

TEACHER TRUST IN LEADERSHIP,
PROFESSIONAL LEARNING COMMUNITY, AND STUDENT ACHIEVEMENT:
AN ANALYSIS OF STATEWIDE SURVEY DATA

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By
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TEACHER TRUST IN LEADERSHIP,
PROFESSIONAL LEARNING COMMUNITY, AND STUDENT ACHIEVEMENT:
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Dedication

I dedicate this work to my wife, Sanae, I thank you for your love, encouragement, pushing, support, patience, understanding, and tireless efforts to make as many origami cranes as needed to ensure that the completion came to fruition.

To my wonderful sons, Takashi and Taichi, I hope that you both someday understand why daddy spent so much time away from you over the years trying to complete the most prestigious degree possible. Education is not a gift, it is a journey you must decide to take. Yet, the knowledge you receive along the way, unlike material things in life, can never be taken from you. Please embark on your own journey of learning and enjoy your trip as much as I have enjoyed mine.

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2. MDESE (Missouri Department of Elementary and Secondary Education).....	32
3. MO PLC (Missouri Professional Learning Communities project)	32
4. RPDC (Regional Professional Development Center)	32

TEACHER TRUST IN LEADERSHIP,
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ABSTRACT

The foundation of positive interpersonal relationships is trust and such relationships are needed for professional collaboration and learning to take place. Building trust, then, must be important in order to meet organizational goals and impact student success. The purpose of this survey research was to examine the relationship among teachers' trust in their principals, professional learning community, and student achievement in middle schools.

This study conducted a secondary analysis of a portion of the Teachers' Opportunity to Learn (TOTL) survey data. The survey was administered to the population of 896 middle school mathematics teachers in 179 schools in 117 school districts in the State of Missouri. Four research questions were examined using descriptive statistics, correlational analyses, and multiple regression analyses.

The results of this study support and expand previous research in finding that there is a relationship between teacher-reported levels of teacher trust in the principal and professional learning community in middle schools. Additional findings recognize the significant effects that school background characteristics can have upon the levels of trust

and professional learning community. However, there was no statistically significant relationship between teacher trust in the principal and student achievement nor a mediation effect through professional learning community. Future research is needed to further investigate the possible pathway between teacher trust in the principal and student achievement. In order to combat the academic declines which so often appear in the middle school years, policymakers, school boards, and district administration would be wise to heed the plethora of research surrounding trust in leadership and professional learning communities as an avenue for improving instruction and increasing student achievement in middle schools.

Chapter 1: Introduction

"Without trust, the best we can do is compromise; without trust, we lack the credibility for open, mutual learning and communication and real creativity."

- Stephen R. Covey (1990, p. 221)

Background and Statement of the Problem

According to Mendez-Morse, leaders of change must have the interpersonal expertise that helps them relate to their staff and develop relationships (Mendez-Morse, 1992). In his presentation of collegial models of educational leadership and management, Bush states that interpersonal leadership "stresses the importance of collaboration and interpersonal relationships" (2003, p. 79). In addition, Megan Tschannen-Moran points out that "to be productive and to accomplish organizational goals, schools need cohesive and cooperative relationships" (2004, p. 16). Fleck follows suit when she states, "It's all about the relationships. If you focus on building positive relationships, then everything will take care of itself" (2008, p. 27). At the heart of these interpersonal relationships and functioning teams is trust (Costa, 2003; Forsyth, Barnes & Adams, 2006; Tschannen-Moran, 2004). The findings of Forsyth et al. (2006) and Tschannen-Moran (2004) echo each other in that they consistently support school relational trust as an essential lubricant for effective school function. Such effective school function is a determinant of school success measured by student learning improvement, the long-term goal of all school improvement efforts.

The focus of many efforts to improve student achievement have been centered around professional learning community – the teacher collaboration, inquiry, and adult learning focused on student learning (DuFour, 2004; Saunders, Goldenburg & Gallimore,

2009; Scribner, Cockrell, Cockrell & Valentine, 1999). DuFour (2004) states that there is compelling evidence suggesting that teachers working together collaboratively is best practice. Richmond and Manakore (2010) recognize that opportunities to create a sense of trust, shared goals, and community are essential in order for teachers to work together in collegial and collaborative partnerships. If the foundation of positive interpersonal relationships is trust and such relationships are needed for professional collaboration and learning to take place, then building trust must be important in order to meet organizational goals and impact student success. It also seems only logical to surmise that the level of trust in the leaders of those educational organizations must be highly correlated to the levels of professional learning community and student achievement within those same institutions.

Purpose of the Study

The purpose of this survey research is to add to previous studies by examining the triadic relationship among teachers' trust in their principals, professional learning community, and student achievement in middle schools using statewide survey data collected from a population of middle school mathematics teachers and administrative data on school background characteristics and achievement data in Missouri. This study also examined how teacher and school characteristics are associated with the levels of teacher trust in the principal and professional learning community. This study focused only on the middle school setting which provides both a contrast and a comparison for the previous studies which may help to highlight differences among the relationship of

teacher trust in the principal, professional learning community, and student achievement at various school levels.

Theoretical Framework

The construct of this study is centered around two very important and broad ideas - trust and professional learning community. Other research studies that have examined these two areas (Bryk & Schneider, 2004; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010) have, similarly, struggled with finding adequate definitions for such abstract concepts. It seems that the definitions for trust and professional learning community are as numerous as the research studies examining them. Regardless, as will be presented more thoroughly in the literature review chapter of this paper, working definitions are required. The definition of trust comes from the work of Megan Tschannen-Moran (2004) and her essential components: benevolence, honesty, openness, reliability, and competence. The working definition of professional learning community is rooted in the essential components described by the Missouri Department of Elementary and Secondary Education (2013): focus on learning, collaborative culture, results-oriented.

This study will expand the current knowledge in the literature on trust through an examination of the triadic relationship among teachers' trust in their principals, professional learning community, and student achievement in the middle school setting using statewide data collected from middle schools and mathematics teachers. The pathway between principal leadership, professional learning community, and student achievement has been extolled as a critical pathway for student success (Sebastian &

Allensworth, 2010; Supovitz et al., 2010). Such success is important in the middle school setting and in mathematics (Eccles et al., 1993; Sparks, 2011; Tamer, 2012). Given this to be the case, there is surprisingly little research that examines these links empirically in middle school settings. Much research has looked at trust in leadership, professional learning community, and student achievement in general, but those findings cannot be assumed to hold true for middle school settings. That pathway is important to examine in middle school setting as it has been described as critical for student learning (Sebastian & Allensworth, 2012; Supovitz et al., 2010). Furthermore, most previous studies have examined the data from one district, and little is known whether the relationships among teacher trust in the principal, professional learning community, and student achievement found in these single-district studies hold true in statewide data. There is a need to replicate the previous findings using statewide data.

For these reasons, this study examined four research questions.

Research Questions

By examining the following questions, this research study provides additional insight into the contributions of trusting school environments in regards to increased student achievement, professional learning communities, and overall school improvement or reform.

1. What is the level of teacher trust in their principals and how does the level differ by teacher and school background characteristics in the middle school?
2. What is the level of professional learning community reported by teachers and how does the level differ by teacher and school background

characteristics in the middle school?

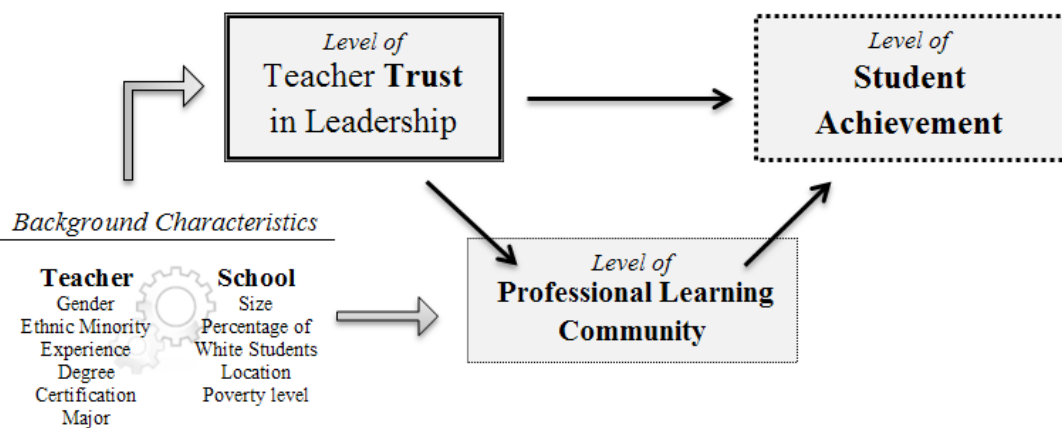
3. How is the level of teacher trust in their principals associated with the level of professional learning community controlling for teacher and school background characteristics in the middle school?

4. How is the school level of teacher trust in their principals associated with school mean middle school student mathematics achievement and how does the professional learning community mediate this relationship?

Conceptual Model

Figure 1 shows a conceptual model of this study which examines the direct relationship between teacher trust in leadership and student achievement and how professional learning community might mediate such a relationship.

Figure 1
Conceptual Model of Study



The teacher characteristics variables analyzed in this study were: the teachers' gender, ethnic minority status, years of experience, college degrees held, math certification held, and major area of study while attending college. The school characteristics variables analyzed in this research were: the schools' enrollment size, percentage of white students, geographic location of the school (rural, suburban, or urban), and the percentage of students receiving free or reduced lunch (poverty level).

Research Hypotheses

The following hypotheses will be tested in this survey study. The justification of each of these hypotheses is provided in the literature review section.

H1: Female teachers, white teachers, and more experienced middle school teachers tend to show a lower level of trust in their principals than male teachers, ethnic minority teachers, and less experienced middle school teachers.

H2: Middle school teachers in ethnically diverse schools tend to show a lower level of trust in their principals, but the level of teacher trust does not differ by the school size or poverty level.

H3: Ethnic minority teachers, more experienced teachers, and teachers who work in low-enrollment and low-poverty middle schools are more likely to report a stronger sense of professional learning community within their middle schools than white teachers, less experienced teachers, and teachers who work in high-enrollment and high-poverty middle schools.

H4: The middle school teachers who report a higher level of trust in their principals are more likely to have a stronger sense of professional learning community.

H5: The middle schools with a higher level of teachers' trust in their principals are more likely to have a higher student mathematics achievement level controlling for teacher and school background characteristics, and this relationship is mediated by professional learning community.

Study Significance

Once again, this dissertation research will add to the knowledge produced by previous studies by examining the relationship among teachers' trust in their principals, professional learning community, and student achievement in the middle school setting. This study is significant in four ways: (a) it replicates previous studies in another setting, (b) it utilizes statewide data, thus covering a larger number of school districts, (c) it examines teacher and school background characteristics as predictors of teacher trust in the principal and professional learning community not included in previous studies, and (d) it focuses on the middle school setting.

First, this study replicates the previous studies. According to Douglas G. Bonett, "replication evidence is the gold standard by which scientific claims are evaluated, yet replication research is rare" (2012, p. 410). This rarity, it seems, may stem from a belief that replication studies are less creative or aren't as valued as 'original' research, yet many call for the need for more replication studies in a variety of fields of research (Bonett, 2012; Bueno de Mesquita et al., 2003; Leithwood & Jantzi, 2000). This study

replicates previous research surrounding teacher trust in leadership, professional learning community, and student achievement in another setting – middle schools.

Second, while many studies have examined teacher trust in leadership, professional learning community, and student achievement (Bryk & Schneider, 2004; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010) all but one have only examined the three factors within the context of a single school district. The study of Louis et al. (2010) used the data from across the country, examining 106 schools from 43 districts in nine states. While the current study used data from only Missouri, the data came from the population of mathematics teachers in 179 middle schools in 117 school districts, representing a larger number of districts than Louis et al.'s study. This greater number of school districts will be able to capture major variations among teachers, schools, and districts across the state.

Third, this study examined teacher and school background characteristics as predictors of teacher trust in the principal and professional learning community that were not examined in the previous studies. Of the four most closely related studies examining teacher trust in principal, professional learning community, and student achievement (Bryk & Schneider, 2004; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010), there were many differences regarding the contributing variables of teacher and school background characteristics. The study by Louis et al. (2010) only examined the building level (elementary vs. secondary) effects and did not consider any other school background characteristics or teacher background characteristics. Two research studies analyzed some school background characteristics (poverty level, ethnic minority status, and school size) but no teacher background characteristics were analyzed

(Sebastian & Allensworth, 2012; Supovitz et al., 2010). Other research (Bryk & Schneider, 2004) has analyzed both teacher and school background characteristics and has shown that such variables can have a significant impact on both the levels of trust in the principal and of professional learning community. This dissertation study, by examining additional predictor variables of teacher and school background characteristics not previously studied, namely degrees held, math certification, math major, math education major, and school location, has significance and can provide findings that add to the previous research.

Finally, among the four most relevant studies (Bryk & Schneider, 2004; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010), none focused only on the middle school setting for their research. Bryk and Schneider (2004) only examined elementary schools, Sebastian and Allensworth (2012) only examined high schools, Supovitz et al. (2010) combined their elementary and middle school data, and Louis et al. (2010) compared elementary versus secondary data as they combined their middle and high school data. This dissertation study is significant in that it teases out the middle school context in the research on teacher trust in the principal, professional learning community, and student achievement.

In short, there is a need to empirically examine the relationship among teacher trust in leadership, professional learning community, and student achievement as it is a key mechanism for improving the learning of students at a critical stage in their educational lives. The significance of this study comes from its replication in another setting, its use of statewide data across more school districts, the inclusion of additional teacher and school background characteristics, and its focus on the middle school context.

Limitations of the Study

The researcher would be remiss not to recognize potential weaknesses of this research study. First and foremost are the assumptions in simple linear regression which assume that the data is at a single level. Clustered data (Kenny, 2013) is inherently present in educational data. This data is no exception because several teachers from the same school were surveyed and within the teacher file their data appears unique. Bryk and Schneider (2004) used a hierarchical linear model in order to address the issue of nested data within groups. Student achievement data linked with individual teacher survey data were not available in the current study. Therefore, the study used the school-level aggregates when examining the relationships among trust in the leadership, professional learning community, and school achievement level

A second limitation of this study was the absence of growth data. A strength of the Bryk and Schneider (2004) study was that they were able to examine the improvement of trust in the principal over a period of several years and then examine the relationship between the improving level of relational trust and the level of professional learning community and student achievement. The data set used for this research study did not contain growth data for any of the variables.

A third limitation of this study was the lack of an instruction variable for analysis. The previous studies which examined the mediating relationships between the level of teacher trust in the principal, professional learning community, and student achievement (Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010) also included an instruction variable which was found to be statistically significant.

These limitations will be discussed again in Chapter 5 along with the future research agenda.

