AN EXPLORATORY STUDY OF PROFESSIONAL LEARNING COMMUNITY AND ACADEMIC OPTIMISM, AND THEIR IMPACT ON STUDENT ACHIEVEMENT

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the Graduate School of The Ohio State University

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ABSTRACT

This study first develops the conceptual and theoretical justifications for investigating whether professional learning community (PLC) may serve as an organizational and cultural mechanism for explaining academic optimism (AO). Using school as the unit of study, this study explores extant data from 105 “high-need” elementary, middle, and high schools (and 2,020 teachers) who used Title 1 School Improvement funds to participate in Ohio’s now-defunct literacy project across the 2007-08 and 2008-09 school years.

Principal Axis Factoring, Pearson Product Correlation, and Confirmatory Factor Analysis (CFA) were used to explore associations between PLC, AO, and their respective sub-scales. Hierarchical Multiple Regression was used to explore relationships with school-level student achievement and other school-level demographics.

Analysis identified many medium to strong positive correlations with subscales among themselves and across constructs. Confirmatory factor analysis models suggested a mixed result for the two latent constructs of PLC and AO. The combined effect of all five PLC sub-scales explained a moderate amount of variance in school-level AO. There was no statistically significant effect for either PLC, its subscales, or AO on school-level academic achievement; only prior achievement had such an effect.
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together to co-construct understanding and expertise in their profoundly important work for students.

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# TABLE OF CONTENTS

ABSTRACT ........................................................................................................................................ ii  
ACKNOWLEDGEMENTS .................................................................................................................. iii 
VITA .................................................................................................................................................... v  
FIELD OF STUDY ............................................................................................................................. vi  
TABLE OF CONTENTS ....................................................................................................................... vi  
LIST OF TABLES ............................................................................................................................... xi  
LIST OF FIGURES ............................................................................................................................. xiii  

INTRODUCTION .................................................................................................................................. 1  
Problem and Need ............................................................................................................................... 1  
Purpose and Significance of the Study ............................................................................................... 6  
Research Questions ............................................................................................................................ 8  
Definitions of Conceptual Terms ......................................................................................................... 9  
  Academic emphasis ............................................................................................................................ 9  
  Academic optimism .......................................................................................................................... 10  
  Collaborative activity ....................................................................................................................... 11  
  Collective efficacy ............................................................................................................................. 11  
Culture ............................................................................................................................................... 12  
Deprivatized practice ......................................................................................................................... 13  
Efficacy theory .................................................................................................................................... 13  
Enabling bureaucracy ......................................................................................................................... 15  
Faculty trust ......................................................................................................................................... 15  
Focus on student learning .................................................................................................................. 16  
Optimism ............................................................................................................................................ 16  
Professionalism ................................................................................................................................. 17  
Professional learning community ....................................................................................................... 18  
Reflective dialogue ............................................................................................................................. 19  

vi
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared norms and values</td>
<td>20</td>
</tr>
<tr>
<td>Social cognitive theory</td>
<td>21</td>
</tr>
<tr>
<td>Trust</td>
<td>22</td>
</tr>
<tr>
<td>Assumptions</td>
<td>23</td>
</tr>
<tr>
<td>Limitations</td>
<td>23</td>
</tr>
<tr>
<td>Summary</td>
<td>24</td>
</tr>
<tr>
<td>LITERATURE REVIEW</td>
<td>25</td>
</tr>
<tr>
<td>Academic Optimism</td>
<td>25</td>
</tr>
<tr>
<td>Optimism</td>
<td>27</td>
</tr>
<tr>
<td>Efficacy Theory</td>
<td>31</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>32</td>
</tr>
<tr>
<td>Collective efficacy</td>
<td>34</td>
</tr>
<tr>
<td>Academic Emphasis</td>
<td>38</td>
</tr>
<tr>
<td>Faculty Trust</td>
<td>40</td>
</tr>
<tr>
<td>Research Critique of Academic Optimism</td>
<td>41</td>
</tr>
<tr>
<td>Enabling Bureaucracy</td>
<td>45</td>
</tr>
<tr>
<td>Professional Learning Community</td>
<td>49</td>
</tr>
<tr>
<td>Community</td>
<td>50</td>
</tr>
<tr>
<td>Professionalism</td>
<td>53</td>
</tr>
<tr>
<td>Organizational Learning</td>
<td>54</td>
</tr>
<tr>
<td>Professional Learning Community</td>
<td>57</td>
</tr>
<tr>
<td>Shared Norms and Values</td>
<td>60</td>
</tr>
<tr>
<td>Collaboration</td>
<td>61</td>
</tr>
<tr>
<td>Reflective Dialogue</td>
<td>63</td>
</tr>
<tr>
<td>Deprivatization of Practice</td>
<td>65</td>
</tr>
<tr>
<td>Focus on Student Learning</td>
<td>66</td>
</tr>
<tr>
<td>Enabling Conditions and Resources for PLC</td>
<td>69</td>
</tr>
<tr>
<td>Supportive Infrastructural Conditions and Resources</td>
<td>70</td>
</tr>
<tr>
<td>Supportive Human and Social Resources</td>
<td>72</td>
</tr>
<tr>
<td>Leadership</td>
<td>77</td>
</tr>
<tr>
<td>Research Critique of Professional Learning Community</td>
<td>81</td>
</tr>
</tbody>
</table>
Discussion of Results ................................................................. 195
The construct of AO. ................................................................. 196
The construct of PLC. ............................................................... 198
Relationships between PLC and AO ............................................ 199
Relationships among PLC, AO, and achievement ..................... 201
Practical Implications ............................................................... 203
Research Implications ............................................................. 205
Limitations and Delimitations .................................................. 207
Conclusion ............................................................................. 208

REFERENCES ........................................................................ 210
APPENDIX: Ordinal Survey Items for PLC and AO subscales .......... 238
LIST OF TABLES

Table 1: Conceptions of Enabling and Hindering Bureaucratic Structures .......................... 47
Table 2: Distribution Frequencies of General Sample (n = 177) ........................................ 102
Table 3: Sample Characteristics with 2008-09 State-Level Comparisons (n = 113) .... 103
Table 4: Summary of Research Questions and Statistical Methodologies ...................... 121
Table 5: Factor Matrix for Initial Three-Factor Solution (Focus on Student Learning). 127
Table 6: Pattern and Structure Matrix of Three-Factor Solution (Focus on Student Learning) .......................................................................................................................... 129
Table 7: Factor, Pattern, and Structure Matrix of Two-Factor, 11-Item Solution (Focus on Student Learning) ......................................................................................................................... 131
Table 8: Factor Matrix for Final Eight-Item Unidimensional Solution (Focus on Student Learning) ................................................................................................................................. 133
Table 9: Factor Matrix for Unidimensional Solution (Deprivatized Practice) ............. 136
Table 10: Factor Matrix for Unidimensional Solution (Shared Sense of Purpose) ....... 138
Table 11: Factor Matrix for Unidimensional Solution (Collaborative Activity) ............ 140
Table 12: Factor Matrix for Unidimensional Solution (Reflective Dialogue) .......... 142
Table 13: Factor Matrix for Unidimensional Solution (Professional Learning Community) ........................................................................................................................................ 144
Table 14: Factor Matrix for Unidimensional Solution (Faculty Trust) .................. 146
Table 15: Factor Matrix for Unidimensional Solutions (Academic Emphasis) .......... 150
Table 16: Factor Matrix for Two-Factor and Unidimensional Solution (Collective Efficacy) ........................................................................................................................................ 152
Table 17: Pattern and Structure Matrix of Two-Factor Solution (Collective Efficacy) . 154
Table 18: Factor Matrix for Unidimensional Solution (Academic Optimism)............ 157
Table 19: General Descriptive Statistics (n=105).............................................. 158
Table 20: Descriptive Statistics of Transformations (n=105)................................. 161
Table 21: Pearson Product Correlations (n = 105) .............................................. 165
Table 22: Comparison of fit statistics for the Two Confirmatory Factor Analysis Models ................................................................. 174
Table 23: Hierarchical Multiple Regression of Academic Optimism on Professional Learning Community Subscales, Controlling for School-level Characteristics .......... 177
Table 24: Hierarchical Multiple Regression of Current School-level Achievement on Professional Learning Community Subscales, Controlling for School-level Characteristics .......................................................... 179
Table 25: Hierarchical Multiple Regression of Current School-level Achievement on Academic Optimism, Controlling for School-level Characteristics ..................... 182
Table 26: Hierarchical Multiple Regression of Current School-level Achievement on Professional Learning Community and Academic Optimism, Controlling for School-level Characteristics ........................................................................ 184
LIST OF FIGURES

Figure 1: Exploratory A Priori Associations Among Professional Learning Community, Academic Optimism, and their Theorized Subscales ................................................................. 100

Figure 2: Histograms of Variables (n=105) ............................................................................. 159

Figure 3: Histograms of Transformed Performance Indices (Prior and Current School-level Achievement) ............................................................................................................. 161

Figure 4: Initial Two-Construct a priori Model for Confirmatory Factor Analysis (with Standardized Loadings) ........................................................................................................... 168

Figure 5: Test II Refinement of the Two-Construct a priori Model for Confirmatory Factor Analysis (with Standardized Loadings) ................................................................. 172
CHAPTER 1

INTRODUCTION

This exploratory study was designed to examine latent variables that may impact schools’ organizational norms and culture capable of supporting increased student achievement. Specifically, this study examined a sample of Ohio public schools in order to explore the associations and relationships among professional learning community (PLC), academic optimism (AO), and school-level student achievement. This chapter will provide the necessary background framed via a problem statement and purpose of study that reflect its significance. A section defining associated conceptual terms will be introduced, followed by the study’s research questions. Finally, this first chapter will provide a summary before proceeding to Chapter Two’s literature review.

Problem and Need

The clarion cries for public schools to meet the demands and challenges of the global 21st Century continue to increase in intensity and frequency (Azzam, 2009). As the pressure for student achievement evolves, locally-developed academic standards have given way to rigorous Common Core learning benchmarks voluntarily adopted by almost all 50 states, the District of Columbia, and a handful of U.S. territories. Alberti (2013) underscores the potential impact of these de facto national standards by stating that “one would be hard-pressed to identify another initiative that has a greater potential to affect
the teaching and learning that take place in so many classrooms across the United States…[yet] the adoption process itself was only the opening of the door” (p. 24). It is within this dynamic context that this study’s research efforts attempt to shepherd and anchor a policy environment that supports schools’ efforts in adapting to the changes that may appear to many educators as obstacles and impediments over which they have little to no control. Recent research details a new school culture construct that could serve as a goal for educators in overcoming those obstacles and impediments. This new cultural construct -- academic optimism -- has been identified as a powerful force that impacts teaching and learning, but which also shares positive orientations with those who deal with education’s increasing challenges (Hoy, Tarter, & Woolfolk Hoy, 2006).

Past quantitative research indicates that academic optimism contributes greater impact to student academic achievement than students’ previous achievement, demographics, and socioeconomic status, heretofore the enduring de facto predictor of student achievement (Hoy et al., 2006). Academic optimism reflects a focus on collective properties and aggregated perceptions with the school as the unit of study. Rather than necessarily focusing on elements of individual capacities or efforts, the three elements of academic optimism reflect school wide norms and indicate organizational properties that, with additional research, could be developed through specific practices and principles.

A culture of academic optimism helps educators believe that they can positively impact student learning during these rapidly evolving times. Academic optimism is associated within multiple theoretical frameworks, including learned optimism and
efficacy theory conceptually rooted in social cognitive theory – such frameworks that reflect human agency and one's control over life (Bandura, 2006a; R. D. Goddard, Hoy, & Woolfolk Hoy, 2000; Seligman, 1991). In academically optimistic cultures, efficacy plays an important role. Self- or collective-efficacy develops, first, from one’s assessment of the ease or difficulty of a specific task and, then, the assessment of one’s competence and readiness to successfully execute that task.

Specifically, then, the presence of a culture with high levels of academic optimism represents a group’s cognitive process of assessing the requisite task for a specific context and concurrently evaluating one's own capacity to deliver the requisite action (Bandura, 2006b; R. D. Goddard et al., 2000; Woolfolk Hoy, Hoy, & Davis, 2009b; Zimmerman & Cleary, 2006). This subjective judgment and perceived belief can manifest the necessary effort and skills required to accomplish a certain task. The result can impact one’s sense of organizational agency (Zimmerman & Cleary, 2006). Its effect contributes to a school staff's higher goals, stronger effort, enduring persistence, and greater resiliency (R. D. Goddard et al., 2000; Woolfolk Hoy et al., 2009b; Zimmerman & Cleary, 2006). In short, schools that can figure out how to be academically optimistic have a far better chance of getting done what needs to get done.

Although research has suggested that antecedents for the development of academic optimism range from enabling leadership to humanistic pupil control ideologies, implications also exist for school wide norms and organizational properties to impact its development (McGuigan & Hoy, 2006). One increasingly popular school practice that focuses on these norms and organizational properties is Professional
Learning Community (PLC). In PLC, all faculty members are considered learners and members of a collective, professional learning organization (Kruse & Louis, 1995; Kruse, Louis, & Bryk, 1995; Louis, Kruse, & Bryk, 1995; Louis & Kruse, 1995a; Louis & Kruse, 1995b). The presence of professional learning community has the potential to shape, compel, and regulate members’ behavior, cognitive, and affective dimensions (Kruse et al., 1995; Louis & Kruse, 1995a; Louis & Marks, 1998a; Vescio, Ross, & Adams, 2006; Vescio, Ross, & Adams, 2008).

With the support of a school staff committed to learning and understanding, professional learning communities can help all individuals address the challenge of human sense-making. Spillane, Reiser, and Reimer (2002) maintain that this constructivist sense-making holds promise for educators because it:

…is not a simple decoding of a policy message (or training framework). In general, the process of comprehension is an active process of interpretation that draws on the individual’s rich knowledge base of understandings, beliefs, and attitudes…. [When school leaders view] failure in implementation as demonstrating lack of capacity or deliberate attempts to ignore policy, they overlook the complexity of the sense-making process. (p. 391)

It is this potential for collaborative sense-making that seems to make PLCs so potentially promising as both a mechanism and model for learning. As Seymour Sarason explains, it is impossible to expect teachers to provide richly compelling intellectual settings for students if the very teachers tasked with fostering those settings have “no parallel community to nourish themselves” (Grossman, Wineburg, & Woolworth, 2001,
Thus, if educators aim to help themselves in their support of students and be resilient in the face of the shifting challenges of public education, then schools must organize and develop learning cultures to shepherd educators’ efforts.

Senge and Fullan suggest that schools’ professional efforts in organizing and developing learning communities is important work for the success of sustained reform in the face of complex problems. In Peter Senge’s (1990) focus on learning organizations and schools’ manifestations of it through professional learning community, a focus on the prevalence of characteristics arise; specifically, PLCs encompass systems thinking, personal mastery/learning, mental models, shared vision, and team learning/principal support (as cited in S. Thompson, Gregg, & Niska, 2004). Fullan describes the PLC impact as more specific and targeted than the usual areas of focus like organizational structures, policy requirements, or drive-by professional development. Fullan suggests that “reculturing a school may be more important than restructuring” as the end point for focus (Fullan & Stiegelbauer, 1991, p. 25).

The merits attributed to the reculturing of a school -- especially in a context of schools’ challenges and external pressures -- is underscored when also exploring the possible explanations associated with the cultural construct of academic optimism. This study, then, explored whether professional learning community (PLC) is an important construct to understand because it may effectively serve to explain the variance of school cultures characterized by academic optimism (AO). To that end, some requisite characteristics of a school wide PLC may be inextricably tied to academic optimism’s tenets of academic emphasis, collective efficacy, and faculty trust of students and parents.
As this paper unpacks the research around professional learning community, it will become increasingly apparent and logical that PLCs may be a foundational construct that can help explain school wide cultures of AO and support strong student achievement into the 21st Century.

**Purpose and Significance of the Study**

This research study examines a sample of Ohio public schools in order to explore the associations and relationships among professional learning community (PLC), academic optimism (AO), and student achievement. Specifically, this study explored the extent that schools’ organizational practices and cultural norms -- that constitute professional learning community (PLC) – may explain elements of a school wide climate of academic optimism (AO) and school-level student achievement.

The significance of this study can be assessed in important ways. First, this study is important because it fills in the gap of robust, empirical research of PLCs. Goddard, Goddard, and Tsachannon-Moran described a “paucity of research investigating the extent to which teacher’s collaborative school improvement practices are related to student achievement” (2007). Indeed, many researchers suggest that this void exists because “there is no universal definition of a professional learning community” (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006, p. 222) nor a universally (even common) quantitative instrument to measure a PLC. This study helps address this vacuum as it proposes to use one of the few quantitative instruments developed -- Louis and Marks’
Professional Community Index (1998a) -- that connects PLCs to school-level student achievement.

Second, this study helps address one benchmark of how PLCs should be evaluated. Specifically, Fullan suggests that PLCs’ value should be assessed by how well they impact organizational improvement and reculturing (as cited in Vescio et al., 2008). Exploring PLCs as a school wide mechanism for developing an organizational culture of AO can pay dividends by helping identify concrete measures in assessing the value of PLCs.

Third, this study is significant because it adds to the promising research of academic optimism. Indeed, this is the first study to explore associations between PLC and AO.

Finally, while this study has real value from a research perspective, its greatest value may be that it puts the locus of control of school challenges within the hands and minds of the staff and school building itself. By supporting practitioners -- teachers, administrators, and students in our public schools -- this study suggests effective strategies for focusing schools’ finite resources and energy, building their professional capacity, and addressing the complexities and pressures of teaching and learning in the 21st Century.
Research Questions

This study explores how Professional Learning Community (PLC) serves as a normative and cultural mechanism that explains a school wide culture of Academic Optimism (AO) and student achievement. More precisely, the research questions are:

1. Can professional learning community be reliably represented by the five (5) subscales of shared sense of purpose, collaboration, reflective dialogue, deprivatized practice, and focus on student learning?

2. Can academic optimism be reliably represented by the three (3) subscales of collective efficacy, academic emphasis, and faculty trust?

3. How are the two constructs of professional learning community and academic optimism, and their respective subscales, associated?

4. Do the five sub-scales of professional learning community explain academic optimism, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) school-level student achievement?

5. Do the five sub-scales of professional learning community have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement?

