Patterns of Relationships Between Teacher Engagement and Student Engagement

Michelle E. Cardwell
St. John Fisher College

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Abstract
Engaging adolescents in school is a challenge. Academic motivation decreases steadily as students move from elementary, to middle, to high school. The purpose of this study was to examine the relationship between teacher engagement and student engagement to determine whether the level of teacher engagement had an impact on the level of student engagement. Perspectives from both the teachers and students were examined to determine if agreement existed between teachers and students regarding the reported levels of teacher engagement and student engagement. This study found evidence that high levels of teacher engagement had a positive effect on student engagement levels. An analysis of student perception variables revealed weak to moderate relationships between most variables. Strong relationships existed between Belief about Self and autonomy and Belief about Self and relatedness. Data revealed that a disconnect existed between teacher and student perspectives regarding teacher and student engagement. It is recommended that teachers, students, and administrators have a common understanding of the definition of engagement and knowledge of what engagement looks, sounds, and feels like in the classroom. The use of engagement measurement/reflection tools should be used to assess engagement levels of teachers and students and to provide data which can influence decisions regarding teacher and student engagement.

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Hasna Muhammad

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Patterns of Relationships Between
Teacher Engagement and Student Engagement

By

Michelle E. Cardwell

Submitted in partial fulfillment
of the requirements for the degree
Ed.D. in Executive Leadership

Supervised by
Dr. Jerry Willis

Committee Member
Dr. Hasna Muhammad

Ralph C. Wilson, Jr. School of Education
St. John Fisher College

August 2011
Dedication

To my mother who instilled in me the importance of diligence, patience, and humility, but who went to sleep and was called home before the completion of my degree.
Biographical Sketch

Michelle E. Cardwell is currently an administrator in K–12 education. Mrs. Cardwell attended SUNY, College at New Paltz from 1986 to 1991 and graduated with a Bachelor of Sciences degree in 1991. She attended Hunter College from 1995 to 1998 and graduated with a Master of Sciences degree in 1998. In addition, she attended the College at St. Rose from 2000 to 2002 and graduated with a second Master of Sciences degree in 2002. She came to St. John Fisher College in the summer of 2009 and began doctoral studies in the Ed.D. Program in Executive Leadership. Mrs. Cardwell pursued her research in Student Engagement under the direction of Dr. Jerry Willis and Dr. Hasna Muhammad and received the Ed.D. degree in 2011.
Acknowledgements

First and foremost, I acknowledge my Father, for through Christ all things are possible. I can do all things through Him who strengthens me.

Special gratitude is extended to Dr. Jerry Willis, my dissertation committee chair, and Dr. Hasna Muhammad, my dissertation committee member and executive mentor, for their support, leadership, patience, and guidance. Their expertise, counsel, and assistance were invaluable.

I also acknowledge the sacrifices made by my children, Candice, Ross, Celianna, and Justin, in order that I devote the necessary time and energy to my studies. I cannot thank them enough for understanding the time spent in class, researching, and writing this dissertation.

Above all, my deepest expression of appreciation goes to my husband, Ross. His love, support, encouragement, and motivational talks made it possible for me to pursue and earn this degree. He served as a constant source of inspiration and motivation, which were the essential factors to the completion of this dissertation.
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This study found evidence that high levels of teacher engagement had a positive effect on student engagement levels. An analysis of student perception variables revealed weak to moderate relationships between most variables. Strong relationships existed between Belief about Self and autonomy and Belief about Self and relatedness. Data revealed that a disconnect existed between teacher and student perspectives regarding teacher and student engagement.

It is recommended that teachers, students, and administrators have a common understanding of the definition of engagement and knowledge of what engagement looks, sounds, and feels like in the classroom. The use of engagement measurement/reflection tools should be used to assess engagement levels of teachers and students and to provide data which can influence decisions regarding teacher and student engagement.
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Chapter 1: Introduction

The importance of student engagement is becoming widely recognized by educators (Appleton, Christenson, & Furlong, 2008). Student engagement is an integral component of learning and has been the focus of a number of recent research studies (Fredricks, Blumenfeld, & Paris, 2004; Johnson, 2008). Student engagement contributes to improved academic performance (Greenwood, Horton, & Utley, 2002; McMahon & Portelli, 2004; Tyler & Boelter, 2008) as measured by grade reports and standardized test scores (Glanville & Wildhagen, 2007). Given the emphasis placed on levels of academic achievement in schools, the way in which students acquire knowledge through the learning process has become a concern. However, enhancing engagement in schools has remained a significant challenge (Klem & Connell, 2004). According to Klem and Connell (2004), “by high school as many as 40 to 60 percent of all students . . . are chronically disengaged from school, not counting those who already dropped out” (p. 262). Albert et al. (2005) reported that in 1999 only 50% of girls and 25% of boys Ages 14–15 were engaged in school. By 2002, the level of student engagement fell to only 39% of girls and 20% of boys.

Students typically enthusiastic and interested in learning lose motivation and become disengaged as they traverse the elementary and secondary education experience (Marks, 2000; McDermott, Mordell, & Sholzful, 2001). The consequences of disengagement are far reaching. Schools typically characterized as underprivileged, underperforming and underachieving, have common threads of low academic performance, high rates of misconduct and suspensions, poor attendance, and
disproportionately high dropout rates (Ogbu, 2003). Many students appear inattentive and seem to lack initiative, motivation, and the desire to learn. Thus, these students are effectively disengaged from their educative process, their schools, and their teachers, resulting in poor academic and social performance (Ogbu, 2003).

Disengagement is a foundation for lack of success in education and it is easy to blame students, parents, and communities for the lack of engagement. However, according to Tucker et al. (2002), researchers in the field of education are beginning to propose and test theories of how teacher behaviors influence student engagement. “Only recently have researchers integrated educational findings with psychological theories regarding student” engagement (Tucker et al., 2002, p. 477).

Agreement exists among researchers that student engagement is essential for achieving academic success. According to the National Research Council (2004), how teachers teach and what teachers teach are powerful factors in student engagement and learning. Research demonstrates that teachers can influence student motivation and increase student engagement in the classroom (National Research Council, 2004).

**Problem Statement**

Engaging adolescents in school is a challenge. Academic motivation decreases steadily as students move from elementary, to middle, to high school (Klem & Connell, 2004). As a result, disengagement from course work is common at the high school level. While dropping out of school is the most visible form of disengagement, many students who remain in school have poor attendance, put forth modest effort on school work, and learn little (National Research Council, 2004). For my dissertation research, I examined the patterns of relationship between student engagement and teacher engagement to
determine whether the level of teacher engagement had an impact on the level of student engagement. In addition, I compared perspectives from the students and teachers regarding student engagement and teacher engagement.

The research site was a small, city high school in upstate New York. The high school had approximately 1,200 students and 90 teachers. The student population was 65% Black or African American; 16% Hispanic or Latino; 1% Asian or Native Hawaiian or other Pacific Islander; and 18% White. Fifty percent of the students were eligible for free lunch and 10% were eligible for reduced lunch. All of the teachers were certified to teach in their subject area. Six percent had fewer than three years of teaching experience and 26% of the staff had 30 credits beyond their Master’s Degree. All of the 355 core classes were taught by Highly Qualified Teachers as defined by No Child Left Behind.

At the time the research was conducted, I was employed at the research site as an instructional leader who had a responsibility in improving the graduation rate, attendance rate, and academic achievement of the students enrolled at the school.

The research site received a designation as a Persistently Low Achieving (PLA) School as a result of persistently low performance scores in mathematics and a low graduation rate. A Joint Intervention Team (JIT), representing members from all the major stakeholder groups concerned with the improvement of the school, was required to conduct a thorough review of the school and provide recommendations for improvement. One of the findings of the JIT was that in some classes students were not engaged in their own learning. This was evidenced by students sleeping in class, high absenteeism, and student interviews. In addition, some teachers appeared to lack engagement at work. This was evidenced by high absenteeism, lack of participation at school functions, and
minimal interaction with students outside of assigned instructional time. A third finding, which a committee was formed to further investigate, was a lack of cultural competence on behalf of the teachers. Classroom environments and lessons did not appear to take account the various cultures and learning styles of the students.

As a result of the JIT review and the need to increase the graduation rate, attendance rate, and academic performance in mathematics of students at the research site, it was necessary to determine the level of student engagement and teacher engagement in mathematics courses, compare perspective of both the student and the teacher regarding student engagement and teacher engagement, and to examine the relationship between student engagement and teacher engagement.

However, while there has been a tendency to think of student engagement as something the student must overcome on his or her own, research has shown that a high level of teacher engagement is essential for the students to be fully engaged and for the success of the school. Teacher engagement is a contributing factor to improving student engagement and academic achievement (Basikin, 2007), and if a correlational relationship exists between student engagement and teacher engagement, and that correlational relationship is a sign of a causal relationship between teacher and student engagement, then an increase in teacher engagement will lead to an increase in student engagement.

**Theoretical Rationale**

Student engagement is a fundamental component essential to the process of learning and paramount to the successful academic advancement and achievement of students (National Research Council, 2004). The concept of student engagement
emerged from the discourse regarding unsuccessful efforts to target academic underachievement to remedy declining academic motivation and achievement, inordinately high levels of student boredom, and disproportionately high dropout rates (Fredricks et al., 2004). In the available research literature there are clear indications of the connection between academic engagement and high academic achievement (Ogbu, 2003). Several motivational theories have been the foundation for research studies that indicate that when specific psychological variables are addressed, student engagement is increased (Csikszentimihaly, 1990; Klem & Connell, 2004; Ryan & Deci, 2000).

One theory of motivation, self-determination theory (Ryan & Deci, 2000), suggests that learning occurs when students are cognitively and emotionally engaged. Ryan and Deci’s (2000) motivational theory affords educators a greater understanding of student needs. These authors identify three types of factors influencing achievement. They are competence, relatedness, and autonomy. Competence involves understanding and self-efficacy, relatedness involves making connections, and autonomy involves taking an active role in one’s own learning (Ryan & Deci, 2000). Research has connected self-determined motivation to educational outcomes. Deci, Vallerand, Pelletier, and Ryan (1991) found that students who are intrinsically motivated to complete assignments are more likely to graduate, have fewer discipline problems, and are well-adjusted. By understanding a student’s inherent needs, educators can relate to students in a way that encourages internal motivation for engagement in the educative process.

Similar to the self-determination theory of Ryan and Deci (2000), Csikszentimihaly’s (1990) flow theory emphasizes the need for balance between
academic rigor and skill development. The components of flow, as proposed by Csikszentmihalyi (1990), include having a clear goal, complete concentration or focus on a topic, a sense of control, direct and immediate feedback, and a distorted sense of time. The positive relationship between flow and skill development has been noted in studies describing the phenomenological experience of students. In short, being in a state of flow, intrinsically motivated, means that individuals are driven to learn because they are enjoying the activity.

Theoretical frameworks such as self-determination theory and flow theory point to causal links between teacher engagement and actions and student engagement and actions. The nature of these links has been the focus of a number of studies. For example, Klem and Connell (2004) have examined the use of selected educational variables as well as psychological requisites necessary to facilitate effective engagement. Connell’s model of motivation (Connell & Wellborn, 1991; Klem & Connell, 2004; Skinner & Belmont, 1993) described the process by which the behaviors of the teacher influenced student engagement. Combinations of carefully employed educational variables have been successful in increasing student engagement. These variables include quality teacher and student interaction (Kelly, 2007), high levels of student efficacy (Linnenbrink & Pintrich, 2003), appropriate instructional methods (Johnson, 2008), higher teacher expectations (Tyler & Boelter, 2008), and establishing a supportive and caring classroom community (Walker & Greene, 2009). The findings of the study conducted by Shernoff, Csikszentmihalyi, Schneider, and Elisa (2003) indicate that challenging tasks produce positive emotions, thereby creating the best opportunity for engagement. Effective classrooms reflect academically intense lessons charged with
relevant activities, which foster feelings of student control in their learning environment and build self-confidence in their academic ability. In these classrooms, students concentrate, experience enjoyment, and secure immediate intrinsic satisfaction, which builds a foundation of future interests (Shernoff et al., 2003). Similar to Ryan and Deci’s theory of self-determination (2000), Connell’s model of motivation stipulates that meeting the three fundamental psychological needs (competence, autonomy, and relatedness) is essential to optimize student engagement (Connell & Wellborn, 1991; Skinner & Belmont, 1993).

**Statement of Purpose**

The purpose of this study was to examine the relationship between teacher engagement and student engagement to determine whether the level of teacher engagement had an impact on the level of student engagement. If data shows that teacher engagement directly influences student engagement then it is incumbent upon teachers and school and district administrators to ensure that high levels of teacher engagement are present. In addition to determining whether the level of teacher engagement had an impact on the level of student engagement, perspectives from both the students and the students were examined to determine if agreement existed between teachers and students regarding the reported levels of teacher engagement and student engagement. If data showed that a disconnect existed between teacher and student perceptions, then it could be recommended that teachers and students communicate their beliefs and perceptions regarding engagement in the classroom.

**Research Questions**

This study intends to investigate the following research questions:
1. How do mathematics teachers describe their engagement at work?

2. How do students describe their mathematics teachers’ engagement in the classroom?

3. How do mathematics teachers describe their students’ engagement in the classroom?

4. How do students describe their engagement in the mathematics classroom?

5. What are the patterns of relationship between teacher engagement and student engagement in the mathematics classroom?

**Significance of the Study**

This study increased our understanding of the relationships between teacher engagement and student engagement. While much literature exists on the topics of teacher engagement and student engagement independently, there is much less literature on teacher engagement and student engagement as multifaceted and interrelated constructs. The level of teacher engagement as measured from the perspective of both the teacher and the student was examined and compared to the level of student engagement as measured from the perspective of both the teacher and the student. This study was significant in that it added to the existing literature on the topic of student engagement while linking teacher engagement to student engagement. This study informed educators of the importance of teacher engagement and its relationship to student engagement. Results of the study indicated that high levels of teacher engagement, as reported by the students, are a contributing factor to high levels of student engagement, thus ensuring that high levels of teacher engagement are needed in order to achieve an optimal level of student engagement. In addition, perceptions of both the
teacher and the student regarding the engagement level of the other can be influenced by outside factors such as cultural differences and perceptual bias.

**Definition of Terms**

Many of the definitions were selected from previous research and have been cited in this study. These terms were essential in developing a complete understanding of the topic and the study to be presented. For the purposes of this study the following definitions will be used:

*Absorption*—Fully concentrated and happily engrossed in one’s work; having difficulties detaching oneself from it so that time passes quickly.

*Autonomy*—The need to be in control of one’s own behavior or to be self-regulating.

*Behavioral engagement*—Participation and involvement in academic activities.

*Cognitive engagement*—Draws on the idea of investment; it incorporates thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills.

*Cohort year*—Year students enter into high school as a freshman.

*Competence*—Interacting effectively with the environment. Has been found to be associated with student performance in school. Students must know what it takes to be competent and they must believe they have what it takes to carry out the strategies. Such beliefs are predictors of behavioral and emotional engagement in the classroom.

*Dedication*—Being strongly involved in one’s work, and experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge. Feeling inspired and challenged by one’s job.
Emotional engagement—Positive and negative reactions to teachers, classmates, academics, and school. Creates ties to an institution and influences willingness to do the work.

Relatedness—The psychological need to be respected by, connected to, and cared for by others.

Teacher engagement—High levels of energy and strong identification with one’s work.

Vigor—High levels of energy and mental resilience while working; the willingness to invest effort in one’s work, and persistence even in the face of difficulties.