Chapter 2: Literature Review

Theoretical Framework - Trust

Trust is essential for building positive interpersonal relationships (Brower, Schoorman & Tan, 2000; Bryk & Schneider, 2003; Butler & Cantrell, 1984; Forsyth, Barnes & Adams, 2006; Goddard, Tschannen-Moran & Hoy, 2001; Hoy & Tschannen-Moran, 1999; Tschannen-Moran, 2009; Tschannen-Moran & Hoy, 2000; Uhl-Bien, 2006; Werbel & Henriques, 2009). While being an interpersonal leader with the skills and knowledge to foster collaboration and collegiality are important, "principals must also create and maintain a sense of trust in the school" (Datnow and Castellano, 2001, p. 221). Without trust, it seems, relationship building will fail and all the work of the leader will be for naught.

There are numerous definitions for the word "trust", and so it is important to provide the definition that will be used in this study. The definition of trust as it pertains to this study is based upon the definition of trust presented in Tschannen-Moran's book, *Trust Matters* (2004) and the five facets she identified. "Trust is one's willingness to be vulnerable to another based on the confidence that the other is benevolent, honest, open, reliable, and competent" (Tschannen-Moran, 2004, p. 17).

According to Tschannen-Moran (2004), the willingness to be vulnerable is essential in situations where members of an organization are dependent upon each other. Without a reliance on other individuals there is no need for trust. It makes sense, then, that as school leaders utilize interpersonal skills to foster collaboration and collegiality

toward a common goal there will be a certain amount of dependence, and thus, vulnerability as well.

The first facet of trust, benevolence, is the concept that there must be some assurance that the trusted party has a caring core and will do no harm to the trustor. Without a benevolent nature, trust cannot be given (Tschannen-Moran, 2004). Accordingly, in order for teachers to trust their principal, the leader must assure the staff that he/she cares for them.

In addition to benevolence, trust also requires honesty. "Honesty concerns a person's character, their integrity, and authenticity" (Tschannen-Moran, 2004, p. 22). When a building leader is honest, the trustor (i.e., teacher) knows that the principal will fulfill their promises and follow through with what they say.

The next components of trust are openness and reliability. While many school leaders may understand the need for an "open door policy" and being reliable, to what degree do teachers view their principal as being open and reliable? That is, the building administrator must afford teachers input into the day-to-day decisions through such collaborative and collegial models as a professional learning community provides. The facets of openness and reliability might best be summed up by Sam Parker (2013) in his book, *Lead [simply]*. Parker, urges leaders in all fields of business to Model-Connect-Involve. That is, model the behavior you want to see in others, connect with the people you lead, and involve them as much as possible.

Finally, the last facet of trust is competence. That is, how knowledgeable do the teachers perceive the principal to be? Principals seen throughout the building, able to provide constructive feedback about the effective instructional practices of the teachers,

who share their reasoning behind their decision-making, and provide staff with valuable professional development may be viewed as more competent educators as well as leaders.

The methods section of this paper will present how each of these four facets of trust were assessed and the level of teachers' trust in the principal was determined using the Teachers' Opportunity to Learn (TOTL) survey data.

Level of Teacher Trust in Leadership

While the four studies previously discussed in the introduction chapter (Bryk & Schneider, 2004; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz, Sirinides & May, 2010) all examined the level of teachers' trust in leadership, only one of them (Bryk & Schneider, 2004) looked at how the teachers' trust in leadership differed by teacher and school background characteristics. Others (Louis et al., 2010; Sebastian & Allensworth, 2012) also examined a few aspects of school background characteristics. No article from any of the studies actually reported the overall mean level of teachers' trust in leadership. In general, mean levels may be less generalizable to contexts outside the study, so the authors may be cautious about reporting the mean levels compared to correlations that may more generalizable.

Teacher background characteristics.

Bryk and Schneider (2004) conducted research using seven years of survey and test score data from more than 400 Chicago elementary schools. Their research began in 1991, when they surveyed 6,144 teachers (1,462 probability sample, 4,682 volunteer sample) in 270 elementary schools (64 probability sample, 206 volunteer sample) (Bryk

& Schneider, 1996). Their study examined specific teacher characteristic variables such as: gender, race, and teaching experience.

Despite the fact that Bryk and Schneider (2004) found the reported level of teachers' trust in the principal to be lower in schools with a predominantly minority student body enrollment, their study also found a statistically significant correlation between those teachers identifying themselves as minority and their reported level of teachers' trust in leadership. Mainly, their research found that teachers of minority backgrounds, black and Hispanic, were more likely to report higher levels of trust in their principal, and these levels were statistically significant at the .001 and .05 levels, respectively.

Interestingly, Bryk and Schneider's (2004) research also found a statistically significant negative correlation between gender and the level of teacher's trust in leadership. Particularly, they found that female teachers (-0.175, $p < .05$) were more likely to report lower levels of trust in their principals than their male teacher counterparts.

Bryk and Schneider (2004) did report teaching experience as being statistically significant (-0.026, $p < 0.001$) in that the level of teaching experience did negatively influence the teachers' reported level of teachers' trust in the principal. This means that those teachers with more experience reported lower levels of trust in the principal.

Based upon Bryk and Schneider's (2004) previous research of the effects of teacher background characteristics on the level of trust, it is my hypothesis that the level of teachers' trust in the principal as reported by teachers will be lower among female teachers, lower among those teachers with more years of experience, and higher among

minority teachers. Because of the lack of previous research surrounding certification and degrees, no assumptions are being made in regards to those variables being studied.

School background characteristics.

Bryk and Schneider's (2004) survey questions also included several school context effects such as: low socioeconomic status levels, school size, and racial diversity of students. School location and type was not addressed in this study as all schools included were urban elementary schools within the Chicago public schools.

Three studies (Bryk and Schneider study, 2004; Forsyth et al., 2006; Sebastian and Allensworth, 2012) revealed no statistically significant correlation between the percentage of low-income students in the school with the level of teacher trust in the principal.

Additionally, two studies (Bryk and Schneider, 2004; Sebastian and Allensworth, 2012) also found that the enrollment size of the building had no statistical relationship with the level of teacher trust in the principal.

Bryk and Schneider (2004) also found those teachers working in schools with large populations of minority students to report much lower levels of trust. While the relationships between minority populations and the level of teachers' trust in principals were all negatively correlated, it should be noted that the most significant statistic ($-.704$, $p < 0.001$) was for schools with a predominantly African American student body (Bryk and Schneider, 2004). Teachers working in those schools reported lower levels of teachers' trust in the leadership.

The study by Louis et al. (2010), while not examining school background characteristics per se, did compare the level of trust in the leader in elementary versus

secondary schools. The data for the Louis et al. study (2010) came from 2005 and 2008 teacher surveys developed for a United States research project funded by the Wallace Foundation. Using mixed methods research they examined 4,491 mathematics teachers in 106 schools (50 elementary, 34 lower secondary, and 19 upper secondary) from 43 districts across the nation (Louis et al., 2010). Hierarchical multiple regression was used to examine the effects of school level. Their study found statistically negative correlations between the level of trust in the principal and the level of the school (-0.252, $p < .01$). This means that the level of trust in the principal is lower in secondary schools than in elementary schools. This is significant to my study because it surveys only middle school mathematics teachers and suggests that I may not find high levels of trust in the principal being reported by the teachers.

Based on the previous studies on teachers' trust in leadership, I hypothesize that teachers in ethnically diverse schools tend to show a lower level of trust in their principals, but the level of teacher trust does not differ by the poverty level or school size.

Theoretical Framework - Professional Learning Community

The idea of organizing schools in an effort to create collaborative learning among educators is an important one. Wahlstrom and Louis (2008) found that increasing the decision-making opportunities in schools to include non-administrators is an important stride that leaders can take in long-term efforts to improve instructional practices of teachers. The concept of professional learning community is also not a new one. In fact, the idea of professional learning communities has been around since the early 1990s. Over the past two decades numerous articles have been written about the concept of

professional learning communities and the definitions therefore are just as numerous (Lomos, Hofman & Bosker, 2011).

In their research of professional learning community in Chicago Public Schools, Bryk and Schneider (1996) used four separate measures which assessed: 1) the extent to which shared work happened among faculty, 2) the commonness of educators' conversations about instruction and student learning, 3) a shared commitment of teachers to improve both instruction and general school operations, and 4) the degree of faculty focus on student learning. Bolam et al. (2005) characterized effective professional learning community as having five elements: 1) shared values and vision, 2) collective responsibility for student learning, 3) reflective professional inquiry, 4) collaboration focused on learning, and 5) professional learning. The essential elements of professional learning community presented by Louis, Marks, and Kruse (1996) are similar: 1) shared norms and values, 2) collective focus on student learning, 3) collaboration, 4) deprivatized practice, and 5) reflective dialogue. It is important to keep such definitions in the forefront as we examine the research surrounding professional learning communities. Moreover, as will be presented in a later section, the context of how professional learning communities are defined within the location of this study, the State of Missouri, must also be considered in regards to the overall research findings.

Level of Professional Learning Community

Similar to the studies on trust in organizations, previous research (Bryk, Camburn, & Louis, 1999; Bryk & Schneider, 2004; Lee & Smith, 1996; Louis et al., 1996; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010; Tschannen-Moran, 2009;

Wahlstrom & Louis, 2008) has also examined the levels of professional learning community found within schools. Additionally, studies have also found that both teacher and school background characteristics can have an effect on the level of professional learning community reported within the schools.

Teacher background characteristics.

The study by Bryk et al. (1999), which examined data from 5,690 teachers in 248 elementary schools in Chicago Public Schools, found that those teachers who identified themselves as African American were more likely to report higher levels of professional community within the school (0.35, $p < 0.001$). Additionally, Bryk et al. (1999) found that there was a statistically positive and significant relationship (0.02, $p < .001$) between teacher experience and levels of professional community within the school. That is, those teachers with more years of experience reported higher levels of professional community in their schools than those who had been teaching for fewer years.

Based upon the previous research by Bryk et al. (1999), the fourth hypothesis of this study states that ethnic minority teachers and teachers who have more experience are more likely to report a stronger sense of professional learning community within their schools than white teachers and less experienced teachers.

School background characteristics.

Several studies on professional learning community (Bryk et al., 1999; Louis et al., 2010; Louis et al., 1996; Wahlstrom & Louis, 2008) also found a statistically significant correlation between elementary schools and professional learning community. That is, as compared to middle schools and high schools, teachers in elementary schools are more likely to report higher levels of professional community. Additionally, Lee and

Smith (1996) reported that teachers who reported the highest levels of professional community were more often found in private and parochial schools rather than public schools.

No studies showed a statistically significant correlation between the percentage of students of minority enrolled in the schools and the reports by teachers to have high levels of professional community.

The research of Bryk et al. (1999) found that higher levels of professional learning community were more likely to be reported by teachers in buildings of less than 350 students (0.296, $p < 0.01$). The Sebastian and Allensworth (2012) study also regressed professional learning community on school size. Their study found a negative and statistically significant relationship between school size and the level of professional learning community reported by teachers (-0.25, $p < .05$). In contrast, Louis et al. (1996) found no statistically significant difference between the levels of professional learning community reported by teachers in smaller schools compared to those in larger schools. The inconsistencies between these studies may be explained by the type and relative sample sizes. The study of Bryk et al. (1999) included 400 elementary schools within Chicago. The study of Louis et al. (1996) included elementary, middle, and high schools but only eight in each group for a total of 24 schools. However, the statistically significant effects found by both Bryk et al. (1999) and Sebastian and Allensworth (2012) might also be explained because both studies were limited to schools within the Chicago Public Schools District. This study will also examine effects of building size on the level of professional learning community reported by teachers. It should be noted that the use

of middle school level data only might have an influence on the findings similar to the secondary school findings of Sebastian and Allensworth (2012).

Three studies (Forsyth et al., 2006; Lee & Smith, 1996; Sebastian & Allensworth, 2012) examined the correlation between the level of professional community reported by teachers and the socioeconomic level of the students in the schools. The Lee and Smith (1996) study revealed that those teachers working in schools with higher socioeconomic levels (few students in poverty) were more likely to report higher levels of professional learning community. In contrast, the studies by Forsyth et al. (2006) and Sebastian and Allensworth (2012) found no statistically significant relationship between school context (including poverty level) and the level of professional learning community reported by teachers. The current study used statewide data that represent a wider range of socioeconomic level than the previous studies. Therefore, we may find a more distinct relationship between socioeconomic status and professional learning community.

Based upon many of these research study findings, the third hypothesis of this research study also states that the teachers who work in low-enrollment and low-poverty schools are more likely to report a stronger sense of professional learning community within their school than teachers who work in high-enrollment and high-poverty schools.

Teacher Trust in Leadership & Professional Learning Community

There have been three studies that have also examined the relationship between the two most important predictor variables of this study – the level of teachers' trust in leadership and the level of professional learning community (Forsyth et al., 2006;

Tschannen-Moran, 2009; Wahlstrom & Louis, 2008). All of these studies have found a statistically significant and positive correlation to exist.

A study by Forsyth et al. (2006) surveyed 790 teachers from 79 elementary, middle, and high schools. In their study, they found a high correlation (0.76, $p < 0.01$) between teachers' trust of the principal and enabling school structures. According to Forsyth et al., (2006), enabling school structures are those formalized and centralized processes whereby members of the educational organization are able to problem solve through interactive dialogue. The enabling school structures help foster trust as teachers value each other's differences, learn from mistakes, and impact lasting change within the school improvement process. Clearly, such enabling school systems are so closely related to professional learning communities as to be tautological in nature. Hence, this study also suggests that those schools which report higher levels of teachers' trust in leadership also report higher levels of professional community.

Next, an empirical study by Tschannen-Moran (2009) added to the previous research as it examined the relationship between teachers' trust in the principal and teacher professionalism. Teacher professionalism was defined as taking work seriously, having a higher level of commitment, and going beyond minimal expectations to meet the needs of students. In the sense that this teacher professionalism included teachers working together, collaboratively with one another, teacher professionalism shares many characteristics with professional learning community. In her survey of 2,355 middle school teachers in 80 schools in a mid-Atlantic state, Tschannen-Moran (2009) used a trust in principal subscale consisting of 8 items on a six-point Likert scale with an alpha coefficient of reliability of 0.98. Her study showed that faculty trust in the principal

explained 19% of the variation in teacher professionalism and the two were positively correlated (0.44, $p < 0.01$). As a result, Tschannen-Moran urged that principals would do well to resist top-down mandates and instead choose practices that lead to strong trust between themselves and their teachers. She also suggests that such increased professionalism and enthusiasm among teachers results in better instruction.

Finally, Wahlstrom and Louis (2008) studied 4,165 teachers in 138 elementary, middle, and high schools across 39 school districts. In their examination of four facets of professional community: *reflective dialogue*, *collective responsibility*, *deprivatized practice*, and *shared norms*, Wahlstrom and Louis (2008) also found a statistically significant correlation between each aspect of professional community and the level of teacher-principal trust at the $p < 0.01$ level. The positive correlations were as follows: *reflective dialogue* (0.186), *collective responsibility* (0.293), *deprivatized practice* (0.200), and *shared norms* (0.418).

Because of the findings in all of these previous studies, this researcher has hypothesized that the teachers who report a higher level of trust in their principals are also more likely to report a stronger sense of professional learning community within their school as well.