6. Do the three sub-scales of academic optimism have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement?
7. Do the constructs of professional learning community and academic optimism as single scales have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement?

Definitions of Conceptual Terms

Academic emphasis.

Academic emphasis is one of the three identified elements of academic optimism (Hoy et al., 2006); specifically, the one that serves as the behavioral component. Sometimes referred to as academic press, this concept can be thought of as a drive and “quest for excellence” that may reflect “a combination of teachers setting high goals, students responding positively to the challenge of such goals, and the principal supplying the resources and exerting influence to attain these goals (R. D. Goddard, Sweetland, & Hoy, 2000; Hoy, Sweetland, & Smith, 2002; Hoy et al., 2006; Tschannen-Moran & Hoy, 1998, p. 348). One can think of academic emphasis as the focused norms and culture that simultaneously drives and constrains any school’s behavioral choices; and, any instructional leader’s and faculty’s collective norms could serve as both stick and/or carrot in influencing and fixing a spotlight on the importance and value of exceptional student achievement.
**Academic optimism.**

Academic optimism attempts to explain school-level variables that impact student achievement. Research suggests that academic optimism explains students’ academic achievement more than students’ previous achievement, demographics, and even socioeconomic status, heretofore the enduring *de facto* predictor of student achievement (Hoy et al., 2006). Academic optimism is comprised of three organizational concepts – academic emphasis of the building, collective efficacy of the staff, and the staff’s trust in students and parents – that interact in systemic and iterative ways (Hoy et al., 2006).

Academic optimism reflects a focus on collective properties and aggregated perceptions with the school as the unit of study (Hoy et al., 2006). Rather than necessarily focusing on elements of individual capacities or efforts [though research has been conducted to measure academic optimism as an individual characteristic (Woolfolk Hoy, Hoy, & Kurz, 2008), the three elements of academic optimism reflect school wide norms and indicate organizational properties that, with additional research, could be developed through specific practices and principles.

Because academic emphasis, collective efficacy, and faculty trust reinforce a positive outlook for a school to guide their efforts, it is little wonder that the elements are tightly intertwined. While optimism is often conceptually described as a cognitive process via goals or expectancy (McGuigan & Hoy, 2006), the three elements of academic optimism dynamically interact because each relationally addresses a “postulated reciprocal causality”: Academic Emphasis prods academically-focused teacher *behaviors*; Collective Efficacy represents a *cognitive* belief in the success of a
faculty’s academically-focused behavior attempts; and, Faculty Trust serves as an affective condition that supports a sense of protection permitting the encouraged risk-taking necessary to successfully implement academically-focused behaviors, even if they are inventive or different from previously-normed academic behaviors or efforts (Hoy et al., 2006).

**Collaborative activity.**

Collaboration is one of the five latent variables from Louis and Marks’ (1998a) *Professional Community Index* used to explore the conception of PLC. While almost all schools have some collaborative interactions and relationships, a central tenet to professional learning communities is possible only when collegiality is a generalized, school-wide attribute (Louis & Kruse, 1995b). When this exists, “role and department boundaries, which often serve as rigid barriers, become more permeable….This flexibility helps to shape information, routines, and the transfer of knowledge between grade levels and departments” (Kruse et al., 1995, p. 33-34).

**Collective efficacy.**

Collective efficacy is the second of the three identified elements of academic optimism; specifically, the one that serves as the cognitive component. Described by Wood and Bandura (1989), social cognitive theory frames an understanding of human learning and motivation, such that efficacy beliefs support and encourage one’s sense of
agentic thinking, which is described as the thoughts that begin and sustain one's efforts in achieving a desired goal (Curry, Snyder, Cook, Ruby, & Rehm, 1997).

The increasing collaboration and interdependence of human interaction in modern life is also increasing the importance of collective agency via shared beliefs in a group’s power to produce effects (Bandura, 2000a; Bandura, 2000b). Collective efficacy, by extension, is the perceived belief that other members of a faculty have the capacity to organize and execute the actions necessary to support the collective goal (Hoy et al., 2006). While the collective goal is framed by academic emphasis as an exceptional academic press and focus on rigorous student achievement, then a faculty with high levels of perceived collective efficacy believes that their colleagues have the necessary agency to make the rigorous student achievement a reality.

### Culture.

In this study, culture refers to the notion of organizational culture. Hoy and Miskel (2008) suggest that this notion of an institution can be defined by its shared “feel, sense, atmosphere, character, or image” and that it “encompasses many of the earlier notions of informal organization, norms, values, ideologies, and emergent systems” (p. 177). More specifically, the researchers define organizational culture as “a system of shared orientations that hold the unit together and give it a distinctive identity” (p. 177). In this study, organizational culture is operationally defined as the extent that schools’ shared sense of organizational life demonstrates varying levels of academic optimism.
Deprivatized practice.

One of the five latent variables from Louis and Marks' (1998a) *Professional Community Index* used to explore the conception of PLC, deprivatized practice occurs when educators “practice their craft openly” (Kruse et al., 1995, p. 31). In professional communities characterized by deprivatized practice, teachers openly engage in their practice and support of one another through assistance and aid as mentors, advisors, or specialists (Little, 1990; Miles, Saxl, & Lieberman, 1988; as cited in Louis & Kruse, 1995b).

Transparent dialogue about instructional practices allows teachers to share accomplishments and learn from mistakes in a low-risk environment (Louis & Kruse, 1995b). This openness also allows “teachers to be analytic in their planning and thinking and to use observations from others about student effort and achievement that cannot be obtained while in the act of teaching” (Kruse et al., 1995, p. 31). If PLCs are ways to build capacity within schools, then the elements of deprivatized practice open up access to embedded expertise and vicarious experiences already present (Berry, Johnson, & Montgomery, 2005).

Efficacy theory.

Efficacy theory is conceptually rooted in social cognitive theory and reflects human agency and an individual's perceived control over life. Based upon Wood and Bandura’s (1989) conceptions, efficacy theory frames an understanding of human learning and motivation. It is characterized as a future-oriented and task-specific
judgment rather than a characteristic generally applicable to all of one’s life events. Self-efficacy develops, first, from the assessment of the ease or difficulty of a specific task and, then, the assessment of one’s competence and readiness to successfully execute that task. Specifically, then, it represents an individual's cognitive process of assessing the requisite task for a specific context and concurrently evaluating one's own capacity to deliver the requisite action (Bandura, 2006b; R. D. Goddard et al., 2000; Woolfolk Hoy et al., 2009b; Zimmerman & Cleary, 2006). This subjective judgment and perceived belief can manifest the requisite effort and skills necessary to accomplish a certain task and, resultantly, can impact one’s sense of personal agency (Zimmerman & Cleary, 2006).

While it is important to understand that perceptions of self-efficacy vary according to specific circumstances and content-disciplines, the sources of self-efficacy are important too. There are four sources of input one taps to generate a subjective judgment of self-efficacy including mastery and vicarious experiences, verbal persuasion, and physiological arousal (R. D. Goddard et al., 2000; Woolfolk Hoy et al., 2009b). These sources contribute to self-regulatory micro-decisions that impact the cyclical equation of self-efficacy including higher goals, greater effort, enduring persistence, and greater resiliency (Woolfolk Hoy et al., 2009b; Zimmerman & Cleary, 2006). Of course, when these sources provide unconstructive input, then perceptions of self-efficacy can be low and negatively impact those same effort and motivation qualities.
Enabling bureaucracy.

When considering organizational characteristics, especially the bureaucratic nature of organizations, the concept of enabling properties is an important consideration for a school. Specifically, enabling bureaucracy emerged as a bipolar construct between enabling and hindering points (Hoy & Sweetland, 2001).

A positive, enabling bureaucracy foundationally supports teachers through its structure. According to Adler and Borys (1996) the positive attributes of an enabling bureaucracy provide needed guidance and clarifies responsibilities, thereby “easing role stress and helping individuals be and feel more effective” (p. 61). It can shepherd dialogue, foster trust, and help employees deal with surprises and crises (Hoy & Sweetland, 2001).

A negative, hindering perspective of bureaucracy may be defined as one that “controls, punishes, and hinders the effective and efficient operation of the organization” (Hoy & Sweetland, 2001, p. 302). At its worst, bureaucracy can be coercive and hindering, serving as an impersonal, machine-like, and punishment-centered culture (Gouldner, 1954; Westley & Mintzberg, 1991; as cited in Hoy & Sweetland, 2001).

Faculty trust.

Faculty trust is the third of the three identified elements of academic optimism (Hoy et al., 2006); specifically, the one that serves as the affective component. It is a conception of trust originating from the reference group of school faculty. This viewpoint takes stock of the levels which students and parents are benevolent and
reliable, such that faculty are confidently willing to be vulnerable (Tschannen-Moran & Hoy, 2000). Faculty trust of students and parents serves as an affective condition providing “cover” to take instructional risks necessary to successfully implement academically-focused behaviors, even if they are inventive or different from previously-normed academic behaviors or efforts (R. D. Goddard, Tschannen-Moran, & Hoy, 2001; Hoy et al., 2006).

**Focus on student learning.**

Focus on student learning is one of the five latent variables from Louis and Marks' (1998a) *Professional Community Index* used to explore the conception of PLC. Ultimately, much of the research of impactful professional learning communities has a strong, clear focus on student learning. This collective focus can be driven by shared norms and values that all students can learn and that the community has collective responsibility for that outcome. This concept is evident when a community of teachers shares beliefs and values that all students can be academically successful and that the teachers can effectively consider providing responsive and supportive learning environments that address student achievement (Louis & Kruse, 1995b).

**Optimism.**

General optimism is a positive expectation about life that has been defined as “a mood or attitude associated with an expectation about the social or material future – one which the evaluator regards as socially desirable, to his [or her] advantage, or for his [or
her] pleasure” (C. Peterson, 2000, p. 46). While optimism may be future-oriented and *cognitive* in its conception, it also has relative, *affective* elements because the evaluator determines what is desirable. By self-determining the desirable goal, optimism becomes intertwined with motivation. Carver, Reynolds, and Scheier (1994) conceptualized optimism as dispositional; that is, it is often referred to as the *expectancy* conception amid the global expectation that good things will be plentiful in the future and bad things scarce (C. Peterson, 2000).

Regardless of how optimism is defined or conceptualized, the research is lengthy about its positive association with psychologically healthy people and a host of favorable characteristics ranging from happiness, hardiness, achievement, and physical well-being (Hoy et al., 2006; C. Peterson, 2000; Seligman, 1991). Indeed, its positive effects are so pervasive that Peterson refers to optimism as the “Velcro construct” because its wide array of correlates stick to optimism in ways that are not always evident (C. Peterson, 2000).

**Professionalism.**

The traditional conception of professionalism is often bound by a set of norms and technical expertise unique to a body of members (McMahon & Hoy, 2009). As opposed to definitions of occupations, definitions of professions uniformly emphasize the non-routine characteristics of the work, individual judgment, and adaptive expertise to address problems (Louis et al., 1995).
Professionalism exerts control over entry to the profession and conditions of work; to that end, professionalism often relies on members to monitor and control the professional performance and conduct expectations of their peers such that an individual member’s behaviors are tied to the broader collective’s efforts and jointly-held normative behaviors (Louis & Kruse, 1995b; McMahon & Hoy, 2009). One such normed control occurs when professionalism is also characterized by a strong client-orientation (Louis et al., 1995) which, incidentally also underscores an important characteristic of a positive PLC; that is, a focus on student learning, not just instruction (DuFour & Eaker, 1998).

**Professional learning community.**

One increasingly popular school practice that focuses on school wide norms and organizational properties is Professional Learning Community (PLC). Professional Learning Community (PLC) can be defined most simply as an organizational structure characterized by behaviors and cultures that permit sustained, structured educator collaboration to improve the quality of learning in schools (Dufour, 2007; Louis et al., 1995; Louis, 2008; Vescio et al., 2008). What makes a PLC difficult to define is that it is not a prescription, a program, a model, or an innovation to be implemented. Rather, a PLC is an infrastructure or a way of working together that results in continuous school improvement (Hord, 1997). Above all, in PLCs the members of the school community are framed as learners whose inquiry both identifies themselves with and serves to improve a larger, collective learning organization. As such, members of a PLC share responsibility, expertise, and leadership for everyone's learning: teachers, administrators,
and most importantly, students (DuFour & Eaker, 1998; Dufour, 2007; Kruse et al., 1995; Louis, 2008; Vescio et al., 2008).

Louis and Marks' *Professional Community Index* (1998b) has been one of the few empirical research efforts and instruments used to explore the conception of PLC and its impact as an organizational and cultural mechanism. The instrument measures five latent factors: Shared Sense of Purpose; Collaborative Activity; Focus on Student Learning; Deprivatized Practice; and Reflective Dialogue (Louis & Marks, 1998b).

**Reflective dialogue.**

Reflection serves as one of the five latent variables from Louis and Marks’ (1998b) *Professional Community Index* used to explore the conception of PLC. Reflective dialogue is present in positive PLCs where development of professional community is characterized by conversations that focus on instructional practice, pedagogy, and student learning (Clift, Houston, & Pugach, 1990; Liebowitz, 1991; Little, 1990; Osterman, 1990; as cited in Louis & Kruse, 1995b). Kuh (2008) describes reflective dialogue as a way that participants typically get frequent feedback and reflective insight about one’s practice.

Reflective dialogue is often characterized as the domain of individual critique and analysis. With reflective dialogues, teachers work toward a more critical and clear understanding of their own practice and improvement (Louis & Kruse, 1995b). However, when a school-wide commitment to reflective dialogue exists, it can serve as a vehicle for collective responsibility. In part, this occurs because reflective dialogue
characterized by “rich and recurring discourse promotes high standards of practice, and both generate and reinforce core beliefs, norms, and values of the community. In other words, talk is the bridge between educational values and improved practice in schools” (Kruse et al., 1995, p. 30)

**Shared norms and values.**

Sometimes described as a shared sense of purpose, shared norms and values serve as one of the five latent variables from Louis and Marks' (1998a) *Professional Community Index* used to explore the conception of PLC. While all factors are important, shared norms and values appear to be the foundation for any professional learning community (Hipp, Huffman, Pankake, & Olivier, 2008; Louis & Kruse, 1995b). Peterson and Deal (2002) underscore the value of a core of shared values, beliefs, assumptions, and norms in developing a collaborative school culture as a key to productivity and school improvement (as cited in Strahan, 2003). If positively developed, shared norms and values serve as mechanisms that permit internal social control and interpersonal trust (Abbott, 1991; Angle & Perry, 1983; Bucher & Stelling, 1969; Forsyth & Danisiewicz, 1985; as cited in Louis & Kruse, 1995b). This control can also serve to coalesce the general moral understandings of a school community such that it becomes a collective advocate for teaching and learning (Kruse et al., 1995, p. 29).
Social cognitive theory.

The historical thread of social cognitive theory and its conceptions of behavior impact this study’s work. Social cognitive theory stems from Rotter’s conception of behavior within the tradition of social learning theorists and social learning theory. Social learning theory suggests that an individual’s behavior (or potential thereof) is “a function of reinforcement value and expectancies that are determined by a person’s reinforcement history for relevant situations” (Fibel & Hale, 1978, p. 924). In turn, Rotter conceptualized an expectancy-value theory of motivation based upon the foundation of and insights of social learning (Weiner, 1992). Expectancy -- the central tenet of Rotter’s social learning theory -- is defined by Rotter (1954) as the “probability held by the individual that a particular reinforcement will occur as a function of a specific behavior on his part in a specific situation” (as cited in Weiner, 1992, p. 204). A general expectancy based on past reinforcement history can influence, but not dictate one’s expectancy of a particular, specific scenario (Fibel & Hale, 1978; Weiner, 1992).

Rotter’s work also led to the conception of locus of control, as a way to describe one’s control over outcomes. Described in two ways -- internal vs. eternal -- one’s perceived locus of control “deals both with situational parameters and individual differences” (Rotter, 1975, p. 56) and serves to “influence the individual’s specific goal expectancy in any given situation” (Weiner, 1992, p. 212). Rotter’s work and these conceptions serve as a foundation for teacher and collective efficacy defined earlier (R. D. Goddard et al., 2000; Hoy et al., 2006; Tschannen-Moran & Hoy, 2000).
Social cognitive theory also takes on an agentic perspective by which an individual becomes a forger of experiences and developer of events (Bandura, 2000a; Bandura, 2000b). To this end, personal efficacy becomes a key instrument to an individual’s sense of human agency; such that Bandura describes personal efficacy as the “core belief and foundation of human agency” (Bandura, 2000b, p. 25). Efficacy is defined elsewhere in this section of terms.

**Trust.**

Trust is a multifacted and dynamic concept with multiple definitions and reference groups. Even though studies of trust in schools are few and far between, Cunningham and Gresso (1993) have described trust as “the foundation of school effectiveness” (Tschannen-Moran & Hoy, 1998, p. 341). In short, though, trust can be thought of as “a general confidence and overall optimism in occurring events” and parties (Tschannen-Moran & Hoy, 1998, p. 342). Tschannen-Moran and Hoy (2000) state that definitions of trust may include elements of the following seven facets: *willingness to risk vulnerability*, *confidence* “to rest in uncertainty”, *benevolence* that the trusted party will protect and avoid harm, *reliability* based upon a belief of predictability, *competence* that the trusted party has the requisite skill set to deliver, *honesty* of the trusted party’s integrity and truthfulness, and *openness* and transparency in sharing personal or vulnerable information (pp. 556-558).
Assumptions

The extant data used in this analysis were data privately shared with the author and was collected by the Ohio Department of Education from surveys that used methodological instruments previously shown to have acceptable levels of reliability and validity. This study assumes that voluntary, anonymous participants provided their best estimates and avoided socially desirable responses. This study also assumes that the school level demographics and characteristics of student achievement, prior student achievement, and percentage of students eligible for free and reduced price lunches was accurately compiled.

Limitations

This study uses a sample of schools that represent a geographical diversity throughout one state. In addition, the sample was not random – all schools were identified by the state department as demonstrating high literacy needs and had agreed to participate in a two-year state-funded grant. For these reasons, care will be used in generalizing from the sample.

An additional limitation was the non-return rate of schools originally approached to participate in the surveys. Of the original 170 schools, 113 returned staff surveys (2,050 teachers). Of those, only 110 schools met a threshold of 10% or greater rate of return. In no instances did schools return only one set of the two surveys and, in general, the returns were balanced. For these reasons care will be used in generalizing from the sample.
Another limitation involves the aggregation of the extant data. When data from individual participants were aggregated to school-level measures, care should be taken to avoid ecological fallacies by extending the findings to individual teachers, grade level teams, or departments.