Chapter Summary

Student engagement, in many classrooms, is low and as a result, academic performance is suffering. Students that are engaged exhibit positive characteristics. They attend school regularly, they earn better grades, and they score higher on standardized tests (Tyler & Boelter, 2008). Since engagement is a precursor to academic achievement, the research into student engagement must continue, and factors that are proven to improve student engagement must be implemented. If educational institutions and federal and state governments do not require a transformation of existing organizational and instructional practices, student engagement will continue on its descending path, threatening the future prosperity of the United States. Our failure to engage, motivate, and educate our students is not an affordable option in the future of education. The remaining chapters will present (a) a review of literature (Chapter 2) with focus on engagement and academic performance in mathematics, student and teacher engagement and its measurement, and the Research Assessment Package for Schools instrument; (b)
research design and methodology (Chapter 3) to include the research context and participants and the instruments and procedures used for data collection and analysis; (c) results of the research questions (Chapter 4) addressing each question individually; and (d) discussion, including a summary of findings, limitations, implications, and recommendations of the research, and conclusions (Chapter 5).
Chapter 2: Review of the Literature

This chapter is a review of literature that is pertinent to understanding the relationship between teacher engagement and student engagement in the mathematics classroom. It begins with an examination of the literature regarding the importance of high levels of student engagement in the mathematics classroom and the current condition of student performance in mathematics in the United States. Following, is an in-depth explanation of student engagement and how it is defined. Definitions of student engagement have been extracted from current literature and compared to the definition used in this study. Measuring student engagement is discussed, highlighting several measurement methods and tools. A discussion of teacher engagement follows and is compared to current research on work engagement. Additionally, methods and tools for measuring teacher engagement are noted. Finally, information on the Research Assessment Package for Schools (RAPS) is presented and the components of the assessment are identified and clearly explained.

Engagement and Academic Performance in Mathematics

National and international data revealed persistent problems in the mathematics performance of students in the United States (Gonzales et al., 2005). Results from the 2003 Trends in International Mathematics and Science Study (TIMSS) showed that eighth graders in the United States were out performed by students in nine countries (Gonzales et al., 2005). Additionally, results from the National Assessment of Educational Progress (NAEP) showed that the average mathematics score for 17 year
olds had not improved in the past thirty years (Perie, Moran, & Lutkus, 2005). According to a study conducted by Grigg, Donahue, and Dion (2007), less than one-quarter of high school seniors are proficient in mathematics. Consequently, the study of student performance in mathematics and the teaching of mathematics became a high priority in many educational systems (Warwick, 2008).

Researchers (Shernoff, Knauth, & Makris, 2000; Yair, 2000) have suggested that high school students in the United States are not fully engaged in classroom learning. Hiebert et al., (2003) reported in a study investigating mathematics classroom dynamics that a majority of teachers did not engage students in learning mathematics. These results are of concern, because student engagement has been found to contribute to improved academic performance (Greenwood, Horton, & Utley, 2002; Kong, Wong, & Lam, 2003; McMahon & Portelli, 2004; Tyler & Boelter, 2008). The effects of student engagement or conversely, student disengagement, are far reaching. As each year passes, fewer students opt to study mathematics after they complete the mandatory courses in high school because some students have become indifferent to or apprehensive of mathematics (Kong et al., 2003; Warwick, 2008).

**Student Engagement**

Student engagement is a complex construct which incorporates numerous definitions. Researchers (Appleton, Christenson, & Furlong, 2008; Fredricks et al., 2004; Furlong et al., 2003; Jimerson, Campos, & Greif, 2003) have indicated there is inconsistency in the definition of engagement and the terminology used to identify engagement. Examples of varying terminology found in recent literature identifying engagement are: engagement (Audas & Willms, 2001), school engagement (Fredricks et
al., 2004; Furlong et al., 2003; Jimerson et al., 2003), academic engagement (Suarez-Orozco, Pimentel, & Martin, 2009), student engagement (Chapman, 2002) and student engagement in academic work (Marks, 2000). Despite the inconsistencies in the terminology of engagement, themes have emerged from the research. For example, some definitions contrasted the positive outcome of engagement with the negative result of disengagement (Ogbu, 2003). Some researchers identified the importance of fundamental needs as precursors of engagement (Christenson & Anderson, 2002; Connell & Wellborn, 1991; Furlong et al., 2003; Ryan & Deci, 2000). Most definitions tend to include a behavioral component and also contain emotional or psychological components. However, few include academic or cognitive components in their definition.

Engagement is typically described as multidimensional with two to four components. Researchers adopting a two-component model often include a behavioral element, which has been defined as exhibiting positive conduct, effort, and participation, and an emotional element, which has been defined as having interest, belonging, and a positive attitude (Marks, 2000; Willms, 2003). A more recent review of the literature resulted in a three-component model including a cognitive component, which has been defined as having self-regulation, learning goals, and an investment in learning (Fredricks et al., 2004; Jimerson et al., 2003). Linnenbrink and Pintrich (2003) described engagement as having three components, which include behavioral, cognitive, and motivational. Similarly to Fredricks et al. (2004) and Jimerson et al. (2003), Linnenbrink and Pintrich (2003) describe behavioral engagement as observable behavior that can easily be seen by the teacher, such as completing assignments and class participation.
Cognitive engagement is defined as paying attention to the teacher, thinking deeply about the subject matter, and the use of various strategies to solve a problem or arrive at a solution. Motivational engagement, as defined by Linnenbrink and Pintrich (2003), has similarities to the definition of emotional engagement as defined by Fredricks et al. (2004). Motivational engagement and emotional engagement are defined as having a personal interest in the subject matter and displaying positive emotions during learning. For the purpose of this study, the following forms of engagement discussed by Fredricks et al. (2004) were examined:

Behavioral engagement draws on the idea of participation; it includes involvement in academic . . . activities and is considered crucial for achieving positive academic outcomes. . . . Emotional engagement encompasses positive and negative reactions to teachers, classmates, academics, and school and is presumed to create ties to an institution and influence willingness to do the work.

Finally, cognitive engagement draws on the idea of investment; it incorporates thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills. (p. 60)

According to Fredricks et al. (2004), a student’s overall level of engagement depends on the extent to which he or she is engaged in these three areas: behavioral, emotional, and cognitive.

Deci et al. (1991) found that by understanding a student’s inherent needs, educators can relate to students in a way that encourages internal motivation for engagement in the educative process. These inherent needs (perceived competence,
relatedness, and autonomy) must be met in order for students to become fully engaged in the classroom (Connell & Wellborn, 1991; Ryan & Deci, 2000).

Measuring Student Engagement

As schools and districts look for ways to increase levels of student engagement, it is important for them to understand various methods for measuring student engagement. In order to increase levels of student engagement, efficient methods of measuring student engagement must first be identified (Fredricks et al., 2011).

The measurement of student engagement tends to focus on the quantity and quality of academic tasks, activities, and conditions. While there are many ways to study engagement, data is generally collected through surveys or questionnaires. The quantity of student engagement may be gauged through questions on the amount of time spent on task in the classroom or answering questions. Quantitative engagement measures also focus on factors that impact learning. Qualitative engagement measures may focus on the perceived value of tasks, assessments, and feedback.

As noted in the literature, the approaches for measuring student engagement vary. Subtle measures can be obtained through direct observation of participants. This fieldwork can be invasive, tend to focus on behavior, is resource demanding, and is difficult to generalize (Astor & Connell, 1992). Time or activity diaries can be completed by sampled students. Such diaries offer a means of gathering rich data from students, however, they place heavy demands on the participants and may be unreliable (Coates, 2006). Questionnaires are a common means of collecting feedback and are unobtrusive, inexpensive, and an easy means of gathering valid, rich, and representative data.
Interview questions may consist of a few, often three, open-ended questions, and a subsequent series of follow-up questions. The purpose of the open-ended questions is to allow the respondent the opportunity to provide a more detailed and free response answer as well as converse with the researcher regarding his or her feelings about student engagement, teacher engagement, and the behaviors and practices the respondent feels influence student engagement.

**Teacher Engagement**

A high level of teacher engagement, which is defined as having commitment and enthusiasm (Rutter and Jacobson, 1986), is essential for the success of high schools and is a contributing factor to academic achievement (Basikin, 2007). Engagement at work has been described by Kirkpatrick (2007) as an employee’s interest in, enthusiasm for and investment in the job. Maslach, Schaufeli, and Leiter (2001) defined engagement as having energy, involvement, and efficacy. However, this definition differs from that of Schaufeli et al. (2002), who defined engagement as “a positive, fulfilling, work related state of mind that is characterized by vigor, dedication and absorption.”

Engaged teachers are concerned about the quality of education they deliver (McLaughlin, Pfeifer, & Stanford University Policy Institute, 1986) and that concern is observable in their classroom practices (Rutter & Jacobson, 1986). Engaged teachers search for new ideas, implement best teaching practices (Marzano, 2003), modify instruction to meet the instructional needs of their students (Cotton, Dollard, & de Jonge, 2002), have high expectations for their students (Boaler, 2004; Tyler & Boelter, 2008), take responsibility for student learning (Cotton et al., 2002), frequently monitor student progress and provide students with feedback (Marzano, 2003).
The importance of the behavioral aspects of engagement has been examined and well documented. However, theories that define engagement based primarily on behavior are very likely inadequate (Rutter & Jacobson, 1986). Admittedly, positive teacher behaviors are important and may suggest ideas of effective engagement. Certain behaviors (e.g., increased class preparation time, increased tutoring sessions) do support student and teacher engagement. However, examining engagement as a psychological disposition or attitude adds value and allows heightened understanding. Teachers who possess positive attitudes towards their students and believe in the importance of the educative process are more likely to engage in behaviors associated with higher teacher engagement and thus, positively impact their students’ psychological states and to foster student engagement in the classroom environment.

Attitudinal characteristics imbue the engaged teacher with a connectedness with the student beyond the mere classroom behavioral expression of going through the motions. Engaged teaching thereby reflects more deeply held predispositions towards one’s work (Rutter & Jacobson, 1986). It is the teacher who believes and exudes the notion that education is paramount while embracing the role as an educator committed to making a difference in the lives of the students (Berman & McLaughlin, 1980; Cotton et al., 2002; Lieberman & Miller, 1981). Teacher beliefs that their efforts are impactful and make a difference in the lives of their students is important (Cotton et al., 2002; Rosenholtz, 1986). The work of an effectively engaged teacher is inspired by the meaningfulness of the success of the work itself (Rosenholtz, 1986). Engaged teachers experience pride and confidence in their efforts when students achieve as well as disappointment and new challenges when they do not (Farber, 1984). Additionally,
engaged teachers show characteristics of enthusiastic and positive interest into vigorous work (Basikin, 2007).

**Measuring Teacher Engagement**

Recently increased attention has been placed on teacher engagement and its effect on schools and student performance. This concern was brought about by high teacher turnover rates, low teacher moral, and poor student performance. Studies (Basikin, 2007) found that increased levels of teacher engagement had a positive effect on student engagement and academic achievement. Thus, in order to ensure that teachers are engaged at work, it is necessary to identify effective methods of measuring teacher engagement.

Teacher engagement can be measured using the Work and Well-Being Survey, also known as the short form of the Utrecht Work Engagement Scale (UWES-9) developed by Schaufeli et al. (2003). The UWES-9 has three subscales that measure vigor, dedication, and absorption with one’s job (Schaufeli, Bakker, & Salanova, 2006). The subscales are all three items long, and have internal reliability consistencies of .77, .85, and .78 respectively. Three items were used to address each dimension of work engagement, totaling nine questions (see Table 2.1). All nine items were anchored in a seven-point Likert scale ranging from (1) Never to (7) Always. Several studies have used the UWES-9 to measure teacher engagement. Basikin (2007) investigated the work engagement among a sample of 152 secondary school English teachers in Yogyakarta, Indonesia. Data was collected using the UWES-9. In addition, Adekola (2010) conducted a study using the UWES-9 in which data was collected from secondary school English teachers in Nigeria. Reliability in both the Indonesian and Nigerian context was
high ($\alpha = 0.91$ overall; $\alpha = 0.76, 0.83,$ and $0.79,$ respectively for component vigor, dedication and absorption subscales).

Table 2.1

*Measuring Teacher Engagement Using the Utrecht Work Engagement Scale (UWES-9)*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Questions Measuring Teacher Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vigor</td>
<td>At my work, I feel bursting with energy.</td>
</tr>
<tr>
<td></td>
<td>At my job, I feel strong and vigorous.</td>
</tr>
<tr>
<td></td>
<td>When I get up in the morning, I feel like going to work.</td>
</tr>
<tr>
<td>Dedication</td>
<td>I am enthusiastic about my job.</td>
</tr>
<tr>
<td></td>
<td>My job inspires me.</td>
</tr>
<tr>
<td></td>
<td>I am proud of the work that I do.</td>
</tr>
<tr>
<td>Absorption</td>
<td>I feel happy when I am working intensely.</td>
</tr>
<tr>
<td></td>
<td>I am immersed in my work.</td>
</tr>
<tr>
<td></td>
<td>I get carried away when I am working.</td>
</tr>
</tbody>
</table>

**Research Assessment Package for Schools (RAPS)**

The Institute for Research and Reform in Education (IRRE; 1998) developed the Research Assessment Package for Schools (RAPS) as part of public school. The RAPS instrument was originally intended to be used in studying specific psychological and interpersonal processes affecting students’ school performance and commitment (Connell & Wellborn, 1991; Skinner & Belmont, 1993). The measures have since been revised for use by evaluators and educators. The revised version of RAPS contains only measures that show the most utility as predictors of subsequent outcomes in the self-system process model (IRRE, 1998), which is defined as containing the subscales perceived competence,
relatedness, and autonomy. Currently, the RAPS instrument includes six separate but integrated measurement tools:

- **RAPS-R** (records), a strategy for analyzing and reporting data from student records;
- **RAPS-S** (student version), a survey given to students to assess their levels of engagement in school, their beliefs about themselves, the interpersonal supports they receive from adults at home and at school;
- **RAPS-T** (teacher perception of students), a survey given to teachers to obtain their reports of student engagement;
- **RAPS-P** (parent version), a parent report of student engagement in school and the support that the student receives from his or her teachers;
- **T-RAPS** (teacher version), a survey given to teachers to assess their own levels of engagement and the professional and interpersonal supports they perceive in their schools; and
- **RAPS-CFT and RAPS-CFS** (critical features version), survey items addressing the extent to which seven critical features of school reform are being implemented from the perspective of teachers and students.

**RAPS-S.** The RAPS-S is a student survey designed to measure specific psychological and interpersonal processes affecting students’ school performance and adjustment. It is available in forms for middle school (RAPS-SM) and for elementary school (RAPS-SE). Each version was separately validated using age-appropriate students. The RAPS-S includes a total of 84 items, tapping three major domains and seven separate sub-domains, in a questionnaire format. All items, with the exception of
one, are measured using a 4-point Likert scale ranging from 1 (*not at all true*) to 4 (*very true*). The last question is answered on a scale of 1 (*not at all important*) to 4 (*very important*).

According to the Student Report of Engagement, as measured by the RAPS-S (1998), engagement includes two components of student adjustment to school: Ongoing Engagement and Reactions to Challenge. Across these two components there are a total of 10 items on the secondary level.

**Ongoing engagement.** “Ongoing engagement includes the extent to which the student exerts efforts on school work, pays attention in class, prepares for class, and believes that doing well in school is personally important” (Klem & Connell, 2004, p. 11). The RAPS-S includes five questions at the secondary level measuring ongoing engagement (see Table 2.2).