Professional Learning Community & Student Achievement

Among the abundant literature about professional learning communities, previous literature syntheses (Bolam et al., 2005; Lomos et al., 2011; Vescio et al., 2008) have identified empirical studies (Lee & Smith, 1996; Louis et al., 1996) that directly looked at the relationship between professional learning communities and student achievement.

These studies (Lee & Smith, 1996; Lomos et al., 2010; Louis et al., 1996; Saunders, Goldenberg & Gallimore, 2009; Sigurdardottir's, 2010) have found statistically significant relationships between professional learning community and students' academic success. Lomos et al. (2011) conducted an extensive examination of previous research studies and found that the effects of professional learning community on student achievement were diverse but positive and significant. Other recent studies also found statistically significant relationships between professional learning community and student achievement

Lee and Smith (1996) surveyed 9,904 high school teachers across (12 teachers per school) 820 schools (650 public, 68 Catholic, and 47 Independent) along with 11,692 students across (14 students per school) those same schools. Their data signaled that students in schools which reported high levels of professional learning community made larger, statistically significant, academic gains as compared to those students in schools reporting medium or low levels of professional learning community. It should be noted that these academic gains were in all subject areas: mathematics gain (6.57, $p < 0.05$), reading gain (3.70, $p < 0.05$), history gain (2.95, $p < 0.05$), and science gain (3.43, $p < 0.05$). Additionally, while the high-level professional learning community schools had higher socioeconomic status (SES) student populations, when controlling for SES levels, the high professional learning community schools, where teachers take collective responsibility for student learning, showed the academic gains for high and low SES students to be similar.

Louis et al. (1996) used survey data from 910 teachers and 3,590 students across 8 elementary schools, 8 middle schools, and 8 high schools collected from 1991 to 1994.

Their study found a statistically significant correlation between the level of professional community and the level of authentic achievement in mathematics and social studies (0.1777, $p \leq 0.05$) based on classroom averages.

Lomos (2012) and Lomos et al. (2010) conducted a cluster analysis and hierarchical linear model of the Third International Mathematics and Science Study (TIMSS) conducted in 2003 at the eighth grade level in the Netherlands. Their data included a survey sample of 2,706 secondary students and 117 mathematics teachers in 117 secondary schools. Pupils ranged in age from 12 to 18 years and the schools were divided into two main subgroups – vocational focus and academic focus. The study focused solely on mathematics professional learning community, and those schools ($n = 40$) which reported the highest levels of professional community were also the schools with the highest levels of student achievement.

The study by Saunders et al. (2009) examined the effects of professional learning community on the student achievement scores from the Stanford 9 Achievement Test. Saunders et al. (2009) conducted a quasi-experimental investigation of 15 Title I elementary schools (9 test schools and 6 comparison schools) in a larger urban district in southern California over a five year period. Within the 9 test schools, a program referred to as Getting Results was implemented. The essential component of Getting Results was the implementation of Instructional Leadership Teams and Grade Level Meeting Teams focused on improving instruction student learning in an effort to increase student achievement (Saunders et al., 2009). The Academic Performance Index (API) for the 9 test schools showed a mean academic gain of 172.6 while the mean academic gain for the 6 comparison schools was only 122.1. Thus, there was a gain difference of +50.5 points

in the API between the test groups. Also worth noting were the gains for Hispanic students between the two test groups. The mean academic gain for Hispanic students in the professional learning community schools was 189.7 while the mean academic gain for the Hispanic students in the 6 comparison schools was only 111.7 with a difference of 78.0 points. Additional study data shows that the API statewide rankings for the 9 professional learning community schools showed a mean gain of 1.7 while the API statewide rankings for the 6 test schools showed a mean gain of only 0.3. Such data clearly show the academic benefits of implementing professional learning communities in order affect student achievement.

In her mixed methods study of schools in Iceland, Sigurdardottir's (2010) findings indicated a strong relationship between a school's level of effectiveness ($0.52, p \leq 0.01$) and the teachers' perceived level of professional learning community. The test scores of the schools' tenth grade students on the standardized national test were used as indicators of the schools' effectiveness. Additionally, value added scores which take into account previous achievement (test scores in grade 4) were used and adjusted based upon the educational background of the students' parents. The extremely small sample size must be noted, as Sigurdardottier examined only two schools. While both school A and B included collaborative practices for staff, school A (highly effective school) had more structure to the collaboration and contained clear vision and values. Additionally, school B (low effectiveness) had less awareness of collective learning, less perception of mutual support, and fewer collaboration supports in the social climate. In the end, her research suggests that improvements in professional learning community can improve the schools' level of effectiveness.

The findings of these previous research studies suggest that professional learning community may mediate the relationship between teacher's trust in leadership and student achievement, hence this researcher's fifth hypothesis.

Teachers' Trust in Leadership, Professional Learning Community, and Student Achievement

The triadic relationship between trust in leadership, professional learning community, and student achievement is the crux of this dissertation research. To date, There have been five empirical studies which have explicitly examined all three, namely, the studies by Bryk and Schneider (2004), Forsythe et al. (2006), Louis et al. (2010), Sebastian and Allensworth (2012), and Supovitz et al. (2010). While the study by Forsyth et al. (2006) did examine teacher trust in principal, during their final canonical correlations they included the variable of teacher trust in the principal under a larger context of trust which also included teacher trust in students and teacher trust in parents. Therefore, a summary of the four more closely related studies (Bryk & Schneider, 2004; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al. 2010) and their findings are presented here.

The field study of Bryk and Schneider (2004) used both qualitative and quantitative methods to examine 6,144 teachers across 270 elementary schools in Chicago. According to Bryk and Schneider, most Chicago students are in high poverty and racially segregated schools, and so schools were selected to represent that modal type (2004) although at least two schools with contrasting demographics were included. The greatest strength of the Bryk and Schneider's study was the longitudinal design that

allowed them to examine changes in the measures of trust, professional learning community, and student achievement over time. The findings of Bryk and Schneider (2004) show that schools with an increasing level of trust also increased the level of professional learning community. Also, schools with increasing levels of trust and professional learning community had increased student academic achievement. Despite the major strength of the Bryk and Schneider (2004) study using longitudinal data, they did not examine the direct and indirect paths on the relationships among these three factors simultaneously. Thus, we cannot ascertain from their study whether professional learning community might mediate the relationship between the level of teacher trust in the principal and student achievement.

The Louis et al. study (2010) used structural equation modeling to examine direct and indirect effects and found statistically significant and positive correlations between mean trust and mean professional community (0.451, $p < .01$), mean trust and mean math proficiency (0.249, $p < .05$), mean professional community and mean math proficiency (0.198, $p < .05$). Additionally, the studies have also shown statistically significant and positive correlations between school mean levels of trust and focused instruction (0.436, $p < .01$), professional community and focused instruction (0.510, $p < .01$), and focused instruction and math proficiency (0.269, $p < .01$).

Louis et al. (2010) further conducted multiple regression analyses on the relationship between two predictors: professional community and the level of trust in the principal and focused instruction. Their first regression found that professional community was a significant predictor of instruction (0.510, $p = .000$) and held true even after trust in principal (0.337, $p = .002$) and building level (0.280, $p = .024$) were added to

the model. Also, the r-square value showed that 26% of the variance in focused instruction could be accounted for by the level of professional community. This increased to 33% when trust in the principal and building level were added to the model. In a second regression, Louis et al. (2010) found that while focused instruction was a significant predictor of math achievement (0.267, $p = .006$) in the first model, the effects of focused instruction were diminished and actually disappeared when the professional community (0.119, $p = .284$), trust in principal (0.243, $p = .038$), and building level variables (-0.154, $p = .449$) were added in the third model. In this model, trust in the principal and instructional leadership (-0.315, $p = .006$) were the only statistically significant factors associated with math achievement. The r-square value, however, only showed that 7% of the variance in the model could be accounted for by the level of focused instruction. This increased to 19% when professional community and trust in principal were added. Their study, then, showed that professional community did not mediate a relationship between trust and student achievement. Thus in their structural equation model which examined the mediating relationships between several variables including instructional leadership, trust in the principal, and shared leadership, Louis et al. (2010) found no statistically significant relationship between trust in the principal and professional learning community. This is in contrast to the assumptions I have made. Additionally worth noting is their finding that both instructional leadership (0.267, $p = .001$) and shared leadership (0.381, $p < .001$) were both found to have a statistically significant relationship with professional community. Also, their study found significant relationships between professional community and focused instruction (0.395, $p = .001$) and between focused instruction and mathematics achievement (0.205, $p = .037$) as part

of the path model. Thus, their findings show some mediation effects through professional learning community between leadership and achievement.

Two additional studies (Sebastian and Allensworth, 2012; Supovitz, Sirinides & May, 2010) while not addressing teacher trust in principal as a single variable, did examine it under the larger umbrella of principal leadership. The predictor variable, principal leadership, in the studies was comprised of a) focusing on the mission and goals of the school, b) supporting trust and collaboration in the building, and c) actively supporting instruction (Sebastian and Allensworth, 2012; Supovitz et al., 2010). Like Louis et al. (2010), Sebastian and Allensworth (2012) and Supovitz et al. (2010) both used structural equation modeling to examine direct and indirect effects through multiple mediators. In both studies, the researchers examined a more indirect relationship between principal leadership and student achievement by examining a path through professional community and/or instructional practice.

Sebastian and Allensworth (2012) examined school level background characteristic data, but no teacher level demographic data was available. In their between school analysis and multilevel structural equation model designed to address the inherent nesting of educational data, Sebastian and Allensworth (2012) found a statistically significant and positive relationship between principal leadership and classroom instruction via the learning environment pathway (0.25, $p = 0.09$) and principal leadership and student achievement via the learning environment and classroom instruction pathways (0.16, $p = 0.06$ and 0.21, $p = 0.08$). It should be noted, though, that no statistically significant direct relationship was found between principal leadership and

student achievement. Nor was any statistically significant relationship between principal leadership and student achievement via the professional community pathway found.

Supovitz et al. (2010) collected data from a mid-sized urban school district in the southeastern United States in 2006-2007. The survey data included achievement data for 11,397 students in 38 elementary and middle schools along with survey data from 721 teachers in those schools. Similar to the study of Sebastian and Allensworth (2010), this study examined the relationship between principal leadership and peer influence and student learning (student academic achievement gain scores) via teacher change in instruction (teacher reported). Peer influence, which this researcher would equate to professional learning community, was comprised of the following subcomponents: 1) instructional conversations with peers around instructional issues, 2) interaction around teaching and learning, and 3) instructional advice networks. Supovitz et al. (2010) used a multilevel structural framework to allow for clustering of data. Their findings showed principal leadership to be a statistically significant and positive predictor of change in instruction for both English language arts (.18, $p < .01$) and mathematics (.14, $p < .01$). Additionally, peer influence was also discovered to be a statistically significant and positive predictor of change in instruction (.21, $p < .01$) and student mathematics achievement (.26, $p < .01$). The study also found the largest and most significant relationship was between principal leadership and English language arts achievement (.38, $p < .01$) and mathematics achievement (.30, $p < .01$) via the peer influence path. This last finding is quite significant as it supports the examination of this study, that professional learning community is a significant mediator in the relationship between principal leadership and student achievement.

In summary, all previous studies (Bryk & Schneider, 2004; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010) suggest that trust is significantly correlated to student achievement. However, the findings from these studies are inconsistent regarding the relationship and which factors mediate the relationship between teacher trust in the principal (or principal leadership) and student achievement. While Bryk and Schneider (2004) and Supovitz et al. (2010) seem to support that professional learning community mediate this relationship, both Louis et al. (2010) and Sebastian and Allensworth (2012) found other mediators including learning environment and instruction to be more important than professional learning community.

I will discuss the Missouri context around professional learning community, and develop a hypothesis on the relationships among teacher trust in the principal, professional learning community, and student achievement considering both the findings from previous empirical studies and the Missouri context.

Missouri Context for Professional Learning Community

As mentioned previously, prior to beginning a study of professional learning community, it is important to share the context within the specific schools to be studied. Since the survey data for this study was collected only from middle schools within the State of Missouri, it is important to discuss the context of professional learning community as it relates to the state. The context of professional learning community within the schools will affect the working definition of the teachers studied and also perhaps the learning environment itself.

According to the Missouri Department of Elementary and Secondary Education (MDESE) website (2013), the state began sponsoring a school improvement initiative called The Missouri Professional Learning Communities Project (MO PLC) during the 2003-2004 school year. The program itself evolved from Missouri's earlier Accelerated Schools Program. By 2007-2008, MO PLC had expanded to include professional development about professional learning community in all nine Regional Professional Development Centers (RPDC) of the state.

The MO PLC work employs the research and resources of many professional learning community authorities such as Rick DuFour, Robert Eaker, Shirley Hord, Rick Stiggins, and Doug Reeves (MDESE, 2013). The fundamental guiding principles of MO PLC focus on three main ideas: focus on learning, collaborative culture, and results-oriented. To date, the MO PLC works with almost 300 schools across the State of Missouri. Table 1 was compiled in 2011-2012 and shows the growth of MO PLC over the years. The table shows that in the 2011-2012 school year 292 schools were participating MO PLC schools. Of those 292 schools, 26 were in their fourth year, 114 were in their third year, 76 in their second, and 76 in their first. The TOTL survey data collected for this study was also compiled in 2011.

Table 1
*Growth of MO PLC Project Schools 2011-2012**

RPDC Region	Year 1 Schools	Year 2 Schools	Year 3 Schools	Year 4 & Continuing	Total Schools
Region 1 Southwest	13	7	6	10	36
Region 2 Heart of MO	11	19	13	--	43
Region 3 Kansas City	10	6	19	--	35
Region 4 Northeast	1	5	19	--	25
Region 5 Northwest	9	5	6	1	21
Region 6 South Central	6	11	14	--	31
Region 7 Southwest	1	9	21	4	35
Region 8 St. Louis	22	7	7	11	47
Region 9 Central	3	7	9	--	19
Total	76	76	114	26	292

*Source: MDESE, 2013

The framework of professional learning community in Missouri is important for two reasons. First, it is imperative to understand the alignment between how professional learning community is measured in the survey and teachers' experience with professional learning community promoted by the MO PLC. While it is impossible to ensure that

every participant in the TOTL survey holds to the same beliefs or understanding about professional learning community, one could reasonably argue that the information coming from the education department within the state would have at least some influence or effect on those understandings.

The second aim for understanding the environment of the state itself in regards to professional learning community is to better understand the possible environment of the school being studied as well. That is, since the number of schools in Missouri having participated in MO PLC at the time of the TOTL survey administration was almost 300, there is a very good likelihood that some if not many of the 179 schools surveyed had received professional development around professional learning community. There is also the possibility that individual teachers who were surveyed had participated in professional development provided by their corresponding RPDC within their region of the state.