The final limitation may be the presence of the Hawthorne Effect when “the positive findings [may be] a result of the interest and involvement of the teachers in an innovation as opposed to a benefit specifically tied to participation in a PLC” (Vescio et al., 2008, p. 88). However, at the time the schools were asked to complete the surveys, the state had already communicated that the grant had been stopped and that all subsequent funding was pulled. It seems logical that schools would have little incentive to trump up the results. Indeed, it may be possible that the abruptness of the change may have generated possible ill will toward the project and its state funding agency.

**Summary**

Chapter One stated the problem, need, purpose, significance, and research questions of this study – exploring how professional learning community can serve as a normative and cultural mechanism that explains a school culture of academic optimism and student achievement. In addition, the chapter described germane concepts, constitutive and definitive definitions, and methodological instruments within their relevance to the overall research questions. Chapter One effort serves as an initial background for Chapter Two’s review of the concepts’ and constructs’ relevant literature, as well as the conceptual and theoretical justifications for the research questions.
CHAPTER 2  
LITERATURE REVIEW

Chapter Two presents a review of the literature for each variable in this study. This review highlights the conceptual and theoretical justifications for investigating whether professional learning community (PLC) may serve as an organizational and cultural mechanism associated with academic optimism (AO).

Academic Optimism

In attempts to explain school-level variables that impact student achievement, a construct has been identified called academic optimism (AO). Research suggests that academic optimism contributes to students’ academic achievement more than students’ previous achievement, demographics, and even socioeconomic status, heretofore the enduring de facto predictor of student achievement (Beard, Hoy, & Woolfolk Hoy, 2010; Beard, 2011; Hoy et al., 2006; Woolfolk Hoy et al., 2008). According to Hoy et al. (2006) the construct of AO is grounded in the research of positive psychology and represents a school’s sense of agency. This sense of agency results from a relationship among three positive concepts interacting in systemic and iterative ways. These concepts are (a) academic emphasis of the building, (b) collective efficacy of the staff, and (c) staff’s trust in students and parents. The three concepts represent the school’s affective,
cognitive, and behavioral elements, respectively. When present, they represent a school’s sense of academic optimism.

As a construct, academic optimism reflects a focus on collective properties and aggregated perceptions with the school as the unit of study (Hoy et al. 2006). Though more recent research has been conducted to measure academic optimism as an individual characteristic in teachers (Woolfolk Hoy et al., 2008) and students (Tschannen-Moran, Bankole, Mitchell, & Moore, 2013), this study focuses on the original, collective construct. So rather than necessarily focusing on elements of individual capacities or efforts, the three major elements of academic optimism reflect school wide norms and indicate organizational properties that, with additional research, could be developed through specific practices and principles.

Because academic emphasis, collective efficacy, and faculty trust reinforce a positive outlook for a school to guide their efforts, it is little wonder that the elements are tightly intertwined. While optimism is often conceptually described as a cognitive process via goals or expectancy (McGuigan & Hoy, 2006), the three elements of academic optimism dynamically interact because each relationally addresses a “postulated reciprocal causality” (Hoy et al., 2006, p. 431). This dynamic works when academic emphasis prods academically-focused teacher behaviors; collective efficacy represents a cognitive belief in the success of a faculty’s academically-focused behavior attempts; and, faculty trust serves as an affective condition that supports a sense of protection permitting the encouraged risk-taking necessary to successfully implement
academically-focused behaviors, even if they are inventive or different from previously-normed academic behaviors or efforts.

As a result of the reciprocal causality, each element scaffolds the effectiveness of each of the other elements and, by relationship, the level of academic optimism in the building itself. This dynamic interaction presents itself as a way to sustain a more complete system than any one of the elements alone (Hoy et al., 2006). In other words, if a principal or school has a consistent focus on academic achievement, but the faculty possesses little cognitive belief that one’s peers are up to the challenge, then the actual practices of the faculty have little chance to address the educational needs that students bring to the school. Absent any collective belief that a faculty has the agency that their own actions can impact external challenges, then the behaviors have little hope of impact. If, however, a faculty has a collective belief and optimism that they can impact student achievement, then that cognitive condition is able to manifest itself in real action if the third element of faculty trust is present. This trust of students and parents serves as a disinhibitor for teachers to actively choose efficacious actions – aligned to the school’s academic emphasis – which they might have otherwise approached and turned away from with professional trepidation (Hoy et al., 2006).

**Optimism**

To fully explore the construct of academic optimism, it warrants exploring the positive psychology of optimism. *General optimism* is a positive expectation about life that has been defined by Lionel Tiger as “a mood or attitude associated with an
expectation about the social or material future – one which the evaluator regards as socially desirable, to his [or her] advantage, or for his [or her] pleasure” (Tiger, 1979, p. 18). Seligman introduced a conception of optimism as a function of one’s “explanatory style”; that is, in the way one thinks about the causes of an event (Seligman, Reivich, Jaycox, & Gillham, 1995). While optimism is future-oriented and cognitive in its conception, it also has relative, affective elements because the evaluator determines what is desirable (C. Peterson, 2000; C. Peterson & Seligman, 2004; Seligman, 1991). By self-determining the desirable goal, optimism becomes intertwined with motivation. Peterson refers to optimism as the “Velcro construct” because its wide array of correlates stick to optimism in ways that are not always evident (C. Peterson, 2000).

Optimism has also be defined as a unidimensional model that sits on the same continuum as pessimism (A. Thompson & Gaudreau, 2008). Yet confounding research has demonstrated that optimism and pessimism are not opposite constructs, but are part of a bidimensional model with distinguishably different conceptions (Robinson-Whelen, Kim, MacCallum, & Kiecolt-Glaser, 1997; A. Thompson & Gaudreau, 2008). Regardless of how optimism is defined or conceptualized, the research is lengthy about its positive association with psychologically healthy people and a host of favorable characteristics ranging from happiness, hardiness, achievement, and physical well-being (Bryant & Cvengros, 2004; C. Peterson, 2000; Seligman, 1991; Seligman et al., 1995).

These positive attributes of optimism are reflected physiologically too. In functional magnetic resonance imaging of the brain, the “areas involved in emotional processing selectively reduce their activity when people think about negative future
events” and increase brain activity when thoughts shift to positive events (Schacter & Addis, 2007, p. 1346). While research indicates diminished brain frequency about negative future events, the actual coping mechanisms also shift. Indeed, optimistic individuals engage in more “task-oriented coping” than do pessimistic individuals, who engage in more “disengagement-oriented coping” (A. Thompson & Gaudreau, 2008, p. 270-272). The task-oriented coping of optimistic individuals or groups should, in turn, contribute to a greater likelihood of achieving the desired future-oriented goal.

There are two conceptions of general optimism – dispositional and explanatory. Dispositional optimism can be referred to as the expectancy conception amid the global expectation that good things will be plentiful in the future and bad things scarce. Dispositional optimism is described in terms of how people pursue these desirable, valued goals (Carver et al., 1994). This expectancy theory ensures that just about anything can be defined in (A) goal terms and (B) the way that people’s behaviors align to the identification and adoption of goals and their own self-regulation in pursuing and achieving these goals (Bandura, 1999; Carver et al., 1994). This self-regulation associated with expectancy theory ensures that people attempt to identify barriers to achieving their adopted goals (Bandura, 1999; Zimmerman, 1995). So “in the face of difficulties, do people nonetheless believe that their goals will be achieved? If so, they are optimistic; if not, pessimistic. Optimism leads to continued efforts to attain the goal, whereas pessimism leads to giving up” (C. Peterson, 2000, p. 47).

By contrast, the explanatory style of optimism can be thought of as the agentic thinking (agency) conception of optimism amid an individual’s disposition to explain
away bad events in specific ways. Based upon his research of learned helplessness and learned optimism, Martin Seligman conceptualizes an optimistic explanatory style amid a “significant measure of choice and therefore of personal control over one’s life” (Seligman, 1991, pp. 9-10). Seligman’s explanatory style can be defined by the individual or group’s interpretation of a negative event; specifically, if the incident can be explained by any of the following three causes:

- temporary incident (instead of an enduring, permanent condition)
- specific incident (instead of an universally, pervasive condition)
- external incident (instead of an internal, personal condition)

Explanatory optimism is high when individuals and groups attribute negative situations as temporary, specific, and/or externally caused (Seligman, 1991, pp. 44-51).

Optimism is a fluid construct that can be characterized as a constant or variable way that individuals or groups cope with their external dynamics (C. Peterson, 2000; Seligman, 1991). Indeed, the fluctuating use of optimism can serve people well. While it is obvious that delusional optimism fails to serve many individuals or collective groups, even healthy levels of optimism may not always be effective (Seligman, 1991; Sweeny, Carroll, & Shepperd, 2006). People may wisely choose to shift from optimism for a variety of reasons including preventative ways when they are collecting information about the accuracy of their beliefs or responding to the possibility of undesired outcomes (Sweeny et al., 2006).
Efficacy Theory.

There are associations among positive psychology, optimism, and the agentic impact of perceived efficacy. While efficacy theory is conceptually rooted in social cognitive theory and reflects human agency and an individual's control over life, perceived efficacy impacts one’s beliefs in one’s capabilities to achieve given attainments (Bandura, 1993; Bandura, 1997a). Bandura believed that perceived efficacy is characterized as a future-oriented and task-specific judgment rather than a characteristic generally applicable to all one’s life events. This perception serves as a core element to one’s navigation of life because while it directly impacts one’s behavior, it also impacts other determining factors “such as goals and aspirations, outcome expectations, affective proclivities, and perceptions of impediments and opportunities in the social environment” (Bandura, 2006a, p. 309).

Perceived efficacy is a powerful influencer of individuals and group development, adaptation, and change:

“Efficacy beliefs influence whether people think erratically or strategically, optimisitically or pessimistically. They also influence the courses of action people choose to pursue, the challenges and goals they set for themselves and their commitment to them, how much effort they put forth in given endeavors, the outcomes they expect their efforts to produce, how long they persevere in the face of obstacles, their resilience to adversity, the quality of their emotional life and how much stress and depression they experience in coping with taxing environmental demands, and the life choices they make and the accomplishments they realize” (Bandura, 2006a, p. 309)
The perceived self-efficacy and resultant influence for any event, then, also relies on a sound assessment of the domain, area, or sphere of functioning (Bandura, 1990; Bandura, 2001; Bandura, 2006a).

**Self-efficacy.**

Self-efficacy develops, first, from the assessment of the ease or difficulty of a specific task and, then, the assessment of one’s competence and readiness to successfully execute that task. Specifically, then, it represents an individual's cognitive process of assessing the requisite task for a specific context and concurrently evaluating one's own capacity to deliver the requisite action (Bandura, 2006a; R. D. Goddard et al., 2000; Woolfolk Hoy et al., 2009b). This subjective judgment and perceived belief can manifest the requisite effort and skills necessary to accomplish a certain task and, resultantly, can impact one’s sense of personal agency (Zimmerman, 1995; Zimmerman & Cleary, 2006). This is distinct from locus of control because locus is not concerned with perceived abilities, but instead with outcomes -- and whether they are determined by internal or external factors within or outside of one’s control (Bandura & Schunk, 1981; Bandura, 1997b).

While it is important to understand that perceptions of self-efficacy vary according to specific circumstances and content-disciplines, the sources of self-efficacy are important too. There are four sources of input one taps to generate a subjective judgment of self-efficacy including mastery and vicarious experiences, verbal persuasion, and physiological arousal (R. D. Goddard et al., 2000; R. Wood & Bandura, 1989; Woolfolk Hoy et al., 2009b).
Of the four sources, mastery experiences are the most powerful way to build perceptions of efficacy (R. Wood & Bandura, 1989; Zimmerman & Cleary, 2006). After one successfully navigates first-hand mastery experiences, people strengthen self-beliefs, can better manage setbacks, and even begin to explain away failures.

Another source is vicarious experiences. Vicarious experiences, including proficient modeling of watching others, support the development of self-efficacy through “behavioral, cognitive, and affective changes resulting from observing other individuals perform a behavior” (Zimmerman & Cleary, 2006, p. 64). The more similar the model is to the observer translates into how closely the observer will comparatively judge his own capabilities (Bandura & Schunk, 1981; R. Wood & Bandura, 1989; Zimmerman & Cleary, 2006).

Social persuasion is another source of self-efficacy. Social persuasion serves to develop self-efficacy by giving feedback that compliments and praises as well as by “assigning tasks to them in ways that bring success and avoid placing them prematurely in situations in which they are likely to fail” (R. Wood & Bandura, 1989, p. 365).

The final source that influences how one makes an efficacy judgment is physiological experiences. By recognizing and self-assessing the emotional tension -- via such physical symptoms as sweaty palms and nervous butterflies -- one can judge their perceived capabilities as indicators of personal ineffectiveness (R. Wood & Bandura, 1989; Zimmerman & Cleary, 2006).

These four sources of self-efficacy contribute to self-regulatory micro-decisions that may impact the cyclical equation of self-efficacy including higher goals, increased
effort, enduring persistence, and greater resilience (Bandura, 1997b; Woolfolk Hoy, Hoy, & Davis, 2009a; Zimmerman & Cleary, 2006). When these sources provide unconstructive input, then perceptions of self-efficacy can be low and negatively impact those same effort and motivation qualities.

When these sources provide constructive input, as with individuals who report positive self-efficacy, effects include causal attributions and higher feelings of control over performance results (Bandura, 1997b; Zimmerman & Cleary, 2006). These self-regulatory decision processes are the cognitive mechanisms related to self-reflection of PLCs and the perceptions of collective efficacy (Bandura, 1997a; Bandura, 1997b; R. D. Goddard, Hoy, & Woolfolk Hoy, 2004; Hoy et al., 2006).

An individual’s self-efficacy does not happen in a vacuum, but is influenced by an expansive web of socio-structural influences (Bandura, 1997b; Woolfolk Hoy et al., 2009a). The theory of individual agency and perceptions of self-efficacy can also be extended to a sense of collective agency. This sense of collective agency is manifested in a school’s perceptions of collective efficacy (Bandura, 1998; R. D. Goddard et al., 2004; Parker, 1994).

Collective efficacy.

As one of the three elements in academic optimism, collective efficacy serves as the only cognitive component in the larger construct. Based upon the social cognition theory that frames an understanding of human learning and motivation, if self-efficacy “is an individual’s perceived belief about his or her capacity to organize and execute the
actions required to produce a given level of attainment” (Hoy et al., 2006, p. 428), then efficacy beliefs support and encourage one’s sense of agentic thinking, described as the thoughts that begin and sustain one's efforts in achieving a desired goal (Curry et al., 1997)

Collective efficacy, by extension, is the perceived belief that other members of a group have the capacity to organize and execute the actions necessary to support the collective goal (Bandura, 2000a; R. D. Goddard, 2001). In AO, the collective goal is framed by academic emphasis as an exceptional academic press and focus on rigorous student achievement (R. D. Goddard et al., 2000; Hoy et al., 2006). As such, a faculty with high levels of perceived collective efficacy believes that their colleagues have the necessary agency to make the rigorous student achievement a reality (Hoy et al., 2006).

Collective efficacy is a powerful cognitive element. Collective efficacy explains schools’ student achievement more than the impact of SES, urbanicity, or grade band (Bandura, 2000a; R. D. Goddard et al., 2000; R. D. Goddard et al., 2004). Furthermore, collective efficacy explains student performance more than academic emphasis, though academic emphasis is stronger as it works through strong levels of collective efficacy (R. D. Goddard et al., 2000; Hoy et al., 2002). In short, academic emphasis and collective efficacy “are especially important in motivating achievement among both teachers and students” (Hoy et al., 2006, p. 428).

Yet Goddard et al. (2004) explain that collective efficacy is analogous, but not identical to self-efficacy. It is similar in that both individual and collective dimensions of efficacy are derived from the same four sources mentioned earlier. In addition, both
individual perceptions of self-efficacy and collective efficacy are developed through a cognitive processing of two elements: analysis of the difficulty of the educational task and (b) assessment of the perceiver’s educational competence (R. D. Goddard et al., 2004). To that end, research indicates a positive correlation between teacher’s perceptions of self-efficacy and their perceptions of collective efficacy (R. D. Goddard, 2001; R. D. Goddard & Goddard, 2001; R. D. Goddard et al., 2004; Skaalvik & Skaalvik, 2007). Similar to self-efficacy, collective efficacy is “associated with the tasks, level of effort, persistence, shared thoughts, stress levels, and achievement of groups (R. D. Goddard, 2002, p. 482).

Collective efficacy differs from self-efficacy, though, in that “the collective performance of a social system involves interactive, coordinative, and synergistic dynamics that create emergent group-level properties not reducible solely to individual attributes and that these group activities vary in the degree to which attainments require interdependent effort and collaborative contributions” (Bandura, 2006a). As such, Bandura defines perceived collective efficacy as “the group’s shared belief in its conjoint capabilities to organize and execute courses of action required to produce given levels of attainment” (R. D. Goddard, 2002, p. 482).

This collective perception of efficacy is of most interest in the performance abilities of the system as a whole. The role and execution of behaviors and actions in an organization necessarily acknowledges that it is the individual who enacts them, but that perceptions of collective efficacy is an emergent group-level attribute (Bandura, 2006a). While some researchers attempt to measure collective efficacy through the aggregated
mean of individual perceptions of self-efficacy, those researchers ignore the interdependent nature of collective efficacy and the role of individuals acting on a shared belief with all of the attendant cognitive, affective, and behavioral influences (Bandura, 2006a; Woolfolk Hoy, Davis, & Pape, 2006).

Schools where perceptions of collective efficacy are high “are capable of self-regulation, which helps in the identification, selection, and monitoring of educational efforts that are likely to meet the unique needs of students” (R. D. Goddard et al., 2000, p. 480); this is possible because these teachers have an increased level of agency and greater likelihood of executing behaviors that develop student learning and meet the school’s intentional goals (R. D. Goddard et al., 2000; Pressley, 1995; Zimmerman, 1995).