**Reaction to challenge.** There are numerous ways in which students may cope with negative school-related events. Students may blame negative events on the teacher or other individuals. Students may cope with negative events by downplaying their importance. In other instances, students may worry about the outcome of specific events without doing anything to ensure that such events won’t occur again. Finally, students may cope by examining their own behavior and attempting to make changes to prevent similar negative events from occurring in the future. Six questions are included in the RAPS-SM measuring reaction to challenge (see Table 2.2).
Table 2.2

*Student Engagement Items from the RAPS-SM Engagement Domain*

<table>
<thead>
<tr>
<th>Sub-domain</th>
<th>Domain Questions Measuring Student Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing Engagement</td>
<td>I work very hard on my schoolwork.</td>
</tr>
<tr>
<td></td>
<td>I don’t try very hard in school.</td>
</tr>
<tr>
<td></td>
<td>I pay attention in class.</td>
</tr>
<tr>
<td></td>
<td>I often come to class unprepared.</td>
</tr>
<tr>
<td></td>
<td>How important is it to you to do the best you can in school?</td>
</tr>
<tr>
<td>Reaction to Challenge</td>
<td>When something bad happens to me in school (like not doing well on a test or not being able to answer an important question in class) . . .</td>
</tr>
<tr>
<td></td>
<td>. . . I say the teacher didn’t cover the things on the test.</td>
</tr>
<tr>
<td></td>
<td>. . . I get angry at the teacher.</td>
</tr>
<tr>
<td></td>
<td>. . . I say it was the teacher’s fault.</td>
</tr>
<tr>
<td></td>
<td>When something bad happens to me in school (like not doing well on a test or not being able to answer an important question in class) . . .</td>
</tr>
<tr>
<td></td>
<td>. . . I try to figure out what I did wrong so that it won’t happen again.</td>
</tr>
<tr>
<td></td>
<td>. . . I try to see what I did wrong.</td>
</tr>
<tr>
<td></td>
<td>. . . I tell myself I’ll do better next time.</td>
</tr>
</tbody>
</table>

*Belief about Self.* The Beliefs about Self domain incorporated three sub-domains: perceived competence, perceived autonomy, and perceived relatedness (IRRE, 1998).

The Perceived Competence sub-domain of the RAPS-SM consisted of 16 questions that measured perceived control in a school setting, belief of the kind of
strategies necessary to achieve desired outcomes, and the belief that the student had the
ability to enact strategies (IRRE, 1998).

The Perceived Autonomy sub-domain of the RAPS-SM consisted of nine
questions that were divided into three sections (three questions in each section) that
measured different types of self-regulation, or reasons for doing school work: introjected

The Perceived Relatedness sub-domain of the RAPS-SM consisted of 14
questions that were divided into four sections: emotional security with self (3 questions),
satisfaction with self (3 questions), teacher emotional security (4 questions), and peer
emotional security (4 questions).

**Experiences of teacher support.** This section includes 14 items at the secondary
level that identify the extent to which the student feels that the teacher(s): (a) are involved
with them, (b) provide support for autonomy, and (c) provide structure. See Table 2.3.
Researchers have used these measures in education and psychology (Klem & Connell,
2004; Tucker et al., 2002).

**RAPS-T.** The RAPS-T is a brief teacher report which measures student
engagement. It is available in forms for middle school (RAPS-TM) and for elementary
school (RAPS-TE). The RAPS-T is a 3-item measure using a 4 point scale ranging from
(1) Not At All True to (4) Very True. This survey was developed to get information about
student engagement from teachers that could be compared to student reports of their own
engagement (see Table 2.4).
Table 2.3

*Teacher Support Items from the RAPS-SM*

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Questions Measuring Teacher Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement</td>
<td>My teacher has plenty of time for me.</td>
</tr>
<tr>
<td></td>
<td>My teacher doesn’t seem to have enough time for me.</td>
</tr>
<tr>
<td></td>
<td>My teacher likes the other kids in my class better than me.</td>
</tr>
<tr>
<td></td>
<td>My teacher likes to be with me.</td>
</tr>
<tr>
<td></td>
<td>My teacher cares about how I do in school.</td>
</tr>
<tr>
<td>Autonomy Support</td>
<td>My teacher doesn’t explain why we have to learn certain things in school.</td>
</tr>
<tr>
<td></td>
<td>My teacher thinks what I say is important.</td>
</tr>
<tr>
<td></td>
<td>My teacher interrupts me when I have something to say.</td>
</tr>
<tr>
<td></td>
<td>My teacher tries to control everything I do.</td>
</tr>
<tr>
<td>Structure</td>
<td>My teacher is fair with me.</td>
</tr>
<tr>
<td></td>
<td>The rules in my classroom are clear.</td>
</tr>
<tr>
<td></td>
<td>My teacher isn’t fair with me.</td>
</tr>
<tr>
<td></td>
<td>My teacher doesn’t make clear what he/she expects of me in school.</td>
</tr>
</tbody>
</table>

Table 2.4

*Teacher Report of Student Engagement Items from RAPS-T*

<table>
<thead>
<tr>
<th>Questions Measuring Teacher Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>In my class, this student seems tuned in.</td>
</tr>
<tr>
<td>This student comes to class unprepared.</td>
</tr>
<tr>
<td>This student does more than is required.</td>
</tr>
</tbody>
</table>
Chapter Summary

Research has yet to provide a more comprehensive analysis as to the efficacy of engagement as a multifaceted construct encompassing behavior, emotion, and cognition from both the teacher and the student. Despite the absence of a comprehensive analysis encompassing a multifaceted construct, there is widespread agreement highlighting the importance of engagement on academic achievement. The study of engagement can provide heightened understanding regarding the relationship between teacher engagement and student engagement. That understanding contributes to our knowledge about the intricacy of the experiences of students in school and also facilitates more precision in the design of successful targeted interventions (Fredricks et al., 2004). Studies tend to focus on an insular examination of engagement while not connecting important components necessary for a more complete analysis (Fredricks et al., 2004). This research will fill a void which exists regarding the relationship between student engagement and teacher engagement.
Chapter 3: Research Design Methodology

Research demonstrates that student engagement positively impacts academic achievement (Greenwood et al., 2002; McMahon & Portelli, 2004; Tyler & Boelter, 2008) and teacher engagement stimulates and develops student engagement (McLaughlin et al., 1986). Consequently, teacher engagement positively impacts academic achievement (Basikin, 2007).

This quantitative study examined the relationship between teacher engagement and student engagement to determine whether the level of teacher engagement had an impact on the level of student engagement. In addition, correlations were calculated to compare perspectives from the teachers and students regarding teacher engagement and student engagement.

Five research questions guided this study:

1. How do mathematics teachers describe their engagement at work?
2. How do students describe their mathematics teachers’ engagement in the classroom?
3. How do mathematics teachers describe their students’ engagement in the classroom?
4. How do students describe their engagement in the mathematics classroom?
5. What are the patterns of relationship between teacher engagement and student engagement in the mathematics classroom?
Research Context

Data was collected in a small city high school in the Northeast of the United States. The selected high school had a population of approximately 1,200 students and 90 teachers. Of the 90 teachers, all were certified to teach in their subject area. Six percent of the staff had fewer than three years of teaching experience and 26% of the staff had 30 credits beyond their Master’s Degree.

Research Participants

Informational meetings were held to inform all mathematics teachers ($N = 13$) of the study, and all teachers teaching either Integrated Algebra or Geometry ($n = 9$) were invited to participate in the study. A letter was distributed to all 9 potential teacher participants, which reiterated the purpose of the research and requested their participation in the study. Written consent was obtained from each teacher agreeing to participate in the study ($n = 5$). The 5 teachers who agreed to participate completed the Utrecht Work Engagement Scale (UWES-9) and Research Assessment Package for Schools (RAPS-T). Due to the small number of teacher participants and the need to keep anonymity, demographic data was not collected.

Students enrolled in the classes of the teachers agreeing to participate in the study were invited to participate. I met with the potential students by going to each classroom and informing them of the study. A letter was sent home with the students inviting them and a parent or guardian to attend a meeting where information regarding the study was shared and questions were answered. Students and parents were also given a phone number and an e-mail address to contact me if additional information was needed. In addition, students who were invited to participate in this study were informed that their
participation was on a volunteer basis. Written consent from a parent or guardian was required and agreement was received from each student prior to his or her participation in the study. Students and teachers were assured their individual responses would not be divulged to anyone and that there would be no way for anyone to identify data from individual participants.

In an effort to ensure reliable data collection and honest responses, students were informed of the purpose of the survey and the importance of their perspective as a necessary ingredient to the research. Students were encouraged to answer questions honestly because this was an opportunity for them to share their perspective and potentially impact district and school policy.

Out of the students who participated in this study \( (N = 89) \), 60% \( (n = 53) \) were female, 40% \( (n = 35) \) were male, and one student chose not to answer the question about gender. The largest percentage of the students identified themselves as being African American/Black \( (n = 41) \) at 46% of the sample surveyed, while students identifying themselves as Multiracial \( (n = 22) \) and Hispanic/Latino \( (n = 19) \) accounted for 25% and 21% of the sample respectively. Students identifying themselves as White \( (n = 5) \), American Indian \( (n = 1) \), and Asian \( (n = 1) \) accounted for 5%, 1%, and 1% of the population respectively. Nineteen percent \( (n = 17) \) of the students were from Cohort 2010 (Freshmen), 66% \( (n = 59) \) were from Cohort 2009 (Sophomores), 13% \( (n = 12) \) were from Cohort 2008 (Juniors), and 1% \( (n = 1) \) was from Cohort 2007 (Seniors).

When asked to identify how much they liked math, 22% \( (n = 20) \) indicated it was very true they liked math; 55% \( (n = 49) \) indicated it was sort of true they liked math; 13% \( (n =
12) indicated it was *not very true* they liked math; and 8% \((n = 8)\) indicated it was *not at all true* that they liked math.

**Instruments Used in Data Collection**

**Utrecht work engagement scale (UWES-9).** Teacher engagement was measured using the UWES-9 developed by Schaufeli et al. (2002). The UWES-9 included three dimensions that measured vigor, dedication, and absorption with one’s job and had internal reliability consistencies of .77, .85, and .78 respectively (Schaufeli et al., 2006). Three items were used to address each dimension of work engagement, totaling nine questions. Several studies have used the UWES-9 to measure teacher engagement. Basikin (2007) investigated the work engagement among a sample of 152 secondary school English teachers in Yogyakarta, Indonesia. Data was collected using the UWES-9. In addition, Adekola (2010) conducted a study using the UWES-9 in which data was collected from secondary school English teachers in Nigeria. Of the 196 teachers who were selected to participate in Adekola’s study, 162 teachers completed and returned the survey, giving the response rate of 82%. Reliability in both the Indonesian and Nigerian context was high \((\alpha = 0.91 \text{ overall}; \alpha = 0.76, 0.83, \text{ and } 0.79, \text{ respectively for the Vigor, Dedication and Absorption})\). The mean scale score of the three UWES-9 subscales was computed by adding the scores on the particular scale and dividing the sum by the number of items \((3)\) of the subscale involved. A similar procedure was followed for the total score. All nine questions on the UWES-9 survey instrument had seven possible responses \((Never, Almost \text{ Never, Rarely, Sometimes, Often, Very Often, and Always})\). The numeric values given to the answers were 0, 1, 2, 3, 4, 5, and 6 respectively. This is consistent with the process used by Schaufeli et al. (2002).
When comparing data from the UWES-9 (7-point Likert scale) to data from the RAPS (4-point Likert scale) a common scale was determined to allow the data from two different scales to be comparatively analyzed. One of the methods available for use within SPSS was to determine the correct linear transformation in order to convert one Likert scale to another was to use the formula, \( X = \frac{x - a}{b - a} \), check for a scale with a minimum \( a \) and a maximum \( b \), change the minimum to 0 and the maximum to 1, substitute the numbers into the equation, and enter the completed equation into SPSS to generate the common 4-point scale.

**Research assessment package for schools (RAPS).** The IRRE(1998) developed the RAPS as part of a public school reform effort.

**RAPS-SM.** Student participants were administered the Teacher Support subscales (Involvement, Autonomy Support, and Structure), the Beliefs about Self subscales (Perceived Competence, Perceived Autonomy, and Perceived Relatedness) and the Engagement subscales (Ongoing Engagement and Reaction to Challenge) of the RAPS-SM (IRRE, 1998). Additionally, demographic data questions constructed were added to the survey.

As detailed in Chapter 2, the RAPS-SM is a widely used instrument with subscales that measure teacher engagement and student engagement (IRRE, 1998). More than 50 studies with multiracial samples involving over 10,000 students supported the reliability, validity, and usefulness of the RAPS-SM (Connell et al., 1995). The psychometric properties of the RAPS-SM subscales range from adequate to excellent. Scores on the Engagement domain predicted student GPAs and standardized test scores (Connell et al., 1995). Reliability coefficients ranged from .69 to .74 (IRRE, 1998).
Each Belief about Self subscale also predicted student engagement (Connell et al., 1995). Additionally, Connell et al., (1995) indicated that aggregate scores on the Teacher Support subscales consistently correlated to the Beliefs about Self subscales (Perceived Competence, Perceived Autonomy, and Perceived Relatedness).

Data from IRRE (1998) indicated that each Teacher Support subscale had adequate internal consistency: Involvement (.73), Autonomy Support (.68), and Structure (.62). Additionally reported by the IRRE (1998), the Beliefs about Self subscales also possessed adequate reliability: Perceived Competence (.84), Perceived Autonomy (.79), and Perceived Relatedness (.77). All RAPS-SM items were rated on a 4-point Likert scale ranging from 1 to 4, (*not at all true* to *very true*).

**Student reported teacher support.** Students rated their mathematics teacher on Involvement (a demonstration of caring and interest), Autonomy Support (encouragement of independent thinking), and Structure (clear and fair expectations and feedback). Student reported teacher support was measured using the Experiences of Support from Teacher sub-domain from the RAPS-SM. All 11 questions, Involvement (5 questions), Autonomy Support (4 questions), and Structure (5 questions) were answered using a 4-point Likert scale. All total scores were calculated by averaging the items within each component (reversing negative items).

**Self-reported student engagement.** Self-reported student engagement was assessed using the Engagement domain and Beliefs about Self domain from the RAPS-SM.

Students answered 11 questions within the Engagement domain. Five questions focused on Ongoing Engagement, which is the extent to which the students exerted effort
on school work, paid attention, prepared for class, and believed that it was important to do well in school (IRRE, 1998). The Reaction to Challenge sub-domain consisted of 6 questions that focused on how students dealt with or coped with challenges they were faced with.

The Beliefs about Self domain incorporated three sub-domains: Perceived Competence, Perceived Autonomy, and Perceived Relatedness.

The Perceived Competence sub-domain of the RAPS-SM consisted of 16 questions that measured perceived control in a school setting, belief of the kind of strategies necessary to achieve desired outcomes, and the belief that the student had the ability to enact strategies (IRRE, 1998).

The Perceived Autonomy sub-domain of the RAPS-SM consisted of 9 questions that were divided into three sections (3 questions in each section) that measured different types of self-regulation, or reasons for doing school work: Introjected Self-regulation, Identified Self-regulation, and Intrinsic Self-regulation (IRRE, 1998).

The Perceived Relatedness sub-domain of the RAPS-SM consisted of 14 questions that were divided into four sections: Emotional Security with Self (3 questions), Satisfaction with Self (3 questions), Teacher Emotional Security (4 questions), and Peer Emotional Security (4 questions).

In creating summary scores or total scores reflecting domains, sub-domains, and categories, negative items were reversed before calculations were made. A 4-point Likert scale was used for all questions, therefore, item reversals were made by subtracting each student’s score on that item from five (IRRE, 1998). The total self-reported student
engagement score was calculated by finding the mean of the scores from the Engagement domain and the Belief about Self domain.