The entire essential curriculum created by MO PLC (MDESE, 2013) can be found in Appendix A, and the alignment between that essential curriculum and the PLC survey items found in the TOTL Survey should be noted. The first PLC statement, *the teachers in this school are continually learning and seeking new ideas*, establishes the primary purpose as learning and assesses effective teams. The second PLC statement, *the teachers in this school are engaged in systematic analysis of student performance*, signals that assessment for learning, systematic process for intervention and student success, and an understanding of what students need to know and do are evident. The next three PLC statements: *the teachers in this school are encouraged to experiment with their teaching*, *the teachers in this school trust each other*, and *the teachers in this school*

feel responsible to help each other do their best, all quantify the foundation for learning community culture and how effective building level leadership teams work. Finally, the last two PLC statements: *the teachers in this school share ideas and teaching practices* and *the teachers in this school share both failure and success in teaching* are indicative of continuous improvement.

Based upon the findings of the previous empirical studies which examined professional learning communities and student achievement in addition to the Missouri context of professional learning community, I have hypothesized that the middle schools with a higher level of teachers' trust in their principals are more likely to have a higher student mathematics achievement level controlling for teacher and school background characteristics, and this relationship is mediated by professional learning community. Indeed, if the State of Missouri has initiated the MO PLC in an effort to improve schools, it has recognized the importance of professional learning community in regards to increasing student achievement. Likewise, the previous studies (Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010) have all found professional learning communities to have a statistically significant relationship with student achievement.

Current Study and Significance

As mentioned previously, this research study will add to the knowledge produced by previous studies by exclusively examining the relationship among teachers' trust in their principals, professional learning community, and student achievement in the middle school setting. It is significant in that it: (a) replicates previous studies in another setting,

(b) uses statewide data, thus covering a larger number of school districts, (c) examines a number of teacher and school background characteristic variables as predictors of teacher trust in the principal and professional learning community not used in previous research, and (d) focuses on the middle school context.

To date, four empirical studies have examined the level of teacher trust in the principal, professional learning community, and student achievement (Bryk & Schneider, 2004; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010). The studies of Sebastian and Allensworth (2012), as well as Supovitz et al. (2010), included trust in principal under a larger construct of principal leadership along with a focus on the mission and goals of the school and a focus on instruction. Replications studies are important in that they give added credence to earlier findings, and in some cases, allow for a larger generalization of the findings (Bonett, 2012; Bueno de Mesquita et al., 2003; Leithwood & Jantzi, 2000). This study replicates previous research surrounding teacher trust in leadership, professional learning community, and student achievement in another setting – middle schools.

An additional significance of this study is the use of statewide data from multiple school districts. Both the Bryk and Schneider study (2004) and the Sebastian and Allensworth study (2012) were limited to a single school district – Chicago Public Schools. Likewise, the study by Supovitz et al. (2010) was taken from a single, unidentified school district in a Southeastern state. The study of Louis et al. (2010) used the data from across the country, examining 106 schools from 43 districts in nine states. However, it should be noted that they used the student achievement data on the different state tests in nine states.

This dissertation study, by utilizing the student achievement data within a single state, ensures that the possible differences among state assessments used in each school district is eliminated. Additionally, because it examines 179 schools across 117 school districts within the state, it actually provides an even larger sample size than the multistate study of Louis et al. (2010).

Moreover, this study is significant because it examines many additional teacher background characteristics on the levels of teacher trust in the principal and professional learning community reported by teachers in the middle schools which have not previously been examined. Three of the four most relevant studies (Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010) did not examine the effects of any teacher background characteristics on the level of teacher trust in the principal or the level of professional learning community reported. The study by Bryk and Schneider (2004) was the only study that examined teacher background characteristics: gender, race, and experience. This dissertation study, by examining additional predictor variables of teacher background characteristics not previously studied, namely degrees held, math certification, math major, and math education major, has significance and can provide findings that add to the previous research.

Additionally, this study also examines the relationship between school background characteristics and the levels of teacher trust in the principal and professional community reported by teachers in the middle schools. Similar to previous studies (Bryk & Schneider, 2004; Sebastian & Allensworth, 2012; Supovitz et al., 2010), this study also examines the effects of school socioeconomic level, size, and minority enrollment on the levels of teacher trust in principal and professional learning community. In contrast, an

additional school background characteristic not previously studied, but included in this dissertation research, is school location. The previous studies (Bryk & Schneider, 2004; Sebastian & Allensworth, 2012; Supovitz et al., 2010) were all conducted within single, large urban school districts.

Thus, only one study (Bryk & Schneider, 2004) has analyzed both teacher and school background characteristics and has shown that such variables can have a significant impact on both the levels of trust in the principal and of professional learning community. If the levels of trust and professional community are influenced by such background characteristics, then it is important to identify such characteristics. This study, by utilizing statewide data from 117 school districts, allows us to examine the effects of school location, rural vs. urban, on the levels of teacher trust in the principal and levels of professional learning community reported by teachers.

Finally, this study is significant because of its focus on the middle school data. This researcher has decided to carefully examine how professional learning community might mediate the relationship between teacher trust in principal and student achievement in middle schools only. The Louis et al. (2010) study included elementary, middle, and high schools, but they grouped all middle school and high school data into one “secondary schools” variable. The Sebastian and Allensworth (2012) study focused on high schools, and the Supovitz et al. (2010) study analyzed elementary and middle data without separating the middle school data. By teasing out the effects of middle schools on the levels of teacher trust in the principal and professional learning community reported by teachers, this research adds to the previous research.

Summary

In summary, because it is believed that trust is the foundation of positive relationships in an organization, and previous research suggests that such relationships have an impact on student achievement and school success, this study carefully examines the level of trust in middle schools. By examining the data from a statewide survey of middle school mathematics teachers, the researcher determines the effects of teacher and school background characteristics on the level of teachers' trust in their principals and professional learning community in schools. Additionally, the study examines the relationships between professional learning communities and the level of trust within buildings and how professional learning community mediate the relationship between teacher trust in their principals and middle school student achievement levels. While some other studies have also examined this triadic relationship (Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010), they did not exclusively examine middle schools. Also, they included other factors under the umbrella of principal leadership besides trust in the principal. This study is designed to focus on the isolating effects of teacher trust in the principal alone and specifically examining its effects in the middle school setting. This studies focus only on the middle schools provides both a contrast and a comparison for the previous studies which may help to highlight differences among the relationship of teacher trust in principals, professional learning community, and student achievement at various school levels. In essence, it replicates previous studies at a single school level. As Mackey states, "Replication studies are necessary to more effectively control for extraneous variables that might have confounded the original findings" (Porte, 2012).

Accordingly, this study will address the following questions:

1. What is the level of teacher trust in their principals and how does the level differ by teacher and school background characteristics in middle schools?
2. What is the level of professional learning community reported by teachers and how does the level differ by teacher and school background characteristics in middle schools?
3. How is the level of teacher trust in their principals associated with the level of professional learning community controlling for teacher and school background characteristics?
4. How is the school level of teacher trust in their principals associated with school mean middle school student mathematics achievement and how does the professional learning community mediate this relationship?

Chapter 3: Research Methods

Research Design

This study conducted a secondary analysis of a portion of the Teachers' Opportunity to Learn (TOTL) survey data collected by Dr. Motoko Akiba in the Department of Educational Leadership and Policy Studies at the Florida State University. The survey was administered to the population of 896 middle school mathematics teachers in 179 schools in 117 school districts in the State of Missouri.

Data Collection Sample

The entire population of 896 mathematics teachers who were teaching in all middle schools (grades 6-8) in the state of Missouri as of January, 2011, were invited to participate in a paper-and-pencil survey named Teachers' Opportunity to Learn (TOTL) survey during the spring of 2011. The research team that developed the TOTL survey obtained updated restricted-use core datasets on students, teachers, schools, and districts from the MDESE in January, 2011, and a master list of middle school mathematics teachers was created as the survey mailing list. The teacher surveys were sent to the school address of each teacher in early January, and two follow-up postcards and two follow-up surveys were mailed from February to May. Each teacher who completed the survey received a \$30 gift card from a major retailer. After four follow-ups, 626 teachers completed the survey, with the response rates of 70%.

Demographic information about the gender (percentage of female), certification (percentage holding a mathematics certification), and degree level (percentage holding a

master's degree or above) of the survey participants can be found in Table 2 along with a comparison of the characteristics of mathematics teachers in middle schools across Missouri and a national sample. The middle school mathematics teacher characteristics are presented in the first row and the characteristics of the middle schools in which they worked are presented in the second row.

Of the 626 middle school math teachers who participated in this study, 503 or 80.4% were female, 80.7% held full math certification, and 68.5% held a master's degree or above. These characteristics of the survey participants are similar to the characteristics of the population of Missouri middle school mathematics teachers except for the degree level. The teachers who hold a master's degree or above are overrepresented in the survey participants (68.5% vs. 34.4% in the population). Compared to the national sample of middle school mathematics teachers, there are more female (80.4% vs. 70.0%), more teachers with a math certification (80.7% vs. 59.5%), and more teachers with a master's degree or above (68.5% vs. 52.4%).

Additional predictor variables included in Table 2 without comparable state or national data are years of experience and the percentage of teachers majoring in math and math education while an undergraduate or graduate student. Beginning teachers with 0 to 5 years of teaching experience accounted for 22.2% of the respondents, and experienced teachers with more than 15 years of teaching experience accounted for 30.0% of the respondents. 17.4% were math majors and 38.2% were math education majors while either an undergraduate or graduate student.

Table 2 also presents the demographic data for the 179 middle schools of these mathematics teachers: mean school enrollment size, school location, school poverty level

(mean percentage of students receiving free or reduced priced lunch), and mean percentage of ethnic minority students. The middle schools from which mathematics teachers participated in the survey ranged from just 35 students to 1,479 students with a mean size of 523 students in grades 6-8. There were 26 urban schools (14.5%), 95 suburban schools (53.1%), and 58 rural schools (32.4%) among the 179 schools surveyed which was comparable to the population of Missouri from which the sample was taken. The percentage of students receiving free or reduced lunch prices ranged from 8.2% to 95.7% among the schools with a mean of 42.7%. The percentage of ethnic minority students in the 179 schools ranged from 0.0% to 99.4% with the mean percentage of ethnic minority students at 23.2% which is comparable to the population of Missouri but just half of the national sample (45.0%).

While the mean size of the middle schools within the study was 523 students compared to the mean size of 435.3 in the population of Missouri, it is important to note that only 9 schools from the entire state were not included in this statewide survey of Missouri middle schools. Compared to the national sample, this study had less than half the percentage of urban schools (14.5% vs. 34.6%), more suburban schools (53.1% vs. 39.1%), and more rural schools (32.4% vs. 26.3%). The mean percentage of students receiving free and reduced lunch (42.7%) was comparable to both the population and national sample.

Variables

Appendix B lists all the variables, survey questions, original coding, and final coding for all the variables on teachers' trust in leadership, professional learning

communities, and control variables. Reliability indices of Cronbach alphas are also reported for composite variables.

Table 2

Comparison among survey participants, teacher population in Missouri and national sample

Variable	Survey Participants	Population in Missouri	National Sample ¹
Middle School Math Teachers	N = 626	N = 886	N = 370
% Female	80.4	76.2	70.0
% Math Certification	80.7	81.0	59.5
% Master Degree or Above	68.5	34.4	52.4
% 0 to 5 yrs Exp.	22.2		
% 15+ yrs. Exp.	30.0		
% Math Major	17.4		
% Math Ed. Major	38.2		
Middle Schools	N = 179	N = 188	N = 179
Mean School Size	523.0	435.3	656.8
Location			
% Urban	14.5	17.0	34.6
% Suburban	53.1	51.6	39.1
% Rural	32.4	31.4	26.3
Mean % FRL	42.7	41.1	47.8
Mean % Minority	23.2	21.8	45.0

Source: ¹The national statistics on middle school mathematics teachers came from the NCES Schools and Staffing Survey (SASS) 2007-2008 (unweighted data) and the statistics on G6-8 middle schools came from the NCES Common Core Data 2008-2009.

Teachers' Trust in Leadership

For the measure of teachers' trust in leadership, teachers were asked to what extent they agree or disagree (1 = strongly disagree, 2 = disagree, 3 = neither disagree or agree, 4 = agree, 5 = strongly agree) ($\alpha = .918$) with the following statements about their principals: 1) *My principal facilitates collaboration and communication among teachers,* 2) *My principal understands math teaching and learning and discusses them with teachers,* 3) *My principal understands and supports my professional goals and learning*

needs, 4) *My principal provides constructive feedback on my instruction*, 5) *I can share my feelings, worries, and frustrations with my principal*, and 6) *I respect my principal as an instructional leader*. These items are well aligned with the four facets of trust identified by Tschannen-Moran (2004): benevolence, honesty, openness and reliability, and competence (see Table 3).

The teachers' perceived benevolent nature of the principal was measured in a statement "*My principal provides constructive feedback on my instruction.*" Feedback that is perceived to be less than constructive might be considered negative, critical, or harmful. This type of feedback would be contrary to benevolence, and therefore agreement with the statement would be an indication of trust in the principal.

Disagreement with the statement, "*I can share my feelings, worries, and frustrations with my principal,*" for example, would signal that the teacher perceives their principal to be less than honest. Agreement with the statement would show a level of teacher trust in the leader. The next two aspects of trust, openness and reliability, may be found in the statements, "*My principal facilitates collaboration and communication among teachers*" and "*My principal understands and supports my professional goals and learning needs.*" Agreement with these two statements would point out that the teachers believe their principal to be open and reliable, and therefore they are more likely to have a higher level of trust. The level of agreement or disagreement with the statements, "*My principal understands math teaching and learning and discusses them with teachers*" and "*I respect my principal as an instructional leader,*" clearly signals the level of competence, as well as the level of trust, perceived by the teachers. Thus, by carefully examining how

the teachers responded to the aforementioned statements, this study will ascertain the level of teachers' trust in the principal.

Table 3
Survey Questions Addressing Four Facets of Trust

Survey Question	Possible Corresponding Facets of Trust*
1. My principal provides constructive feedback on my instruction.	<i>Benevolence</i>
2. I can share my feelings, worries, and frustrations with my principal.	<i>Honesty</i>
3. My principal facilitates collaboration and communication among teachers. 4. My principal understands and supports my professional goals and learning needs.	<i>Openness and Reliability</i>
5. My principal understands math teaching and learning and discusses them with teachers 6. I respect my principal as an instructional leader.	<i>Competence</i>

* - Tschannen-Moran (2004)

Professional Learning Community

Once again, the essential curriculum outlined by the Missouri Professional Learning Community Project is formulated around three main ideas of professional learning community: focused on learning, collaborative culture, and results oriented.

