of efficacy (Tables 9 & 10).

Table 9

*Model Summary for TSE and Administrative Support Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.178</td>
<td>.032</td>
<td>.022</td>
<td>3.06112</td>
</tr>
</tbody>
</table>

Predictors: (Constant), Administrative Support  
Dependent Variable: Teachers’ Sense of Efficacy (TSE)

Table 10

*ANOVA for TSE and Administrative Support Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>31.558</td>
<td>1</td>
<td>31.558</td>
<td>3.368</td>
<td>.069</td>
</tr>
<tr>
<td>Residual</td>
<td>965.154</td>
<td>103</td>
<td>9.370</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>996.712</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent Variable: TSES  
Predictors: (Constant), Admin

**Research Question 4:**

Research question 4 explored whether there was a relationship between self-efficacy and resource support for math teachers in Alabama. A simple linear regression between the teachers’ sense of efficacy variable as the dependent variable and resource support as the independent variable did not reveal a significant relationship (F(1,103)=.920, p>.05) with $R^2$ of .009. Resource support is not a significant predictor of teachers’ sense of efficacy (Tables 11 & 12).
Table 11

*Model Summary for TSE and Resource Support Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.094</td>
<td>.009</td>
<td>-.001</td>
<td>3.09696</td>
</tr>
</tbody>
</table>

Predictors: (Constant), Resource Support

Dependent Variable: Teachers’ Sense of Efficacy (TSE)

Table 12

*ANOVA for TSE and Resource Support Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8.825</td>
<td>1</td>
<td>8.825</td>
<td>.920</td>
<td>.340</td>
</tr>
<tr>
<td>Residual</td>
<td>987.887</td>
<td>103</td>
<td>9.591</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>996.712</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent Variable: TSES

Predictors: (Constant), Resources
Research Question 5:

Research question 5 sought to answer whether there was a relationship between self-efficacy and colleague/teacher support for math teachers in Alabama. A simple linear regression yielded a significant relationship (F(1,103)=6.289, p=.014), with an $R^2$ of .058. Thus, levels of colleague/teacher support can explain around 6% of the variation in teachers’ sense of efficacy scores. The estimated teachers’ sense of efficacy score will be within 6.04 points of being correct 95% of the time (Tables 13 & 14).

Table 13

*Model Summary for TSE and Teacher/Colleague Support Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.240</td>
<td>.058</td>
<td>.048</td>
<td>3.01993</td>
</tr>
</tbody>
</table>

Predictors: (Constant), Teacher/Colleague Support
Dependent Variable: Teachers’ Sense of Efficacy (TSE)

Table 14

*ANOVA for TSE and Teacher/Colleague Support Linear Regression*

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>57.353</td>
<td>1</td>
<td>57.353</td>
<td>6.289</td>
<td>.014</td>
</tr>
<tr>
<td>Residual</td>
<td>939.359</td>
<td>103</td>
<td>9.120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>996.712</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent Variable: TSES
Predictors: (Constant), Colleague
Research Question 6:

Research question 6 sought to answer whether there was a relationship between self-efficacy and the linear combination of administrative support, teacher/colleague support, resource support, gender, and race for math teachers in Alabama? A standard multiple regression analysis was performed using TSE scores as the dependent variable and administrative support, teacher/colleague support, resource support, gender, and race (Caucasian or Minority) as independent variables. Once cases of missing data on the dependent variable were removed from analysis, the total sample consisted of 105 secondary math teachers from Alabama.

Table 15 displays the multiple correlation coefficient ($R^2$), adjusted $R^2$, and the standard error of the estimate. Table 16 displays the sum of squares, degrees of freedom (df), the F statistic, and the p-value (Sig). The linear combination of the IV’s was a good predictor of teacher sense of efficacy levels, $F(5,99)=3.460$, $p=.006$. The multiple correlation coefficient ($R^2=.149$) indicated that around 15% of variability in TSE scores can be explained by the linear relationship of the five IVs. The standard error of estimation was 1.213.

Table 15

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.386</td>
<td>.149</td>
<td>.106</td>
<td>2.92749</td>
</tr>
</tbody>
</table>

Predictors: (Constant), Gender, Race, Admin, Resource, Colleague

Dependent Variable: Teachers’ Sense of Efficacy (TSE)
Table 16

ANOVA for TSE and Linear Combination of Gender, Race, Administrative, Resource, and Teacher/Colleague Support Multiple Linear Regression

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>148.265</td>
<td>5</td>
<td>29.653</td>
<td>3.460</td>
<td>.006</td>
</tr>
<tr>
<td>Residual</td>
<td>848.447</td>
<td>99</td>
<td>8.570</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>996.712</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent Variable: TSES

Predictors: (Constant), Gender, Race, Admin, Resource, Colleague

Table 17 displays the non-standardized (B) and standardized (β) regression coefficients, and the semi-partial correlations (sr²). The non-standardized beta weights of the individual variables indicated that only two of the five IVs had beta weights that are significantly different from zero. The Caucasian/Minority race beta was significant at the \( \alpha = .05 \) level \((t = -2.873, p = .005)\) with a negative weight of B= -2.127. This variable was coded as “0” for Minorities and “1” for Caucasians; the predicted score for teacher sense of efficacy decreases by 2.127 points if you are a minority. Unique variation explained by race was about 7%.