A faculty’s capacity for collective efficacy to self-regulate and shape teachers’ efforts and practices is difficult to understand unless one acknowledges that teachers’ joint beliefs are part of the normative behaviors and culture of schools (R. D. Goddard et al., 2000; R. D. Goddard & Goddard, 2001; Y. L. Goddard et al., 2007). The perception of collective teacher efficacy is a “way of conceptualizing the normative environment of a school and its influence on both personal and organizational behavior. That is, teachers' beliefs about their faculty's capability to educate students constitute a norm that influences the actions and achievements of schools” (R. D. Goddard et al., 2000, p.496).

Research findings around collective efficacy are compelling. Quantitative methodologies demonstrate a positive and powerful impact on student achievement with an effect stronger than socio-economic status (R. D. Goddard & Goddard, 2001; R. D. Goddard, 2001). Collective efficacy has been associated with an influence over decisions
impacting school improvement and to teachers’ openness to assist colleagues beyond the requisite levels of the job (R. D. Goddard, 2002; Ross & Gray, 2006). R. D. Goddard and Goddard (2001) found that mastery experiences – as characterized by previous student achievement – were a significant predictor of collective efficacy. Yet, the opposite was not true; the level of a faculty’s perceptions of collective efficacy was not a predictor of student achievement.

**Academic Emphasis.**

As the second of three elements in academic optimism, academic emphasis is the only behavioral component in the larger construct. Academic emphasis can be defined as the academic push for excellent student achievement (R. D. Goddard et al., 2000). Sometimes referred to as academic press, this concept can be thought of as a drive and “quest for excellence” that may reflect teachers setting high, but achievable goals; supporting a school setting characterized by order and seriousness; believing in the ability and potential for students to achieve those high goals; and having students responding positively to the challenge of such goals (Hoy & Tarter, 1992, p. 76). In turn, schools that demonstrate academic emphasis include all stakeholders’ pursuit and respect of academic success. These stakeholders include the principal aligning resources and influence to achieve these goals (Tschannen-Moran & Hoy, 1998; Goddard, Sweetland, and Hoy, 2000).

One can think of academic emphasis as the focused norms and culture that simultaneously drive and constrain any school’s behavioral choices; and, any
instructional leader’s and faculty’s collective norms could serve as both stick and/or carrot in influencing and fixing a spotlight on the importance and value of exceptional student achievement. Its relationship with agentic thinking lies in the idea that this involves an intentional pursuit of these academic goals of excellence. As the principle element of organizational agency, academic emphasis “suggests that schools may choose, through a number of individual and collective efforts, to pursue student achievement, and likewise they may act purposefully to strengthen member perceptions of the import of student academic success” (R. D. Goddard et al., 2000, p. 688). The school group’s norms permit them some control over others’ choices if it has repercussions for the organizational group, at large. This professional group threshold can serve as a benchmark when rewarding or socially sanctioning one’s peers for their efforts or lack of efforts in supporting this academic emphasis (R. D. Goddard et al., 2000).

Hoy, et al. (2006) notes at least four studies that demonstrate a significant relationship between academic emphasis and increased student achievement -- regardless of methodological approaches across elementary, middle, and high schools -- while even controlling for socioeconomic status and previous student achievement.

In addition, while principal leadership is often believed to impact student achievement, research suggests that the principal leadership itself does not predict student achievement so much as how the principal impacts the school’s collective academic emphasis. It is the school’s resulting level of academic emphasis that imbues much of what the school focuses on. The principal targets resources, energy, and efforts around student achievement and polices the collective efforts to focus only on efforts that
support that academic press (Hoy et al., 2006; McGuigan & Hoy, 2006; Smith & Hoy, 2007).

**Faculty Trust.**

The third of three elements in academic optimism, faculty trust is the only affective component in the larger construct. Faculty trust in parents and students defines the reference group as school faculty and is related to events and one’s optimism and a general confidence in their occurrence (Hoy, Smith, & Sweetland, 2002; Tarter & Hoy, 1988; Tarter, Bliss, & Hoy, 1989; Tarter, Sabo, & Hoy, 1995; Tschannen-Moran & Hoy, 1998). Faculty trust is anchored in the more-general definitions of trust characterized as “a general confidence and overall optimism in occurring events” (Tschannen-Moran & Hoy, 1998, p. 342) or even the “willingness to be vulnerable to another party based on the confidence that that party is benevolent, reliable, competent, honest, and open” (Hoy et al., 2006, p. 429).

Tschannen-Moran and Hoy (1998) have described trust as “the foundation of school effectiveness” (p 341). They also explain that definitions of trust may include elements of the following seven facets: *willingness to risk vulnerability, confidence “to rest in uncertainty”, benevolence* that the trusted party will protect and avoid harm, *reliability* based upon a belief of predictability, *competence* that the trusted party has the requisite skill set to deliver, *honesty* of the trusted party’s integrity and truthfulness, and *openness* and transparency in sharing personal or vulnerable information (Hoy & Tschannen-Moran, 1999; Tschannen-Moran & Hoy, 2000, pp. 556-558)
Faculty trust, then, is the viewpoint that takes stock of the levels by which students and parents are benevolent and reliable, such that faculty are confidently willing to be vulnerable (R. D. Goddard et al., 2001; Hoy, Smith, & Sweetland, 2003). Faculty trust of students and parents may be the foundation for strong school-family relationships and collaboration (R. D. Goddard et al., 2001). Faculty trust of students and parents serves as an affective condition providing a protective “cover” to take instructional risks necessary to successfully implement academically-focused behaviors, even if they are inventive or different from previously-normed academic behaviors or efforts (R. D. Goddard et al., 2001; Hoy et al., 2006).

Multiple studies have demonstrated that schools with higher levels of trust among faculty, parents, and teachers have increased levels of student achievement (Bryk & Schneider, 1996; Bryk & Schneider, 2003; R. D. Goddard et al., 2001; Hoy & Tschannen-Moran, 1999). This faculty trust is a two-way street and functions best in a spirit of reciprocity between teachers and their students and parents. Indeed, faculty trust serves as a prime element to the success of school improvement efforts in that it encourages students’ volitional presence and participation in the learning process and forges a protective culture for faculty to be inventive with their academic emphasis-oriented instructional practices (Hoy et al., 2006).

Research Critique of Academic Optimism

There is much strength to the research of AO. First, the construction of the interaction among its three elements is imaginative and novel. It synthesizes the
disparate -- cognitive, affective, and behavioral -- elements of an organizational culture. Yet despite its inventiveness, the construct has generalizability. It has held itself up in international translations (Wu, Hoy, & Tarter, 2013) and even when its collective identity is reduced to the individual teacher or the individual student as the unit of analysis (Beard et al., 2010; Tschannen-Moran et al., 2013; Woolfolk Hoy et al., 2008). Next, the design and methodology of the six empirical studies to date are rigorous -- evident in their descriptions below and their acceptance into high profile, peer-edited journals (and edited books). Even though the construct is based upon the reiterative relationships of academic emphasis (AE), collective efficacy (CE), and faculty trust (FT), these variables also each enjoy an independent theoretical and research body to support their associations. Finally, the focus on constructs that are rooted in positive psychology and have the potential to be developed by schools regardless of their means, locations, or demographics ensures that the locus of control remains within the school.

The conception of academic optimism was described and confirmed in 2006 (Hoy et al., 2006). Through surveys of 96 high schools and the methodological design of hierarchical linear modelling (HLM), confirmatory factor analysis (CFA), and structural equation modelling (SEM), academic optimism was confirmed as a latent construct that made a significant contribution to academic achievement - even controlling for socioeconomic status, prior achievement, and other demographics. The intraclass correlation coefficient for AE was .24, CE was .23, and FT was .21 suggesting that 24%, 23%, and 21% of the variance existed between schools and that academic optimism could adequately be conceived as a school property. The SEM testing of hypotheses tested
direct and indirect effects simultaneously; specifically, that achievement was a latent
dependent variable. Tests of models for math and science ($x^2 = 26.15, p = .16, NFI = .97, CFI = .99, RMSEA = .05$) as well as reading, social studies, and writing ($x^2 = 47.71, p = .11, NFI = .96, CFI = .99, RMSEA = .04$) suggested two excellent fits to the data. The predictor variables for the two models accounted for 67% and 54% of the variance in student achievement, respectively. Academic optimism, then, was directly related to achievement in model 1 (.21) and model two (.27), respectively explaining 21% and 27% of the variance in student achievement (Hoy et al., 2006).

Similar to the above study of high schools, (Smith & Hoy, 2007) designed and executed a study to test the construct of academic optimism and achievement at the elementary school level. Data were collected from the survey of 99 elementary schools. Its contribution to the body of research rests on the fact that this was the first paper to focus on poor urban schools, ranging from 55% to 92% of the student populations receiving free or reduced lunch. Confirmatory factor analysis and multiple regression were conducted. The CFA confirmed that academic emphasis (0.83), collective efficacy (0.99), and faculty trust (0.94) loaded as a single factor explaining 89.8333 (89.83%) of the variance. Multiple regression analysis was conducted via a model where academic optimism, SES, and school size were predictor variables to the dependent variable of student achievement, in this case, mathematics scores. Academic optimism again showed its power as a construct in that it had a positive impact on math scores ($\beta = 0.34, p < 0.01$) and also ended up with the same beta weight as SES ($\beta = -0.34, p < 0.01$).
While academic optimism has also been confirmed as an individual construct (Beard et al., 2010; Tschannen-Moran et al., 2013; Woolfolk Hoy et al., 2008) this critique of academic optimism’s research literature will remain limited to the construct as a school wide, organizational property. This supports the conception and methodological design of this proposed study. To that end, McGuigan and Hoy’s research is worth reviewing because it attempted to quantitatively extend the research into conceptualizing what may serve as an antecedent to academic optimism’s development (McGuigan, 2005; McGuigan & Hoy, 2006). They hypothesized that principal leadership -- “as manifested by the creation of school structures and processes that enable teachers’ work” -- is associated with a school wide culture of academic optimism (McGuigan & Hoy, 2006, p. 3).

Their study surveyed the teaching staff at 40 elementary schools using a 12-item Likert-scale surveys to assess enabling school structure and the dependent latent variable of academic optimism. Academic optimism again loaded as a single, latent construct of collective efficacy (.96), academic emphasis (.98), and faculty trust (.95). Additionally, enabling school structure was positively correlated with academic optimism, even when SES is controlled for (partial $r = .46, p < 0.01$) which in turn positively correlated with math student achievement (partial $r = .45, p < 0.01$) and reading (partial $r = .38, p < 0.01$), again controlled for SES. In the multiple regression path model, enabling school structure predicted a school wide culture of academic optimism, controlling for SES ($= .37, p < 0.01$). Academic optimism predicted math ($= .54, p < 0.01$) and writing ($= .50,$
$p < 0.01$) achievement -- heavily outpacing the influence of SES in the path model (McGuigan & Hoy, 2006).

Perhaps the main weakness of the AO research to date is its size and scope. Because the construct of academic optimism is still relatively new (less than a decade), a wide body of empirical research has not emerged to support its breadth and impact. To that end, much of the research to date has been focused on confirming its existence across types of schools -- high and elementary schools (Hoy et al., 2006; McGuigan & Hoy, 2006) or across school characteristics -- suburban, rural, urban, or international (McGuigan & Hoy, 2006; Smith & Hoy, 2007; Wu et al., 2013). While identifying the construct has value for educators, researching ways that academic optimism can be developed has even more value for positively impacting schools and students.

Through this study I hoped to add to the high quality body of academic optimism research by also connecting it to the ever-increasingly popular public education movement of professional learning communities and their enabling qualities.

**Enabling Bureaucracy**

As McGuigan and Hoy assert above, just conceptualizing and empirically validating the construct of academic optimism is not sufficient. Public educators and administrators need to develop an understanding of how such a culture can be created in schools to enable teachers’ work (McGuigan, 2005; McGuigan & Hoy, 2006). Specifically, such a culture may be possible if an enabling school bureaucratic structure of PLC -- defined as the extent to which school organization and structures, hierarchies,
rules, and procedures enable and support educators in their work – “supports rather than hinders the tasks of teaching and learning” (Hoy & Sweetland, 2000, p. 210; Hoy & Sweetland, 2001; Sinden, Hoy, & Sweetland, 2004a; Sinden, Hoy, & Sweetland, 2004b).

When considering organizational characteristics, especially the bureaucratic nature of organizations, the concept of enabling properties is an important consideration for a school interested in developing academic optimism and trying to use PLC as the mechanism to do it.

Two things about schools and bureaucracy are generally accepted; first, all schools are bureaucracies that almost wholesale represent Weberian bureaucratic characteristics of formal procedures embedded within central hierarchies of authority, specialized division of labor, impersonality and objectivity, technical competence, and policies, rules and regulations (Hoy & Sweetland, 2001, p. 296; Hoy & Miskel, 2008). Second, generally speaking, the common use and connotations associated with bureaucracy is pejorative (Adler & Borys, 1996; Hoy & Sweetland, 2001, p. 296). Hoy and Sweetland conceptually define bureaucracy as hindering when it stunts, drags, or serves as an impediment to “the effective and efficient operations of the organization” (Hoy & Sweetland, 2001, p. 302). Adler and Borys (1996) suggest that the negative effect of the affective or attitudinal outcomes of bureaucracy includes stifled creativity, deeper dissatisfaction, and demotivated workers. At its worst, bureaucracy can be coercive and hindering, serving as an impersonal, machine-like, and punishment-centered (Beard et al., 2010; Hoy & Sweetland, 2001; Hoy & Miskel, 2008; Sinden et al., 2004a).
Yet, important positive distinctions for bureaucracy – enabling bureaucracies – exist too. The positive attributes of an enabling bureaucracy provide “needed guidance and clarifies responsibilities, thereby easing role stress and helping individuals be and feel more effective” (Adler & Borys, 1996, p. 61). It can shepherd dialogue, foster trust, and help employees deal with surprises and crises (Hoy & Sweetland, 2000; Hoy & Sweetland, 2001). The empirical study of bureaucracy has shown it to be a two-pole construct -- ranging from enabling to hindering. Sinden et al. (2004a) detailed the two opposing conceptions of bureaucracy listed in Table 1.

<table>
<thead>
<tr>
<th>Enabling bureaucratic structure</th>
<th>Hindering bureaucratic structure</th>
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<tbody>
<tr>
<td>● Facilitates problems solving</td>
<td>● Expects blind adherence to rules</td>
</tr>
<tr>
<td>● Enables cooperation</td>
<td>● Promotes control</td>
</tr>
<tr>
<td>● Encourages collaboration</td>
<td>● Act autocratically</td>
</tr>
<tr>
<td>● Promotes flexibility</td>
<td>● Displays rigid</td>
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<tr>
<td>● Encourages innovation</td>
<td>● Discourages change</td>
</tr>
<tr>
<td>● Protects participants</td>
<td>● Disciplines subordinates</td>
</tr>
<tr>
<td>● Values differences</td>
<td>● Demands consensus</td>
</tr>
<tr>
<td>● Delights in the unexpected</td>
<td>● Fears the unexpected</td>
</tr>
<tr>
<td>● Learns for mistakes</td>
<td>● Punishes mistakes</td>
</tr>
<tr>
<td>● Views problems as opportunities</td>
<td>● Views problems as obstacles</td>
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Sinden et al., 2004a, p. 465

McGuigan (2005) and McGuigan and Hoy (2006) examined the organizational impact of enabling bureaucratic functions as a way to focus on the practical outcomes of school leadership. Their study of enabling and hindering bureaucracy emphasized
curtailing one’s focus to only the school as a manifestation of a building’s leadership through enabling bureaucracy:

“Rather than focus on transformational leadership or personal leadership traits, one can examine an aspect of school leadership that is manifested by the extent to which school organizations, structures, rules, and procedures are seen by teachers as enabling rather than hindering their work (Adler & Borys, 1996; Hoy & Sweetland, 2001). Thus, the study seeks to capture the academic effects of a well-managed school” (McGuigan & Hoy, 2006, p. 464).

When considering potentially powerful variables of enabling organizational structures, professional learning communities can be a natural focus for researchers to study enabling bureaucracy (McGuigan & Hoy, 2006). Indeed, PLCs can be an increasingly popular way for schools to address their hindering and coercive bureaucratic nature. When schools are organized in PLCs, they are able to address the hindering bureaucratic, political units of isolated silos whose isolation makes them struggle to innovate and reform in the name of helping all students learn (Natriello, Pallas, & McDill, 1986; Wahlstrom & Louis, 2008a). In instances where no enabling, participatory structures exist in the culture, Louis and Kruse suggest that it affects teachers’ desire to change and clouds a focus on student learning and school reform efforts (Kruse et al., 1995; Louis et al., 1995).

Yet the kinds of infrastructural efforts of changing schedules and providing settings for teachers to get together do not impact an organizational culture alone. A superficial restructuring of the schedule – allowing teachers to meet outside their
classroom -- is inadequate when trying to impact the culture of schools positively. Crafting an organizational structure that promotes community has the potential to foster a promising powerful culture, even one characterized by academic optimism, yet it is an effort that is neither easy nor always pays immediate dividends (Kruse & Louis, 1995; Louis, 2008).

**Professional Learning Community**

PLCs are an important construct to understand because they may effectively serve as an enabling organizational and cultural antecedent to the development of school cultures characterized by academic optimism (AO). More importantly, some requisite characteristics of a school wide PLC may be inextricably tied to academic optimism’s tenets of academic emphasis, collective efficacy, and faculty trust of students and parents. The following sections will explore the research literature about PLC. The result of this review will suggest how PLCs could theoretically act as a structural and cultural dynamic that grows and deepens a school wide culture of academic optimism.

Professional learning community (PLC) can be defined most simply as an organizational structure characterized by enabling behaviors and cultures that permit sustained, structured educator collaboration to improve the quality of learning in schools (DuFour & Eaker, 2005; Louis & Kruse, 1995b; Louis, 2008; Schmoker, 2005a; Vescio et al., 2008). What makes a PLC difficult to define is that it is not a prescription, a new program, a model, or an innovation to be implemented. Rather, a PLC is an infrastructure
or a way of working together that results in continuous school improvement (Hord, 1997).