Additionally, MO PLC identifies eight strands (MDESE, 2013) of the essential curriculum as follows:

1. Foundation for learning community culture
2. How effective building-level leadership teams work
3. Administrative leadership
4. How effective teams work
5. What students need to know and do
6. Assessment for learning
7. Systematic process for intervention & student success
8. Continuous improvement

The key components or guiding themes within each of those strands can also be found in Appendix A. Careful examination of the eight strands shows much congruence to the questions used in the TOTL survey to assess professional learning community. These items were adopted from the CTP's (2001b) measures of professional learning community. The first six items were taken from the CTP's teacher survey (2001a) and the last item was added by the researcher. In the survey, teachers were asked what extent they agree or disagree (1 = strongly disagree, 2 = disagree, 3 = neither disagree or agree, 4 = agree, 5 = strongly agree) ($\alpha = .895$) with the following seven statements:

The teachers in this school:

- 1) *are continually learning and seeking new ideas.*
- 2) *are engaged in systematic analysis of student performance data.*
- 3) *are encouraged to experiment with their teaching.*
- 4) *trust each other.*
- 5) *feel responsible to help each other do their best.*
- 6) *share ideas and teaching practices.*
- 7) *share both failure and success in teaching.*

The higher the level of agreement with these statements would signal that teachers perceive a higher level of professional learning community within their school setting. It is obvious that higher agreement also signals a community focused on learning, with a collaborative culture, and results-oriented.

Student Achievement

In addition to the aforementioned data acquired through the TOTL Survey, the eighth grade mathematics assessment data from the statewide 2011 Missouri Assessment Program (MAP) was obtained for each of the schools surveyed via the Missouri Department of Elementary and Secondary Education (MDESE) website. This data gives the percentage of eighth graders within each school who scored at the proficient level or above on the 2011 MAP math assessment.

Reliability of Survey Assessment

While starting to analyze the data pertaining to each research question presented in this study, the internal consistency estimate of reliability for the six teacher trust variables on the TOTL survey was determined. The reliability analysis of the teacher trust variables yielded a Cronbach's alpha of .918 signaling an excellent internal consistency. An additional internal consistency estimate of reliability for the seven professional learning community variables was also conducted. The reliability analysis of the professional learning community variables produced a Cronbach's alpha of .895, also an indicator of good internal consistency.

Teacher Background Characteristics

Five individual teacher characteristics were collected: 1) gender (0 = male, 1 = female), 2) ethnic minority status (0 = white, 1 = African American, Hispanic, Asian/Pacific Islander, American Indian/Alaska native, or other), 3) total teaching experience (two dummy variables for new teachers with one to five years of experience

and experienced teachers with more than fifteen years, and 4) education level of master's degree or above (1 = yes, 0 = no).

School Background Characteristics

In addition, four school background characteristics were collected: 1) school location (two dummy variables for urban and rural with reference variable of suburban), 2) percentage of students receiving free/reduced-price lunch, 3) percentage of white students, and 4) school size.

Analysis

For the first research question, descriptive statistics and frequencies were computed to present the levels of teacher trust in their principals and a multiple regression analysis was conducted to examine the relationship between the teacher and school background characteristics and the level of teacher trust in their principals. For the second question, descriptive statistics and frequencies were computed to present the level of professional learning community and a multiple regression analysis was conducted to examine how the level of professional learning community is associated with teacher and school background characteristics. For the third research question, a multiple regression analysis was conducted to examine the relationship between teacher trust in their principals and professional learning community, controlling for teacher and school background characteristics. Finally, for the last research question, the first step was to establish a relationship between the mean school level of teacher trust in the principal and mean school achievement controlling for school background characteristics. That is,

prior to determining if a professional learning community mediates the relationship between the level of teacher trust in the principal and student achievement, one must first establish that the level of teacher trust has a direct influence on the level of student achievement and therefore a relationship to be mediated. A multiple regression analysis was conducted to determine if a relationship existed. As will be presented in more detail in the subsequent chapters, no direct relationship was found, and this led to additional analyses.

Chapter 4: Research Findings

Introduction

Currently, we are living in an era of high stakes testing and conversations about tethering teacher performance evaluations to student test scores. Such pay-for-performance conversations undoubtedly add undue stress to educators and may create competition driven schools and classrooms. Such an environment could undermine the level of trust in a school, which research has shown to be an important component to school success (Bryk & Schneider, 2002). Thus, the reform efforts designed to improve schools may be having the opposite effect, and it is therefore critical to carefully examine how trust in school leadership is related to a school's performance. As stated in the first chapter, the survey research reported here examined in detail the relationship among teachers' trust in their principals, professional learning community, and student achievement.

Test for Multicollinearity

Before completing the descriptive statistics and frequencies for the teacher and school background characteristics, a Kendall's tau correlation was conducted in order to check for multicollinearity among background variables prior to a regression analysis. Multicollinearity is a common problem in many correlation analyses and arises when there is a strong correlation between two or more predictors in a regression model (Field, 2005). Kendall's tau is a nonparametric measure of the agreement between two rankings. The results of the Kendall's tau correlations can be found in Tables 4 and 5. Table 4

presents the correlation coefficients among teacher background characteristics based on data from 626 teachers, and Table 5 presents the coefficients among school background characteristics based on data from 179 schools. The largest coefficients among teacher variables was -0.366 between the degree and a dummy variable of 0-5 years of teaching experience. Among school variables, the largest coefficient was 0.492 between rural schools and the percentage of white students. Based upon the general rule of thumb for Kendall's tau which states that correlations of at or below 0.80 are good indicators that multicollinearity is not present, the tables show this to be the case for sets of characteristics within this study. Without any strong correlations between the statistically significant demographic variables, we are able to proceed with the multiple regressions for the testing of the four research questions.

Table 4 *Correlation of Teacher Background Characteristics*

Variable	Gender	Ethnic minority	0-5 Years of Experience	16+ Years of Experience	Degree Held	Math Cert.	Math Major	Math Ed Major
Gender								
Correlation Coefficient	1.00							
Sig. (2-tailed)								
N	626							
Ethnic minority status								
Correlation Coefficient	-.011	1.00						
Sig. (2-tailed)	.783							
N	626	626						
0-5 Years of Experience								
Correlation Coefficient	.016	-.010	1.00					
Sig. (2-tailed)	.683	.793						
N	626	626	626					
16+ Years of Experience								
Correlation Coefficient	-.061	.004	-.350**	1.00				
Sig. (2-tailed)	.128	.917	.000					
N	626	626	626	626				
Degree Held								
Correlation Coefficient	-.046	-.010	-.366**	.226**	1.00			
Sig. (2-tailed)	.252	.796	.000	.000				
N	626	626	626	626	626			
Math Certification								
Correlation Coefficient	0.18	.026	.018	-.121**	.069	1.00		
Sig. (2-tailed)	.651	.520	.650	.003	.084			
N	626	626	626	626	626	626		
Math Major								
Correlation Coefficient	.017	.091*	-.022	.030	.039	.203**	1.00	
Sig. (2-tailed)	.675	.023	.577	.453	.329	.000		
N	626	626	626	626	626	626	626	
Math Ed. Major								
Correlation Coefficient	-.024	-.026	.181**	-.092*	-.076	.301**	.255**	1.00
Sig. (2-tailed)	.540	.520	.000	.022	.056	.000	.000	
N	626	626	626	626	626	626	626	626

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed)

Table 5
Correlation of School Background Characteristics

Variable	School Size	Rural School	Urban School	Free/Reduced Lunch	White Students
School Size					
Correlation Coefficient	1.00				
Sig. (2-tailed)					
N	179				
School Location - Rural					
Correlation Coefficient	-.452**	1.00			
Sig. (2-tailed)	.000				
N	179	179			
School Location - Urban					
Correlation Coefficient	.068	-.285**	1.00		
Sig. (2-tailed)	.268	.000			
N	179	179	179		
School Free/Reduced Lunch					
Correlation Coefficient	-.287**	.041	.318**	1.00	
Sig. (2-tailed)	.000	.502	.000		
N	179	179	179	179	
Percentage of White Students					
Correlation Coefficient	-.309**	.492**	-.348**	-.082	1.00
Sig. (2-tailed)	.000	.000	.000	.104	
N	179	179	179	179	179

** Correlation is significant at the 0.01 level (2-tailed)

Teacher Trust in Principal

Next, the descriptive statistics (Table 6) were computed and a multiple regression analysis (Table 7) was conducted in order to address the first research question, “What is the level of teacher trust in the principal and how does the level differ by teacher and school background characteristics?”

The 626 survey respondents chose from a five point Likert Scale from 1 being strongly disagree to 5 being strongly agree to indicate the degree of agreement with the six statements about their principals listed in Table 6. The trust variable with the lowest mean score among all six variables was *My principal understands math teaching and learning and discusses them with teachers* ($\bar{x} = 2.95$). The two trust variables with the

highest mean scores were *My principal facilitates collaboration and communication among teachers* ($\bar{x} = 3.98$) and *My principal understands and supports my professional goals and learning needs* ($\bar{x} = 3.84$).

Table 6
Descriptive Statistics of Teacher Trust in the Principal

	N	Minimum	Maximum	Mean	Std. Deviation
1. My principal facilitates collaboration and communication among teachers.	626	1.00	5.00	3.98	1.14
2. My principal understands math teaching and learning and discusses them with teachers.	626	1.00	5.00	2.95	1.25
3. My principal understands and supports my professional goals and learning needs.	626	1.00	5.00	3.84	1.18
4. My principal provides constructive feedback on my instruction.	626	1.00	5.00	3.45	1.26
5. I can share my feelings, worries, and frustrations with my principal.	626	1.00	5.00	3.55	1.38
6. I respect my principal as an instructional leader.	626	1.00	5.00	3.77	1.26
TRUST	626	1.00	5.00	3.59	1.05

Value Range for Scale: 1 = Strongly Disagree to 5 = Strongly Agree

For the purpose of answering the four main research questions, the mean of the six teacher trust variables was computed in order to create a single trust variable which will, from this point forward, be referred to as TRUST. The last row in Table 6 shows the overall mean score of the TRUST variable ($\bar{x} = 3.59$), which shows that teachers' mean responses to the six statements were between "neither" and "agree." The standard deviation of 1.05 also shows that there is a sufficient variation in this composite variable of TRUST.

A multiple linear regression analysis (Table 7) was used to develop a model for predicting the level of TRUST from the teacher background characteristics (gender, ethnic minority status, teaching experience, master's degree or above, mathematics certification, mathematics major, and mathematics education major) and school background characteristics (enrollment size, location, poverty level, and minority enrollment). The relationship between TRUST and the predictor variables can be expressed with the following equation:

$$TRUST_i = \pi_0 + \beta_1 (gender) + \beta_2 (ethnic\ minority\ status) + \beta_3 (new\ teacher) + \beta_4 (experienced\ teacher) + \beta_5 (masters\ or\ higher) + \beta_6 (math\ cert.) + \beta_7 (math\ major) + \beta_8 (math\ ed.\ major) + \beta_9 (school\ enrollment) + \beta_{10} (rural\ school) + \beta_{11} (urban\ school) + \beta_{12} (free\ and\ reduced\ lunch) + \beta_{13} (percentage\ of\ white\ students) + e$$

Regressing TRUST on the teacher and school background characteristics, the model produced an R-square of only .024, which indicates that only 2.4 percent of the variation in TRUST can be explained by the variability in the teacher or school background characteristics. No statistically significant relationships between teacher and school background characteristics and the level of TRUST can be found except for the

percentage of white students (.005) which was significant at the $p < .05$ level. This result did not support the second hypothesis of this research study, that states, “Female teachers, white teachers, and more experienced middle school teachers tend to show a lower level of trust in their principals than male teachers, ethnic minority teachers, and less experienced middle school teachers.” On the other hand, the second hypothesis, “Middle school teachers in ethnically diverse schools tend to show a lower level of trust in their principals, but the level of teacher trust does not differ by the school size or poverty level” was supported by the data. None of the additional teacher and school variables; degree level, math certification, mathematics or mathematics education major, and school location were significantly associated with the level of teacher trust in the principal.

Table 7
Relationship between Teacher and School Characteristics and Teacher Trust in the Principal

Model Predictor	Coefficient	Std. Error	t	Sig.
(Constant)	3.259	.360	9.054	.000
Gender	.167	.106	1.574	.116
Ethnic minority status	.084	.186	.453	.651
0-5 Years of Experience	-.041	.115	-.354	.724
16+ Years of Experience	-.043	.100	-.425	.671
Masters Degree+	-.112	.100	-1.127	.260
Math Certification	-.090	.114	-.790	.430
Math Major	.137	.117	1.172	.242
Math Ed Major	-.042	.095	-.443	.658
Enrollment Size	.000	.000	1.103	.270
Location – Rural	-.027	.121	-.222	.825
Location – Urban	-.043	.137	-.312	.755
Free/Reduced Lunch	-.001	.003	-.444	.657
White Students	.005*	.002	2.096	.037
Total R ²	.024			

a. Dependent Variable = TRUST

b. Teacher Background Characteristics, n = 626; School Background Characteristics n = 179

c. p<.05*, p<.01**, p<.001***

Professional Learning Community

Next, the descriptive statistics (Table 8) were computed and a multiple regression analysis (Table 9) was conducted in order to address the second research question, “What is the level of professional learning community reported by teachers and how does the level differ by teacher and school background characteristics?” Once again, the 626 survey respondents chose from a five point Likert Scale from 1 being strongly disagree to 5 being strongly agree to indicate the level of agreement with seven statements about teachers in their schools. The PLC variable with the lowest mean score among all six variables was *Teachers are encouraged to experiment with their teaching* ($\bar{x} = 3.57$). The trust variable with the highest mean score was *Teachers share ideas and teaching practices* ($\bar{x} = 3.93$).

Like the trust variables, the mean of all seven professional learning community variables was computed and a single composite variable was established which will now be referred to as PLC. The last row in Table 9 shows the overall mean score of the PLC variable ($\bar{x} = 3.69$). The mean value of 3.69 shows that teachers’ responses were between “neither” and “agree.”

Table 8
Descriptive Statistics of Professional Learning Community

	N	Minimum	Maximum	Mean	Std. Deviation
1. Teachers are continually learning and seeking new ideas.	626	1.00	5.00	3.75	.94
2. Teachers are engaged in systematic analysis of student performance data.	626	1.00	5.00	3.71	.96
3. Teachers are encouraged to experiment with their teaching.	626	1.00	5.00	3.57	1.00
4. Teachers trust each other.	626	1.00	5.00	3.66	1.03
5. Teacher feel responsible to help each other do their best.	626	1.00	5.00	3.59	1.01
6. Teachers share ideas and teaching practices.	626	1.00	5.00	3.93	.95
7. Teachers share both failure and success in teaching.	626	1.00	5.00	3.64	1.05
PLC	626	1.00	5.00	3.69	.78

Value Range for Scale: 1 = Strongly Disagree to 5 = Strongly Agree

A multiple regression analysis was conducted to develop a model for predicting the level of PLC from the teacher background characteristics (gender, ethnic minority status, experience, degree held, certification, and major area of study) and school background characteristics (enrollment size, location, socioeconomic status, and minority

enrollment). The relationship between PLC and the predictor variables can be expressed with the following equation:

$$PLC_i = \pi_0 + \beta_1 (\text{gender}) + \beta_2 (\text{teacher ethnic minority status}) + \beta_3 (\text{new teacher}) + \beta_4 (\text{experienced teacher}) + \beta_5 (\text{masters or higher}) + \beta_6 (\text{math cert.}) + \beta_7 (\text{math major}) + \beta_8 (\text{math ed. major}) + \beta_9 (\text{school enrollment}) + \beta_{10} (\text{rural school}) + \beta_{11} (\text{urban school}) + \beta_{12} (\text{free and reduced lunch}) + \beta_{13} (\text{school ethnic status}) + e$$

Regressing PLC on the teacher and school background characteristics produced an R-square of only .034, which indicates that only 3.4 percent of the variation in PLC can be explained by the variability in the teacher or school background. Similar to the results of the regression on TRUST, few statistically significant relationships between teacher and school background characteristics and the reported level of PLC were found. In fact, the findings of this model show no statistically significant relationships between the teacher background characteristics and the reported level of PLC. The few statistically significant relationships lie within the school background characteristics. Specifically, urban location (.203) and free/reduced lunch levels (-.005), while weak, were both significant at the $p < .05$ level.