Also, the teacher/colleague support beta was significant at the \( \alpha = .05 \) level \((t = 2.277, p = .025)\) with a positive weight of B= .006. The Beta of .006 indicated that for every 1 point increase in teacher/colleague scores, there is a .006 increase in teacher sense of efficacy scores. Unique variation explained by levels of teacher/colleague support was around 5%.
The predictive general linear equation for the set of IVs (gender, race, administrative support, resource support, and teacher/colleague support) and the DV (teachers’ sense of self efficacy) is:

\[ TSE = 20.293 + \text{Gender}(0.471) - \text{Race}(2.127) + \text{Admin}(0.002) - \text{Resource}(0.003) + \text{Colleague}(0.006) \]

While gender, administrative support, and resource support are all shown in the equation, beta weights for these variables are statistically equal to zero; therefore their contribution to the prediction equation is trivial. The indication is that these variables have no relationship to teacher sense of efficacy scores. Race and teacher/colleague support are the only variables that have a significant predictive relationship to teachers’ sense of efficacy scores.

Table 17

**Coefficients Model for Multiple Linear Regression**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig</th>
<th>sr² unique</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>20.293</td>
<td>1.213</td>
<td>16.725</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.471</td>
<td>.677</td>
<td>.065</td>
<td>.696</td>
<td>.488</td>
</tr>
<tr>
<td>Race</td>
<td>-2.127</td>
<td>.740</td>
<td>-.276</td>
<td>-2.873</td>
<td>.005</td>
</tr>
<tr>
<td>Admin</td>
<td>.002</td>
<td>.002</td>
<td>.139</td>
<td>.871</td>
<td>.386</td>
</tr>
<tr>
<td>Resource</td>
<td>-.003</td>
<td>.002</td>
<td>-.207</td>
<td>-1.401</td>
<td>.164</td>
</tr>
<tr>
<td>Colleague</td>
<td>.006</td>
<td>.003</td>
<td>.349</td>
<td>2.277</td>
<td>.025</td>
</tr>
</tbody>
</table>
Conclusion

Through the analysis of data, it was determined that gender, administrative support, and resource support had no significant relationship to teachers’ sense of efficacy. The only variables that showed significant relationships to teachers’ sense of efficacy were race and colleague/teacher support. If a teacher is black, the predicted teachers’ sense of efficacy score will decrease by 2.127 points. Also, for every 1 point increase in the colleague/teacher support score, there is a .006 increase in predicted teachers’ sense of efficacy score.
V. Discussion

Overview

This study explored the relationship between teachers’ sense of efficacy, gender, race, and types of support as described in the Organizational Health Inventory (OHI) for secondary schools. These types of support include administrative, resource, and teacher/colleague support. Efficacy beliefs appear to be good predictors of teacher performance and student achievement. Efficacy pertains to the beliefs teachers have about their ability to positively affect their learning environment; this belief is based on their content knowledge, pedagogy, and disposition skill set (Tschannnen-Moran & Woolfolk Hoy, 2001). School systems are constantly trying to find ways to improve student achievement in hopes of producing future skilled workers that are able to globally compete and sustain the United States economically.

Mathematics is engrained by interdisciplinary means throughout a student’s educational route. The Alabama State Department of Education has mandated the inclusion of math standards in all core classes (ALSDE, 2012). This inclusion justifies the need to identify ways to strengthen math instruction. School systems are forced to deal with budget restraints that threaten the accessibility of resources needed to adequately address the need. Exploring school and teacher related factors that may provide strategic and efficient means leading to increased student achievement will help school systems make informed decisions. Evaluating possible relationships between efficacy beliefs, gender, and race which are tied to teacher related factors and perceived levels of administrative, resource, and colleague support which are linked to school
factors will help provide useful information for this cause. Data from this study provided
discernment on those factors.

For the purpose of the study, efficacy beliefs of secondary math teachers in Alabama
were assessed using the Teachers’ Sense of Efficacy Scale (Tschannen-Moran &
Woolfolk Hoy, 2001). Administrative, resource, and teacher/colleague support was
assessed using the Organizational Health Inventory for Secondary Schools (Hoy &
Tarter, 1997). Statistical test were ran to explore individual relationships between
teachers’ sense of efficacy, serving as the dependent variable, and gender, race,
administrative, resource, and teacher/colleague support serving as the independent
variables to test for separate relationships. Then the independent variables were linearly
combined to test whether they collaboratively had a relationship with teachers’ sense of
efficacy. The results provided insight on what factors actually related to teacher efficacy
beliefs and implications of how school systems can use this information to improve
secondary math teacher performance leading to increased student achievement. The
following research questions were addressed:

1. Is there a relationship between self-efficacy and gender for math teachers in
   Alabama?
2. Is there a relationship between self-efficacy and race for math teachers in
   Alabama?
3. Is there a relationship between self-efficacy and perceived levels of administrative
   support for math teachers in Alabama?
4. Is there a relationship between self-efficacy and perceived levels of resource
   support for math teachers in Alabama?
5. Is there a relationship between self-efficacy and perceived levels of teacher/colleague support for math teachers in Alabama?