Indeed, professional learning communities may exist among informal or formal groups of educators. They may be grounded in small or large groups in role- or discipline-alike responsibilities. They may capitalize on stable rosters of teacher members or may include membership with vacillating or semi-permanent participants. Above all, in PLCs the members of the school community are framed as learners whose inquiry both identifies themselves with and serves to improve a larger, collective learning organization. As such, members of a PLC share responsibility, expertise, and leadership for everyone's learning: teachers, administrators, and most importantly, students (DuFour & Eaker, 1998; DuFour & Eaker, 2005; Louis et al., 1995; Schmoker, 2005a; Vescio et al., 2008)

Exploring an understanding of PLCs begins from the most general point of view, one where PLCs can be characterized by the core semantic and conceptual frameworks of the term itself. The very roots of the construct include ideas about community, professionalism, and organizational learning.

**Community.**

At its most basic level, any PLC is first and foremost a community. In a community, “membership is based on the whole person, rather than on specialized contributions” or expertise (Louis et al., 1995, p. 14). Community is defined by interactions among similar people who identify themselves through membership in a
group that emphasizes personal connection. Generally speaking, communities of individuals are caring, encouraging, and mutually accountable to each other (Louis, 2008).

In the construct of PLCs, community is firmly embedded within the school. Louis and Kruse suggest that if a school is to be thought of as a community, it will exhibit three essential characteristics:

- “A common set of activities that provides many occasions for face-to-face interactions, and the potential for common understandings, values, and expectations for behavior to evolve (Van Maanen & Barley, 1984).
- Specific organizational structures that promote this, such as time and expectations that people will gather and talk, small, stable networks of teachers, etc. (Schein, 1985); and,
- A core of shared values about what students should learn, about how faculty and students should behave, and about the shared aims to maintain and promote the community. Central to a school community is an ethic of interpersonal caring that permeates the life of teachers, students, and administrators (Beck, 1992; Firestone & Rosenblum, 1988; Noddings, 1984)” (as cited in Louis et al., 1995, p. 16).

Community can foster social control through the establishment and use of norms and values while also permitting supportive conditions for individuals to develop (Louis et al., 1995). To underscore this idea, Judith Warren Little’s study of community (1990) has served as a central conceptual foundation for PLCs in its exploration of teachers'

51
autonomy and professional relations with one another. Little suggests that the benefits of community are most important when they exert mutual influence and obligation on members. This influence of community can change the practices of privacy and autonomy such that "strong collegiality" influences "teachers' practice or commitments". When community is characterized by such influence, this focus is what manifests changes or sustains practices that impact student learning. She further maintains that this focus is "precisely such 'content' that renders teachers' collegial affinities consequential for pupils" (p. 511).

While a consequential focus on student learning is an imperative, it is not always clear who the learner is in a community. Grossman, Wineburg, and Woolworth (2001) describe the paradox of how we define the learner in a community as an essential tension of teacher community. On one end of the continuum is a desire to bring teachers together in collaborative settings to improve their pedagogy or practice – so that community focuses on student learning. On the other end of the continuum is a focus on teachers developing their content expertise within their school-situated discipline so that they remain professionally current and familiar with relevant changes in the discipline – so that community is characterized by the teacher being the student at the center of the collaboration. The tension between student learning and teacher learning is what workplace community must successfully navigate and resolve.
Professionalism.

When a community exhibits professionalism, it demonstrates traits necessary for establishing a PLC. Professionalism can refer to the degree which a person exhibits expert knowledge, skills, and dispositions. It can also refer to membership and expectations of a vocation or advocacy body aligned to a particular training or defined educational track. In short, the “professional” in PLC is based upon the construct of professionalism associated with collecting the unique contributions of expertise (Louis et al., 1995). So while the earlier conception of community is defined by interactions among similar people whose membership in the group is not based on unique expert contributions, professionalism is often bound by the member's technical knowledge base (Louis et al., 1995).

As opposed to definitions of occupations, definitions of professions uniformly emphasize the non-routine characteristics of the work, individual judgment, and adaptive expertise to address problems. Professionalism exerts control over entry to the profession and conditions of work; to that end, professionalism often relies on members to monitor and control the professional conduct of their peers (Louis et al., 1995; Louis & Marks, 1998a; Wahlstrom & Louis, 2008b). Professionalism is also characterized by a strong client-orientation (Louis et al., 1995; Louis, 2008) which, incidentally also underscores an important characteristic of a positive PLC; that is, a focus on student learning, not just instruction (DuFour & Eaker, 1998; DuFour & Eaker, 2005; Hord, 2009).

McMahon and Hoy (2009) refer to professionalism as a set of norms and technical expertise unique to a body of members. This professionalism can be
represented as the degree to which members of a profession meet the performance and conduct expectations that define that profession’s practices such that an individual member’s behaviors are tied to the broader collective’s efforts and jointly-held normative behaviors. As community develops based upon professional relationships, the opportunities for leveraging Bandura’s four sources of collective efficacy should increase. The efficacy sources most impacted should include mastery and vicarious experiences -- sources that would be harder to come by in schools that are characterized by unprofessional, social or even dysfunctional community.

Organizational Learning.

A Professional Learning Community exists when a group exhibits common professional dispositions and directs its focus on systematic, organized learning. Organizational learning, at its most basic level, can refer to “the process of improving action through better knowledge and understanding (Fiol & Lyles, 1985, p. 803). Organizational learning also has procedural perspectives with its focus on a learning community's efforts of inquiry, interpretation and translation, theory creation, behavioral modification, and frequently includes cognitive change (Collinson & Cook, 2007; Crossan & Guatto, 1996; Fiol & Lyles, 1985). To that end, organizational learning can be defined more precisely as the "deliberate use of individual, group, and system learning to embed new thinking and practices that continuously renew and transform the organization in ways that support shared aims" (Collinson & Cook, 2007, p. 8).
Peter Senge (1990) focuses on an approach to organizational management via learning organizations. Senge suggests that effective organizational management should encompass the following five characteristics: systems thinking, personal mastery and learning, mental models, shared vision, and team learning.

While schools' primary mission is to organize themselves in ways that positively impact student learning, it is sometimes lost in the mix that the adults associated with the school must also be active learners. To that end, organizational learning can also be explored from a social theory of learning and practice. Etienne Wenger's description of communities of practice suggests that this organizational learning mechanism can frame itself by the three characteristics of domain, community, and practice. Domain leads to an identity “defined by a shared interest”; community occurs when members “interact and learn together”; and, practice develops when a “shared repertoire of resources” supports the community (Wenger & Snyder, 2000; Wenger, 2006, pp. 1-2).

Furthermore, the constructs of organizational learning and learning community intertwine with other theories. Sense-making based upon the collective and collaborative focus of professional learning communities shares similarities with Vygotsky’s constructivist theory of learning. Constructivist theory and community learning can be thought of through six guiding principles:

- Each learner approaches learning with his or her own unique experiences and prior understandings
- Knowledge is constructed collaboratively and individually through a variety of experiences
• Learning is an active and reflective process
• Learning is developmental in its construction of meaning and models
• Social interaction permits multiple perspectives on learning and meaning making
• Learning is ultimately negotiated by each individual learner (Hord, 2009; Vygotsky, 1978).

Organizational learning can be contextualized in schools' efforts to support continuous improvement efforts and data-based decision making. As such, professional learning communities can be the kind of intentional behavioral and cultural mechanisms for implementing and sustaining schools' focus on organizational learning.

With the support of a professional community committed to learning and understanding, PLCs can help all participating individuals address the challenge of human sense-making. In schools, multiple individual and collective stakeholders -- including teachers, parents, students, businesses, advocacy groups, and professional organizations -- mix within the internal and external influences of political policies and regulations and educational theories and research-based practices, in a loosely coupled dance. In such dynamics, challenges and confusion about mission, purpose, and means may frequently exist. In such a community, individuals may resort to their autonomous ways as a coping mechanism for making sense of their work (Little, 1990).

When schools or groups of educators actively group themselves to take professional responsibility for the inquiry, sense-making, and improved practices that
contribute to increased student learning, they begin to develop some of the cultural norms and adopt some of the organizational features of PLCs.

**Professional Learning Community.**

A professional learning community (PLC) may be described as an organizational mechanism that increases collaborative opportunities for quality talk, constructivist knowledge building, and – ultimately – improved student learning. Yet PLCs may also be described in more specific ways. Two prominent descriptions of professional learning communities include those by DuFour, and Hord.

DuFour – who arguably has become K-12 education's most recognized name when it comes to practicing and advocating for PLCs – described professional learning community as consisting of six elements, including a shared mission, vision, and values; collective inquiry, teams characterized by collaboration; an orientation and disposition toward innovation and risk; an orientation toward continuous improvement; and, an orientation to results (DuFour & Eaker, 1998, pp. 25-29). Hord’s (2008) research and focus of PLCs as vehicles for faculty professional development characterizes professional learning communities as consisting of five dimensions that include: "shared beliefs, values and vision; shared and supportive leadership; supportive conditions, both structural and relational; collective intentional learning and its application; and shared personal practice” (pp. 12-13).

Despite these more specific descriptions of PLCs, the conceptualization of PLCs has failed to reach consensus or convergence, and is increasingly fraught with
approximation and uncertainty. DuFour (2007) himself has been candid about the overuse and frequent misunderstanding associated with the term. He has seen the phrase Professional Learning Community used for:

every imaginable combination of individuals with an interest in education – a grade-level teaching team, a school committee, a high school department, an entire school district, a state department of education, a national professional organization, and so on. In fact the term has been used so ubiquitously that it is in danger of losing all meaning. (p. 2)

In addition to the shifting definitions of PLC, the research supporting the case for PLCs is another area of underlying insecurity. On one hand, advocates have framed PLCs as perhaps the "richest, most unprecedented culmination of the best we know about authentic school improvement" and "an ironclad case" (Schmoker, 2005b, pp. 135-136) as well as "…our best hope for high levels of learning" (Dufour, 2007, p. 4)

Yet, when it comes down to assessing the research base supporting PLCs, the case for PLCs is light and needs more exploration. In fact, while much research exists that examines the various characteristics of PLCs, far less research exists that focus on and support PLC impact on teachers’ practices and students’ learning – arguably the most important, consequent variables. A recent comprehensive review by Vescio, Ross, and Adams (2008) of empirical research published in peer-reviewed journals between 1990 and 2005 found only a "small number of empirical studies that explore the impact on teaching practice and student learning" (p. 80). Vescio et al (2008) found only eleven articles that met their rigorous criteria for requisite PLC characteristics and a focus on
such consequential associations. They write that these studies suggest that well-implemented PLCs have the ability to impact the core mission of schools.

So where does this unique dynamic of enthusiasm, disparate definitions and conceptions, and prodigious yet light research treatment leave researchers and practitioners in understanding PLCs? Despite these challenges in defining the work, understanding the core components, and even implementing a PLC as an organizational and cultural practice, it is important to systematically articulate the construct so that one can more effectively evaluate the empirical support associated with PLCs.

Louis and Kruse’s (1995b) study will be used to help assess PLCs’ empirical research. Conceptually, their study is broad, deep, and rigorous. Their proposed model used strong methodology involving a thorough and rich treatment of the practices that anchor school-based PLC. Specifically, the research emerged from the 1990 U.S. Department of Education's Office of Educational Research and Improvement's Center for the Organization and Restructuring of Schools. The office funded a five-year longitudinal program of research about elementary, middle, and high schools that were well into the adoption of school wide restructuring efforts (Louis & Kruse, 1995b). This model arose from the funded mixed-methods work that ultimately investigated how a school wide organizational and cultural effort impacts teacher's work and student achievement (Louis & Kruse, 1995b). In addition, the use of Louis and Kruse's model is important because it preceded the widespread adoption movement of PLCs in schools, but also represents the first rigorous research that focuses on the school as the unit of study.
Finally, Louis and Kruse’s model can effectively serve as an organizational framework for the disparate theoretical efforts and research findings about PLCs. Louis and Kruse suggest five general characteristics of PLCs: shared norms and values; collaboration; reflective dialogue; deprivatized practice; and, a focus on student learning (Kruse et al., 1995; Louis & Kruse, 1995b). Through an extensive review of research conceptually aligned to Louis and Kruse's framework of PLC characteristics, this chapter will examine the consequential impact on teaching and learning by examining and evaluating the most germane research from the last twenty years. In particular, this literature review assesses the research highlighted by Vescio, et al. (2008) and the most empirically rigorous quantitative study that has emerged since (Saunders, Goldenberg, & Gallimore, 2009).

**Shared Norms and Values.**

The first characteristic, shared norms and values, appears to be the foundation for any professional learning community (Hipp et al., 2008; Kruse et al., 1995). If positively developed, shared norms and values serve as mechanisms that permit internal social control – through coherent values and norms – and are far stronger than external social controls (Kruse et al., 1995). This control also serves to coalesce a “delimited core of value positions” in the school which permits teachers to begin the task of developing a moral community that ultimately allows them to become advocates for teaching and learning (Kruse et al., 1995, p. 29).

If educators want to “form more tightly connected social and professional connections, the absence of a core of shared values will instead produce
misunderstanding and conflicts and may also lead to interpersonal mistrust” (Kruse et al., 1995, p. 29). Yet when shared norms and values are combined with settings for PLCs, then the well-developed organizational norms and values permit professional discussions that promote development and improvement (Kruse et al., 1995; Litwak, 1961).

This foundational presence of shared norms and values is evident in other literature. The PLC’s organizational value in developing a collaborative school culture is a key to productivity and school improvement. Effective PLCs must be characterized by three core cultural elements: values, defined as the set standards of what is considered good in a school; beliefs and assumptions, thought of as the perceptions that guide behaviors; and norms, conceived as the non-articulated rules that school members should follow (K. D. Peterson & Deal, 2002; Strahan, 2003).

A three-year study of three Title I elementary schools that have “beaten the odds” found that collaborative dialogue and planning involved in professional learning communities developed a shared sense of responsibility toward learning that resulted in reinforcing instructional norms valuing increased student engagement and achievement (Strahan, 2003). In addition, shared norms, as a characteristic of professional learning community, have a robust effect on teachers’ standard contemporary practice characterized by student-centered practices (Wahlstrom & Louis, 2008b).

**Collaboration.**

The second characteristic, collaboration, is another important characteristic of professional learning community. While almost all schools have some collaborative interactions and relationships, a central tenet to professional learning communities occurs
when community and collegiality is a generalized, school-wide attribute (Kruse et al., 1995). When this exists, “role and department boundaries, which often serve as rigid barriers, become more permeable....This flexibility helps to shape information, routines, and the transfer of knowledge between grade levels and departments” (Kruse et al., 1995, pp. 33-34).

Louis and Kruse (1995) draw distinctions among cooperation, collegiality, and collaboration. Cooperation is not always inclusive of a shared value base, but does focus on mutual assistance in the name of efficiency. Collegiality is more often characterized by the presence of teacher dialogue and mutual learning centered around teaching and student performance. Collaboration can be characterized as a more evolved type of collegiality where a focus of co-development exists that also contributes to teachers’ voluntary commitments to their peers.

Karl Weick (1995) suggests that collaboration is a means for the community’s sense-making to evolve. This collaboration supports “the ways in which people chop moments out of continuous flows and extract cues from those moments” (p. 43). This sense-making in a community can follow a four-stage model of means-convergence: (1) assessment of diverse ends that will be met by embarking on the work; (2) development of common means to reach their goals; (3) agreement on community ends characterized by binding norms, roles, and responsibilities; and (4) the ultimate entropy of diverse means that splinter the community into smaller communities of practice or extinction (Dooner, Mandzuk, & Clifton, 2008; Weick, 1995).
This evolution of collaboration is an important characteristic of PLCs. Dooner, Mandzuk and Clifton (2008) suggest that collaboration characterized by superficial and feigned camaraderie is less likely to produce powerful opportunities for cognitive dissonance, constructivist interdependence, and improved professional practice. Yet the very act of addressing cognitive conflict may induce increased opportunities for affective conflict – a potentially trust-destroying and angst-ridden exercise that bears down hard upon even mature professional learning communities. Conversely, Scribner et al. found that constructive conflict among professional community members contributed to shared norms and a clearer identity (1999).

Wynn and Brown (2008) in their qualitative research on principal leadership and professional learning community found that collaboration provided first-year teachers valuable emotional support. Though in instances when collaboration is characterized solely by team teaching, it has generally produced disappointing student results because of a lack of organizational direction, time for planning, and role conflict (Supovitz, 2002). This suggests that the enabling effect of appropriate supportive resources, infrastructure, and/or personnel outlined later is critical for effectively establishing a PLC.

**Reflective Dialogue.**

The third characteristic for the study or implementation of PLCs is reflective dialogue. It is present in PLCs when its development is characterized by conversations that focus on instructional practice, pedagogy, and student learning (Kruse et al., 1995;
Little, 1990). Kuh (2008) describes reflective dialogue as a way that participants typically get frequent feedback and reflective insight about one’s own practice.

Kruse et al. (1995) describe reflective dialogue as the domain of individual critique and analysis. When a school-wide commitment to it exists, then stable settings serve as a vehicle for collective responsibility. With reflective dialogues, teachers work toward a more critical and clear understanding of their own practice and improvement. In part, this occurs because reflective dialogue characterized by “rich and recurring discourse promotes high standards of practice, and both generate and reinforce core beliefs, norms, and values of the community in other words, talk is the bridge between educational values and improved practice in schools” (Kruse et al., 1995, p. 30).

The impact of reflective dialogue bears itself out in research. One positive professional learning community that increased student achievement over a four-year period used reflective practices outlined by the National Board for Professional Teaching Standards (Berry et al., 2005). Strahan’s (2003) three-year study of three Title I elementary schools that have “beaten the odds” found that the escalating spiral of reform was driven by data-based dialogue and reflection focused on addressing student needs. Reflective practice, as a characteristic of professional learning community also had a robust effect on teachers’ standard contemporary practice characterized by student-centered practices (Wahlstrom & Louis, 2008b).

Yet reflective dialogue is not a given in sites that create settings for collaboration. Supovitz found that there was no increase in reflective dialogue between PLCs with teacher team structures and schools without teacher teams. One reason for this neutral
impact is that perhaps reflective dialogue must be characterized by active inquiry over an extended period of time for reflection (2002). To underscore the point, Hollins, et al. (2004) describe one case of longitudinal commitment to reflective practices in a low performing, high-poverty elementary school. Public reflection was eventually viewed with enthusiasm – especially in its potential for sharing instructional strategies. They were not alone. In a different study with similar outcomes, Aubusson et al. (2007) report in their qualitative study of 82 schools participating in student-centered action research that schools who engaged in inquiry and tried to discern and articulate their impact on student learning, thereafter developed greater motivation, persistence in reflection, and team confidence.