The result shows that the third hypothesis, “Ethnic minority teachers, more experienced teachers, and teachers who work in low-enrollment and low-poverty middle schools are more likely to report a stronger sense of professional learning community within their middle schools than white teachers, less experienced teachers, and teachers who work in high-enrollment and high-poverty middle schools” was not supported. The teachers who are working in urban schools and low-poverty schools were more likely to report a slightly higher level of professional learning community, but no teacher

background characteristics or school size predicted the level of professional learning community.

Table 9
Relationship between Teacher and School Background Characteristics and Professional Learning Community

Model Predictor	Coefficient	Std. Error	t	Sig.
(Constant)	3.951	.266	14.850	.000
Gender	-.015	.078	-.188	.851
Ethnic minority status	.141	.137	1.025	.306
0-5 Years of Experience	-.057	.085	-.667	.505
16+ Years of Experience	.144	.074	1.942	.053
Master's Degree or above	-.049	.074	-.670	.503
Math Certification	.027	.084	.326	.744
Math Major	.004	.086	.050	.961
Math Ed Major	.069	.070	.980	.328
Enrollment Size	.000	.000	.149	.882
Location – Rural	-.038	.089	-.425	.671
Location – Urban	.203*	.101	2.008	.045
Free/Reduced Lunch	-.005*	.002	-2.250	.025
White Students	-.002	.002	-.967	.334
Total R ²	.034			

a. Dependent Variable = PLC

b. Teacher Background Characteristics, n = 626; School Background Characteristics n = 179

c. p<.05*, p<.01**, p<.001***

TRUST and PLC

Next, a multiple regression (Table 10) was conducted for the third research question, “How is the level of teacher trust in their principals associated with the level of professional learning community controlling for teacher and school background characteristics?”

The relationship between PLC and the predictor variables can be expressed with the following equation:

$$PLC_i = \pi_0 + \beta_1 (\text{gender}) + \beta_2 (\text{teacher ethnic minority status}) + \beta_3 (\text{new teacher}) + \beta_4 (\text{experienced teacher}) + \beta_5 (\text{masters or higher}) + \beta_6 (\text{math cert.}) + \beta_7 (\text{math major}) + \beta_8 (\text{math ed. major}) + \beta_9 (\text{school enrollment}) + \beta_{10} (\text{rural school}) + \beta_{11} (\text{urban school}) + \beta_{12} (\text{free and reduced lunch}) + \beta_{13} (\text{school ethnic status}) + \beta_{14} (\text{TRUST}) + e$$

The model produced an R-square of .253, which indicates that 25.3 percent of the variation in PLC can be explained by TRUST and teacher and school background variables. The coefficient of .351 shows that the relationship between TRUST and PLC is positive and statistically significant at $p = .001$ level, after controlling for teacher and school background characteristics. This finding supports the third hypothesis of this research study which states that middle school teachers who report a higher level of trust in their principals are more likely to have a stronger sense of professional learning community.

Table 10
Relationship between Teacher Trust in the Principal and Professional Learning Community

Model Predictor	Coefficient	Std. Error	t	Sig.
(Constant)	2.805	.249	11.248	.000
TRUST	.351***	.026	13.359	.000
Gender	-.073	.069	-1.061	.289
Ethnic minority status	.111	.121	.919	.358
0-5 Years of Experience	-.042	.075	-.567	.571
16+ Years of Experience	.159*	.065	2.435	.015
Masters Degree+	-.010	.065	-.153	.879
Math Certification	.059	.074	.797	.426
Math Major	-.044	.076	-.576	.565
Math Ed Major	.084	.062	1.352	.177
Enrollment Size	.000	.000	-.426	.670
Location – Rural	-.029	.079	-.363	.717
Location – Urban	.218*	.089	2.449	.015
Free/Reduced Lunch	-.004*	.002	-2.316	.021
White Students	-.004*	.002	-2.222	.027
Total R ²	.253			

a. Dependent Variable = PLC

b. Teacher Background Characteristics, n = 626; School Background Characteristics n = 179

c. p<.05*, p<.01**, p<.001***

The findings of the other predictor variables within this model are not surprising, because urban schools (.218) and free/reduced lunch levels (-.004) were statistically significant at the $p < .05$ level in the model presented in Table 9. When TRUST was entered into the model, however, the percentage of white students (-.004) became statistically significant, showing that teachers with a larger percentage of white students reported a lower level of professional learning community. This is an interesting finding as the model in Table 7 showed that teachers working in these schools showed a higher level of trust in the principal. This shows that when the level of TRUST is controlled, or when comparing the schools with the level of TRUST, teachers in ethnically diverse schools are more likely to report a higher level of PLC.

In addition, the dummy variable of experienced teachers with more than 15 years of experience became statistically significant, showing that experienced teachers reported a higher level of PLC than teachers with teacher experience of 15 years or less. It should be noted, however, that while not statistically significant in the previous model in Table 7, this dummy variable was close to $p = .05$ level (i.e. $p = .053$).

Because the student achievement level is available only at school level, and the next analysis examining the last research question was conducted at the school level, the relationship between TRUST and PLC was also examined using school-level aggregates of TRUST and PLC (school mean TRUST and PLC), controlling for only school-level school background characteristics. The result of this multiple regression is presented in Table 11.

Table 11*Relationship between school mean TRUST and school mean PLC*

Model Predictor	Coefficient	Std. Error	t	Sig.
(Constant)	.370	.291	11.248	.205
TRUST	.369***	.045	13.359	.000
Enrollment Size	.000	.000	-.426	.814
Location – Rural	-.062	.097	-.363	.526
Location – Urban	.151	.122	2.449	.219
Free/Reduced Lunch	-.004	.003	-2.316	.124
White Students	-.003	.002	-2.222	.185
Total R ²	.318			

a. Dependent Variable = PLC

b. Teacher Background Characteristics, n = 626; School Background Characteristics
n = 179

c. p<.05*, p<.01**, p<.001***

This model produced an R-square of .318, which indicates that 31.8 percent of the variation in school mean PLC, a slight increase from the first model, can be explained by TRUST and school background variables. The findings about TRUST presented in this model also support the third hypothesis of this research study which stated that those schools with a higher level of trust in their principal also have a higher level of professional learning community reported by their teachers. TRUST remained moderately strong (.369) and statistically significant at the p = .001 level.

An interesting finding with this second model was the fact that three variables in the previous model no longer remained statistically significant. Namely, the urban schools, free and reduced lunch, and percentage of white students variables all lost

statistical significance within this model. Nonetheless, the findings show that in regards to the relationship between TRUST and PLC, for every unit increase in TRUST the level of PLC increases by 0.369 units. This apparent relationship between PLC and TRUST warranted continuation to the last and final research question regarding student achievement.

TRUST, PLC, and Student Achievement

Before proceeding to the analyses addressing the last research question, I examined bivariate relationships among three major variables using Pearson R correlation analyses at the school level. Table 12 shows that all three variables are significantly associated with one another. The relationship between TRUST and PLC was especially strong with a coefficient of .526 and statistically significant at $p = .01$ level, and Table 11 showed that this significant relationship remained even after controlling for school background characteristics. The relationships between TRUST and Student achievement, and between PLC and student achievement were smaller, yet positive and statistically significant at $p = .05$ level. The following analyses addressing the last question examined these relationships controlling for school background characteristics.

Table 12
Correlation among TRUST, PLC, and Student Achievement at School Level

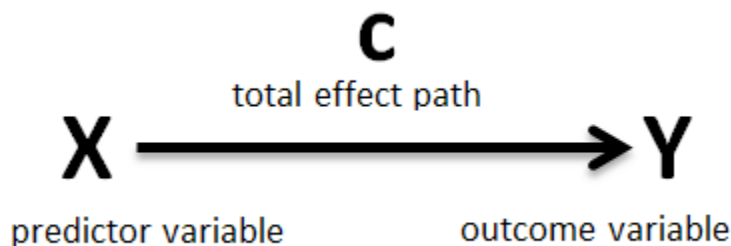
Variable	TRUST	PLC
PLC		
Correlation Coefficient	.526**	
N	179	
Student Achievement		
Correlation Coefficient	.189*	.182*
N	179	179

$p < .05^*$, $p < .01^{**}$

The final research question, “How is the school level of teacher trust in their principals associated with school mean student achievement and how does the professional learning community mediate this relationship?”, was also addressed through a series of multiple regression analyses.

David A. Kenny (2013) presents a mediational model, or causal model, which if correctly specified, contains paths that can be estimated by multiple regression. Figure 2 and 3 show Kenny’s unmediated and mediated models.

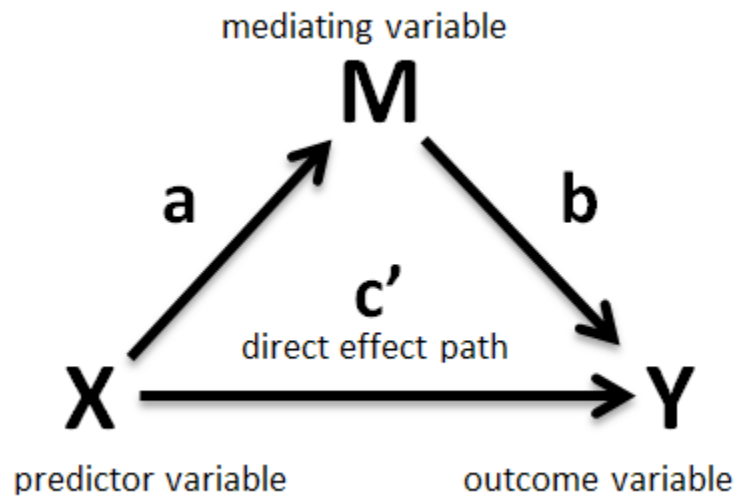
Figure 2
Unmediated Model



Note. Retrieved from <http://davidakenny.net/cm/mediate.htm> by David A. Kenny, 2012. Reprinted with permission.

Kenny's unmediated model shows the relationship between the initial and outcome variables. Note that the X variable causes the Y variable.

Figure 3
Mediated Model



Note. Retrieved from <http://davidakenny.net/cm/mediate.htm> by David A. Kenny, 2012. Reprinted with permission.

In Kenny's mediated model, the mediating variable is an intervening or process variable which can partially or completely mediate the relationship between X and Y. In partial mediation, the direct effect path is reduced in size but different from zero. In complete mediation, Y is no longer affected by X and so the path becomes zero (Kenny, 2013).

In order to estimate the paths through multiple regression, Kenny (2013, para. 5) recommends researchers to follow these steps:

Step 1: Show that the predictor variable is correlated with the outcome by using Y as the criterion variable in a regression equation and X as a predictor. This step establishes that there is an effect that may be mediated.

Step 2: Show that X is correlated with the mediating variable. Use M as the criterion variable in the regression equation and X as a predictor. This step basically comprises treating the mediator as if it were an outcome variable.

Step 3: Show that the M affects Y by using Y as the criterion variable in a regression equation and X and M as predictors. It is not enough to correlate the mediator with the outcome; M and Y may be correlated because they are both caused by X. Thus, the initial variable must be controlled in establishing the effect of M on Y.

Step 4: Determine if M completely mediates the X-Y relationship. The direct effect path should be zero if it does.

As suggested, a series of multiple regression analyses were necessary in order to address each of Kenny's steps and ascertain the effects of an interaction of TRUST and PLC to determine mediation. The first regression (Table 13) was on the relationship between school mean teacher trust and school mean student achievement, and this model included only the school background characteristic variables as well. Once again, the

school-level data file was used for this multiple regression analysis, and this first model is represented with the following equation:

$$\text{Student Achievement}_i = \pi_0 + \beta_1 (\text{school enrollment}) + \beta_2 (\text{rural school}) + \beta_3 (\text{urban school}) + \beta_4 (\text{free and reduced lunch}) + \beta_5 (\text{percentage of white students}) + \beta_6 (\text{TRUST}) + e$$

Table 13
Relationship between School Mean TRUST and Student Achievement
Controlling for School Background Characteristics

Model Predictor	Coefficient	Std. Error	t	Sig.
(Constant)	68.202	5.196	13.126	.000
School Mean TRUST	.740	.795	.931	.353
Enrollment Size	.003	.003	.949	.344
Location – Rural	-2.069	1.741	-1.188	.236
Location – Urban	2.608	2.183	1.195	.234
Free/Reduced Lunch	-.421***	.046	-9.132	.000
White Students	.167***	.035	4.802	.000
Total R ²	.649			

- a. Dependent Variable = Percentage of students who met the proficient or advanced level.
- b. n = 179
- c. p<.05*, p<.01**, p<.001***

As Table 13 shows, the model produced an R-square of .649, which indicates that 64.9 percent of the variation in student achievement can be explained by school mean TRUST and school background characteristics. However, the coefficient for the relationship between school mean TRUST and student achievement was not statistically significant. This means that there is no direct effect of school mean TRUST on student

achievement and there is no mediation effect by school mean PLC as well. The last hypothesis, “The middle schools with a higher level of teachers’ trust in their principals are more likely to have a higher student mathematics achievement level controlling for teacher and school background characteristics, and this relationship mediated by professional learning community,” was not supported by the data.

It should be noted that two of the school background characteristic variables, free/reduced lunch percentage (-4.21) and white student enrollment percentage (.167) were both statistically significant at the $p < .001$ level. These relationships show that: 1) as the level of poverty in a school increases, the level of student achievement decreases, and 2) as the percentage of white students increase, the student achievement increases.

Although step two of Kenny’s process (2013) was unnecessary, this researcher further examined if any correlation existed between PLC and student achievement, because the previous literature supported this relationship. Therefore, another multiple regression analysis, presented in Table 14, was used to determine if school mean PLC was associated with school mean student achievement irrespective of school mean TRUST.

Similar to the regression for school mean TRUST, the relationship between school mean achievement and school mean PLC, controlling for four school background characteristics, was not statistically significant. The coefficient is positive and the p-value is .088, close to the $p = .05$ level. Yet, it was not statistically significant. Once again, the percentage of free/reduced lunch students (-.414) and the percentage of white students enrolled (.173) were both statistically significant at the $p < .001$ level. These

results confirm again that the fourth hypothesis was not supported by the current data focused on middle schools in Missouri.