6. Is there a relationship between self-efficacy and the linear combination of gender, race, and perceived levels of administrative, resource, and teacher/colleague support for math teachers in Alabama?

Data were collected using a survey administered through Survey Monkey. There were 105 acceptable completed surveys used for analysis. Respondents had to be secondary math teachers; “secondary” refers to those who teach grades 6-12. Of the participants, seventy-six percent were females and eighty percent were Caucasian. African Americans mostly represented participants classified as minorities, with one indicating biracial/multiracial status.

**Discussion of Research Question 1**

The first research question examined whether there was a relationship between teachers’ sense of efficacy and gender. No significant relationship was found between the two. Explanations for the lack of significance could be tied to the efforts to equalize the playing field in STEM (Science, Technology, Engineering, and Math) related areas. University sponsored programs like GEMS (Girls Engaged in Engineering, Math, and Science) and CHARMS (Cultivating Hispanics and African Americans Reading, Math, Science) for girls are making strides to close the gap in the number of girls pursuing STEM related careers. These types of programs not only provide resources, but positive role models of women in STEM leading to improved attitudes in math and science (Weber, 2011). Martinot, Bages, & Desert (2012) commented on how same sex role
models are likely to improve girls’ performance in math. The perception that math is a male dominated field is dissipating. Today’s secondary students see mathematics as a gender-neutral content area (Kloosterman, Tassell, Ponniah, & Essex, 2008).

The percentage of female math teacher participants for the study (76%) closely represented the actual percentage of female math teachers for the state of Alabama (75%). School districts should make sure their schools promote fair practices and opportunities for all to ensure women are well supported and equipped to handle their teaching role. Bandura’s study (1997) suggested the need to contextualize efforts to increase positive beliefs. The effective operation of schools necessitates a commitment to key players; these key players are predominantly women. School environmental factors must be conducive for their success so that their efforts translate to student achievement. In Hoy, Tarter, and Kottkamp’s study (1991) they outlined the components of a healthy school climate. A healthy school climate exists where everyone, including women, views their work environment as positive, stable, and safe; this leads to professional growth and increased efficacy.

Just like female secondary math students, female math teachers should have positive role models; they need to see and talk to others who have been successful in their field. Their belief capacity is moderately based on their observance of those in similar roles (Bandura, 1997). I believe school systems would be wise to develop strong mentoring programs that are content specific. Several studies have found that mentor/mentee teacher assignments should not be purely based on years of experience; instead, assignments should be made according to the content area, the mentor’s record of success, and the targeted needs of the mentee (McConney & Maor, 2009; Friedrichsen,
If strategic assignments are made, teachers will have relevant sources that are able to actually help them address issues relating to instructional practices, content knowledge, and student comprehension. Secondary female math teachers will be able to pull from their mentors who have survived and flourished through similar scenarios.

Discussion of Research Question 2

The next research question explored a possible relationship between teachers’ sense of efficacy and race. The data analysis provided evidence of a significant relationship. According to the Alabama State Department of Education (2012), 20% of secondary math teachers are minorities. Participants in the current study represented the same percentage. Results from the current study indicated a decrease in teachers’ sense of efficacy scores if the teacher was a minority.

Barnard (1948) found that the stability and productivity of an organization was connected to the status of its members. Since race is a significant factor of teacher efficacy, organizational leaders (e.g. administrators) should try to accommodate any additional support needed for minorities, leading to increased success. Schools should try to promote collegiality, professional development, and additional resources that minimize the effects of race and increase the likelihood of teacher success. This positive culture is facilitated by constant assessment of the school environment, including the status of its teachers, and improvement initiatives (Cummings & Worley, 2005).

Gay (2000) commented on how culture is central to education; it influences teachers’ thoughts, beliefs, behaviors, and the way they teach. Minority teachers’
perceived status within this culture could clash with the overarching school culture that is essentially dominated by European and middle-class backings (Gay, 2000). A minority teacher must litigate between their views of right and wrong versus the actual school culture; these may not match. Also because of this difference, they must also deal with their educational legitimacy being questioned. Are they equipped to teach in predominantly White, middle class schools? Ladson-Billings (2005) commented on how African American teachers may be presumed to be less capable.

African Americans, specifically, are taxed more in the teaching field. Expectations of success are driven by their race. Ladson-Billings (2005) stated how the teaching field for African Americans was and is held in high esteem. It was one of the first professional fields open to African Americans. So imagine the potential stress African American teachers may go through when placed in a culture they may not completely relate to, coupled with the expectation from their family and community to succeed. This may adversely affect their performance.