*Deprivatization of Practice.*

Deprivatization of practice, the fourth characteristic of PLCs, occurs when educators “practice their craft openly” (Kruse et al., 1995, p. 31). In professional communities characterized by deprivatized practice, teachers openly engage in their practice and support one another through assistance and aid as mentors, advisors, or specialists (Kruse et al., 1995, p. 31; Lieberman, 1988; Little, 1990).

Dialogue as a result of deprivatized instructional practices allows teachers to share accomplishments and learn from breakdowns in a low-risk environment (Louis & Kruse, 1995b). This openness also allows “teachers to be analytic in their planning and thinking and to use observations from others about student effort and achievement that cannot be obtained while in the act of teaching” (Kruse et al., 1995, p. 31). If PLCs
are ways to build capacity within schools, then the elements of deprivatized practice opened up access to embedded expertise already present (Berry et al., 2005).

Intentional deprivatized practices demonstrate positive associations. Supovitz (2002) found that in PLCs with structures for teacher teams, the school culture had higher levels of teacher deprivatization than in schools without teacher teams. Aubusson’s et al. (2007) found that a significant number of schools identified deprivatizing practice – especially through peer observation -- as critical to the professional community’s successful focus on student learning.

Positive results followed other deprivatized practices. When frequent feedback loops about instructional performance occur in deprivatized settings, individual teacher’s sense of efficacy increases (Lee, Zhang, & Yin, 2011; Louis & Kruse, 1995b; Wahlstrom & Louis, 2008b). Walhstrom and Louis (2008b) found in their research of over 4000 K-12 teacher survey responses that while deprivatized practice had little impact on focused instructional practices characterized by pacing and academic focus, it did have significant impact on teachers’ instructional practices characterized by student-centered instruction and flexible grouping.

**Focus on Student Learning.**

The fifth and final characteristic of PLC is a strong, clear focus on student learning. This collective focus can be driven by shared norms and values that all students can learn and that the community has collective responsibility for that outcome. This concept is evident when a community of teachers shares beliefs and values that all students can be academically successful even before the teachers consider providing
responsive and supportive learning environments that address student achievement (Kruse et al., 1995). Andrews and Lewis (2002) found in their qualitative study of a high school that the development of professional learning community increased teachers’ thinking and focus about students’ learning and contributed to a wider consensus of the valued understanding of what good instruction looks like in their community of learners.

The effectiveness of PLC increased its impact when the focus on student learning centered on improved pedagogy and learning instead of activities that were more superficial. Aubusson’s et al. (2007) research found that when teachers’ collaborative efforts were limited to a focus on planning discrete lessons versus focusing on inquiry and student learning, then teachers’ learning was not as great. Underscoring that finding, Graham’s (2007) mixed methods study of a middle school’s professional learning community suggests that the depth of teacher conversation was positively impacted by a focus on active learning. Kruse and Louis (2002) propose this happens: when PLCs situate students as the focus, “…the emphasis shifts to how pedagogy is linked to the process of student learning, and professional actions increasingly focus on choices that affect students’ opportunity to learn and provide substantial student benefit” (p. 32).

Berry, Johnson, and Montgomery (2005) found in their PLC case study that an increase in student achievement developed when teacher teams organized to solve student-centered issues. Englert and Tarrant (1995) found that the level of discourse evolved through the development of learning communities where teachers in the first year used formative feedback assessing student engagement and in later years were more likely to assess the success of their teaching through student’s cognitive goals.
A focus on student learning contributed to cultural markers supporting students. A study by Marks, Doane, and Secada (1996) found that when cultures of professional learning community were present with a focus on student learning and high rigor, then students themselves perceived that the school’s central focus and activity was to their learning. Louis and Marks (1998a) found in their study of 24 restructured secondary schools that when a school-wide culture of professional community as defined by a focus on student learning is present, then a concomitant presence of social support for achievement in higher.

When a focus on student learning was absent in PLCs, the impact on teaching and learning was negligible. Wells and Feun (2008) in their research of schools participating in PLC training found little forward movement developing anything but a contrived community. Indeed, while teachers indicated collaborative meetings were free of much conflict, the dialogue was void of any focus on student learning and achievement. Supovitz (2002) also found that the significant change in school cultures did not manifest itself into an increased instructional focus.

The collective responsibility for student learning is important because is also reinforces policies and structures that encourage decentralization and a shift from bureaucracy (Kruse et al., 1995). In support of this paper’s research questions connecting PLCs with academic optimism, Wahlstrom and Louis (2008b) describe their work identifying student level outcomes to levels of collective responsibility, the researchers’ proxy for collective efficacy. Increasing professional community contributes to increased collective responsibility for performance (Louis, Marks, & Kruse, 1996a). Graham
(2007) observed teachers’ professional community groups and found that as members increasingly perceived themselves as more effective instructionally, then greater focus was placed on collaborative conversation and a sense of adaptive expertise where meeting structures were reworked to increase that collaborative conversation.

Hirsh and Hord (2008) describe an NSDC project developing a professional learning community structure among K-12 principals and found that their retention and efforts were, in part, attributed by members to the collective responsibility and accountability they felt for their peers. This collective responsibility positively contributed to the learning and retention of members. Wood (2007) describes her National School Reform Faculty (NSRF) research with Lucent Learning Communities which found increased levels of collective responsibility in those who use practices of inquiry, reflective dialogue, and collaboration to build their own community’s knowledge. Wahlstrom and Louis (2008b) wrote of their work with the K-12 Learning for Leadership database that collective responsibility had a relatively high impact on elementary schools, but was not significant in middle or high schools. And collaboration can color collective responsibility when it was viewed as valuable in that its outcomes helped all students in the school and not just those in teacher’s own classrooms (Wynn & Brown, 2008).

**Enabling Conditions and Resources for PLC**

When considering how PLC may serve as an antecedent to the development of school wide culture of academic optimism, the enabling features of PLC are important
(Hoy & Sweetland, 2001; McGuigan, 2005; Sinden et al., 2004a; Wu et al., 2013). To that end, a professional learning community must itself have supportive conditions and resources that enable its development as an organizational and cultural mechanism. Louise and Kruse (1995b) propose through their model that the following supportive conditions and resources support the establishment, impact, and sustainability of PLCs: supportive infrastructural conditions and resources; human capital and social resources; and related leadership.

**Supportive Infrastructural Conditions and Resources.**

The infrastructural conditions and resources – such as time for teachers to collaborate or opportunities for shared decision-making -- associated with PLCs serve as many of the requisite architectural features and tools required, but not necessarily sufficient toward the impact of PLCs (Kruse & Louis, 1995; Louis & Kruse, 1995b; Louis & Marks, 1998a). While the structure may make schools feel as if something is being accomplished as a PLC, Vescio et al. (2006) clarify that the collaboration afforded through structural settings and opportunities is the vehicle and not the goal for professional learning communities; the goal, of course, is improved student achievement. Policy can support the organizational structures and settings for professional communities, but by itself is not much more than a foundation for communities (Saunders et al., 2009; Supovitz, 2002). To underscore these cautions, Supovitz (2002) found that even though structural supports did impact school culture, the professional communities that did develop failed to focus on instruction. Thus if educators are to be both
accountable and effective, the researchers suggest that teacher groups will need organizational structures to support these efforts.

One organizational structure is developing time and place for collaborative talk. This structure helps a PLC make sense of and carry out change. It helps sustain the change, too. Indeed, in organizations where little or limited interaction and communication occur, the monitoring and control become less likely (Louis & Kruse, 1995b). Aubusson’s et al. (2007) found that dedicated time was a necessary element to the development of professional community and student-focused learning regardless of the developmental stage of the PLC.

Yet a challenge to having settings with time is the ability of the group to stay focused on student learning. Englert and Tarrant (1995) found that in PLCs that positively impacted student learning, most of the talk was centered around student learning. In their study, nearly 20% of the learning community talk focused around problem-solving which also included generating support for their efforts moving away from conventional teaching practices that previously had not served students well. Supovitz (2002) reports that of 268 teaching teams in his study, the mean percentage of time dedicated to instructional issues was 25% -- with the other 75% sidetracked for administrative tasks, discipline, or school/district paperwork. When settings are created, but the conversation is not centered on student achievement and learning, then little effort is being placed toward a school’s primary focus. Indeed, time is not time, if the time is hijacked for a non-instructional focus.
Even though settings of time and place must be designated for PLC members to collaborate, it is also important that enabling characteristics of physical proximity, interdependence, and communication structures exist away from the meetings too. When teachers have physical proximity with each other, then teacher effort is promoted thorough increased informal communication, sustained observations, and dialogue related to teaching practices and student performance (Kruse & Louis, 1995). When interdependence is present, collective responsibility and reciprocal influence among the staff increases accountability to one’s colleagues and community members (Kruse & Louis, 1995). School-wide professional learning communities need conditions where teachers can communicate and exchange ideas laterally and vertically along two foci; one must address the daily needs of internal stakeholders and the other must focus on ways to envision new ideas and plans to address necessary future changes in support of the professional learning community (Kruse et al., 1995).

**Supportive Human and Social Resources.**

Once the requisite enabling, physical infrastructure exists for staff to meet and collaborate around student learning, supportive cultural characteristics and resources -- for example, effective professional development and feedback on performance -- appear to contribute to the success of a PLC (Louis & Kruse, 1995b; Louis & Marks, 1998a).

In positive PLCs, members have a collective openness to professional improvement and this school-wide openness to improvement contributes to teachers’ sense of professional community (Louis et al., 1996a; Louis & Kruse, 1995b). This
openness is key to a successful school-wide reform because it impacts the condition and support for faculty risk taking (Louis & Kruse, 1995b). Graham (2007) observed PLCs collaboratively deal with conflict in ways that facilitated or obstructed conversations based upon student learning, and that the groups’ abilities to positively deal with conflict was largely mediated by the group members’ sense of receptivity and openness to different ideas. Englert and Tarrant (1995) found that PLCs were more likely to be successful when members were tolerant of ambiguity or divergent thoughts. Wynn and Brown’s (2008) research found that new teachers who participated in a PLC were more likely to be open to, appreciate, and reflect upon informal feedback. Such participation also provided deeper insight into their own practices as compared to insight from a district’s official evaluation instrument.

Conversely, an absence of openness to improvement is a serious barrier to development of PLC. Collaboration among professional communities can generate both cognitive and affective conflict or dissonance and that the affective conflict can lead to less openness, tolerance, and trust for other members (Amason & Schweiger, 1997; Dooner et al., 2008). A culture of trust and respect, then, is an important condition to couple to an openness for improvement.

Teachers will generally only be open to or seek out candid feedback of their work when positive, open, and supportive relationships exist among staff. Trust refers to the quality and confidence of interpersonal relations; respect refers to the condition of honor among colleagues for their mutual expertise (Kruse & Louis, 1995). Commitment and professional community are encouraged with the existence of trust and respect from
internal and external communities, including colleagues, administrators, central office personnel, and parents, respectively (Firestone & Rosenblum, 1988; Louis & Kruse, 1995b).

In addition Hord (2009) maintains that PLCs must have a culture built on integrity and truthfulness to effectively focus on student learning. While a collegial, supportive, and safe learning environment for teachers in PLCs is necessary, such a supportive culture is not sufficient for development of either instructional discourse or effective facilitation skills (Los Angeles Unified School District, September 2008).

A trusting, respectful PLC culture may sometimes need to extend beyond an immediate teacher group. Andrews and Lewis (2002) found that the ability to develop professional learning community was, in part, founded on the success of an external facilitator building a trusting, non-threatening environment. In addition, research suggests that successful PLCs must help parents and external community members understand the collaborative settings and schedules that foster important teacher collaboration (Hord, 2009).

A coupling of trust and openness to improvement also manifested itself in a PLCs' dispositions to take risks. A PLC’s readiness characteristics are defined by an enabling, cultural climate that promotes professional inquiry, teachers’ inclination to take risks, and the approaching of leadership in unconventional ways (Scribner et al., 1999). Professional learning communities that addressed important needs of student learning had a culture of members who encouraged risk and experimentation (Hipp et al., 2008).
Englert and Tarrant (1995) found that the enabling effect of PLCs increased teachers’ sense of collaborative empowerment and openness to risk-taking.

Another human resource important to effective professional learning communities is a collective access to expertise, though one could perhaps argue that this could also be an infrastructural condition (Louis & Kruse, 1995b). While teachers may improve their individual classroom practice on their own, a school’s collective improvement is unlikely without enabling structures and opportunities for teachers to access the expertise of their colleagues (Louis & Kruse, 1995b). Of course, one constructivist value of PLCs is that they can serve as a vehicle for sustained, embedded teacher development (Supovitz, 2002). Berry, Johnson, and Montgomery’s (2008) study of one school’s efforts to expand the expertise of its cohort of National Board-certified Teachers throughout a professional learning community learned that a “web of interaction” – where all teachers could access specific persons with explicit areas of expertise – was valuable in supporting inter and intra-group communication (p. 59). Gorodetsky and Barack (2008) examined an experimental high school and found a PLC where teachers’ attention to instruction and learning in their communities of practice were more inclined to develop a greater appreciation in the collective expertise of their peers and personal practices and capacity rather than a blind adherence to external sources of expertise (like the partnering university). When PLCs increasingly accessed the expertise of their members, principal leadership and its influence seemed to be diminished because access to other expertise was more readily available (Wahlstrom & Louis, 2008b).
Yet the location of expertise in a PLC varies in its importance. In some instances, reliance on embedded PLC members impeded progress. Math and language arts teachers stumbled on their own professional limitations because their limited expertise served only to narrow the possible negotiation of new instructional efforts gleaned from external sources (Vescio et al., 2006). Such “normative practices that are not grounded in expertise are often unprofessional, involving an unspoken preference to avoid confronting the poor functioning of a group. In other cases, however, teachers may discuss practice, but persist in affirming the value of poor pedagogy because they lack access to information that would suggest otherwise (Kruse et al., 1995, p. 38). To correct a similarly-weak foundation, work in a large middle school engaged in a 5-year reform model found that high quality professional development and access to research-based literature provided an excellent anchor to guide collaborative community practices (Phillips, 2003).

As might be expected, challenges appeared in accessing embedded expertise. Englert and Tarrant (1995) in their study of special education teachers implementing a new teaching framework found that before a collaborative culture could develop, the group had to define norms and processes for sharing power and expertise. Supovitz (2002) also found that secondary teachers in team-based schools employed the targeted instructional practices significantly more frequently than did their peers in non-team-based schools. This suggests that the increased collaboration, deprivatization, and access to expertise within the group likely contributed to changes in teacher practices.
Membership in community – even with a professional orientation – has its own important, generative benefits of socialization. Socialization is present in the collective work as a vehicle for internal social control and the daily norms and values that may reinforce or undermine a commitment to professional community – among current and new members (Kruse et al., 1995). In Englert and Tarrant’s (1995) research, as colleagues began to experience success, they would raise expectations for student achievement, and other teachers in the learning communities, in turn, increased their expectations for students. Kruse and Louis (1995) suggest that structural conditions like communication structures and networks or interdependent roles cannot be capitalized on to create professional communities unless enabling preconditions – like teacher empowerment, time to collaborate, and school autonomy exist.

**Leadership.**

The final, important condition in Louis and Kruse’s model for the successful development of professional learning communities is the presence of supportive, facilitative leadership and the manner and extent that administrative leadership provides enabling bureaucratic conditions (Louis & Kruse, 1995b; Louis & Marks, 1998a). To that end, principals’ influence can be felt in PLCs through a variety of ways.

School leaders who create opportunities for meaningful interactions in a supportive environment and climate for learning promote teachers’ commitment to organizational effectiveness (Hipp et al., 2008; Louis & Kruse, 1995b). Berry, Johnson, and Montgomery (2005) noted that the principal served as a catalyst for expanding the
expertise and student focus through the development of a professional learning community. Leaders who support a shared vision establish an aligned sense of “goal-consensus” (Vandenberghe & Staessens, 1991, p. 1). Leaders “are crucial for organizational innovation because they act as a constant source of pressure to think in ways that deviate from the current culture” (Miles et al., 1988; cited in Kruse et al., 1995, p. 39).

Leadership style seems to have differing impacts in the successful development of PLCs. Leaders who demonstrated collaborative styles of leadership, when compared to directive leadership styles, had greater likelihood of developing cultures of professional learning community; leaders who demonstrated collaborative styles of leadership, when compared to nondirective leadership styles, had greater likelihood of developing cultures of professional learning community (Huffman & Jacobson, 2003). Relatedly, Saunders, Goldenberg, and Gallimore (2009) in their quasi-experimental study of Title 1 schools found that implementation and uptake of a viable professional learning community is more likely with staff consensus and buy-in, but that a mandated practice may be productively implemented if the efforts are viewed as giving teachers greater influence and attention to practices that address teaching and learning.

Instructional leadership had mixed effects in professional learning communities. Walhstrom and Louis (2008b) in their research of teachers’ perceptions on leadership and the impact on their instructional practices found that principal leadership has a strong effect only on focused, instruction that is characterized by pacing, alignment of instruction, and academic learning. On the other hand, their research of teachers’
perceptions on leadership and the impact on their instructional practices found that principal leadership has minimal effect on instructional practices characterized by flexible grouping or student-centered instructional practices. However PLC and their characteristics of shared norms and values, reflective dialogue, and deprivatized practices did provide the necessary arena and contexts to impact these high-yield practices.

Scribner et al. (1999) conducted research in middle schools and found that principal leadership contributed to the uptake and development of professional learning community. Principal leadership that developed trust among the school’s staff was more likely to help a staff find a shared sense of purpose among leadership and teachers, a systemic trust. Yet Wahlstrom and Louis (2008b) found that a principal’s instructional leadership – as defined by teachers’ trust in the principal – had little impact influencing teacher practice characterized by standard contemporary pedagogy or flexible grouping. Their research found that while trust of the principal had no impact on teacher instructional practices, it did passively serve as a foundation for other forms of trust in a PLC.

Other forms of trust that could grow from that foundation include a reciprocal trust or intra-trust amongst teachers Scribner et al. (1999) found that principals who demonstrated support and commitment to teachers and students were likely to develop a reciprocal trust from teachers. However, Walhstrom and Louis (2008b) suggest that perceived trust of principals and prevalence of shared decision making opportunities impacted teachers’ contemporary teaching practices, yet any impact attributed to
principals was erased upon adding the influence of PLC characteristics of shared norms and values, reflective practices, and deprivatized practices.