Table 14
Relationship between PLC and Student Achievement Controlling for School Background Characteristics

Model Predictor	Coefficient	Std. Error	t	Sig.
(Constant)	67.473	5.174	13.041	.000
School Mean PLC	1.963	1.145	1.714	.088
Enrollment Size	.003	.003	.929	.354
Location – Rural	-1.948	1.733	-1.124	.262
Location – Urban	2.310	2.173	1.063	.289
Free/Reduced Lunch	-.414***	.046	-8.956	.000
White Students	.173***	.035	5.001	.000
Total R ²	.641			

- a. Dependent Variable = School Student Achievement
- b. n = 179
- c. p<.05*, p<.01**, p<.001***

Chapter 5: Discussion

Introduction

This chapter is organized by the four research questions. The findings are summarized and discussed in comparison to the findings from the previous empirical studies. Then the study limitations and future research agenda will be discussed. The chapter will conclude with policy and leadership implications of the findings.

RQ1. What is the level of teacher trust in their principals and how does the level differ by teacher and school background characteristics in the middle school?

The survey data collected from 626 middle school mathematics teachers showed that the mean level of teacher trust in the principal (TRUST) was 3.59 on a five point scale ranging from 1= strongly disagree to 5 = strongly agree. The mean level of 3.59 indicates that their level of agreement with six statements about their principals was between “neither” and “agree,” showing a slightly positive average level of teacher trust in the principal.

In regards to the effects of teacher background characteristics on the levels of teacher trust in principal, I had hypothesized that female teachers, white teachers, and more experienced middle school teachers tend to show a lower level of trust in their principals than male teachers, ethnic minority teachers, and less experienced middle school teachers (hypothesis 1). This was not supported by the data, as none of those teacher background characteristics were found to be statistically significant. This was in stark contrast to the findings by Bryk and Schneider (2004) whose study found that

teacher gender, teacher ethnic minority status, and teacher experience were all statistically significant. A possible reason for this discrepancy perhaps lies in the fact that only middle school teacher data was used within this dissertation study. Another possible reason for this discrepancy may be the small percentage of ethnic minority teachers (6.2%) included in this study. It should also be noted that the additional teacher background characteristics which were not examined in previous studies, namely degree held, math certification, math major, and math education major were not statistically significant either. It is possible that these teacher background characteristics, which are more closely related to content knowledge skill sets and have less to do with the softer relational skill sets, may have a more direct influence upon the instructional practices of teachers instead. As mentioned earlier, though, a limitation of this study was the absence of an instruction variable, and so this could not be analyzed.

In regards to the effects of school background characteristics on the levels of teacher trust in the principal, the data supported the second hypothesis, “Middle school teachers in ethnically diverse schools tend to show a lower level of trust in their principals, but the level of teacher trust does not differ by the school size or poverty level.” The findings on the relationship between ethnic diversity and the level of teacher trust in the principal was consistent with the finding from Bryk & Schneider (2004) which found a negative relationship between these two factors. This p value was .037, slightly smaller than the cutoff point of $p = .05$. The lack of statistically significant relationship between school poverty level and TRUST was also consistent with the previous studies (Bryk & Schneider, 2004; Forsyth et al., 2006; Sebastian and Allensworth, 2012). Also comparable to the findings of Bryk and Schneider (2004) and

Sebastian and Allensworth (2012), the enrollment size of the school was also not significant. Another interesting and somewhat surprising finding was that the location of the school, rural vs. urban, was also not found to be statistically significant. My initial assumption was that rural schools, because they are found in much smaller communities with well established relationships between families and neighbors, would have higher levels of trust than the schools in more disconnected cities. This finding along with that of the lack of influence of poverty, though, suggests that schools, regardless of location, are able to create tightknit communities and trusting relationships inside of seemingly larger perhaps even unfavorable conditions.

In summary, most teacher and school background characteristics do not appear to influence the level of teacher trust in the principal reported by middle school teachers. Teachers working in ethnically diverse schools tend to report a lower level of trust in the principal, but no other teacher or school characteristics were associated with the level of teacher trust in the principal. A possible reason for the lower level of trust reported in ethnically diverse schools might be racial and ethnic tension. As Bryk and Schneider (2004) point out, “the absence of racial and ethnic tensions in the school community makes it easier to maintain social trust” (p. 97).

RQ2. What is the level of professional learning community reported by teachers and how does the level differ by teacher and school background characteristics in the middle school?

The survey data collected from 626 middle school mathematics teachers showed that the mean level of professional learning community (PLC) was 3.69 on a five point scale ranging from 1= strongly disagree to 5 = strongly agree. The mean level of 3.69

indicates that their level of agreement with six statements about their school was between “neither” and “agree,” showing a slightly positive average level of professional learning community. It is also worth noting that the mean for all professional learning community variables were slightly higher than those of teacher trust in the principal.

The analysis tested the third hypothesis, “Ethnic minority teachers, more experienced teachers, and teachers who work in low-enrollment and low-poverty middle schools are more likely to report a stronger sense of professional learning community within their middle schools than white teachers, less experienced teachers, and teachers who work in high-enrollment and high-poverty middle schools.” The result of a multiple regression analysis showed that this hypothesis was not supported by the data.

In regards to the effects of teacher background characteristics on the levels of professional learning community reported by participants, again none of them were found to be statistically significant. Once again, the findings of this dissertation study are in contrast to the findings of Bryk and Schneider (2004) in regards to both ethnic minority status and years of experience. Whereas Bryk and Schneider (2004) found that teachers of minority and teachers with more experience reported higher levels of professional learning community, this study did not. Once again, because only 6.2 percent of the teachers in this study were ethnic minorities, it is possible that we did not have a large enough sample size of minority teachers to detect any noticeable differences. Moreover, as the Missouri Context for Professional Learning Community section in Chapter 2 might suggest, the long term professional development in the state concerning professional learning community may have influenced these findings. Had the study been able to use a measure of professional learning community over time, perhaps a significant finding

would have emerged. An additional lack of significance was found with the teacher background characteristics not studied previously, namely degree held, math certification, math major, math education major. As stated above, these teacher background characteristics may have more influence on the instructional practices of the teachers rather than on the softer relational skills required to build professional communities. Additionally, because the survey participants were all middle school mathematics teachers, perhaps these characteristics are so closely related as to be tautological, though the findings of this study did not find any significant correlations between them.

As to the school background characteristics associated with the level of professional learning community reported by middle school mathematics teachers, the school location (urban) and poverty level of students were both statistically significant. The second finding is in contrast to the findings of Forsyth et al. (2006) and Sebastian and Allensworth (2012) who found no statistically significant relationship between the poverty level of the school and the level of professional learning community reported. This finding does, however, support that of Lee and Smith (1996), who also found a statistically significant relationship between the poverty level of the school and the level of professional learning community reported. The reason that poverty level may have an effect on professional learning community and not on the level of teacher trust in the principal may be its relationship to student achievement. That is, previous research has shown that schools in poverty tend to have lower academic achievement. The lack of academic gains among students may cause teachers to have a sense of defeat which would be detrimental to the tenets of professional learning community.

RQ3. How is the level of teacher trust in their principals associated with the level of professional learning community controlling for teacher and school background characteristics in the middle school?

When it comes to the level of trust in the principal and the level of professional learning community within the school, the multiple regression result showed a statistically significant and positive relationship between these factors, controlling for teacher and school background characteristics. This finding supports the fourth hypothesis, “The middle school teachers who report a higher level of trust in their principals are more likely to have a stronger sense of professional learning community,” and is consistent with the previous research surrounding teacher trust in leadership and professional learning communities (Forsyth et al., 2006; Tschannen-Moran, 2009; Wahlstrom & Louis, 2008). The finding supports the importance of developing teacher trust in the principal in order to foster professional learning community among teachers.

Also worth noting is the finding that one teacher background characteristic (experienced teachers) and three school background characteristics (urban location, SES, and percentage of white students) were all found to be statistically significant at the $p < .05$ level in this regression model. It is interesting, however, that the statistically significant relationship with the school level background characteristics were lost once an additional regression analysis was ran using the school level data file instead of the teacher level data file. The inherently nested nature of educational data may be the cause for these changes in significance and should be noted. Furthermore, however, the fact that TRUST and PLC remained statistically significant with the second regression model is also noteworthy.

RQ4. How is the school level of teacher trust in their principals associated with school mean middle school student mathematics achievement and how does the professional learning community mediate this relationship?

This dissertation study has shown that the relationship between the level of teacher trust in the principal and the level of professional learning community are statistically significant and this is supported by previous research (Bryk & Schneider, 2004; Louis et al., 2010; Sebastian & Allensworth, 2012; Supovitz et al., 2010). Additionally, the research of Sebastian and Allensworth (2012) and Supovitz et al. (2010) has shown the path of indirect effects occurs between principal leadership and student achievement, where trust in the principal is a subcomponent of principal leadership. It was surprising, then, when the final regression model for this dissertations study showed no statistically significant indirect relationship between the level of teacher reported trust in the principal and the level of student achievement through professional learning community. This study found no statistically significant direct relationship between teacher trust in the principal and student achievement and between the level of professional learning community and student achievement. Therefore, the fourth hypothesis, “The middle schools with a higher level of teachers’ trust in their principals are more likely to have a higher student mathematics achievement level controlling for teacher and school background characteristics, and this relationship mediated by professional learning community” was not supported by the current data.

In order to ascertain why this study’s findings did not support the final hypothesis, it is important to look, once again, at the previous research. Louis et al. (2010), in their

study of the pathway between leadership and student achievement examined three components of leadership: instructional leadership, trust, and shared leadership. It is important to note that while they did not find trust to be statistically significant, both instructional leadership and shared leadership were found to be significantly associated with professional community. Their study went on to find a significant relationship between professional learning community and focused instruction and between focused instruction and math achievement. This study lacked other leadership variables besides trust which may have resulted in the lack of significance.

Next, as we look once again at the Sebastian and Allensworth (2012) and Supovitz et al. (2010) studies, it is important to remember that trust in the principal was not the only component of their principal leadership construct. Sebastian and Allensworth (2012) included both instructional leadership measures and teacher-principal trust measures under their construct of principal leadership. Supovitz et al. (2010) went even further with three components: mission and goals, principal trust, and focus on instruction. Their study, similar to Louis et al. (2010) and the findings of this study, did not find a direct path of effect from leadership to student achievement. Instead, their path as well, included the learning environment and classroom instruction. Once again, this implies that instructional leadership may have more influence than trust and the influence of leadership and professional community on student achievement may be more indirect via an effect on the classroom instruction of the teacher.

As mentioned previously, this study did not include an instructional variable, and so analysis could not be made in regards to an indirect path between either trust in the principal or professional learning community and student achievement. In summary,

while this study's finding did not support the final hypothesis, the lack of significance itself may point to even greater significance in the previous research regarding the influence on and by instructional practices.

Limitations and Future Research Agenda

It is important to discuss the limitations of the study before discussing the policy and leadership implications of the findings. First, all of the data came from a sample of Missouri middle school mathematics teachers and cannot be generalized to all teachers or to the entire country. Additionally, all of the data was taken from teacher self-reports of their year-long experiences during a one-time survey assessment. Future research may be better served by collecting longitudinal survey data from the same group of teachers to examine the changes in the level of trust in the principal and professional learning community and examine the relationships between these factors and changes in student achievement over time. Also, it might be important to conduct interviews with teachers to gather a better perspective or gain a deeper understanding of the thoughts and feelings behind the levels of trust reported by teachers.

Additionally, despite the nested nature of the data at school, teacher, and students levels, Hierarchical Linear Model (HLM) analysis could not be conducted, because student achievement data was only available at the school level. When the student achievement data linked with individual teachers who taught them are available, future studies can use HLM to examine the relationship between teacher-level trust in the principal, professional learning community, and student-level achievement data.

Next, as mentioned in the previous discussion section, this study did not find a significant relationship between trust in principal or professional learning community and student achievement, and it did not include additional leadership variables such as instructional leadership or shared leadership. Likewise, this study also omitted any teacher instructional practice variables. Based on previous research, instructional variables may have the greatest direct and indirect influences upon student achievement. Future research might replicate the Louis et al. (2010) study further by also including other leadership variables and an instructional variable as well. Then, more indirect effects may be found between professional learning community and student achievement.

Finally, another possible mediator of the level of trust in the principal might be teacher attrition rate. Future research may want to examine this at the school level in order to determine if teacher turnover has any effect on the level of teacher trust in the principal or professional learning community.

Policy and Leadership Implications

Educational leaders by definition live within a political context and they mold and are molded by that context (Soder, 2001). Bush (2003) is clear to point out that “a central element in many definitions of leadership is that there is a process of influence” (p. 5). Thus, how the leader molds or influences the context within which they live is reliant, for the most part, upon the leadership style with which they lead. The study of leadership and management has spanned the decades as researcher after researcher have tried to quantify or qualify effective leadership and how it impacts those around the leader. In

this age of accountability, high stakes testing, and the call for school reform, the influence of the leader is being examined now more than ever.

Indeed, this study was as much a policy study as a leadership study, because of the building leader's role as a policy implementer. In the context of Missouri, the Department of Elementary and Secondary Education has clearly promoted the implementation of Professional Learning Community as a key component of school improvement efforts. Since the task of implementing such a policy as MOPLC is given to the school principal, the building leader would be wise to recognize the need for building trusting relationships with staff. Teachers are often skeptical of policies which appear to come down from departments of education. In order to avoid a curmudgeon mentality among staff, principals must recognize the "softer skills" needed to implement education policies aimed at school improvement. Additionally, leadership preparation should recognize the need for these "soft skills" of leaders. We often tell principals to sit back and watch the first year so as not to rock the boat or cause undue stress that change can bring about. Instead, though, we should be telling principals to hit the ground running and create a sense of urgency when it comes to building relationships.

The findings of Bryk and Schneider (2004), Louis et al. (2010), Sebastian and Allensworth (2012), and Supovitz et al. (2010) have all shown the important indirect relationship between leadership and student achievement. The findings of this study support those of previous research (Bryk & Schneider, 2004; Forsyth et al., 2006; Sebastian & Allensworth, 2012; Tschannen-Moran, 2009; Wahlstrom & Louis, 2008) by pointing out that the level of teacher trust in the principal impacts the level of professional learning community within the school. Trusting relationships are not made

overnight, but require long term work on the part of the building leader. It is not enough to simply ask nor possible to demand collaborative relationships among your staff.

Instead, the positive learning environment and collegial culture must be nurtured and grown (Tschannen-Moran, 2004). That the last few decades of literature surrounding leadership has focused on collegial and collaborative styles of leadership is no surprise.