**RAPS-T.** Teacher perception of student engagement was measured using the RAPS-T, which is a brief teacher report that measures student engagement. This survey was developed by IRRE to obtain information regarding student engagement from the perspective of the teacher so that it could then be compared to student reports of their own engagement. All three items were answered using a 4-point Likert scale. Again, all scores ranged from 1–4, with 4 indicating a higher level of student engagement as reported by the teacher. Five teachers completed the RAPS-T for each student in their class who participated in this study.

**Procedures for Data Collection and Analysis**

I informed all mathematics teachers (N = 13) of the research study and all teachers assigned to teach either Integrated Algebra or Geometry (n = 9) were invited to participate in the study. Informational meetings were held to inform teachers of the study. A letter was distributed to all 9 potential teacher participants, which reiterated the purpose of the research and requested their participation in the study. Written consent was retrieved from each teacher agreeing to participate in the study (n = 5). The 5 teachers who agreed to participate completed the UWES-9 and RAPS-T. Due to the small number of teacher participants and the need to keep anonymity, demographic data was not collected. To promote honest responding, data was collected and ensured confidentiality.

Students enrolled in the classes of the teachers agreeing to participate in the study were invited to participate. I met with the potential students by going to each classroom
and informing them of the study. A letter was sent home with the students inviting them and a parent or guardian to attend a meeting where information regarding the study was shared and questions were answered. Students and parents were also given a phone number and an e-mail address to contact me for additional information. In addition, students who were invited to participate in this study were informed that their participation was on a volunteer basis. Written consent from a parent or guardian was required and agreement was received from each student prior to his or her participation in the study. Students and teachers were assured that their responses would not be divulged to anyone and that there would be no way for anyone to identify data from participants.

In an effort to ensure reliable data collection, curtail response acquiescence, and minimize careless responses several protocols were employed. Students were informed of the purpose of the survey and the importance of their perspective as a necessary ingredient to the final product. Students were encouraged to actively participate as eager participants who share an opportunity to potentially impact district and school policy. Students were encouraged to provide honest opinions regardless of content where confidentiality and respect for their opinions were ensured.

The data from the survey instruments were compiled, organized, and stored electronically in a SPSS database and excel files. Headings for the data included demographic items, responses to the questions, instrument used, and item being measured. Each teacher was identified by one of the following numeric codes: 101, 102, 103, 104, or 105. Each student’s identity was not disclosed because the student surveys were completed anonymously.
Descriptive statistics were calculated to describe the frequency of variables in the sample which included demographic student data, student engagement sub-domains, teacher support sub-domains, and teacher engagement sub-domains. These calculations provided the demographic summaries of the sample as well as quantitative measurement descriptions. In this study, descriptive statistics gave a concise description of the sample and various subsamples within the groups. These descriptions were reported in narrative, table, or figure format.

Correlational analysis was used to compare the variables of student engagement and teacher engagement. Initial correlations were calculated between all possible variables, including demographic data, student engagement variables, and teacher support variables. Using the Pearson correlation, the mean score of each variable was compared to determine any statistically significant relationships. Some correlational analyses addressed significant questions in the study such as whether teacher and student self assessments of their own engagement were similar to the assessment by others (e.g., teachers for students, students for teachers).

Independent-samples $t$ tests were used to compare Teacher Support scores by male and female students to determine if the mean scores were significantly different from each other.

I used a one-way ANOVA to compare the means of groups of participants to determine if there was statistical significance between the means. In the event of a significant ANOVA, a Bonferroni post-hoc test was used to determine the nature of the differences between the groups.
Chapter 4: Results

The study reported here examined the relationship between teacher engagement and student engagement. It addressed five research questions regarding the relationship between teacher engagement and student engagement for high school mathematics teachers and students. This chapter is organized by research question and the analysis of the data pertaining to each specific question. The research questions addressed in this study are listed below.

1. How do mathematics teachers describe their engagement at work?

2. How do students describe their teachers’ engagement in the mathematics classroom?

3. How do mathematics teachers describe their students’ engagement in the classroom?

4. How do students describe their engagement in the mathematics classroom?

5. What are the patterns of relationships between teacher engagement and student engagement in the mathematics classroom?

Research Question 1

How do mathematics teachers describe their engagement at work? Research Question 1 explored how mathematics teachers described their engagement at work. Teachers’ self-reported perceptions of their engagement (Teacher Engagement) as assessed by the Utrecht Work Engagement Scale (UWES-9) were examined. Data from
each dimension (Vigor, Dedication, and Absorption) as well as the total engagement score were analyzed.

Schaufeli and Bakker (2003), in the establishment of statistical norms for the UWES-9 decided that five categories would be used: very low, low, average, high, and very high. Table 4.1 displays norm scores reported in the UWES Manual.

Table 4.1

**Norm Scores for the UWES-9**

<table>
<thead>
<tr>
<th>Category</th>
<th>Vigor</th>
<th>Dedication</th>
<th>Absorption</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>$\leq 2.17$</td>
<td>$\leq 1.60$</td>
<td>$\leq 1.60$</td>
<td>$\leq 1.93$</td>
</tr>
<tr>
<td>Low</td>
<td>2.18–3.20</td>
<td>1.61–3.00</td>
<td>1.61–2.75</td>
<td>1.94–3.06</td>
</tr>
<tr>
<td>Average</td>
<td>3.21–4.80</td>
<td>3.01–4.90</td>
<td>2.76–4.40</td>
<td>3.07–4.66</td>
</tr>
<tr>
<td>High</td>
<td>4.81–5.60</td>
<td>4.91–5.79</td>
<td>4.41–5.35</td>
<td>4.67–5.53</td>
</tr>
<tr>
<td>Very High</td>
<td>$\geq 5.61$</td>
<td>$\geq 5.80$</td>
<td>$\geq 5.36$</td>
<td>$\geq 5.54$</td>
</tr>
</tbody>
</table>

The overall level of teacher engagement at the research site was a mean score of 5.22. The range was within the high category (4.67 was the lowest teacher score and 5.50 was the highest) as indicated in the UWES Manual. The mean score for each dimension also fell within the high range: Vigor ($M = 5.33$), Dedication ($M = 5.0$), and Absorption ($M = 5.33$). Individual teacher data indicated that the total teacher engagement score for four out of five teachers (80%) was within the very high range ($\geq 5.51$) and one out of five teachers (20%) was within the high range (4.67–5.50). Figures 4.1, 4.2, and 4.3, display the engagement score by teacher for the UWES-9 dimensions: Vigor,
Dedication, and Absorption respectively. Figure 4.4 displays the teacher engagement score for all three dimensions by teacher. Figure 4.5 displays the total teacher engagement score by teacher. Figure 4.6 displays a summary of scores by dimension.

Figure 4.1. Vigor Score from UWES-9.

Figure 4.2. Dedication Score for UWES-9.
Figure 4.3. Absorption Score for UWES-9.

Figure 4.4. Scores for the UWES-9 for each Dimension by Teacher.
Figure 4.5. Teacher Engagement Scores for UWES-9 by Teacher.

Figure 4.6. Summary of Scores for UWES-9.
Figure 4.7. Comparison of Studies Using the UWES-9.

The small number of teacher participants in this study prevents the use of many types of statistical analyses but comparing individual teacher and mean scores with the normative data is one way of understanding the meaning of the data collected. Another is to informally compare the results in this study with those of other studies. For example, in a study in which work engagement was measured using the UWES-9, Balducci, Fraccaroli, and Schaufeli (2010), reported work engagement as frequent with an overall mean score of 3.82 on a 7-point scale with 0 (Never) and 6 (Always) with means scores of 3.78, 3.37, 4.30 respectively for the Vigor, Dedication, and Absorption dimensions. Schaufeli et al. (2006) conducted a study in which educators who completed the UWES-9 had an overall mean score of 4.17 on a 7-point scale with 0 (Never) and 6 (Always) with mean scores of 4.41, 4.40, and 3.70 respectively for Vigor, Dedication, and Absorption dimensions. The data from this study were compared to the data from Balducci et al. (2010) and Schaufeli et al. (2006; See Figure 4.7). Comparisons thus indicated that the
teacher engagement score from this study was higher on all dimensions (Vigor, Dedication, and Absorption) when compared to the other studies cited.

Summary research question 1. Teacher engagement was measured using the UWES-9. Five teachers participated in this study. The mean teacher engagement score from this study was within the high to very high range on all dimensions, Vigor, Dedication, and Absorption, when compared to the norm scores in the UWES Manual (Schaufeli & Bakker, 2003). Comparisons of the results of this study to those of other research studies also indicated the teachers in this study tended to rate themselves much higher on engagement than teachers in similar studies. However, this conclusion must be tempered by the fact that with data from only five teachers no definitive statistical comparisons could be made between those scores and the normative data or between the results of different studies.

Research Question 2

How do students describe their teachers’ engagement in the mathematics classroom? Research Question 2 explored how students described their teachers’ engagement. Students reported their perception of their mathematics teacher’s engagement as assessed by the RAPS-SM. Students answered 14 questions in the Experiences of Teacher Support (Teacher Support) sub-domain that examined the level of teacher support in three sub-scales: Involvement, Autonomy Support, and Structure. Authors of the RAPS Manual (IRRE, 1998), provided interpretive criteria for scores from the RAPS-SM. According to the IRRE (1998), the fall into the optimal and high risk range “reflect thresholds in the scales of the composite scores that have been found to differentiate between . . . students who demonstrate significantly greater risk for poor
academic performance . . . than do other . . . students who are more likely to show successful performance” (p. 73). Table 4.2 displays the optimal and high risk ranges for Teacher Support scores.

Table 4.2

<table>
<thead>
<tr>
<th>Composite</th>
<th>High-Risk Indicator</th>
<th>Optimal Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Support</td>
<td>Score &lt; 2.75</td>
<td>Score ≥ 3.50</td>
</tr>
</tbody>
</table>

Using the norm reference data presented in the manual (IRRE, 1998), the mean Teacher Support score from this study ($M = 3.04$) fell between the optimal level ($≥ 3.50$) and the high risk level ($< 2.75$). That is, the mean score for this group of teachers was neither outstanding (e.g., optimal) nor high risk. According to the IRRE (1998), students with teachers who measure in the optimal level of support are more likely to have higher academic performance and achievement scores than students with teachers who score at the high risk level who are at a greater risk of poor academic performance. Table 4.3 displays Teacher Support data.

Figure 4.8 displays data on the Teacher Support scores for each teacher. The data indicated that four out of five teachers (80%) received a Teacher Support score ranging from 3.09 – 3.19, which fell between the optimal and high risk levels. One teacher (20%) received a Teacher Support score of 2.73 which fell must within the high end of the high risk range.
Table 4.3

*Teacher Support Data*

<table>
<thead>
<tr>
<th>Teacher</th>
<th>n</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>16</td>
<td>3.18</td>
<td>0.76</td>
</tr>
<tr>
<td>102</td>
<td>19</td>
<td>3.19</td>
<td>0.51</td>
</tr>
<tr>
<td>103</td>
<td>22</td>
<td>2.73</td>
<td>0.59</td>
</tr>
<tr>
<td>104</td>
<td>12</td>
<td>3.12</td>
<td>0.51</td>
</tr>
<tr>
<td>105</td>
<td>19</td>
<td>3.09</td>
<td>0.61</td>
</tr>
<tr>
<td>Total</td>
<td>88</td>
<td>3.04</td>
<td>0.62</td>
</tr>
</tbody>
</table>

*Note.* n = number of students who answered questions about the teacher.

![Total Scores for Teacher Support](image)

*Figure 4.8.* Total Score for Teacher Support.

A one-way ANOVA was computed comparing the Teacher Support mean scores of each individual teacher. Teacher Support was entered as the dependent variable and the score from each of the five teachers was entered as the independent variable. No
significant difference was found between the level of Teacher Support, $F(4, 83) = 2.02, p > .05$. Table 4.4 displays the ANOVA source table for Teacher Support and individual teacher scores. The two-tailed significance level was .099 which suggests there was some variation in the student ratings of teachers. Figure 4.8 graphically shows the primary source of that variation was probably the high risk score of Teacher 103.

Table 4.4

*ANOVA Source Table for Individual Teacher Support Scores*

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>2.928</td>
<td>4</td>
<td>.732</td>
<td>2.023</td>
</tr>
<tr>
<td>Error</td>
<td>30.026</td>
<td>83</td>
<td>.362</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32.954</td>
<td>87</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Teacher Support sub-domain consisted of three subscales: Involvement, Autonomy Support, and Structure. Students rated their mathematics teacher on each of the subscales. Figure 4.9 displays data on each of the Teacher Support subscales. The results indicated that Teachers 101, 102, 104, and 105 scored between the *optimal* and *high risk* range in all three subscales. Teacher 103 scored in the *high risk* range ($< 2.75$) in two out of three subscales: Involvement ($M = 2.70$) and Autonomy Support ($M = 2.62$).

A one-way ANOVA was computed comparing the mean score of each teacher from the Teacher Involvement sub-domain. No significant difference was found between the level of Teacher Involvement of each teacher, $F(4, 83) = 1.90, p > .05$. The Teacher Involvement scores as reported by the students did not differ significantly from teacher to teacher. The ANOVA source table can be located in Table 4.5.
A one-way ANOVA was computed comparing the mean score of each teacher from the Autonomy Support sub-domain. No significant difference was found between the level of Autonomy Support of each teacher, \( F(4, 83) = .928, p > .05 \). The Autonomy Support scores did not differ significantly from teacher to teacher. Table 4.5 displays the ANOVA source table for the Teacher Support subscales.

**Figure 4.9.** Student Reported Teacher Engagement by Sub-domain.

A one-way ANOVA was computed comparing the mean score of each teacher from the Teacher Structure sub-domain. A significant difference was found between the Teacher Structure scores of each teacher, \( F(4, 83) = 3.62, p < .05 \). A Bonferroni post-hoc test was used to determine the nature of the differences between the teachers. This analysis revealed that Teacher 103 was reported as having a lower Structure score (2.85) than Teacher 101 (3.45) and Teacher 102 (3.37). No significant difference was reported between Teacher 103 (2.85) and Teacher 104 (3.33) or between Teacher 103 (2.85) and Teacher 105 (3.29). The Structure scores for Teacher 101 (3.45), Teacher 102 (3.37),
Teacher 104 (3.33), and Teacher 105 (3.29) were not significantly different from each other. The ANOVA source table can be located in Table 4.5.

Table 4.5

ANOVA Source Table for Teacher Involvement, Autonomy Support, and Structure

<table>
<thead>
<tr>
<th>Sub-domain</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement</td>
<td>Between</td>
<td>3.555</td>
<td>4</td>
<td>0.889</td>
<td>1.895</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>38.916</td>
<td>83</td>
<td>0.469</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>42.471</td>
<td>87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>Between</td>
<td>1.932</td>
<td>4</td>
<td>0.483</td>
<td>0.928</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>43.178</td>
<td>83</td>
<td>0.520</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>45.109</td>
<td>87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Between</td>
<td>4.559</td>
<td>4</td>
<td>1.140</td>
<td>3.624</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>26.109</td>
<td>83</td>
<td>0.315</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30.668</td>
<td>87</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data from the Teacher Support sub-domain was disaggregated by student demographic data and is presented by gender, cohort year, and race/ethnicity.

**Gender.** An independent-samples t test was run and the score from the Teacher Support sub-domain of students who identified themselves as male was compared to the Teacher Support score of students who identified themselves as female. No statistical significance was found between gender and Teacher Support, $t(85) = -.037$, $p > .05$. The males’ mean score ($M = 3.05$) was not significantly different from the females’ mean
score ($M = 3.05$). Table 4.6 displays the data of the Teacher Support scores disaggregated by gender of students.