Hord (2009) characterized shared leadership in professional learning communities as cultures that have “collegial and facilitative participation of the principal, who shares leadership and has the ability to participate without dominating” (Wynn & Brown, 2008, p. 52). Furthermore, she describes shared leadership as a product of constructivist leadership characterized by a reciprocal relationship among members of a professional community (Hord, 2009). The constructivist leader supports organizational practices that drive sense-making, coherence, and collaborative knowledge-making as critical elements of continuous improvement (S. Thompson et al., 2004).

Wynn and Brown (2008) found in their research that new teachers in an enabling sense of professional learning communities valued principals’ shared leadership when it was characterized by flexibility and support. Phillips (2003) found that when school leadership shared responsibility and empowered teachers for the success of persistently difficult student achievement issues, then professional community and changes in teacher practices began to occur.

A significant challenge, though, is clarifying leadership roles. The kind of teacher empowerment that contributes to teachers’ greatest satisfaction is one that focuses on the immediacy and direct relation to their daily classroom work. Other non-direct empowerment issues can become distractions (Hoy & Tarter, 2008; Johnson, 1990; Louis & Kruse, 1995b). Andrews and Lewis (2002) suggest that distributed leadership and teacher influence is possible when role confusion is addressed. Specifically, positive
professional learning communities can develop when a distinction is drawn between the strategic leadership required of principals and the pedagogical leadership afforded within the collaborative purview of teachers. This distinction may also be conceived as a parallel leadership because when shared leadership increased, there was a greater distribution of building leadership. This distribution occurred through PLCs, which in turn, helped collaboratively define shared norms and values.

The extent of which principal leadership has impact is limited. Graham’s (2007) mixed methods research suggest that organizational structures are important only to setting up a stable settings for collaboration, working primarily to foster a culture rather than causally creating a culture of professional learning community. While principal leadership may not have a causal impact on student achievement, principals do have an impact on PLCs. Scribner et al. (1999) found that while shared leadership aided development of professional community, leadership who completely abdicated responsibility for school leadership did little to develop or sustain professional community. Even in teacher-run schools, those in formal leadership positions “retain the greatest influence over the quality of professional community” (Louis & Kruse, 1995a, p. 210).

Research Critique of Professional Learning Community

This study explores PLC from a single framework -- the one proposed by Louis and Kruse (1995b) -- in an attempt to settle on a working definition of PLC while still effectively explaining PLC’s conceptually complex cultural dynamic and organizational
properties. The objective is to effectively orient even sophisticated readers to PLC as a construct even if the possible tradeoff is an inauthentic simplification. To that end, this study has also synthesized many disparate and varied research outcomes to primarily anchor the theoretical efforts outlined above. Combined with PLC’s “intuitive appeal..., compelling logic, and the approbation of many educators” (Saunders et al., 2009, p. 1006), readers may believe that the body of research is broad and deeply-empirical too.

Unfortunately, the research base is neither as rigorous nor as broad as practitioners and researchers might be led to believe (Vescio et al., 2008). That is, a lot of research about theory and conceptualization are evident, but little well-organized research and methodological support is available, at least in their own review of published research across fifteen years, from 1990 through 2005. They detailed that the vast majority of research is comprised of work descriptions of PLCs, anecdotal findings, or reflective self-reports with little empirical grounding. Goddard, Goddard, and Tschannen-Moran (2007) even went so far as to describe this void as a “paucity of research investigating the extent to which teacher’s collaborative school improvement practices are related to student achievement” (p. 880).

The review by Vescio, et al. (2008) is worth highlighting because it was so systematic and detailed. It began by searching many websites and databases, including EBSCO and ERIC. The study’s team used various search terms that aligned with many of the relevant, conceptual and theoretical terms used in this chapter review. From the initial fifty-five published articles or books found, they then culled their search to only those works that met certain benchmarks. The benchmarks are: (a) research must have an
empirical approach; (b) the conception of PLCs must explicitly or implicitly align to the five major characteristics of PLC used in this study’s conceptualization; (c) the works must be vetted by a peer-reviewed or adjudicated process; and, (d) the methodological objective must include connecting the research to its possible impact on teacher practice and/or student achievement.

The authors (2008) found only eleven empirical works that warranted a review under those reasonably-rigorous criteria. From that small group, nine of those eleven studies were largely qualitative while only the remaining two (e.g. Bolam, 2005; Louis and Marks, 1998) could be considered studies of rigorous quantitative methodology. While this paper added the small group of works for review in the following paragraphs, it also focused on a more in-depth critique of the two quantitative efforts (e.g. Bolam, 2005; Louis and Marks, 1998). This critique also turns its attention to another newer, empirically rigorous work -- a quasi-experimental study published since then (Saunders, 2009).

While those high quality “threshold” studies and their research outcomes are outlined after the break, this critique will first review the only two quantitatively studies from 1990 to 2005 that Vescio et al. (2008) characterized as robustly quantitative. It is then followed by a review of the quasi-experimental study (Saunders, 2009).

Bolam, et al’s. (2005) study represented one of the two robustly-quantitative studies highlighted by Vescio et al. (2008). It is an English government effort that included a methodology of single questionnaire per school (nearly 2000 buildings), case
studies of 16 schools, and three workshops to triangulate and intermittently adjust the
directions and findings of the case studies.

The methodological treatment of the study used exploratory factor analysis to
confirm variables of their construct. For at least four of their twelve variables, a
generally weak, but positive and significant correlation was found with student
achievement (r= .3). In other words, as the strength of PLCs increased or decreased, so
did student achievement. While the other eight variables were not correlated, primary
level schools had positive, significant correlations with raw test scores and value added
data. Secondary level schools only experienced positive, significant correlations with
value-added data. Bolam, et al.’s. (2005) effort did not attempt to determine levels of
explained variance or causality. As such, their contribution to the PLC research body is
limited (2005).

Louis and Marks’ (1998) study appears to be the most robust quantitative research
of PLCs from the period of 1990 through 2005 (Vescio et al., 2008). The origin of their
work shares the same lineage as Louis and Kruse’s 1995 PLC framework that this paper
uses to organize itself conceptually; specifically, PLCs are constructed of five factors:
shared norms and trust; collaboration; deprivatized practice; reflective dialogue; and,
focus on student learning. This work focused on a national sample of twenty-four
schools (eight each of elementary, middle, and high) involved in the School Restructuring
Study (SRS) conducted by the Center on the Organization and Restructuring from 1991-
1995 for the U.S. Department of Education, Office of Educational Research and
Improvement (Louis & Marks, 1998c; Marks & Printy, 2002).
Their methodology collected survey data from nearly 1000 teachers and almost 6,000 students, classroom observational data, interviews, teacher assessment samples, student work samples, and case studies of each of the twenty-four schools in the study (Louis & Marks, 1998c). Specifically, Louis and Marks explored if their conception of PLC positively affected classroom instruction, such that authentic instruction and authentic achievement increases. The research team avoided assessing impact on standardized test scores in favor of authentic learning, defined by Newman et al. (1996) as “dimensions of intellectual quality rather than content” that support the “construction of knowledge, disciplined inquiry [regardless of content discipline], and value beyond documenting one’s competence in performing the task” via “intellectually rigorous work” (as cited in Louis & Marks, 1998c, pp. 536-537).

Hierarchical linear modeling provided two powerful explanations about PLC on student achievement. First, the presence of PLC in schools contributed to higher levels of social support for authentic achievement (.31, p ≤ .01) accounting for 91.4% of the between-school variance. Likewise, schools demonstrating high levels of PLC had a higher quality of authentic, classroom pedagogy (.36, p ≤ .01) accounting for 36.2% of the between-school variance. In short, PLC contributed to higher levels of social support and authentic pedagogy. Second, the strength of a school’s PLC accounted for 85% of variance of students’ authentic achievement, such that the higher the strength of the PLC, the greater the student achievement (Louis & Marks, 1998c; Vescio et al., 2008).

Like all research, Louis and Marks’ work is not without problems. The quantitative instrument -- *Professional Community Index* -- used in Louis and Marks’
study serves as one of the first and only available ways to quantitatively measure the existence of PLC. In that sense, the instrument is an excellent choice to use and it is, in fact, the instrument that this study used to measure PLC in exploring its relationships with academic optimism.

As an instrument, though, the reliability ratings (Cronbach alphas) for the variables’ confirmatory factor analyses appear barely adequate. Specifically, the total reliability for the Professional Community Index \(a = .69\) is derived from the following subscales: shared sense of purpose (three items; \(a = .74\)); collaborative activity (six items; \(a = .68\)); focus on student learning (four items; \(a = .61\)); deprivatized practice (four items; \(a = .62\)); and, reflective dialogue (two items; \(a = .68\)) (Louis & Marks, 1998c, Appendix A). While the numbers are near Kline’s (1993) Cronbach’s alpha rule of thumb of .7 or higher representing acceptable levels of reliability, such levels are well below the reliability measures of other instruments used in this proposed study (Field, 2009).

However, the two lowest subscales also have no more than four items respectively. Such low numbers add some comfort in that they address Cortina’s (1993) caution that Cronbach alpha measurements can be falsely higher the more items the sub-scale uses (Field, 2009).

The one empirically-rigorous, quasi-experimental study published since Vescio, et al. (2008) is by Saunders et al. (2009). This study appears to be the strongest quantitative research effort published since 2005. With a robust methodological design and implementation, their longitudinal study over five years framed the work of PLCs as a study of schools’ grade-level learning teams characterized by stable settings, exclusive
instructional foci, and clear protocols. The schools’ treatment group \((n = 9)\) and control group \((n = 6)\) shared statistical similarities and contexts. All came from the same geographical area of Los Angeles, all demonstrated socio-economic demographics that qualified them for federal Title I funding, and all were part of the same school district -- thus were all “obligated to use the same guidelines and policies related to curriculum, instruction, assessment, class size, English learner programming, and school calendar” (Saunders et al., 2009, p. 1012). The treatment schools had a two-stage implementation process: in years one and two, schools’ principals were the only parties directly provided training; in years three through five, direct training was provided to a building leadership team comprised of the principal and some teachers. Stage two was also augmented with an external evaluation of training and implementation fidelity as well as the inclusion of twice-annual booster trainings to all staff members.

Saunders et al. (2009) used \(z\)-scores of state performance indices and national norm-referenced achievement tests to determine the impact between the longitudinal effects (of pre-intervention and post-intervention) as well as treatment versus control groups’ effects. Through analysis of variance (ANOVA), the research team found that the treatment groups had met or surpassed the district average achievement levels, even though all treatment schools started well below the district average and the district average also improved over the five-year period (p. 1012).

They also found that no statistically significant improvement occurred over Phase One’s two-year period. Using effect sizes of the national, norm-referenced tests suggested only a moderate impact \((d = 0.22)\) at the end of Phase One. The effect size
improved considerably annually -- over the three years -- in Phase Two ($d = 0.63$, $d = 0.64$, and $d = .88$). In contrast to previous research, Saunders and his research team (2009) began investigating schools before they launched their grade-level PLC teams. At the study launch, all of the schools were scoring well below district averages on standardized tests. After the program was fully implemented, schools using learning teams saw dramatic gains in student achievement. By the end of the study, the learning team schools had exceeded the gains made by the district as a whole, which included many historically high-performing schools in more affluent neighborhoods (Saunders et al., 2009, p. 1012).

This lack of impact on student achievement during Phase I suggests that the impact of training and enabling conditions that support and pressure all adult learners in schools matter. During Phase I when only the building principal received training, the principals’ leadership did not manifest enough accountability in the explicit team model. This suggests that the enabling impact of principal leadership is necessary, but not sufficient to ensure staff’s ownership and focus on student learning and those instructional efforts teachers may leverage to impact student achievement. In short, simply having supportive leadership, settings, and time are important and necessary, yet alone they were insufficient conditions for developing positive professional learning community (Saunders et al., 2009).
PLC Impact on School Culture and Academic Optimism.

Vescio et al’s. (2008) eleven works underscore the impact of PLCs on significant school-level variables. The first major impact potentially affecting school effectiveness is culture. While culture is not necessarily a proxy for student achievement, it does serve as corroborating the characteristic of PLC to develop powerful culture as a means to an end (Stoll et al., 2006). Seashore, Anderson, and Riedel (2003) underscore the theoretical impact of PLC on culture by stating:

By using the term professional learning community we signify our interest not only in discrete acts of teacher sharing, but in the establishment of a school-wide culture that makes collaboration expected, inclusive, genuine, ongoing, and focused on critically examining practice to improve student outcomes. ...The hypothesis is that what teachers do together outside of the classroom can be as important as what they do inside in affecting school restructuring, teachers’ professional development, and student learning. (p. 3)

Little’s (2003) work with teacher learning community demonstrates impacts similar to other research: community that expresses collective responsibility to student learning, a focus on innovation and risk-taking, and a commitment to collaborative and interdependent relations with other members of the community.

The eleven studies in Vescio, et al. (2008) described a consistent impact on school culture. Indeed, “all eleven of the studies cited empirical data suggesting a change in the professional culture of the school had occurred” (p. 84) -- six studies used participants’ quotations (Andrews & Lewis, 2002; Berry et al., 2005; Englert & Tarrant, 1995; Hollins...
et al., 2004; Phillips, 2003; Strahan, 2003); three used surveys between treated and untreated groups (Dunne, Nave, & Lewis, 2000; Supovitz, 2002; Supovitz & Christman, 2003); one used interview and survey data (Bolam et al., 2005); and one used survey data to measure for a culture of professional community (Louis & Marks, 1998c).

These eleven works suggest that professional learning communities have an impact on and foster optimistic change in school culture. In a general sense, Bolam et al. (2005) found that PLC impacted the always-evolving culture of schools in ways that added to a sense of possibility and comfort with change and ambiguity. They reported that “an understanding that the job of sustaining a professional learning community is never finished – it will always be ongoing. [It is] an optimistic view of change” (p. 142).

In supporting this study’s theory and rationale that PLCs serve as antecedents to a school wide culture of academic optimism, it was important to explore the research associations among PLC culture and efficacy -- the cognitive element of academic optimism. The dynamic collaboration and change in pedagogy associated with PLCs contribute to teacher efficacy – especially as such practices increase the occasions to improve classroom instruction by increasing the frequency and depth of feedback cycles (Louis & Kruse, 1995a). These occasions serve as deprivatized, vicarious sources of ableness and actual mastery experiences. Such experiences then contribute to: professional efficacy as well as PLCs characterized by shared norms and values, collaboration, deprivatized practice, reflective dialogue, and a focus on student learning – all characteristics that should impact academic optimism.
Perceptions of efficacy (self- and collective-efficacy) are evident in PLCs. Englert and Tarrant (1995) found that teachers in professional learning communities experienced greater feelings of self- and collective efficacy. Professional community can reinforce a collective sense of efficacy; including, improved communication between and among individuals and groups; improved job performance, satisfaction, and morale (Louis & Kruse, 1995a; Supovitz & Christman, 2003).

A three-year study of three Title I elementary schools that have “beaten the odds” found that the continuous data-directed, collaborative dialogue “helped to cultivate collective efficacy at each school and provided a renewable source of energy for participants” that both provided momentum and fueled the dynamics of school reform (Strahan, 2003, p. 143). More impact of collective efficacy was evident in other research. Saunders, Goldenberg, and Gallimore (2009) found that schools with professional learning communities characterized by a focus on teaching and learning rather than a focus on school governance were more likely to attribute student academic gains to their own collaborative efforts to improve instruction. In addition to increased feelings of agency, these teachers had higher expectations for themselves too. Collaborative work with colleagues increases teachers’ sense of affiliation among themselves and with their school as well as a sense of mutual support and individual responsibility for the quality and impact of instruction (Louis & Kruse, 1995a).

This sense of collective efficacy may serve to increase the affective element of academic optimism too -- faculty trust. This is possible as efficacy is positively related to teachers’ personal commitment to their students and one another and can contribute to
prosocial, professional orientations – like feelings of contribution to the organization’s mission and goals – and contribute to improved satisfaction of parents, students, and faculty (Brief & Motowidlo, 1986; Kruse & Louis, 1995; Louis & Kruse, 1995a). To extend that thinking, a PLC’s “effective social construction of knowledge” is related to teachers’ sense of efficacy and commitment to their work and is inversely related to negative attitudes about the students that they teach” (Murphy & Louis, 1994, p. 9).

Hollins’, et. al. (2004) study of a low performing, high-poverty elementary school found that teachers involved in collaborative study groups developed more positive attitudes about the children they taught. These pro-social impacts may have an influence on faculty trust of students within the construct of academic optimism. Other impacts of PLC include higher morale (Supovitz, 2002) which could be associated with the improved teachers’ perception of the school and its associated improved image in the broader community (Andrews & Lewis, 2002).

An organizational and cultural presence of PLC contributed much to the optimistic ways schools could shift to a sharper focus on student learning and academic emphasis -- the behavioral element of academic optimism. This cultural sense of optimism and agency impacted teachers’ views toward their students’ abilities too. The sense of belief in students to meet expectations of academic push was also evident. Englert and Tarrant (1995) found a cultural raising of teacher’s expectations for students occurred after collaborative participation in a professional learning community.

Such a cultural shift toward student learning and academic emphasis appeared to impact culture more when the organizational mechanisms present to support such a focus
were established. When teacher workgroups in the Los Angeles Unified District followed a group protocol were compared to teacher workgroups who had no protocol to guide their PLC development, the protocol groups engaged in deeper and richer discussions about instructional practices and decisions. Their secondary schools found that schools who followed a protocol to maintain focus on student learning were more likely to demonstrate “curiosity and openness to expressing doubt regarding the instructional beliefs; critical thinking and probing questions about instructional issues; concrete and shared vocabulary with which to discuss instruction; coherent discussions with relevant details about instructional issues; and attributing student learning to instructional practices vs. external factors outside of teacher’s control” (Los Angeles Unified School District, September 2008, p. 3).

The need for organizational supports is underscored by Saunders, Goldenberg, and Gallimore (2009). They found that schools who implemented professional learning community workgroups that followed protocols attending to issues of teaching and learning and collaborative inquiry were more likely to engage in “focus in meetings on student academics, systemic and joint planning, purposeful use of assessment data (all kinds), and agreements to implement and evaluate goal-directed instruction,…had more consistent focus, planning, and time for academic topics, goals and indicators, and spent less time on non-academic topics and tasks,…more time discussing the relations between instruction and student outcomes, and worked more on instructional improvements” (p. 11).
PLC Impact on Student Achievement.