This study did not provide data leading to the cause of teachers’ sense of efficacy fluctuation of scores with respect to race. However, schools, in their assessment of their climate and culture, should try to identify any barriers that exist because of racial constructs. Raudenbush, Rowan, and Cheong’s study (1992) revealed information about inter-teacher variations, including race. The results indicated greater faculty collaboration and increased levels of teacher autonomy compensated for the inter-teacher variations.

Although race is a sensitive issue, it cannot be ignored. In such a critical need area, the educational system cannot afford 20% of its math teachers to not believe they
are able to favorably change the outcomes of their students. When people have a weak sense of belief in their competencies, they are less motivated; their commitment level diminishes (Bandura, 1997). We need teachers who are more motivated and committed, not less.

**Discussion of Research Question 3**

The third research question examined whether there was a significant relationship between teachers’ sense of efficacy and administrative support. There was no significant relationship found. However, this variable was measured using questions based on a managerial role, rather than as a colleague or facilitator (Hoy, 1991). Previous literature linked administrators acting as role models of professional practice as strong predictors of teacher satisfaction and development (Sezin, 2009). Administrators also played a significant role in facilitating collegiality amongst faculty (Shen et al., 2011). Those who promoted autonomy in the classroom, positive working conditions, and positive student behavior were able to increase job satisfaction for their teachers.

Administrators as relationship builders seem to be key to meaningful involvement. Those who establish trust and sound relationships with their teachers are able to induce higher levels of student achievement (Walsh, 2005; Edgerson & Kritsonis, 2006). Further, when administrators acted as advocates for induction and mentoring programs for teachers and also served as instructional leaders, a positive culture evolved and teacher performance increased (Wood, 2005). This culture was further substantiated by the commitment of administrators to foster the development of shared expectations and ownership with teachers, creating a working environment that promoted effective
responsive behavior (Price, 2011). Administrators should pay attention and respond to the needs of their faculty; they should strive to provide resources and professional development. Administrators should promote the use of collaborative efforts, including professional learning communities and faculty study groups in order to deal with content specific needs (Koellner, Jacobs, & Borko, 2011; Mullen & Hutinger, 2008).

The current study provided a rationale for the notion of administrators acting as instructional leaders rather than just managers. In this role, administrators also act as colleagues who seek to improve instructional quality and student achievement, serving as models of productive behavior. They interact with, assess, and assist their teachers to encourage personal professional growth (Kent, 2004). May & Supovitz (2011) found that this type of involvement promoted positively changed behavior amongst reading and mathematics teachers.

So, in essence, even though the current study did not find a significant relationship between teachers’ sense of efficacy and administrative support as it pertains to more managerial actions, other studies strongly sustain the concept of administrators supporting collegiality with their teachers by fostering school climate and culture that allows for sharing, modeling, assessing, and training leading to increased teacher satisfaction and student achievement. Administrators can directly and indirectly affect teachers’ sense of efficacy by providing avenues for personal growth and internal support. When teachers believe they have the means to make a positive impact on their students, their efficacy beliefs also increase (Bandura, 1997; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).
Systems should encourage their administrators to get more involved in professional development related to instructional practices. Administrators should spend more time working with teachers in this area and in the classroom. By working closer with teachers, administrators will be able to properly assess teachers’ instructional and professional needs and work towards gathering resources that directly attend to these needs. This will help with the provision of more efficient and targeted professional development activities and resources that are relevant with respect to content and are able to strengthen teachers in multiple areas.

**Discussion of Research Question 4**

The next research question addressed whether there was a relationship between teachers’ sense of efficacy and resource support. Resources referred to the accessibility of instructional and supplemental materials. Previous studies pointed to how the use of mathematical content specific resources and training could boost teacher confidence and competence leading to increased self-efficacy (Evans, 2011). One study found that teachers who engaged in in-service activities where they collaborated with colleagues and explored the use of textbooks and problem solving activities were able to create of micro-lessons. These activities and materials strengthened teacher effectiveness (Moyer-Packenham et al., 2008).

Technology also appeared to play a significant role in teacher beliefs about practice. Technology standards have been embedded into math curriculum standards (ALSDE, 2012); technology is seen as a means to differentiate instruction and increase student learning (Response to Intervention, 2012). However, technology is not as
effective without proper training, access, and meaningful inclusion into the content area. Bennison and Goos (2010) studied found that although teachers had received some training in technology, they still saw the need for more in order to effectively integrate technology into their instructional practices. There was a need for increased opportunities for collaboration and exploration. Varma, Husic, and Linn (2008) further substantiated this need in their study where they found teachers were more effective in the use of technology and pedagogical resources when they also received mentoring support and training. They were able to habitually change their instructional practices and interact more with their students.

The current study did not find a statistical significant relationship between teachers’ sense of efficacy and resource support. Having access to an array of materials did not seem to be an indicator of secondary math teachers’ beliefs that they could still effectively teach and promote student learning. This aligns with the previous studies in regards to resource support where training, practice, and collaboration seemed to be common threads that made resources beneficial to student learning; the resources by themselves did not act as the catalyst.