Table 4.6

*Teacher Support Score by Gender of Students*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Involvement $M$ (SD)</th>
<th>Autonomy $M$ (SD)</th>
<th>Structure $M$ (SD)</th>
<th>Composite $M$ (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male ($n = 35$)</td>
<td>3.16 (0.62)</td>
<td>2.76 (0.77)</td>
<td>3.22 (0.52)</td>
<td>3.05 (0.57)</td>
</tr>
<tr>
<td>Female ($n = 52$)</td>
<td>3.02 (0.70)</td>
<td>2.86 (0.65)</td>
<td>3.26 (0.62)</td>
<td>3.05 (0.60)</td>
</tr>
</tbody>
</table>

**Cohort year.** A one-way ANOVA was computed comparing Teacher Support mean scores for each Cohort Year. Post hoc tests could not be performed because at least one group (Cohort 2007) had fewer than two students. The one-way ANOVA comparing Teacher Support scores for each Cohort Year was rerun excluding Cohort Year 2007. A significant difference was found among the cohorts, $F(2, 84) = 4.38, p < 0.05$. A Bonferroni post hoc test was used to determine the nature of the differences between the cohorts. The analysis revealed that students who entered high school in 2008 (juniors) perceived their teacher to be more supportive ($M = 3.50$) than students who entered high school in 2009 ($M = 2.94$) and students who entered high school in 2010 ($M = 3.07$). Students who entered high school in 2009 ($M = 2.94$) were not significantly different from students who entered high school in 2010 ($M = 3.07$). Table 4.7 displays data of Teacher Support scores disaggregated by cohort year of students.
Table 4.7

*Teacher Support Scores by Cohort Year of Students*

<table>
<thead>
<tr>
<th>Cohort Year</th>
<th>Involvement M (SD)</th>
<th>Autonomy M (SD)</th>
<th>Structure M (SD)</th>
<th>Composite M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008 (n = 12)</td>
<td>3.45 (0.44)</td>
<td>3.50 (0.41)</td>
<td>3.55 (0.33)</td>
<td>3.50 (0.33)</td>
</tr>
<tr>
<td>2009 (n = 58)</td>
<td>2.96 (0.66)</td>
<td>2.69 (0.65)</td>
<td>3.13 (0.59)</td>
<td>2.94 (0.58)</td>
</tr>
<tr>
<td>2010 (n = 17)</td>
<td>3.11 (0.89)</td>
<td>2.71 (0.86)</td>
<td>3.33 (0.69)</td>
<td>1.93 (0.78)</td>
</tr>
</tbody>
</table>

**Race/ethnicity.** A one-way ANOVA was computed comparing the mean of each Teacher Support score reported by students identified by race/ethnicity. Post-hoc tests could not be performed because at least one group had fewer than two students. The one-way ANOVA comparing the mean of each Teacher Support score reported by students identified by race/ethnicity was rerun excluding the groups which contained fewer than two students. The mean scores of the students who identified themselves as African-American/Black ($M = 2.92$), Hispanic/Latino ($M = 3.19$), Caucasian/White ($M = 3.33$), and Multiracial ($M = 3.10$), were compared using a one-way ANOVA. No significant difference was found, $F(3, 82) = 1.36$, $p > 0.05$. The race/ethnicity of the students was not related to the level of Teacher Support as reported by the students. Table 4.8 displays data of the Teacher Support scores disaggregated by race/ethnicity of students.
Table 4.8

*Teacher Support Scores by Race/Ethnicity of Students*

<table>
<thead>
<tr>
<th>Race</th>
<th>Teacher Support</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Involvement</td>
<td>Autonomy</td>
<td>Structure</td>
<td>Composite</td>
</tr>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>African-American (n = 40)</td>
<td>2.96 (0.82)</td>
<td>2.67 (0.84)</td>
<td>3.06 (0.63)</td>
<td>2.92 (0.71)</td>
</tr>
<tr>
<td>Caucasian (n = 5)</td>
<td>3.36 (0.38)</td>
<td>3.05 (0.54)</td>
<td>3.52 (0.39)</td>
<td>3.33 (0.43)</td>
</tr>
<tr>
<td>Hispanic/Latino (n = 19)</td>
<td>3.14 (0.52)</td>
<td>2.97 (0.42)</td>
<td>4.41 (0.50)</td>
<td>3.19 (0.40)</td>
</tr>
<tr>
<td>Multiracial (n = 22)</td>
<td>3.08 (0.65)</td>
<td>2.87 (0.69)</td>
<td>3.32 (0.60)</td>
<td>3.10 (0.60)</td>
</tr>
</tbody>
</table>

**Summary research question 2.** Research Question 2 explored how students described their mathematics teacher’s engagement as measured by the Teacher Support sub-domain from the RAPS-SM. Students answered 11 questions rating their teacher on levels of Involvement, Autonomy Support, and Structure. Teachers 101, 102, 104, and 105 received Teacher Support levels below the *optimal* level but above the *high risk* level with mean scores of 3.16, 3.18, 3.09, and 3.07 respectively. Teacher 103 received a Teacher Support mean score (M = 2.72) which was in the *high risk* range (2.75).

Data from the Teacher Support sub-domain was disaggregated by student gender, cohort year, and race/ethnicity. Teacher Support ratings did not appear to be impacted by the gender or race/ethnicity of the students doing the ratings. However, the year students entered high school (cohort year) did have an impact. Students who entered high school in 2008 (juniors when the study was conducted) perceived their teacher to be more supportive (M = 3.50) than students who entered high school in 2009 (M = 2.94) and students who entered high school in 2010 (M = 3.07). Students who entered high school
in 2009 (M = 2.94) were not significantly different from students who entered high school in 2010 (M = 3.07).

Research Question 3

How do mathematics teachers describe their students’ engagement in the classroom? Five teachers completed the RAPS-T which assessed how engaged they perceived their students (n = 89) to be. Indicators of optimal and high risk levels of student engagement were derived from the RAPS-T student Engagement composite score (IRRE, 1998). The indicators (scores above or below a cutoff) reflected thresholds that were found to differentiate between students who were at greater risk for poor academic performance than other students who were more likely to achieve greater academic success (IRRE, 1998). An optimal level of teacher reported Student Engagement is a score \( \geq 3.50 \) while a high risk level is a score < 2.30. On a 4-point scale, with 4 representing higher engagement, the overall mean score for teacher reported Student Engagement for this study (2.98) was between the optimal and high risk levels as identified in the RAPS Manual (IRRE, 1998). Figure 4.10 and Table 4.9 display data of individual teachers regarding teacher reported Student Engagement. The Student Engagement composite score for all five teachers was between the optimal (\( \geq 3.50 \)) and high risk (< 2.30) levels. However, Teacher 103 approached the high risk level with a teacher reported Student Engagement score of 2.39.
Summary research question 3. Five teachers completed the RAPS-T which assessed how engaged the teachers perceived the students \((n = 89)\) to be. The overall teacher perception of Student Engagement for this study \((2.98)\) was between the *optimal* and *high risk* levels. The mean Student Engagement composite scores of each of the five teachers was between the *optimal* \((\geq 3.50)\) and *high risk* \((< 2.30)\) levels. That is, the average ratings of the five teachers was not in the high risk range but was also not in the optimal range. However, the Student Engagement mean score reported by Teacher 103 \((M = 2.39)\) approached the *high risk* level \((< 2.30)\). It is important to note that Teacher 103 received the lowest Teacher Support score as reported by the students. In addition, Teacher 103 self-reported as having a *very high* Teacher Engagement score as measured by the UWES-9.
Table 4.9

Scores of Teacher Reported Student Engagement

<table>
<thead>
<tr>
<th>Teacher</th>
<th>n</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>16</td>
<td>3.23</td>
<td>0.80</td>
</tr>
<tr>
<td>102</td>
<td>20</td>
<td>3.12</td>
<td>0.97</td>
</tr>
<tr>
<td>103</td>
<td>22</td>
<td>2.38</td>
<td>0.55</td>
</tr>
<tr>
<td>104</td>
<td>12</td>
<td>3.33</td>
<td>0.65</td>
</tr>
<tr>
<td>105</td>
<td>19</td>
<td>3.11</td>
<td>0.58</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>2.98</td>
<td>0.80</td>
</tr>
</tbody>
</table>

Note. n = number of students who teacher reported data on.

Research Question 4

How do students describe their engagement in the mathematics classroom? Self-reported Student Engagement was assessed using the Engagement domain and Beliefs about Self domain from the RAPS-SM. All items were answered using a 4-point Likert scale.

Eighty-seven students answered the Engagement domain questions with a mean score of 3.31. The Engagement domain mean score ($M = 3.31$) was calculated by averaging the Ongoing Engagement sub-score ($M = 3.38$) and the Reaction to Challenge sub-score ($M = 3.26$). Using the norm reference data reported in the RAPS Manual (IRRE, 1998), the Engagement domain score for this study fell between the optimal ($\geq 3.75$) and high risk ($< 3$) levels.

The Belief about Self domain score (3.29) was calculated by averaging the subscore (mean) of the three sub-domains: Perceived Competence (3.39), Perceived
Autonomy (3.17), and Perceived Relatedness (3.31). Again, using the norm reference
data presented by the IRRE (1998), the Belief about Self domain score for this study fell
between the optimal (≥ 3.75) and high risk (< 3) levels.

The total self-reported student engagement mean score \( (M = 3.30) \) was calculated
by computing the mean of the scores of the Engagement domain \( (M = 3.31) \) and the
Belief about Self domain \( (M = 3.29) \). Figure 4.11 and Table 4.10 display data on self-
reported Student Engagement.

![Self-Reported Student Engagement](image)

**Figure 4.11.** Self-Reported Student Engagement.

A one-way ANOVA was computed comparing the mean Engagement score of
students disaggregated by teacher. No significant difference was found between the
Engagement domain score and who the students reported as their teacher, \( F(4, 83) = .229, \]
\( p > .05 \). The Engagement score did not differ significantly based on who their
mathematics teacher was. Table 4.11 displays the ANOVA source table for Engagement
domain and Belief about Self domain.
Table 4.10

Scores of Self-Reported Student Engagement by Teacher

<table>
<thead>
<tr>
<th>Teacher</th>
<th>n</th>
<th>Engagement M (SD)</th>
<th>Belief About Self M (SD)</th>
<th>Total Engagement M</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>16</td>
<td>3.29 (0.52)</td>
<td>3.09 (0.57)</td>
<td>3.19</td>
</tr>
<tr>
<td>102</td>
<td>19</td>
<td>3.38 (0.38)</td>
<td>3.53 (0.24)</td>
<td>3.45</td>
</tr>
<tr>
<td>103</td>
<td>22</td>
<td>3.31 (0.44)</td>
<td>3.26 (0.30)</td>
<td>3.28</td>
</tr>
<tr>
<td>104</td>
<td>12</td>
<td>3.25 (0.38)</td>
<td>3.08 (0.60)</td>
<td>3.16</td>
</tr>
<tr>
<td>105</td>
<td>19</td>
<td>3.29 (0.40)</td>
<td>3.36 (0.31)</td>
<td>3.32</td>
</tr>
<tr>
<td>Total</td>
<td>88</td>
<td>3.31 (0.42)</td>
<td>3.29 (0.43)</td>
<td>3.30</td>
</tr>
</tbody>
</table>

Note. n = number of students who answered questions about the teacher.

A one-way ANOVA was computed comparing the Belief about Self score disaggregated by teacher. A significant difference was found between the Belief about Self score and who the students reported as their teacher, $F(4, 83) = 3.73, p < .05$. A Bonferroni post-hoc test was used to determine the nature of the differences. This analysis revealed that students who had either Teacher 101 (3.09) or Teacher 104 (3.08) reported lower engagement than students who had Teacher 102 (3.53). Students who had Teacher 103 (3.26) or Teacher 105 (3.37) were not significantly different than any of the other groups. Table 4.11 displays the ANOVA source table. Figure 4.12 displays data which compared Teacher Identification and the scores from the Belief about Self domain.
Table 4.11

ANOVA Source Table for Self-Reported Student Engagement

<table>
<thead>
<tr>
<th>Domain</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement</td>
<td>0.169</td>
<td>4</td>
<td>.042</td>
<td>0.229</td>
<td>.921</td>
</tr>
<tr>
<td>Error</td>
<td>15.273</td>
<td>83</td>
<td>.184</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15.442</td>
<td>87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief about Self</td>
<td>2.457</td>
<td>4</td>
<td>.614</td>
<td>3.729</td>
<td>.008</td>
</tr>
<tr>
<td>Error</td>
<td>13.669</td>
<td>83</td>
<td>.165</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16.125</td>
<td>87</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.12. Scores of the Belief about Self Domain by Teacher.

**Relationship between Engagement domain and Beliefs about Self domain.**

Self-reported student engagement was measured using data from the Engagement domain.
and Beliefs about Self domain. A Pearson correlation was calculated examining the relationship between the Engagement score and the Beliefs about Self score. A moderate correlation was found, $r(86) = .668$, $p < .001$, indicating a significant linear relationship between the two variables.

The Belief about Self domain was comprised of three sub-domains: Perceived Competence, Perceived Autonomy, and Perceived Relatedness. Pearson correlations were calculated to determine the strength of the linear relationship between the Engagement domain and Perceived Competence, Perceived Autonomy, and Perceived Competence. Moderate positive relationships were found, $r(78) = .483$, $p < .001$, $r(86) = .637$, $p < .001$, and $r(86) = .303$, $p < .05$, for Perceived Competence, Perceived Autonomy, and Perceived Relatedness respectively, indicating a significant linear relationship between the variables. This corresponds with existing literature that reports the Beliefs about Self domain is a measure of student engagement (Connell, 1995).

Summary research question 4. Self-reported student engagement was assessed using the Engagement domain and Beliefs about Self domain from the RAPS-SM. The Engagement domain score (3.31), which fell between the optimal ($\geq 3.75$) and high risk ($< 3$) levels, was calculated by averaging the Ongoing Engagement subscore (3.38) and the Reaction to Challenge subscore (3.26).

The Belief about Self domain score (3.29), which also fell between the optimal ($\geq 3.75$) and high risk ($< 3$) levels was calculated by averaging the sub-score of the three sub-domains: Perceived Competence (3.39), Perceived Autonomy (3.17), and Perceived Relatedness (3.31).
The total self-reported student engagement score (3.30) was calculated by computing the mean of the scores of the Engagement domain (3.31) and the Belief about Self domain (3.29). No significant difference was found between Teacher Identification and the scores of the Engagement domain. However, a significant difference was found between Teacher Identification and the Belief about Self domain. Thus, who the student had as their mathematics teacher had an effect on their level of Belief about Self. Therefore, teachers had an impact on the level of student engagement in their class.

**Research Question 5**

What are the patterns of relationship between teacher engagement and student engagement in the mathematics classroom?

**Teacher engagement and teacher support.** Teachers’ self-reports of engagement as assessed by the UWES-9 (Teacher Engagement) and the students’ reports of Teacher Support as assessed by the RAPS-SM Experiences of Support from Teachers sub-domain were examined. Figure 4.13 displays data of Teacher Engagement scores and Teacher Support scores for each teacher.

A Pearson correlation was calculated to determine if scores on Teacher Engagement and Teacher Support were significantly related. Results of the analysis revealed that the scores of Teacher Engagement and Teacher Support were not significantly \((r \leq 0.05)\) correlated. Table 4.12 displays the correlation matrix between Teacher Engagement and Teacher Support.
Table 4.12

Correlation Matrix between Teacher Engagement and Teacher Support

<table>
<thead>
<tr>
<th></th>
<th>Support</th>
<th>$r$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement</td>
<td>-.041</td>
<td>.707</td>
<td></td>
</tr>
</tbody>
</table>

Note. $N = 88$

Additional Pearson correlations were calculated to determine the relationships, if any, between the Teacher Engagement dimensions (Vigor, Dedication, and Absorption) and the Teacher Support subscales (Involvement, Autonomy Support, and Structure). No significant difference was found between any of the dimensions and subscales. Table 4.12 displays the correlation matrix between Teacher Engagement dimensions and Teacher Support subscales.