It is also important to note, however, that precursors to collegial models of leadership are just as important. Instructional leadership, it seems, is equally important in its relationship to student achievement. Louis et al. (2010), Sebastian and Allensworth (2012), and Supovitz et al. (2010) all found the instructional practices of teachers to have a significant impact on student achievement. The building leader, then, would be wise to not only nurture the collaborative cultures needed for professional learning communities to be embedded within the school, but also create the focus and protocols needed to keep those communities centered around student learning. In essence, in order to most influence the school toward the greatest possible levels of improvement and success, a leader cannot rely upon a single leadership style. They must learn to strengthen many areas of the school at the same time.

As a practicing elementary assistant principal and principal for the past nine years, this connection between the level of trust in the principal and professional learning community does not come as a surprise. Unquestionably, I quickly discovered the need to develop trusting relationships with all members of my staff before any remnants of school reform could be implemented. Without high levels of trust, teachers were unwilling to recognize a need for reform and also unable to see that the power for change already lay within each of them. The first few years in each of my two leadership roles

were spent building relationships and trust – both teacher trust in me as their leader and my own trust in my teacher’s abilities and dedication. The positive and trusting relationships clearly lead to a more collegial and collaborative environment where teacher success can lead to student success.

In this age of increased accountability and call for greater school reform, many legislatures and policy makers are examining school choice and pay for performance. The idea is to create better schools by allowing parents to choose and encouraging teachers to out-perform their peers. These ideas, while perhaps valuable in the business world, may prove counterproductive if they encourage competition and secretiveness which will significantly impact the levels of trust, professional learning community, instruction, and achievement within schools.

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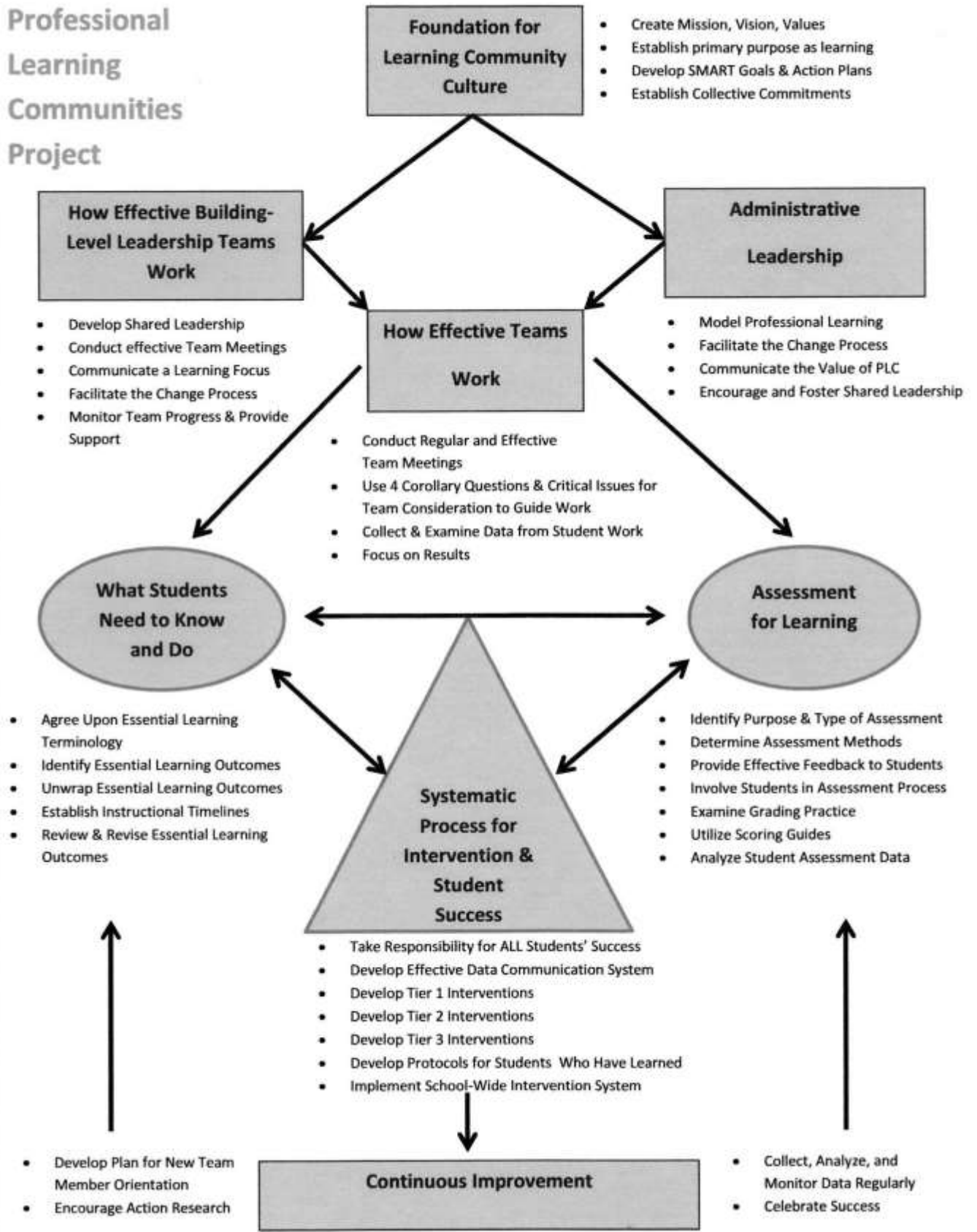
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APPENDIX A
MO PLC Essential Curriculum

**Missouri
Professional
Learning
Communities
Project**

Essential Curriculum



APPENDIX B

Descriptive Data for Individual TRUST and PLC Variables

Table 1

Descriptive Statistics for My Principal Facilitates Collaboration and Communication Among Teachers

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	23	3.7	3.7	3.7
2.00	54	8.6	8.6	12.3
3.00	109	17.4	17.4	29.7
4.00	165	26.4	26.4	56.1
5.00	275	43.9	43.9	100.0
Total	626	100.0	100.0	

Table 2

Descriptive Statistics for My Principal Understands Math Teaching and Learning and Discusses them with Teachers

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	90	14.4	14.4	14.4
2.00	150	24.0	24.0	38.3
3.00	170	27.2	27.2	65.5
4.00	133	21.2	21.2	86.7
5.00	83	13.3	13.3	100.0
Total	626	100.0	100.0	

Table 3

Descriptive Statistics for My Principal Understands and Supports my Professional Goals and Learning Needs

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	31	5.0	5.0	5.0
2.00	64	10.2	10.2	15.2
3.00	114	18.2	18.2	33.4
4.00	185	29.6	29.6	62.9
5.00	232	37.1	37.1	100.0
Total	626	100.0	100.0	

Table 4*Descriptive Statistics for My Principal Provides Constructive Feedback on my Instruction*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	52	8.3	8.3	8.3
2.00	99	15.8	15.8	24.1
3.00	153	24.4	24.4	48.6
4.00	162	25.9	25.9	74.4
5.00	160	25.6	25.6	100.0
Total	626	100.0	100.0	

Table 5*Descriptive Statistics for I Can Share my Feelings, Worries, and Frustrations with my Principal*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	72	11.5	11.5	11.5
2.00	81	12.9	12.9	24.4
3.00	119	19.0	19.0	43.5
4.00	137	21.9	21.9	65.3
5.00	217	34.7	34.7	100.0
Total	626	100.0	100.0	

Table 6*Descriptive Statistics for I Respect my Principal as an Instructional Leader*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	40	6.4	6.4	6.4
2.00	70	11.2	11.2	17.6
3.00	135	21.6	21.6	39.1
4.00	132	21.1	21.1	60.2
5.00	249	39.8	39.8	100.0
Total	626	100.0	100.0	

Table 7*Descriptive Statistics for Teachers are Continually Learning and Seeking New Ideas*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	10	1.6	1.6	1.6
2.00	45	7.2	7.2	8.8
3.00	180	28.8	28.8	37.5
4.00	249	39.8	39.8	77.3
5.00	142	22.7	22.7	100.0
Total	626	100.0	100.0	

Table 8*Descriptive Statistics for Teachers are Engaged in Systematic Analysis of Student Performance Data*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	10	1.6	1.6	1.6
2.00	57	9.1	9.1	10.7
3.00	175	28.0	28.0	38.7
4.00	247	39.5	39.5	78.1
5.00	137	21.9	21.9	100.0
Total	626	100.0	100.0	

Table 9*Descriptive Statistics for Teachers are Encouraged to Experiment with their Teaching*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	18	2.9	2.9	2.9
2.00	69	11.0	11.0	13.9
3.00	191	30.5	30.5	44.4
4.00	237	37.9	37.9	82.3
5.00	111	17.7	17.7	100.0
Total	626	100.0	100.0	

Table 10
Descriptive Statistics for Teachers Trust each Other

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	22	3.5	3.5	3.5
2.00	64	10.2	10.2	13.7
3.00	153	24.4	24.4	38.2
4.00	254	40.6	40.6	78.8
5.00	133	21.2	21.2	100.0
Total	626	100.0	100.0	

Table 11
Descriptive Statistics for Teachers Feel Responsible to Help each Other do their Best

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	19	3.0	3.0	3.0
2.00	71	11.3	11.3	14.4
3.00	176	28.1	28.1	42.5
4.00	243	38.8	38.8	81.3
5.00	117	18.7	18.7	100.0
Total	626	100.0	100.0	

Table 12
Descriptive Statistics for Teachers Share Ideas and Teaching Practices

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	12	1.9	1.9	1.9
2.00	39	6.2	6.2	8.1
3.00	116	18.5	18.5	26.7
4.00	272	43.5	43.5	70.1
5.00	187	29.9	29.9	100.0
Total	626	100.0	100.0	

Table 13*Descriptive Statistics for Teachers Share Both Failure and Success in Teaching*

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
1.00	25	4.0	4.0	4.0
2.00	59	9.4	9.4	13.4
3.00	172	27.5	27.5	40.9
4.00	228	36.4	36.4	77.3
5.00	142	22.7	22.7	100.0
Total	626	100.0	100.0	

APPENDIX C

Original Coding, Final Coding, and Reliability of Variables

Table 1
Variables on Teachers' Trust and Professional Learning Communities

Teachers' Trust in Leadership

	Survey item	Original coding	Final coding	Reliability (Cronbach alpha)
<i>Trust in Principal</i> (Mean of 6 items)	To what extent do you agree or disagree with each of the following statements about your current principal ? My principal facilitates collaboration and communication among teachers. (Principal1) My principal understands math teaching and learning and discusses them with teachers. (Principal2) My principal understands and supports my professional goals and learning needs. (Principal3) My principal provides constructive feedback on my instruction. (Principal4) I can share my feelings, worries, and frustrations with my principal. (Principal5) I respect my principal as an instructional leader. (Principal6)	1= Strongly disagree 2 = Disagree 3 = Neither 4= Agree 5= Strongly agree	Same	$\alpha = .918$
	PrincipalALL	PrincipalALL = Mean (Principal1, Principal2, Principal3, Principal4, Principal5, Principal6)	TRUST	

Professional Learning Communities

	Survey item	Original coding	Final coding	Reliability (Cronbach alpha)
<i>Professional Learning Community</i> (Mean of 7 items)	Now consider the teachers at your school . To what extent do you agree or disagree with the following statements? The teachers in this school... a. are continually learning and seeking new ideas (PLC1) b. are engaged in systematic analysis of student performance data (PLC2) c. are encouraged to experiment with their teaching (PLC3) d. trust each other (PLC4) e. feel responsible to help each other do their best (PLC5) f. share ideas and teaching practices (PLC6) g. share both failure and success in teaching (PLC7)	1= Strongly disagree 2= Disagree 3= Neither 4= Agree 5= Strongly agree	Same	$\alpha = .895$
	PLCALL	PLCALL = Mean (PLC1, PLC2, PLC3, PLC4, PLC5, PLC6, PLC7)		

Teacher Background Characteristics

	Survey item	Original coding	Final coding
<i>Gender</i>	What is your gender? (GENDER)	1 = Male 0 = Female	Same
<i>Minority Status</i>	Ethnic Minority Status (MINORITY)	1 = White 2 = African American 3 = Hispanic	0 = White 1 = Minority

		4 = Asian/Pacific Islander 5 = American Indian/Alaska Native 6 = Other	Same
<i>Total Teaching Experience</i>	By the end of this school year, how many years will you have been teaching all together ? Do not include teaching as a substitute or student teaching. (NEWTEACH, EXPTEACH)	(NEWTEACH) 1 = 0 thru 5 years 0 = other (EXPTEACH) 1 = 16 years or more 0 = other	Same
<i>Math Certification</i>	Holding a Math Certification (CERT)	1 = Yes 0 = No	Same
<i>Master's Degree</i>	Holding a Master's Degree or above (MASTER)	1 = Master's Degree or above 0 = Bachelor's Degree	Same
<i>Majored in Math</i>	Majored in mathematics (MAJORMATH)	1 = undergrad/grad math major 0 = others	Same
<i>Majored in Math Education</i>	Majored in mathematics education (MAJORMED)	1 = undergrad/grad math ed major 0 = others	Same

School Background Characteristics

		Original coding	Final coding
<i>School Size</i>	Total enrollment (SCHLSIZE)	Number of students enrolled	Same
<i>School Location</i>	Rural location (SCHLRURAL) Urban location (SCHLURBAN)	1 = rural, 0 = otherwise 1 = urban, 0 = otherwise	Same
<i>Poverty Level</i>	% of students receiving free or reduced-price lunch in the school (SCHLFRL)	Percent of FRL students	Same
<i>School Achievement</i>	% of students who met the proficient or advanced levels in the school (SCHLMAP)	0 = white 1 = non-white	Same
<i>White Students</i>	% of students who are white (WHITE_PCT)		Same

VITA

Troy S. Hogg was born in Jefferson City, MO, has been an educator for twenty years, and spent eleven years as a classroom teacher with seven years in three Missouri districts and three years overseas in Japanese schools. After returning from Japan in 2003, Hogg also spent four years as an elementary assistant principal and is in his fifth year as principal at Benton S.T.E.M. Elementary in Columbia, MO. Hogg graduated from Lincoln University in Jefferson City, MO, in 1993, with a Bachelor of Science degree in Elementary Education. In 1999, he graduated from William Woods University in Fulton, MO, with a Masters of Education degree in Elementary Administration. In 2008, he completed his Educational Specialist degree in Educational Leadership and Policy Analysis from the University of Missouri. Additionally, he is currently pursuing the Executive Development Program for Instructional Leaders certification through the National Institute for School Leadership (NISL).

In 1996, Hogg was selected as Teacher of the Year in the Osage R-III School District in Westphalia, MO. In 1997, he was selected as a Missouri STARR (Select Teacher as a Regional Resource) Teacher and received extensive professional development in standards, curriculum, and instruction. In 2007, he was nominated for the CCTA Educator of the Year by the faculty and staff of Eugene Field Elementary in Columbia, MO.

Hogg is a member of the National Association for Elementary School Principals (NAESP), Missouri Association for Elementary School Principals (MAESP), the Northeast Missouri Association for Elementary School Principals (NEMAESP), the

National Science Teachers Association (NSTA), and the National Council for the Teachers of Mathematics (NCTM).