In my personal experience, I have seen many classrooms filled with technology and other resources but they are under-utilized because of lack of training. Technology is beneficial and can help teachers supplement instruction only when teachers are properly trained to use it. School systems should make sure teachers are receiving training and are able to collaborate with each other in terms of best practices. Teachers who are proficient in technology and are able to positively increase student learning using technology should
have time to share with their colleagues. These exchanges empower both parties and strengthen the camaraderie and professionalism among them.

**Discussion of Research Question 5**

The fifth research question explored whether there was a relationship between teachers’ sense of efficacy and teacher/colleague support. The data analysis indicated a significant relationship. As levels of teacher/colleague support increase so does teachers’ sense of efficacy. This was further authenticated by Guo et. Al (2011) who found that teacher collaboration and teacher influence significantly affected teachers’ self-efficacy. This is promising since collaborative practices are becoming prevalent means to address school, teacher, and student issues (Graham, 2007). Teachers are able to draw on each other’s strengths to collaboratively strategize how to improve practice and student performance; this garners supportive relationships among teachers. Novice teachers also benefit from these relationships. Youngs, Holdegreave-Resendez, and Qian (2011) found a positive link between novice teachers’ successful journal through their induction phase and collaborative practices with their colleagues.

A formal means to encourage teacher support is through professional learning communities; professional learning communities have been found to promote teacher improvement (Graham, 2007). Mentoring by colleagues also serves as way to positively affect teacher practices and beliefs. Mentors can help their colleagues with content knowledge, lesson planning, instructional practices, and assessment; these relationships build professionalism and increase confidence (Fraser-Abder, 2005).

Being able to work with colleagues in terms of sharing innovative practices, mentoring, training, team building, and professional development seems to be a
consistent means of increasing teachers’ sense of efficacy. Administrators can help create cultures that promote colleague interaction and collaboration. They can also take a more instructional leadership approach and actively participate in colleague exchanges. With this increased collegiality, teachers should grow in confidence in their practice and their ability to deal with difficult situations knowing there are others in close proximity able to support them. Increased confidence and belief should positively influence teachers’ productivity resulting in increased student learning and performance.

Discussion of Research Question 6

The final research question examined whether there was a relationship between teacher’s sense of efficacy and the linear combination of gender, race, administrative, resource, and teacher/colleague support. A significant relationship was found between the two. Around 15% of the variation in levels of teachers’ sense of efficacy was accounted by the linear combination. However, the model only indicated two variables that significantly contributed to the outcome of teachers’ sense of efficacy, race and levels of teacher/colleague support. This corroborates with the findings from the other research questions where individual relationships between teachers’ sense of efficacy and the independent variables (e.g. gender, race, administrative, resource, and colleague) were examined.

A predictive equation was obtained to reflect the results. It appeared that race had more of an effect on teachers’ sense of efficacy than colleague support. Caucasians had higher teachers’ sense of efficacy scores than minorities. Also, teachers who indicated
experiencing higher levels of colleague/teacher support had higher levels of teachers’ sense of efficacy.

Knowing these combined contextual factors that affect teachers’ beliefs in their ability to encourage positive changes in their students should help school districts and administrators provide better support. Professional development that allows for interaction and collaboration amongst teachers can provide teachers with empowering resources and experiences. When teachers are given opportunities to communicate and build trust with their colleagues and administrators, they are able to share what is really going on. They no longer have to feel as though they are isolated in a given situation. When dealing with difficult subject-matter material or with difficult students, they will be more comfortable asking for assistance. Administrators can further help in the process by supporting a climate of openness and parity amongst teachers, where racial issues are addressed and everyone feels safe and respected; this support should be on-going (Graham, 2007).
Implications

Findings from the study implicate a push to increase opportunities involving collaboration that is targeted by need. Administrators can help by allotting consistent time for content area teachers to meet and discuss what is going on in their classrooms. They will be able to share proven instructional techniques and ways to increase student involvement and performance. Administrators can also help with mentoring assignments. Pairings could be based on content knowledge, teaching skills, or other needs that may be more sensitive and require specific designees based on their background and experience (e.g. race and gender issues).

Administrators can also help by being more than just managers; they can also be instructional leaders. Implications from the study hint that teachers need administrators who are involved in the teaching and learning process. Administrators should work with their teachers, actively participate in professional development, and engage in meaningful assessment and feedback leading to advanced collegiality among the entire staff. Administrators should also be able to balance their positions as managers, facilitators, and instructional coaches.

Furthermore, the need for more resources should be assessed. Before schools decide to spend excessive amounts on technology and instructional resources, they should consider the availability of training opportunities where teachers can learn together. Also, teachers should be allotted time to work together within their departments to explore how these resources can effectively assist them with instructional practices and increased student achievement. If proper training is not included in the acquisition plan for resources, there should be reconsideration.
Conclusion

Teachers’ sense of efficacy has been linked to student achievement; as teacher efficacy improves so does student achievement (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). This study found relationships between teachers’ sense of efficacy, race, and colleague support for secondary math teachers in the state of Alabama. In order to improve efficacy for these math teachers, possible racial issues cannot be ignored; schools must work to create a climate of parity and collegiality amongst all their teachers.