Figure 4.13. Comparison of Teacher Support and Teacher Engagement.

<table>
<thead>
<tr>
<th>Teacher Support (Student Reported)</th>
<th>Teacher Engagement (Self-Reported)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher 101</td>
<td>3.16</td>
</tr>
<tr>
<td>Teacher 102</td>
<td>3.18</td>
</tr>
<tr>
<td>Teacher 103</td>
<td>3.44</td>
</tr>
<tr>
<td>Teacher 104</td>
<td>3.56</td>
</tr>
<tr>
<td>Teacher 105</td>
<td>3.09</td>
</tr>
<tr>
<td>Total</td>
<td>3.07</td>
</tr>
<tr>
<td>Total</td>
<td>3.04</td>
</tr>
<tr>
<td>Total</td>
<td>3.22</td>
</tr>
</tbody>
</table>
Table 4.12

Correlation Matrix between Teacher Engagement Dimensions and Teacher Support Subscales

<table>
<thead>
<tr>
<th></th>
<th>Involvement $r (p)$</th>
<th>Autonomy $r (p)$</th>
<th>Support $r (p)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vigor</td>
<td>-.054 (.619)</td>
<td>.070 (.514)</td>
<td>-.031 (.777)</td>
</tr>
<tr>
<td>Dedication</td>
<td>.059 (.587)</td>
<td>.016 (.885)</td>
<td>.093 (.389)</td>
</tr>
<tr>
<td>Absorption</td>
<td>.046 (.668)</td>
<td>-.007 (.951)</td>
<td>.041 (.706)</td>
</tr>
</tbody>
</table>

Note. $N = 88$. $p$ is 2-tailed.

It is important to note that the levels of Teacher Engagement and Teacher Support are fairly close. At a glance, these results may suggest that the overall perception of the students regarding the level of teacher support they received is similar to the level of self-reported teacher engagement. However, no statistical significance was found between the variables, thus, indicting students and teachers had a tendency to disagree regarding the level of Teacher Engagement.

**Self-reported student engagement and teacher support.** Self-reported student engagement as assessed from the Engagement domain and Belief about Self domain from the RAPS-SM and Teacher Support as assessed from the Experiences of Teacher Support domain also from the RAPS-SM were analyzed (see Table 4.14). A Pearson correlation coefficient was calculated for the relationship between student engagement as reported in the Engagement domain and Teacher Support. A moderate positive relationship was found, $r(86) = .529$, $p < .05$, indicating a significant linear relationship between the two variables. Students who reported high levels of engagement also reported high levels of teacher support.
Levels of self-reported student engagement as measured by the Belief about Self domain and levels of Teacher Support were also examined. A Pearson correlation coefficient was calculated for the relationship between student engagement as reported in the Belief about Self domain and Teacher Support. A moderate positive relationship was found, $r(86) = .599$, $p < .05$, indicating a significant linear relationship between the two variables. Students who scored high in the Belief about Self domain also reported high levels of Teacher Support. Figure 4.14 displays data comparing Teacher Support and Student Engagement.

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Engagement</th>
<th>Belief about Self</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher 101</td>
<td>3.18</td>
<td>3.09</td>
</tr>
<tr>
<td>Teacher 102</td>
<td>3.19</td>
<td>3.53</td>
</tr>
<tr>
<td>Teacher 103</td>
<td>2.73</td>
<td>3.26</td>
</tr>
<tr>
<td>Teacher 104</td>
<td>3.12</td>
<td>3.08</td>
</tr>
<tr>
<td>Teacher 105</td>
<td>3.09</td>
<td>3.36</td>
</tr>
<tr>
<td>Total</td>
<td>3.04</td>
<td>3.29</td>
</tr>
</tbody>
</table>

Figure 4.14. Comparison of Teacher Support and Self-reported Student Engagement.

Statistical significance was found between both the Engagement score and the Belief about Self score when compared to the Teacher Support Score. Thus, a high level of Teacher Support is a contributing factor to high levels of student engagement.

**Relationships between student perception variables.** The correlations between the RAPS-SM variables, Student Engagement, Belief about Self, Belief about Self sub-
domain variables (Perceived Competence, Perceived Autonomy Support, and Perceived Relatedness), Teacher Support, and Teacher Support sub-domain variables (Involvement, Autonomy Support, and Structure) were examined to determine the relationships between the variables. Table 4.14 displays the correlations between the Student Perception Variables from the RAPS-SM. While the correlations indicated there were weak to moderate relationships between most of the variables, some of the relationships were strong, specifically in relation to Belief about Self. For example, student engagement regarding Belief about Self were found to be significantly correlated with autonomy, $r(86) = .785, p < .01$, indicating as autonomy levels increased, so did the levels for Belief about Self. Additionally, Belief about Self was also significantly correlated with relatedness, $r(86) = .741, p < .01$, which reflected that students’ Belief about Self are strongly connected to their perception of being respected by, cared for, and connected to others.

Table 4.14

Correlation Matrix between Student Perception Variables (RAPS-SM)

<table>
<thead>
<tr>
<th>RAPS-SM Variables</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Student Engagement</td>
<td>.483**</td>
<td>.637**</td>
<td>.303**</td>
<td>.668**</td>
<td>.529**</td>
<td>.428**</td>
<td>.545**</td>
<td>.503**</td>
</tr>
<tr>
<td>2 Competence</td>
<td>—</td>
<td>.221*</td>
<td>.423**</td>
<td>.682**</td>
<td>.599**</td>
<td>.471**</td>
<td>.625**</td>
<td>.561**</td>
</tr>
<tr>
<td>3 Autonomy</td>
<td>—</td>
<td>.277**</td>
<td>.785**</td>
<td>.336**</td>
<td>.276**</td>
<td>.397**</td>
<td>.269**</td>
<td></td>
</tr>
<tr>
<td>4 Relatedness</td>
<td>—</td>
<td>.741**</td>
<td>.473**</td>
<td>.472**</td>
<td>.472**</td>
<td>.358**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Belief about Self</td>
<td>—</td>
<td>.599**</td>
<td>.539**</td>
<td>.639**</td>
<td>.484**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Teacher Support</td>
<td>—</td>
<td>.932**</td>
<td>.897**</td>
<td>.931**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Involvement</td>
<td>—</td>
<td>.735**</td>
<td>.814**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Autonomy Support</td>
<td>—</td>
<td>.769**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Structure</td>
<td>—</td>
<td>—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**p < .01, *p < .05.
Self-reported student engagement and teacher reported student engagement.

The relationships between self-reported student engagement, as assessed by the RAPS-SM, and teacher reported student engagement, as assessed by the RAPS-T, were examined. Figure 4.15 displays a box plot of the three measures of student engagement: Belief about Self, Engagement, and teacher reported Student Engagement. Results indicated that student engagement scores from both the students and the teachers were similar (see Figure 4.16). However, self-reported student engagement scores were slightly higher than teacher reported student engagement scores.

Figure 4.15. Comparison of Student Engagement Scores.
A Pearson correlation was calculated examining the relationship between self-reported student engagement (Engagement domain) and teacher reported student engagement. A weak correlation that was not significant was found, $r(86) = .014$, $p > .05$. Another Pearson correlation was calculated examining the relationship between self-reported student engagement (Belief about Self domain) and teacher reported student engagement. A weak correlation that was not significant was found, $r(86) = .04$, $p > .05$. Table 4.15 displays the correlation matrix between Student Engagement variables. These results indicated that there was a tendency for students and their teachers to disagree regarding the level of student engagement. Students reported themselves to be more engaged then their teachers perceived them to be.
Table 4.15

*Correlation Matrix between Self-Reported Student Engagement Variables and Teacher Reported Student Engagement*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Teacher Reported Student Engagement $r$ ($p$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement</td>
<td>.014 (.895)</td>
</tr>
<tr>
<td>Belief About Self</td>
<td>.040 (.712)</td>
</tr>
</tbody>
</table>

*Note. N = 88. $p$ is 2-tailed.*

**Self-reported student engagement and self reported teacher engagement.**

Self-reported Student Engagement, as assessed by the RAPS-SM, and self-reported Teacher Engagement, as assessed by the UWES-9, were examined. Figure 4.17 displays data comparing Student Engagement scores and Teacher Engagement scores.

A Pearson correlation was calculated examining the relationship between student engagement and teacher engagement. A weak correlation that was not significant was found, $r(86) = .044, p > .05$. Table 4.16 displays the correlation matrix between student engagement and teacher engagement. These results indicated that self-reported student engagement levels were not related to self-reported teacher engagement levels.
Figure 4.17. Comparison of Student Engagement and Teacher Engagement Scores.

Table 4.16

<table>
<thead>
<tr>
<th>Teacher Engagement</th>
<th>Student Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher 101</td>
<td>3.78</td>
</tr>
<tr>
<td>Teacher 102</td>
<td>3.44</td>
</tr>
<tr>
<td>Teacher 103</td>
<td>3.56</td>
</tr>
<tr>
<td>Teacher 104</td>
<td>1.67</td>
</tr>
<tr>
<td>Teacher 105</td>
<td>3.67</td>
</tr>
<tr>
<td>Total</td>
<td>3.22</td>
</tr>
</tbody>
</table>

Comparison of Student Engagement and Teacher Engagement Scores

Correlation Matrix between Student Engagement and Teacher Engagement

<table>
<thead>
<tr>
<th></th>
<th>Teacher Engagement</th>
<th>r (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Engagement</td>
<td>.044 (.681)</td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 88. p is 2-tailed.

Summary research question 5. Significant relationships were found between Student Engagement, Belief about Self, and Teacher Support which indicated that students who reported high levels of Engagement also reported high levels of Teacher Support. In addition, Teacher Support variables, Involvement, Autonomy Support, and Structure were all moderately correlated to Student Engagement, confirming research by Connell and Wellborn (1991) that student engagement is influenced by Teacher Involvement, Autonomy Support, and Structure. Overall, no evidence was found that gender or race/ethnicity was related to student perceptions of student engagement or
teacher support. However, the year students entered high school had a significant relationship to teacher support scores.

Weak correlations that were not significant were found between self-reported Student Engagement and teacher reported Student Engagement indicating that students and teachers disagreed regarding the level of student engagement present at the time the data was collected. This would suggest that a disconnect exists between student and teacher perceptions regarding student engagement.

Teacher engagement as reported by the teachers and teacher support as reported by the students appeared to have similar scores. However, no statistical significance was found indicating a tendency for students and teachers to disagree on their level of teacher engagement. Similar to student engagement, these results suggests that a disconnect exists between student and teacher perceptions regarding teacher engagement.
Chapter 5: Discussion

The purpose of this chapter is to summarize the key findings of this study, present conclusions drawn from the results, and pose implications and recommendations for future practice and research. The first section summarizes the key findings and draws conclusions based on the findings. The second section identifies the limitations of the study. The third section, discusses implications and recommendations.

Summary of Findings

The findings are organized into four sections which identified, summarized, and analyzed the results of the data. Conclusions were drawn based on the results from this study and related literature. Prior research was referenced in support of or in dispute of the findings.

Findings regarding the relationships between student and teacher perspectives on student engagement. If teacher reported student engagement levels are high, then self-reported Student Engagement levels will also be high (Connell & Wellborn, 1991; Decker, Dona, & Christenson, 2007; Klem & Connell, 2004). The data appeared to show that both students and teachers reported high levels of student engagement. However, weak correlations with no statistical significance were found between the variables. This would indicate that the findings from this study do not coincide with the findings regarding the relationships between student and teacher perspectives on student engagement as reported by Connell and Wellborn (1991), Decker et al., (2007), and Klem and Connell (2004). The results from this study were opposite of
the findings of the aforementioned researchers, in that there was a tendency for students and teachers to disagree regarding the level of Student Engagement. A slight gap existed between the scores of self-reported student engagement (3.30) and teacher reported student engagement (2.98). Although no statistical significance was found between the scores of self-reported student engagement and teacher reported student engagement, an examination of the mean differences on the measures gave insight into the differences in teacher and student perspectives on student engagement. Students may have been engaged, but did not appear to the teacher to be behaviorally engaged. This may have been the result of a lack in cultural competence on part of the teachers (i.e., misreading behavior cues or body language of the student). Students from various cultures, religions, or ethnic groups are socialized to behave differently at home then they behave at school (Ogbu, 2003). Teachers who are not familiar with or understand the cultural differences of their students will not be able to address the differences appropriately in their classrooms (Gay, 2000). Teachers must become knowledgeable about their students’ cultural backgrounds so they can translate that knowledge into effective instruction, create a culturally responsive classroom, build relationships with the students, engage students in the learning process, and improve academic performance (Gay, 2000). In response to teachers misreading student behaviors, students should be taught how to emanate behaviors that model the engaged student. For example, students should be taught that the engaged student is responsible for their own learning, is able to identify and articulate their learning goals, and work collaboratively with other students. Engaged students actively participate in class discussions, reflect on lessons they learned, ask and answer questions, and work diligently on completing assignments. If both teachers and
students are made aware of what student engagement looks, sounds, and feels like in a classroom, then misreading engagement levels will be lessened.

In addition to cultural competency, a cause for the disparity between self-reported Student Engagement and teacher-reported Student Engagement could be the expectations the teacher has for the students. Teachers may have low expectations for students, which can translate into lower levels of perceived engagement. According to Kolb and Jussim (1994), the concept of perceptual bias is when the expectations of the teacher influence the teachers’ evaluation of the student. Perceptual biases represent failures to accurately assess students; they do not entail teachers influencing performance (Kolb & Jussim, 1994). This could explain why teachers reported student engagement levels lower than the students reported their own level of engagement, and why the self-reported student engagement levels remained high.

**Findings regarding the relationships between student and teacher perspectives on teacher engagement.** Similar to levels of student engagement, the data indicated a slight gap existed between self-reported teacher engagement (3.22) and student reported teacher engagement (3.04). Teachers scored themselves as being more engaged than the students reported the teachers to be. Although no statistical significance was found between the scores of the teacher engagement variables, an examination of the mean differences on the measures gave insight into the differences in student and teacher perspectives on teacher engagement. One possible explanation for this finding is the position of power theory identified by Kipnis (1976), who stated that persons (teachers) in positions of power within an organization may view themselves more positively than persons (students) in less powerful positions. Another explanation to this finding could be
that teacher engagement levels are less authentic than teachers think they are. An obvious disconnect existed between the level of engagement the teachers believe they are practicing and their perceived engagement level. Teachers are likely to participate in practices they feel increase their level of engagement without taking the students’ perceptions into account. Therefore, teachers will believe they are more engaged when, in fact, their practices have no effect on improving the level of student engagement and academic performance.

However, this research had an exception. One teacher reported low levels of teacher engagement while the students perceived the teacher as having high levels of engagement. Low levels of self-reported Teacher Engagement may be caused by a teacher dealing with an illness, close to retirement, or disgruntled because an expected job assignment didn’t materialize. Regardless of the exact reason for the low level of engagement, teachers who exude low levels of engagement are potentially unhappy and ineffective in their jobs. The disengaged teacher must make a concerted effort to reengage themselves into the teaching and learning process, or they will continue to do an disservice to the students by providing them with ineffective low-quality teaching.