In order for student achievement to increase, teachers must be willing to work together and willing to share their experiences, resources, and expertise. Those teachers who need help in terms of content knowledge, instructional methods, and student assessment should know they have viable access to resources, through their colleagues; these resources could be material or human. Administrators can serve as facilitators where they adequately allot time and space for this collaboration to occur. When secondary math teachers are willing to work together, they can minimize the effects connected to factors like race, gender, and resources. These teachers will start to believe that they can make a difference in the development of themselves and their students.
REFERENCES


http://wps.ablongman.com/wps/media/objects/3984/4080143/forms/jobsatis.pdf


Dear Principal,

I am writing you to ask for your assistance in completing a research project that is required by the Doctoral Program at The University of Alabama at Birmingham School of Education. Improving Performance: Examining the Link between Teacher Self-Efficacy and Support for Female Secondary Math Teachers (protocol # X120305007) is necessary to assess how and if the support mechanisms we have in place are sufficient to meet your professional needs to ensure your success. Ms. Veronique-Zimmerman Brown, a doctoral student within the School of Education is surveying secondary mathematics teachers (grades 6-12) of local school districts to examine the link between teacher self-efficacy and support systems (i.e., administrators, teacher/colleague, and resources). The results of this survey will be used to provide feedback to faculty and administrators within the School of Education as well as your district.

The teachers’ answers to this survey will be confidential and will be released only as summary data combined with all other respondents. This survey is voluntary. However, teachers can help us improve the quality of the UAB School of Education programs and efficiency of provided professional development activities if they take a few minutes to answer the survey.

Please consider forwarding the link to the survey to all of your teachers who currently teach mathematics in grades 6-12. The survey should only take about 20 minutes to complete.

If you have any questions or comments about this research, please contact me at 205-335-2285 (cell) or email me at vzbrown@uab.edu. When we have compiled the results, we will send you a link where you can access the results of the research, or we will send the file as an attachment.

You may also contact the Office of the Institutional Review Board for Human Use (OIRB) at the University of Alabama at Birmingham (UAB) at (205)934-3789 or 1-800-822-8816. If calling the toll-free number, press the option for “all other calls” of for an operator/attendant and ask for extension 4-3789. Regular hours for the Office of the IRB are 8:00 a.m. to 5:00 p.m. CT, Monday through Friday. You may also call this number in the event the research staff cannot be reached or you wish to talk to someone else.
Thank you very much for helping us with this important survey. Once again, this is a research project where information may be used for publication or presentation.

Sincerely,

Veronique Zimmerman-Brown

University of Alabama at Birmingham
College of Arts and Sciences
School of Education
Instructor
email- vzbrown@uab.edu
office #-(205) 996-9549
APPENDIX B

INFORMATION LETTER
**TITLE OF RESEARCH:** Improving performance: Examining the link between teacher self-efficacy and support for female secondary math teachers

**Protocol Number:** X120305007

**INVESTIGATOR:** Veronique Zimmerman-Brown (UAB)

**SPONSOR:** UAB School of Education, Department of Human Studies

You are being invited to participate in a research study that intends to improve performance by examining the link between teacher self-efficacy and support for female secondary math teachers. This study is being conducted by Veronique Zimmerman-Brown, a doctoral candidate at The University of Alabama at Birmingham School of Education. We hope to learn how we can better improve math performance by examining the link between self-efficacy and support for female math teachers. Meaning, as a math teacher, are you aware of the meaning of self-efficacy and understand the need for support for female secondary math teachers.

You have been selected as a possible participant because you have been identified as a secondary math teacher by the principal. If you decide to participate, you will be asked to complete a brief online survey about improving performance in mathematics. Once you click on the link provided, you are essentially consenting to participate in the online survey. The online survey will be completed on your own time and should only take approximately 20 minutes to complete. Please try and complete the survey within one week of receiving the initial invitation.

All information collected will be kept confidential. Once you have completed the survey, click SUBMIT. No identifying marks will be placed on the surveys, no lists will be made, and no subject names will be used at any time. There are no apparent risks or
discomforts associated with participation in this study. All information gathered and used will be confidential so that your identity is unknown. The number of participants in the study is approximately 150. Any information obtained in connection with this study will remain anonymous. Information collected through your participation may be used to publish in a professional journal, and/or presented at a professional meeting, etc. You may withdraw from participation at any time without penalty, however, after you have returned your survey you will be unable to withdraw your data since there will be no way to identify the information that you have provided.

You may request a copy of the survey to keep for future reference. A copy of this form is yours to keep. Your decision whether or not to participate will not jeopardize your relationship with UAB, the School of Education, or your current employer.

If you have any questions I invite you to ask them now. If you have questions later, please feel free to contact me at vzbrown@uab.edu or at 205-996-9549.

If you have questions about your rights as a research participant, or concerns or complaints about the research, you may contact the Office of the Institutional Review Board for Human Use (OIRB) at the University of Alabama at Birmingham (UAB) at (205) 934-3789 or 1-800-822-8816. If calling the toll-free number, press the option for “all other calls” or for an operator/attendant and ask for extension 4-3789. Regular hours for the Office of the IRB are 8:00 a.m. to 5:00 p.m. CT, Monday through Friday. You may also call this number in the event the research staff cannot be reached or you wish to talk to someone else.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY.

YOUR COMPLETED SURVEY INDICATES YOUR WILLINGNESS TO PARTICIPATE. YOU MAY STOP AND EXIT THE SURVEY AT ANY TIME YOU FEEL YOU NO LONGER WANT TO PARTICIPATE.
APPENDIX C

PRE-NOTICE LETTER
Pre-notice Letter.

Month, Year

Dear “School System Name” Secondary Teacher

In a few days, you will receive an email asking you to participate in an important study *Improving Performance: Examining the Link between Teacher Self-Efficacy and Support for Female Secondary Math Teachers (protocol # X120305007)*. The study is being conducted as a part of the requirements of my doctoral program at the University of Alabama at Birmingham, School of Education.

You are receiving this pre-notice because you are a secondary math teacher selected to participate based on your content area and grade level.

Your answers will be kept strictly confidential and the survey results will only be reported in group form by school system.

Your assistance in filling out this survey on perceptions of math teacher success is voluntary.

Completion of the survey will take about 20 minutes. If you have any questions about the study, please call 205-335-2285 (cell).

Thank you in advance for taking the time to help in this important research.

Sincerely,

*Veronique Zimmerman-Brown*

University of Alabama at Birmingham

College of Arts and Sciences

School of Education

Instructor

e-mail: vzbrown@uab.edu

office #: (205) 996-9549
Enclosures
APPENDIX D
FIRST FOLLOW-UP LETTER
Dear “School System Name” Secondary Teacher:

About two weeks ago, you were invited to participate in a research study titled Improving Performance: Examining the Link between Teacher Self-Efficacy and Support for Female Secondary Math Teachers (protocol #X120305007). As of this time, we have not received your reply. We sincerely want your opinions and observations included in the findings of this study.

If you have completed and submitted the survey, we thank you for your cooperation and ask that you disregard the link provided below. If the original email that included the online web survey link did not reach you or if you mistakenly deleted the email, would you please take 20 minutes of your time now to complete and submit the survey by clicking on the link provided below.

At the conclusion of the administration of the survey, a subsequent link summarizing the results of the research will be sent to you via email. Please be assured that your responses will remain strictly confidential.

Sincerely,

Veronique Zimmerman-Brown

University of Alabama at Birmingham

College of Arts and Sciences

School of Education

Instructor

e-mail- vzbrown@uab.edu

office #: (205) 996-9549
(Link to Survey)
APPENDIX E

SECOND FOLLOW-UP LETTER
Follow-up Letter (2)

Month, Year

Dear “School System Name” Secondary Teacher:

About (number of weeks) weeks ago, we sent a follow-up email inviting you to participate in a research study titled *Improving Performance: Examining the Link between Teacher Self-Efficacy and Support for Female Secondary Math Teachers (protocol # X120305007)*. As of this time, we have not received your reply. We sincerely want your opinions and observations included in the findings of this study.

If you have completed and submitted the survey, we thank you for your cooperation and ask that you disregard the link provided below. If the original email that included the online web survey link did not reach you or if you mistakenly deleted the email, would you please take 20 minutes of your time now to complete and submit the survey by clicking on the link provided below.

At the conclusion of the administration of the survey, a subsequent link summarizing the results of the research will be sent to you via email. Please be assured that your responses will remain strictly confidential.

Sincerely,

*Veronique Zimmerman-Brown*

University of Alabama at Birmingham
College of Arts and Sciences
School of Education
Instructor

email- vzbrown@uab.edu

office #-(205) 996-9549

(Link to Survey)
APPENDIX F

SURVEY
**Improving Performance Survey**

**Introduction to Survey**

Dear Secondary Mathematics Teacher:

As part of a commitment to improve our support for our teachers, it is necessary to assess how and if the support mechanisms we have in place are sufficient to meet your professional needs to ensure your success. Because we believe that the best information to make this assessment comes from you, the teacher, we are asking that you take about 20 minutes to share your opinions with us by completing and returning the web survey.

The web survey is self-administered and can be accessed using the provided link. Please be assured that your responses will remain strictly confidential. Once you have clicked on the link, a code will be generated for identification purposes. The identification code is for follow-up purposes only. At the conclusion of the administration of the survey, a subsequent link summarizing the results of the survey will be sent to you via email.

Your assistance in filling out this teacher success survey will strengthen our efforts to provide relevant professional development activities and address your content specific needs. Thank you for completing this survey. Information gathered will be used for analysis and finding ways to better support you in your teaching capacity.