**Findings regarding relationships between student engagement variables.** In this study, the relationships between the student engagement variables were weak to moderate with exceptions regarding the relation with Belief about Self. Strong relationships were found between Belief about Self and Autonomy and Relatedness. These findings are in support of Connell and Wellborn’s (1991) motivation model in which student engagement variables (i.e., Autonomy and Relatedness) are requisite to Student Engagement that is influenced by Teacher Support. This would suggest that
teachers need to create an environment that supports the development of a student’s positive self-image. This can be accomplished when teachers help students understand their academic strengths and weaknesses, make appropriate accommodations to maximize academic success, teach students to become critical thinkers and problem solvers, and have students learn from their mistakes, not be defeated by them.

**Findings regarding relationships between student engagement and teacher support.** The results of this study indicated that students who reported high levels of teacher support indicated that they (the student) also had higher levels of engagement. Students who reported that teachers created a structured environment and had high expectations that were effectively communicated were more likely to report higher levels of engagement. These results were similar to that of research conducted by Klem and Connell (2004), whose findings indicated that “teacher support is important to student engagement as reported by students and teachers” (p. 270) and those of Tyler and Boelter (2008), who reported that student engagement is predicted by high levels of perceived teacher expectations. In addition, Connell and Wellborn’s (1991) findings indicated that students who felt they had a positive relationship with their teacher reported higher levels of student engagement than compared to students who did not report having a positive relationship with their teacher.

Student-reported Teacher Support may reflect a heightened appreciation of the student-teacher relationship. According to Decker et al. (2007), students of color rate their relationships with teachers positively because of a desire to become closer with their teacher. The need for establishing a strong student-teacher bond is consistent with
cultural experiences (Gay, 2000). Given these factors, it is likely that students will score their teacher as having a high level of engagement.

Limitations

Limitations result from the size of the sample population for both students and teachers. The relatively small sample size limits the ability to generalize the results. A small sample size can compromise the reliability of the study. In addition, due to the small number of teacher participants and the need for anonymity, demographic data was not collected.

The sample population is not a representative sample of all students or teachers of the potential population of math teachers and high school math students in the United States. Further, the participants in this survey were not selected at random. While all the potential participants were asked to participate in this study only those who agreed to participate completed surveys. Self-selection may well have introduced unknown biases into the results.

This study was strictly quantitative. Drawing on both quantitative and qualitative data might have enriched the understanding of the important issues surrounding student engagement and teacher engagement. And, anecdotal information would have added to the study’s narrative information, which would have provided specific details and types of information that was not addressed using quantitative instruments.

Another issue is that the survey tools measuring student engagement and teacher engagement did not exactly match the measures for perceived student engagement and perceived teacher support. For example, the RAPS-SM measured behavioral, emotional, and cognitive student engagement while the RAPS-T measured perceived behavioral
engagement. This could explain why the students rated themselves higher in engagement than the teachers rated the students’ level of engagement. Students may have been cognitively or emotionally engaged, but did not exhibit the characteristics of behavioral engagement. In addition, perceived teacher support as assessed by the RAPS-SM was compared to self-reported teacher engagement as assessed by the UWES-9. The UWES-9 measured teacher engagement using three dimensions: vigor, dedication, and absorption. The RAPS-SM measured teacher support using three subscales: involvement, autonomy support, and structure. Once again, the instruments did not measure exact items, thereby potentially comparing imprecise measurements.

**Implications and Recommendations**

Because engagement is a major factor in student achievement, teachers and students must begin with improving levels of engagement before expecting improvements in academic performance. The findings of this study indicated seven factors identified in the research literature as necessary to ensure high levels of engagement were present in the math classrooms in the high school where the research was conducted. This section will discuss each factor in detail and provide examples on how teachers, students, and/or administrators can ensure each factor is present in the classroom.

Engagement in the classroom has to be demonstrated by both the teacher and the student. Teachers and students must be able to recognize when engagement is present. Characteristics of engagement must be understood to ensure that the teachers and students have a common understanding of what engagement looks, sounds, and feels like in the classroom.
For teachers and students to reach optimal levels of engagement, they must be behaviorally, emotionally, and cognitively engaged (Fredricks et al., 2004). Students who are behaviorally engaged will attend class on a regular basis, arrive on-time, are prepared with required materials, ask and answer questions throughout the lesson, make eye contact with the speaker, and position their head and body towards the speaker.

Students who are cognitively engaged are invested in their own learning. Characteristics of students who are cognitively engaged include paying close attention to the teacher, thinking deeply about the subject matter, and use of various learning strategies. Students who are emotionally engaged have positive reactions to their teacher, peers, and school work. Emotional engagement is enhanced when strong relationships exist. Emotional engagement is evidenced by a show of interest and enthusiasm in learning, participation in appropriate conversations with their teacher and peers, and a willingness to complete assignments and tasks.

Teachers who are behaviorally engaged attend work regularly, are punctual, circulate around the room during instruction, and provide assistance to students when necessary. Teachers who are cognitively engaged differentiate instruction that meets the specific instructional needs of the students, implement a variety of teaching strategies, and use data to inform instruction. Emotionally engaged teachers understand that building positive relationships with students is a precursor to student engagement and get to know their students on more than a cursory level.

Data from many studies show that teachers who held higher expectations for their students had higher levels of student engagement in their classroom. Higher expectations contribute to higher levels of student engagement. Teachers who have high expectations
for all of their students ensure that they hold all students to the same high standard of work quality, praise all students, and ensure that the wait time for students to respond to questions is the same for all students.

Teachers and students must be able to navigate the position of power theory identified by Kipnis (1976). A student’s feeling of autonomy in the classroom contributes to higher levels of engagement. Teachers must relinquish some control they have in the classroom to the students in order to create an environment that will promote student engagement. Some strategies teachers can employ to share authority with students within the classroom are having students participate in curriculum development; developing classroom rules, rituals, and routines in collaboration with the students; and providing students with options of activities and assignments.

Knowing students and understanding their perceptions is a component of engagement. Teachers must become aware of and take into consideration perceptions of students in relation to how the students are receiving instruction. This will require teachers to become familiar with the cultural differences between themselves and the students, build relationships with the students to get a better understanding of who they are as learners, and participate in regular reflection on how their instructional practices are being received by the students.

Isolating and overcoming obstacles is another component of engagement. It is recommended that teachers and students reflect on their personal situations and potential obstacles that could adversely affect their performance. Being aware of potential obstacles is necessary in order to create a plan that will allow the teachers and students to meet their daily obligations and respective responsibilities. Seeking support from faculty,
attending support sessions, and collaborating with peers are suggestions of how teachers and students can use resources available to them to ensure continued success regardless of any personal concerns.

Fostering positive relationships is also a component of engagement. Most students will not perform their best in class if they feel that their teacher does not care about them. The building of relationships between the teacher and the student is essential in creating a highly engaged classroom. Teachers can begin to develop relationships with students by taking an interest in the students, getting to know the students by name, and talking to students in and outside of the classroom. Specifically, teachers can greet the students at the door, address them by name, and engage the students in conversation.

Creating an environment which fosters enthusiasm and commitment is yet another component of engagement. Quality instruction can take place in a variety of settings. However, there is no question that well-designed and well-maintained classrooms have a positive impact on student engagement. Classrooms should be physically comfortable for students with respect to temperature, space, furniture, and structural organization. Classrooms also need to be mentally stimulating; they should be inclusive of attractive displays, instructional artifacts, and samples of student work. Teachers can also improve classroom environments and promote higher levels of student engagement if they introduce and consistently implement appropriate rituals and routines.

An obstacle in measuring engagement has been the lack of a common measurement tool that adequately measures engagement and is consistent between teachers, students, and instructional leaders. In the absence of such a tool, educators have used a variety of methods, which have lead to misdiagnoses of engagement levels,
inconsistencies with reporting of data, and a disconnect between perceptions of teachers, students, and administrators regarding the definition and identification of engagement. With this dilemma in mind, I created engagement measurement/reflection tools for teachers, students, and administrators to use. In creating the tools, I incorporated information from a variety of other tools and aligned the tools to reflect components found in the New York State Teaching Standards. Teachers and students can use the reflection and measurement tools provided in the appendices to determine the level of teacher and student engagement. It is necessary that both the teacher and the student use a common measurement of engagement in order to accurately gauge the level of engagement. In addition, administrators and other instructional leaders can use the Student Engagement Measurement Tool (Appendix E) and the Teacher Engagement Measurement Tool (Appendix G) to examine the extent to which teachers and students are engaged. These tools provide a common expectation and definition as to what constitutes high levels of teacher and student engagement.

**Implications for future research.** One direction for future research at the research site is to explore the antecedents to teacher engagement. The findings indicated that the sample of teachers studied reported high levels of teacher engagement. Implications were that the study district and/or school was providing the key organizational conditions necessary for the teachers to be highly engaged with their job. Additionally, studies should be repeated on a regular basis, or after major changes in the district or school to determine the stability of teacher engagement levels. If a district or school has implemented change strategies designed to increase teacher engagement, the survey should be repeated to determine the effectiveness of the imposed strategies.
Additional research is needed with the teachers in this study to determine specific causes of high and low levels of teacher engagement. Anecdotal data from both the students and the teachers regarding effective teacher practices that contributed to perceived levels of teacher engagement would provide additional insight into student and teacher perspectives on teacher engagement.

Future research at the research site is needed to determine if cultural factors are predictive of high perceptions of teacher engagement and/or low levels of perceived student engagement.

**Conclusion**

The importance of student engagement is becoming widely recognized by educators (Appleton et al., 2008). Student engagement is an integral component of learning and has been the focus of a number of recent research studies (Fredricks et al., 2004; Johnson, 2008). Student engagement contributes to improved academic performance (Greenwood et al., 2002; McMahon & Portelli, 2004; Tyler & Boelter, 2008) as measured by grade reports and standardized test scores (Glanville & Wildhagen, 2007). Given the emphasis placed on levels of academic achievement in schools, the way in which students acquire knowledge through the learning process has become a concern. However, enhancing engagement in schools has remained a challenge (Klem & Connell, 2004).

Agreement exists among researchers that student engagement is essential for achieving academic success. According to the National Research Council (2004), how teachers teach and what teachers teach are powerful factors in student engagement and learning. Research demonstrates that teachers can influence student motivation and
increase student engagement in the classroom (National Research Council, 2004). A high level of teacher engagement, which is defined as having commitment and enthusiasm (Rutter, 1986), is essential for the success of high schools and is a contributing factor to academic achievement (Basikin, 2007). Engaged teachers are concerned about the quality of education they deliver (McLaughlin et al., 1986) and that concern is observable in their classroom practices (Rutter, 1986). Engaged teachers search for new ideas, implement best teaching practices (Marzano, 2003), modify instruction to meet the instructional needs of their students (Cotton et al., 2002), have high expectations for their students (Boaler, 2004; Tyler & Boelter, 2008), take responsibility for student learning (Cotton et al., 2002), frequently monitor student progress, and provide students with feedback (Marzano, 2003).

This study investigated the relationship between student engagement and teacher engagement by integrating an analysis of the relationship between student engagement and teacher engagement with an analysis of the level of teacher engagement and its effect on student engagement. In addition, perspectives from the students and teachers regarding student engagement and teacher engagement were studied.

Students and teachers scored student engagement at a high level. A slight gap existed between the scores of self-reported student engagement (3.30) and teacher-reported student engagement (2.98). Although no statistical significance was found between the scores of the student engagement variables, an examination of the mean differences on the measures gave insight into the differences in teacher and student perspectives on student engagement. It was suggested that the results may have been due
to the use of different instruments, cultural differences between the students and teachers, and perceptual bias.

Similar to levels of student engagement, the data indicated a slight gap existed between self-reported teacher engagement (3.22) and student reported teacher engagement (3.04). Teachers scored themselves as being more engaged than the students reported the teachers to be. These results may have been due to the theory of position of power (Kipnis, 1976) or a lack in authenticity in teacher-reported teacher engagement.

The results of this study indicated that students who reported high levels of teacher support indicated that they also had higher levels of engagement. Students who reported teachers as creating a structured environment and had high expectations that were effectively communicated were more likely to report higher levels of engagement. These results may have been influenced by students having a high level of appreciation for the student/teacher relationship as defined by Decker et al. (2007).

In general, students scored themselves and their teachers as having moderate to high levels of engagement. Teachers scored themselves as having high levels of engagement and scored students as having moderate to low levels of engagement.

This study was significant in that it added to the existing literature on the topic of student engagement while linking teacher engagement to student engagement. This study informed educators of the importance of teacher engagement and its relationship to student engagement. Results of the study confirmed that high levels of teacher engagement is a contributing factor to high levels of student engagement, thus ensuring that high levels of teacher engagement are needed in order to achieve an optimal level of student engagement. In addition, perceptions of both the student and the teacher
regarding the engagement level of the other can be influenced by outside factors such as cultural differences and perceptual bias.

Since high levels of teacher engagement are understood to foster high levels of student engagement and high levels of student engagement are a critical component of successful academic outcomes, student and teacher engagement should continue to be reviewed. Since high levels of teacher engagement are understood to foster high levels of student engagement and high levels of student engagement is a critical component of successful academic outcomes, then educators should use the Engagement Measurement/Reflection Tools for students and teachers. The concept of engagement should be at the forefront of research in education and the development and implementation of district- and school-level practices that would contribute to enhancing both teacher and student engagement.
References


Appendix A

The Work and Well-Being Survey (UWES-9)

The following 9 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. Select the answer that best describes how frequently you feel that way.

Q1 At my work, I feel bursting with energy.
   - Never (1)
   - A few times a year (2)
   - Once a month or less (3)
   - A few times a month (4)
   - Once a Week (5)
   - A few times a week (6)
   - Daily (7)

Q2 At my job, I feel strong and vigorous.
   - Never (1)
   - A few times a year (2)
   - Once a month or less (3)
   - A few times a month (4)
   - Once a Week (5)
   - A few times a week (6)
   - Daily (7)

Q3 I am enthusiastic about my job.
   - Never (1)
   - A few times a year (2)
   - Once a month or less (3)
   - A few times a month (4)
   - Once a Week (5)
   - A few times a week (6)
   - Daily (7)
Q4 My job inspires me.

- Never (1)
- A few times a year (2)
- Once a month or less (3)
- A few times a month (4)
- Once a Week (5)
- A few times a week (6)
- Daily (7)

Q5 When I get up in the morning, I feel like going to work.

- Never (1)
- A few times a year (2)
- Once a month or less (3)
- A few times a month (4)
- Once a Week (5)
- A few times a week (6)
- Daily (7)

Q6 I feel happy when I am working intensely.

- Never (1)
- A few times a year (2)
- Once a month or less (3)
- A few times a month (4)
- Once a Week (5)
- A few times a week (6)
- Daily (7)

Q7 I am proud of the work that I do.

- Never (1)
- A few times a year (2)
- Once a month or less (3)
- A few times a month (4)
- Once a Week (5)
- A few times a week (6)
- Daily (7)
Q8 I am immersed in my work.
- Never (1)
- A few times a year (2)
- Once a month or less (3)
- A few times a month (4)
- Once a Week (5)
- A few times a week (6)
- Daily (7)

Q9 I get carried away when I am working.
- Never (1)
- A few times a year (2)
- Once a month or less (3)
- A few times a month (4)
- Once a Week (5)
- A few times a week (6)
Appendix B

Student Survey (RAPS-S)

Read each question and select one of the answers which best describes you.