**Demographics**

**1. Gender (check one):**

- [ ] Male
- [ ] Female

**2. What is your age?**

**3. Are you (check one):**

- [ ] African American
- [ ] Caucasian
- [ ] Asian American
- [ ] Hispanic American
- [ ] Native American
- [ ] Biracial/Multiethnic

Other (please specify)

**4. What is the name of your school system?**

**5. What grade level do you teach?**
### Improving Performance Survey

6. What mathematical content do you teach?

7. What percentage of your school's students receive free-reduced lunch?

#### Survey Questions

**8. Efficacy**

<table>
<thead>
<tr>
<th>Question</th>
<th>1 (Nothing)</th>
<th>2</th>
<th>3 (Very Little)</th>
<th>4</th>
<th>5 (Some Influence)</th>
<th>6</th>
<th>7 (Quite A Bit)</th>
<th>8</th>
<th>9 (A Great Deal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. How much can you do to control disruptive behavior in the classroom?</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>B. How much can you do to motivate students who show low interest in school work?</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>C. How much can you do to get students to believe they can do well in school?</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<td>✔</td>
</tr>
<tr>
<td>D. How much can you do to help your students value learning?</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>E. To what extent can you craft good questions for your students?</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>F. How much can you do to get children to follow classroom rules?</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>G. How much can you do to calm a student who is disruptive or noisy?</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>H. How well can you establish a classroom management system with each group of students?</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>I. How much can you use a variety of assessment strategies?</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>J. To what extent can you provide an alternative explanation or example when students are confused?</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>K. How much can you assist families in helping their children do well in school?</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>L. How well can you implement alternative</td>
<td>✔</td>
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</table>
**9. Health**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>1 (Rarely Occurs)</th>
<th>2 (Sometimes Occurs)</th>
<th>3 (Often Occurs)</th>
<th>4 (Very Frequently Occurs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. The principal is friendly and approachable.</td>
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<td>B. Extra materials are available if requested.</td>
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<tr>
<td>C. Teachers do favors for each other.</td>
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<td>D. The principal treats all faculty members as his or her equal.</td>
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<tr>
<td>E. Teachers are provided with adequate materials for their classrooms.</td>
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<tr>
<td>F. Teachers in this school like each other.</td>
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<tr>
<td>G. The principal puts suggestions made by the faculty into operation.</td>
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<tr>
<td>H. Teachers receive necessary classroom supplies.</td>
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<tr>
<td>I. Teachers are indifferent to each other.</td>
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<td>J. The principal is willing to make changes.</td>
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<td>K. Supplementary materials are available for classroom use.</td>
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<tr>
<td>L. Teachers exhibit friendliness to each other.</td>
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<td>M. The principal looks out for the personal welfare of faculty members.</td>
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<td>N. Teachers have access to needed instructional materials.</td>
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<tr>
<td>O. Teachers in this school are cool and aloof to each other.</td>
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<td>P. The morale of teachers is high.</td>
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<tr>
<td>Q. There is a feeling of trust and confidence among the staff.</td>
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<tr>
<td>R. Teachers accomplish their jobs with enthusiasm.</td>
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### Improving Performance Survey

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<tbody>
<tr>
<td>S. Teachers identify with the school.</td>
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</tbody>
</table>
Title: IMPROVING PERFORMANCE: EXAMINING THE LINK BETWEEN SELF-EFFICACY AND SUPPORT FOR SECONDARY FEMALE MATH TEACHERS

Hoy Organizational Health
- Trust
- Confidence
- Enthusiasm
- Friendliness

Teacher Efficacy
- Perceptions about capabilities to foster student engagement
- Perceptions about capabilities to foster student learning

Resource Support
- Administrative Support
- Teacher/Colleague Support

Supportive
Friendly
Collegial
Classroom Supplies
Instructional Materials
Extra Materials
APPENDIX H

ORGANIZATIONAL HEALTH CONCEPT MAP
ORGANIZATIONAL HEALTH CONCEPT MAP (HOY)
APPENDIX I

TEACHERS’ SENSE OF EFFICACY CONCEPT MAP
TEACHERS’ SENSE OF EFFICACY CONCEPT MAP (WOOLFOLK HOY)

- Teaching Efficacy
- Personal Efficacy

= Teachers' Sense of Efficacy
APPENDIX J

IRB APPROVAL
Form 4: IRB Approval Form  
Identification and Certification of Research  
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The Assurance number is FWA00005960 and it expires on January 24, 2017. The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56.

Principal Investigator: ZIMMERMAN-BROWN, VERONIQUE
Co-Investigator(s):
Protocol Number: X120305007
Protocol Title: Improving Performance: Examining the Link Between Teacher Self-Efficacy and Support for Female Secondary Math Teachers

The IRB reviewed and approved the above named project on 3-14-12. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.
IRB Approval Date: 3-14-12
Date IRB Approval Issued: 3-14-12

Marilyn Doss, M.A.
Vice Chair of the Institutional Review Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.