What year did you begin freshman year in high school? (Cohort Year)
- 2010 (1)
- 2009 (2)
- 2008 (3)
- 2007 (4)
- 2006 (5)

What is your gender?
- Male (1)
- Female (2)

What is your race/ethnicity?
- African American or Black (1)
- American Indian (2)
- Asian (3)
- Pacific Islander (4)
- Hispanic or Latino (5)
- White or Caucasian (6)
- Multi-racial (7)

Who is your math teacher?
- Click to write Choice 2 (1)
- Click to write Choice 3 (2)
- Click to write Choice 4 (3)
- Click to write Choice 5 (4)

Read each of the following items. For each one, tell how true it is for you by selecting one of the four answers. There are no right or wrong answers.
Q1 My teacher has plenty of time for me.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q4 I work very hard on my schoolwork.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q5 When I'm with my teacher, I feel good.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q6 I do my homework because I like to do it.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q7 I don't know how to keep myself from getting bad grades.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q8 My teacher is fair with me.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)
Q9 I work on my classwork because it is interesting.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q10 When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I say the teacher did not cover the things on the test.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q11 I wish I were someone else.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q12 I'm pretty lucky at getting good grades.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q13 I do my homework because I'll feel bad about myself if I don't do it.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q14 When I'm with my teacher, I feel mad.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)
Q15 When I think about myself, I feel bad.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q16 I don't try very hard in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q17 When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I try to figure out what I did wrong so that it won't happen again.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q18 I can get my teacher to like me.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q19 I can work really hard in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q20 My teacher's expectations for me are way off base.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)
Q21 If I'm unlucky, I won't do well in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q22 My teacher cares about how I do in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q23 I can do well in school if I want to.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q24 When I'm with my classmates, I feel ignored.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q25 I pay attention in class.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q26 My teacher doesn't explain why we have to learn certain things in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)
Q27 If I don't do well on my schoolwork, it's because I didn't try hard enough.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q28 When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I get angry at the teacher.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q29 When I'm with my teacher, I feel unhappy.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q30 I wish I felt better about myself.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q31 The rules in my classroom are clear.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q32 My teacher doesn't seem to have enough time for me.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)
Q33 I do my homework because I want to learn new things.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q34 I'm not very smart in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q35 When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I try to see what I did wrong.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q36 When I'm with my classmates, I feel mad.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q37 I am unlucky in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q38 I do my homework because it's fun.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)
Q39 I don't know what it takes to get good grades in school.
   ○ Very True (1)
   ○ Sort of True (2)
   ○ Not Very True (3)
   ○ Not at all True (4)

Q40 Trying hard is the best way for me to do well in school.
   ○ Very True (1)
   ○ Sort of True (2)
   ○ Not Very True (3)
   ○ Not at all True (4)

Q41 When I think about myself, I feel happy.
   ○ Very True (1)
   ○ Sort of True (2)
   ○ Not Very True (3)
   ○ Not at all True (4)

Q42 I work on my classwork because I'll be ashamed of myself if it doesn't get done.
   ○ Very True (1)
   ○ Sort of True (2)
   ○ Not Very True (3)
   ○ Not at all True (4)

Q43 My teacher isn't fair with me.
   ○ Very True (1)
   ○ Sort of True (2)
   ○ Not Very True (3)
   ○ Not at all True (4)

Q44 I often come to class unprepared.
   ○ Very True (1)
   ○ Sort of True (2)
   ○ Not Very True (3)
   ○ Not at all True (4)
Q45 My teacher thinks what I say is important.
   ☐ Very True (1)
   ☐ Sort of True (2)
   ☐ Not Very True (3)
   ☐ Not at all True (4)

Q46 I wish I liked myself better.
   ☐ Very True (1)
   ☐ Sort of True (2)
   ☐ Not Very True (3)
   ☐ Not at all True (4)

Q47 When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I say it was the teacher's fault.
   ☐ Very True (1)
   ☐ Sort of True (2)
   ☐ Not Very True (3)
   ☐ Not at all True (4)

Q48 My teacher likes the other kids in my class better than me.
   ☐ Very True (1)
   ☐ Sort of True (2)
   ☐ Not Very True (3)
   ☐ Not at all True (4)

Q49 I work on my classwork because doing well in school is important to me.
   ☐ Very True (1)
   ☐ Sort of True (2)
   ☐ Not Very True (3)
   ☐ Not at all True (4)

Q50 When I'm with my classmates, I feel good.
   ☐ Very True (1)
   ☐ Sort of True (2)
   ☐ Not Very True (3)
   ☐ Not at all True (4)
Q51 My teacher interrupts me when I have something to say.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q52 The best way for me to get good grades is to get my teacher to like me.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q53 I can't do well in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q54 My teacher doesn't make clear what he/she expects of me in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q55 When something bad happens to me in school (like not doing well on a test or not being able to answer an important question), I tell myself I'll do better next time.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q56 When I'm with my teacher, I feel happy.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)
Q57 When I think about myself, I feel proud.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q58 I work on my classwork because I'll feel guilty if I don't do it.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q59 I can't work very hard in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q60 When I'm with my classmates, I feel unhappy.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q61 My teacher tries to control everything I do.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q62 I can't get my teacher to like me.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)
Q63 My teacher likes to be with me.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q64 I'm pretty smart in school.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q65 I work on my classwork because I think it is important.
- Very True (1)
- Sort of True (2)
- Not Very True (3)
- Not at all True (4)

Q66 How important is it to you to do the best you can in school?
- Very Important (1)
- Sort of Important (2)
- Not Very Important (3)
- Not at all Important (4)
### Appendix C

**Instruments and Variables**

<table>
<thead>
<tr>
<th>UWES-9</th>
<th>RAPS-S</th>
<th>RAPS-T</th>
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<tbody>
<tr>
<td><strong>Teacher Engagement</strong> (Teacher Reported)</td>
<td><strong>Student Engagement</strong></td>
<td><strong>Teacher Support</strong></td>
</tr>
<tr>
<td>Vigor</td>
<td>Competence</td>
<td>Involvement</td>
</tr>
<tr>
<td>Dedication</td>
<td>Autonomy</td>
<td>Autonomy Support</td>
</tr>
<tr>
<td>Absorption</td>
<td>Relatedness</td>
<td>Structure</td>
</tr>
<tr>
<td>Student Engagement (Teacher Reported)</td>
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<tr>
<td></td>
<td>Behavioral Engagement</td>
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</tbody>
</table>
### Appendix D

**Student Engagement Reflection Tool**

<table>
<thead>
<tr>
<th></th>
<th>Very High</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Very Low</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body Language</strong></td>
<td></td>
<td></td>
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<tr>
<td>My body posture indicated I was paying attention to the teacher and other students (i.e. eye contact, head position, body position)</td>
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<tr>
<td><strong>Consistent Focus</strong></td>
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<tr>
<td>I was focused on the learning activity with minimum disruptions.</td>
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<tr>
<td><strong>Verbal Participation</strong></td>
<td></td>
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</tr>
<tr>
<td>I displayed active and appropriate participation by asking and answering questions with relevance, thoughtfulness, and appropriateness.</td>
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<tr>
<td><strong>Student Confidence</strong></td>
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<tr>
<td>I initiated and completed assignments with confidence and worked cooperatively with my peers.</td>
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</tr>
<tr>
<td><strong>Interest and Enthusiasm</strong></td>
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</tr>
<tr>
<td>I was interested and enthusiastic about learning.</td>
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<tr>
<td><strong>Individual Attention:</strong></td>
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<tr>
<td>I felt comfortable seeking and asking questions.</td>
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<tr>
<td><em>I know what to do in this class if I need extra help?</em></td>
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<tr>
<td><strong>Clarity of Learning:</strong></td>
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<tr>
<td>I was able to describe the purpose of the lesson.</td>
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<tr>
<td><strong>Meaningfulness of Work:</strong></td>
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</tr>
<tr>
<td>I found the work interesting, challenging, and connected to learning.</td>
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<tr>
<td><em>The work was interesting to me? I knew why I was learning the work?</em></td>
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<tr>
<td><strong>Rigorous Thinking:</strong></td>
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<tr>
<td>I worked on complex problems, created original solutions, and reflected on the quality of my work.</td>
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<tr>
<td><em>I felt the work was challenging. I was provided with the opportunity to be creative?</em></td>
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<tr>
<td><strong>Student Performance:</strong></td>
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</tr>
<tr>
<td>I understood what quality work was and how it would be assessed.</td>
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</tbody>
</table>

Appendix E

Student Engagement Measurement Tool

<table>
<thead>
<tr>
<th>Observations</th>
<th>Very High</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Very Low</th>
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</thead>
<tbody>
<tr>
<td><strong>Body Language</strong></td>
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<tr>
<td>Students exhibit body postures that indicate they are paying attention to the teacher and other students (i.e. eye contact, head position, body position)</td>
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<tr>
<td><strong>Consistent Focus</strong></td>
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<tr>
<td>All students are focused on the learning activity with minimum disruptions.</td>
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<tr>
<td><strong>Verbal Participation</strong></td>
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<tr>
<td>Students display active and appropriate participation by asking and answering questions with relevance thoughtfulness, and appropriateness.</td>
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<tr>
<td><strong>Student Confidence</strong></td>
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<tr>
<td>Students initiate and complete assignment with confidence and works cooperatively with peers.</td>
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</tr>
<tr>
<td><strong>Interest and Enthusiasm</strong></td>
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</tr>
<tr>
<td>Students appear interested and enthusiastic about learning.</td>
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</tr>
<tr>
<td><strong>Perceptions</strong></td>
<td>Very High</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Very Low</td>
</tr>
<tr>
<td><em>Conversations with students</em></td>
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<tr>
<td><strong>Individual Attention:</strong></td>
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</tr>
<tr>
<td>Students feel comfortable seeking and asking questions.</td>
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<tr>
<td>What do you do in this class if you need extra help?</td>
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</tr>
<tr>
<td><strong>Clarity of Learning:</strong></td>
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<tr>
<td>Students can describe the purpose of the lesson.</td>
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<tr>
<td>What are you working on? What are you learning from this work?</td>
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</tr>
<tr>
<td><strong>Meaningfulness of Work:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Students find the work interesting, challenging, and connected to learning.</td>
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<tr>
<td>What are you learning? Is this work interesting to you? Do you know why you are learning this?</td>
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</tr>
<tr>
<td><strong>Rigorous Thinking:</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Students work on complex problems, create original solutions, and reflect on the quality of their work.</td>
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<tr>
<td>How challenging is this work? In what ways do you have the opportunity to be creative?</td>
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<tr>
<td><strong>Student Performance:</strong></td>
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<td></td>
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</tr>
<tr>
<td>Students understand what quality work is and how it will be assessed.</td>
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<tr>
<td>How do you know you have completed good work? What are some elements of quality work?</td>
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</tr>
<tr>
<td><strong>Overall Level of Student Engagement</strong></td>
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</tbody>
</table>

Appendix F

Teacher Engagement Reflection Tool

<table>
<thead>
<tr>
<th></th>
<th>Very High</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Very Low</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body Language and Behaviors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I pay attention to the needs of the students. (i.e. circulating around the room, asking questions to assess mastery of lesson objectives, use of various instructional strategies, differentiates instruction, articulates high expectations for all students)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Consistent Focus</strong></td>
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</tr>
<tr>
<td>I keep a focus on teaching and student learning with minimum disruptions. I ensure a respectful, safe and supportive learning environment. I remain proactive in meeting the needs of the students.</td>
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</tr>
<tr>
<td><strong>Verbal Participation</strong></td>
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</tr>
<tr>
<td>I consistently ask and answer questions that required the students to use higher order and critical thinking.</td>
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</tr>
<tr>
<td><strong>Confidence</strong></td>
<td></td>
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</tr>
<tr>
<td>Participates as part of an instructional team to improve professional practice. Works cooperatively with my colleagues to ensure the use of research based practices and differentiates instruction to meet the needs of my students. Plans lessons based on student data.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Interest and Enthusiasm</strong></td>
<td></td>
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</tr>
<tr>
<td>I am interested and enthusiastic about teaching and student learning. I am proactive in meeting the needs of the students. I invite families to share information to enhance and increase student development and achievement. I communicate in various ways to students and families student performance, progress, and expectations for student growth.</td>
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<tr>
<td><strong>Individual Attention:</strong></td>
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</tr>
<tr>
<td>I feel comfortable asking and answering students’ questions to help deepen their thinking and understanding of the content matter. I incorporate various types of assessments, monitor and check for understanding, and provide relevant timely feedback.</td>
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<tr>
<td><strong>Clarity of Teaching/Learning:</strong></td>
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<tr>
<td>I describe the purpose of the lesson to the students. I articulate high expectations for all students.</td>
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<tr>
<td><strong>Meaningfulness of Work:</strong></td>
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<tr>
<td>I ensure that the work is interesting, intellectually challenging, and connects to learning.</td>
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<tr>
<td><strong>Rigorous Thinking:</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>I provide opportunities for students to work on complex problems, create original solutions, and reflect on the quality of their work.</td>
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</tr>
<tr>
<td><strong>Student Performance:</strong></td>
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</tr>
<tr>
<td>I ensure students understand what quality work looks like and how it will be assessed. I have knowledgeable of student development and I am responsive to cultural and social factors that influences learning.</td>
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</tr>
<tr>
<td><strong>Overall Level of Teacher Engagement</strong></td>
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</tbody>
</table>

## Appendix G

### Teacher Engagement Measurement Tool

<table>
<thead>
<tr>
<th></th>
<th>Very High</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
<th>Very Low</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body Language and Behaviors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pays attention to the needs of the students. (i.e. circulating around the room, asking questions to assess mastery of lesson objectives, use of various instructional strategies, differentiates instruction, articulates high expectations for all students)</td>
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</tr>
<tr>
<td><strong>Consistent Focus</strong></td>
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</tr>
<tr>
<td>Keeps a focus on teaching and student learning with minimum disruptions. Ensures a respectful, safe and supportive learning environment. Remains proactive in meeting the needs of the students.</td>
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<tr>
<td><strong>Verbal Participation</strong></td>
<td></td>
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</tr>
<tr>
<td>Consistently asks and answers questions that require the students to use higher order and critical thinking.</td>
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</tr>
<tr>
<td><strong>Confidence</strong></td>
<td></td>
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</tr>
<tr>
<td>Participates as part of an instructional team to improve professional practice. Works cooperatively with colleagues to ensure the use of research based practices and differentiates instruction to meet the needs of students. Designs relevant instruction based on student data.</td>
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</tr>
<tr>
<td><strong>Interest and Enthusiasm</strong></td>
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<td></td>
</tr>
<tr>
<td>Interested and enthusiastic about teaching and student learning. Proactive in meeting the needs of the students. Invites families to share information to enhance and increase student development and achievement. Communicates in various ways to students and families student performance, progress, and expectations for student growth.</td>
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</tr>
<tr>
<td><strong>Individual Attention:</strong></td>
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</tr>
<tr>
<td>Comfortable and knowledgeable in asking and answering students’ questions to help deepen their thinking and understanding of the content matter. Incorporates various types of assessments, monitors and checks for understanding, and provides relevant timely feedback.</td>
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</tr>
<tr>
<td><strong>Clarity of Teaching/Learning:</strong></td>
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</tr>
<tr>
<td>Describe the purpose of the lesson to the students and articulates high expectations for all students.</td>
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<tr>
<td><strong>Meaningfulness of Work:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>The work is interesting, challenging, and connects to learning.</td>
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<tr>
<td><strong>Rigorous Thinking:</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Provides opportunities for students to work on complex problems, create original solutions, and reflect on the quality of their work.</td>
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<tr>
<td><strong>Student Performance:</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ensures students understand what quality work looks like and how it will be assessed. Has knowledgeable of student development. Has knowledgeable of and responsive to cultural and social factors that influences student learning.</td>
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</tr>
<tr>
<td><strong>Overall Level of Teacher Engagement</strong></td>
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</tr>
</tbody>
</table>