Changes in instructional practices crafted in the collaborative settings of PLCs can positively impact the development of academic optimism and their end goal of student achievement. As stated earlier, Louis and Marks’ (1998b) study of restructured schools found that school wide cultures of positive professional community positively impact the quality of classroom pedagogy.

This instructional focus and change of pedagogy contributes to student achievement. Hirsh and Hord (2008) describe their PLC research where schools that have positive professional learning communities report important student benefits closing achievement gaps characterized by increased academic gains in a core content areas as well as lower absenteeism and school drop-out rates. The Alberta Initiative for School Improvement (as cited in Servage, 2008) suggests that both students and teacher were positively impacted through professional learning communities whose activities included collaborative curriculum study, lesson and assessment development, use of data, and a focus on implementing pedagogical strategies that were new to members. In trying to determine if a team instructional focus is related to student performance, Supovitz (2002) reviewed the relationship between the instructional practices and the achievement of students in the teacher teams and found that the degree to which teams use group instructional strategies (largely characteristic of instructional interdependence), there was a positive and significant relationship with student achievement.

Additional research supports the idea that PLCs contribute to increased student achievement. Berry, Johnson, and Montgomery (2005) noted that the development of a
professional learning community -- characterized by trust, reflective practice, collective responsibility, student-centered focus on learning, and expectation that all teachers can contribute to a sense of distributed leadership – led to significant increases in student achievement beyond that experienced by other schools in its district. Englert and Tarrant (1995) reported that students whose teachers were in PLCs made value-added gains in reading of 1.3 years per school year.

**Student Focus.**

The value of professional learning community and academic optimism is the most germane when that value supports student outcomes. Student achievement is also the key outcome that Bolam et al. (2005) describe:

“This is why our project’s definition suggests that the ultimate outcome of PLCs has to be experienced by students, even though there is an intermediate capacity-level outcome: An effective professional learning community has the capacity to promote and sustain the learning of all professionals in the school community with the collective purpose of enhancing pupil learning. (p. 145)

To that end this proposed study will investigate the following research questions as well as associations with academic achievement and other demographic characteristics
Research Questions

This study explores how Professional Learning Community (PLC) serves as a normative and cultural mechanism that explains a school wide culture of Academic Optimism (AO) and student achievement. More precisely, the research questions are:

1. Can professional learning community be reliably represented by the five (5) subscales of shared sense of purpose, collaboration, reflective dialogue, deprivatized practice, and focus on student learning?

2. Can academic optimism be reliably represented by the three (3) subscales of collective efficacy, academic emphasis, and faculty trust?

3. How are the two constructs of professional learning community and academic optimism, and their respective subscales, associated?

4. Do the five sub-scales of professional learning community explain academic optimism, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) school-level student achievement?

5. Do the five sub-scales of professional learning community have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement?

6. Do the three sub-scales of academic optimism have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement?
7. Do the constructs of professional learning community and academic optimism as single scales have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement?

The next chapter will explain how this study used a survey research design methodology with extant data from written surveys administered once in 2009 to teachers participating in a state-sponsored literacy grant. The study methodology will use quantitative statistical methodology to examine the extant dataset and explore the research questions outlined above. In summary, Chapter Three will describe the study’s survey research design, extant data, and study methodology in greater detail.
CHAPTER 3

METHODOLOGY

This chapter defines and discusses this exploratory study’s research questions, general sample, data collection, instruments, sample analysis, and methods for data analysis.

Research Questions

This study explores how Professional Learning Community (PLC) can serve as a normative and cultural mechanism that explains a school wide culture of Academic Optimism (AO) and student achievement. More precisely, the research questions are:

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3. How are the two constructs of professional learning community and academic optimism, and their respective subscales, associated?
4. Do the five sub-scales of professional learning community explain academic optimism, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) school-level student achievement?

5. Do the five sub-scales of professional learning community have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement?

6. Do the three sub-scales of academic optimism have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement?

7. Do the constructs of professional learning community and academic optimism as single scales have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement?

An exploratory a priori model of the two latent constructs is presented in Figure 1. The model suggests that the construct of Professional Learning Community is comprised of five sub-scales: shared sense of purpose, collaborative activity, deprivatized practice, reflective dialogue, and focus on student learning. The second latent construct of Academic Optimism is comprised of three sub-scales: collective efficacy, academic emphasis, and faculty trust.
Figure 1: Exploratory A Priori Associations Among Professional Learning Community, Academic Optimism, and their Theorized Subscales
General Sample

For this study, permission was obtained to use an extant dataset created by the Ohio Department of Education (ODE). The ODE effort is a result of gathering data to assess the impact of participating schools’ involvement in a state-supported literacy grant. This extant data are the product of the Ohio Department of Education’s request of teacher feedback from awarded schools. Each school had received Title 1 School Improvement funds to hire a full-time, embedded School Literacy Consultant to help administrators and teachers develop an understanding of literacy and how all students best develop it. Each of these School Literacy Consultants provided professional development and coaching to classroom teachers across the curriculum in support of their students’ reading and writing development.

The potential sample size included 177 schools – 124 elementary, 25 middle, and 28 high. The state department prepared surveys for approximately 6,164 individuals based upon schools’ self-reported teacher populations. Ultimately, 2,050 teachers from 113 of the 177 schools agreed to participate in the data collection efforts by returning surveys. The 113 schools represented 64% of the total potential school sample size. Of those 113 schools, more than 60% had participant return rates of 50% or higher. Overall, the schools’ average teacher participation rate was 52%. Of the 113 schools, 110 schools had more than 10% of their staff return completed surveys. For these reasons, care should be used in generalizing from the sample. Table 3.1 outlines the distribution of participating schools and teachers.
The sample was not random as all participating schools were identified by the state department as demonstrating high literacy needs. The sample did represent all 16 of the state’s geographical regions. All but two of the state’s eight district typologies, based upon the revised 2013 ODE categories of shared demographic and geographic characteristics, were represented. The two typology exceptions were “Small Town: Low Student Poverty and Small Student Population” and “Suburban: Very Low Student Poverty and Large Student Population”. Other demographics for participating schools suggest that the school percentages of school-level minority student population is roughly similar, though a bit higher, for the study’s sample as compared to the state average. The

<table>
<thead>
<tr>
<th>Number of Schools</th>
<th>Percentage of Surveys Returned</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
<td>No surveys returned</td>
<td>*4,114</td>
</tr>
<tr>
<td>3</td>
<td>0.0%–9.9%</td>
<td>14</td>
</tr>
<tr>
<td>9</td>
<td>10-19.9%</td>
<td>77</td>
</tr>
<tr>
<td>8</td>
<td>20-29.9%</td>
<td>87</td>
</tr>
<tr>
<td>8</td>
<td>30-39.9%</td>
<td>88</td>
</tr>
<tr>
<td>14</td>
<td>40-49.9%</td>
<td>230</td>
</tr>
<tr>
<td>12</td>
<td>50-59.9%</td>
<td>188</td>
</tr>
<tr>
<td>10</td>
<td>60-69.9%</td>
<td>269</td>
</tr>
<tr>
<td>22</td>
<td>70-79.9%</td>
<td>461</td>
</tr>
<tr>
<td>14</td>
<td>80-89.9%</td>
<td>306</td>
</tr>
<tr>
<td>13</td>
<td>90-100+%</td>
<td>330</td>
</tr>
</tbody>
</table>

177 Schools (Total) 6,164 Teachers (Total)

*Approximation from the Ohio Department of Education
sample’s percent of faculty gender composition as well as the school-level measure of economic disadvantage exceed the state percentage by nearly 10-20%, respectively. This substantially higher rate of poverty likely reflects the Title I targeted school demographic for grant eligibility. The sample schools had a larger average student body and consequently a larger faculty too. The two years of Performance Indices indicate that the schools generally performed less well than the state average. Demographics and characteristics of participating schools and state measures can be found in Table 3.

Table 3: Sample Characteristics with 2008-09 State-Level Comparisons (n = 113)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Sample %</th>
<th>Standard Deviation</th>
<th>Ohio %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students: Minority (Mean)</td>
<td>29.32</td>
<td>27.09</td>
<td>24.50</td>
</tr>
<tr>
<td>Students: Economically Disadvantaged (Mean)</td>
<td>58.33</td>
<td>20.31</td>
<td>40.20</td>
</tr>
<tr>
<td>Staff: Gender (Female)</td>
<td>82.21</td>
<td>13.30</td>
<td>74.90</td>
</tr>
<tr>
<td>Mean Performance Index (2008-09)</td>
<td>87.71</td>
<td>8.42</td>
<td>92.90</td>
</tr>
<tr>
<td>Mean Performance Index (2007-08)</td>
<td>87.41</td>
<td>7.70</td>
<td>92.30</td>
</tr>
<tr>
<td>Mean Staff Membership</td>
<td>34.83</td>
<td>23.80</td>
<td>25.68</td>
</tr>
<tr>
<td>Mean Student Enrollment</td>
<td>513.73</td>
<td>398.63</td>
<td>462.00</td>
</tr>
<tr>
<td>District Representation</td>
<td>50</td>
<td>N/A</td>
<td>616</td>
</tr>
<tr>
<td>Building Representation*</td>
<td>113</td>
<td>N/A</td>
<td>3879</td>
</tr>
<tr>
<td>Region Representation</td>
<td>16</td>
<td>N/A</td>
<td>16</td>
</tr>
<tr>
<td>Typology Representation**</td>
<td>6</td>
<td>N/A</td>
<td>8</td>
</tr>
</tbody>
</table>

*Elementary = 68, Middle = 34, High = 11
**Using Ohio’s updated 2013 typologies
Data Collection

Two different surveys (Survey A and Survey B) were created. The measures used for the surveys were arranged so that potential independent variables were on Survey A and potential dependent variables were organized on Survey B such that this methodological separation may help control for response bias.

The surveys were also developed to be about the same twenty-minute length and begin with a common cover letter, and then a common instructions and demographics section. The surveys were shuffled to ensure random distribution when they were simultaneously distributed. The random distribution was designed to ensure that the total survey results could be aggregated to support the research and evaluation activities with the school as the unit of study, rather than the individual teacher or administrator. An explanation of the aggregation method appears in the next section.

Embedded School Literacy Consultants (SLC) were requested to administer the surveys to all teachers – regardless of assignment, grade, or content level. Each teacher was permitted to complete only one survey – either Survey A or Survey B. No teacher was permitted to complete more than one survey.

Training and support for the survey administration was facilitated by conference call and a cohort of regional supervisors. The surveys were to be administered by each school’s grant-funded SLC during regularly scheduled staff meetings from late May 2009 through early June, 2009. In schools where no staff meetings remained because of the impending closure of the school year, the SLC randomly distributed surveys in teachers’ mailboxes for individual completion. The latter survey distribution method may account
for the number of schools with zero surveys returned. For either type of administration, the SLC was requested to collect, bundle, and return all completed surveys to the Ohio Department of Education in pre-addressed and postage-paid envelopes. Data were hand-coded into a Microsoft Excel worksheet utilizing cell rules and curbs to ensure the greatest input accuracy.

The surveys asked for teachers’ “best estimates” of the frequency of selected professional development practices and their candid opinions and beliefs on aspects of school climate and perceptions. The surveys were voluntary and anonymous – no name was requested on either survey nor did the survey request any individually identifiable information. Each survey took most teachers 20 minutes or fewer to complete.

To support the consistency of administration and the control of response bias, the following resources were created and used: an introductory letter to school principals, a direction sheet for the survey administrator, a script to administer the teacher questionnaire, and a teacher questionnaire cover letter.

**Final Sample**

As the school was the unit of study, all variables were aggregated to the school level. To begin, missing data were analyzed with SPSS 21 to examine frequency and patterns of non-responses. The individual teacher data were subjected to multiple imputation. The resulting five imputed data sets were averaged to create a school-level mean for each item. Then, each item's school mean was aggregated into an overall school mean for each variable (Hoy et al., 2006; Louis, Marks, & Kruse, 1996b; Louis &
Marks, 1998a; McGuigan & Hoy, 2006). All student data (socioeconomic status, current achievement, and prior achievement) represent school-level summaries and aggregates of the data.

Of the original 2,050 teachers from 113 schools who agreed to participate in the data collection efforts by returning surveys, no school failed to return one kind of survey and not the other. However, six schools had only one participant for either Survey A or Survey B. These six schools were removed from the analyzed sample (retained 2,028 teachers of $n = 107$ schools) in order to eliminate any instances when one participant’s responses would need to represent a school wide response.

The final sample was further refined when two more school cases were removed. Halpin’s findings (1959, p. 28) suggested that descriptive surveys’ average scores from school wide return rates of five participants or higher are reasonably stable results; thus, participation rates of five or more teachers are acceptable for adequately representing school wide beliefs (as cited in R. D. Goddard, 2002, p. 103; as cited in Uline, Miller, & Tschannen-Moran, 1998, p. 475). Even though each of the two school’s return percentage rates exceeded 10% (Case 19, 18.2% and Case 8, 44.4%), their respective return rates represented only four teachers each. Removing both schools from future research made the final sample consist only of schools that met this standard for reasonable stability. Therefore the sample decreased by two school cases (retained 2,020 teachers of $n = 105$ schools).
Instruments and Measures

Both surveys collected participant demographic data such as faculty gender, years, experience, and area of teaching. The two types of surveys differed as follows:

**Survey A: professional learning community.**

The first survey, Survey A, provided data mainly based upon a single instrument - the Professional Community Index (PCI) used to measure professional learning community (Louis et al., 1996b; Louis & Marks, 1998a). The researchers’ original PCI utilized 19 items in its measurement of five sub-scales. While the research team reported a low overall PCI single scale internal reliability measure (Cronbach’s Alpha, $\alpha = .69$), they also reported low to barely acceptable (generally suggested in social sciences as .7 or higher) internal reliability for their five unidimensional sub-scales: shared sense of purpose (Cronbach’s $\alpha = .74$), collaborative activity (Cronbach’s $\alpha = .68$), focus on student learning (Cronbach’s $\alpha = .61$), deprivatized practice (Cronbach’s $\alpha = .62$), and reflective dialogue (Cronbach’s $\alpha = .68$).

This study examined specific sub-scale measures as well as overall composite measure of professional learning community. The focus on sub-scales underscored the exploratory research of this study. Concurrently, this study also utilized variables as composite constructs both to support the well-established concepts and reflections of latent constructs. In addition, composite constructs are used when issues of multicollinearity arose (as outlined later in Chapter 4).
Because of the low reliability measures, the extant data from the Ohio Department of Education also included ten additional questions added to potentially strengthen the sub-scales. The additional items had design structures similar to the original items. To that end, all 29 potential items (new and original) are ordinal measures. The item response styles varied ranging from 6-point Likert scales of “Strongly Disagree” (1) through “Strongly Agree” (6) to 7-point scales where “1” is the “most important” goal through “7” for the “least important” goal. Seven items required reverse scoring.

The exploratory factor analyses for the five sub-scales and single scale for professional learning community were all developed using Principal Axis Factoring. The specific factor results, decisions, and adaptations are outlined in the next chapter. However, the following paragraphs summarize each sub-scale in general as well as provide details of some sample survey items, including new and original items. A comprehensive list of all possible and final survey items (and their abbreviations) used in this study are outlined by sub-scale in Appendix A.

**Focus on student learning.**

This original unidimensional subscale for focus on student learning included nine original items (six of the items required reverse scoring) with two basic item structures. The first structure is an ordinal-type measure that forced participants to rank order their responses on a seven-point scale. For example, the reversed rGOALBASIC measure asked, “If you had to choose from among the seven goals for students listed below, how would you rank them according to their importance in your teaching? A) Basic literacy skills (reading, math, writing, speaking). For this type of measure, participants were
tasked to first read all seven goals and then circle the corresponding rank of each such that a teacher would answer a "1" for the most important goal, a "2" for the next most important goal, and so on, through "7" for the least important goal.

The other basic structure was a more-traditional ordinal, Likert scale response. For example, the FOCVISN measure uses a six-point Likert scale that ranges from 1 (Strongly Disagree) to 6 (Strongly Agree) to ask, “Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: A focused school vision for student learning is shared by most staff in this school.”

The six new items ODE added to the original nine items were developed to replicate the more-traditional Likert scale response detailed above. An example of a new item is the six-point FOCWHAT measure that used the same stem as FOCVISN, but measured different content by asking participants their level of agreement to the statement, “In this school, teachers focus on what and how well students are learning rather than how they are teaching.”

These six additional items were intended to address issues of an omitted survey item (“Teachers exhibit a reasonably focused commitment to authentic curriculum and instruction”) and a low previously-published scale reliability measure ($\alpha = .61$) reported by Louis and Marks (1998a). Ultimately, the adaptation of focus on student learning resulted in a unidimensional sub-scale made up of eight items (both new and original) with a strong scale reliability ($\alpha = .855$).
**Deprivatized practice.**

The original unidimensional subscale for deprivatized practice included four original, ordinal items with the same basic item structure. As an example, the DPRV2TS measure asked, “How often do two or more teaching colleagues regularly observe your students' academic performance or review their grades or achievement data?” Participants could answer "1" (Never), "2" (Once or Twice a Year), or “3” (3 or more times a Year).

The four new items ODE added were developed to replicate the structure of the original four items detailed above. An example of a new item is the DPRVSLC measure that used the same stem and three-response choices as DPRV2TS, but measured different content by asking, “How often do School Literacy Consultant/Coach regularly observe your students' academic performance or review their grades or achievement data?”

These four additional items were intended to address a low previously-published scale reliability measure (α = .61) reported by Louis and Marks (1998a). Ultimately, the adaptation of deprivatized learning resulted in a unidimensional sub-scale made up of six items (both new and original) with a good scale reliability (α = .749).

**Shared sense of purpose.**

The original unidimensional subscale for shared sense of purpose included three original, ordinal items with the same ordinal structure. For example, the SSPGOALS measure used a six-point Likert scale that ranges from 1 (Strongly Disagree) to 6 (Strongly Agree) to ask, “Using the scale provided, please indicate the extent to which
you agree or disagree with each of the following statements: Goals and priorities for the school are clear.”

The other two items assessed participant agreement for “Most of my colleagues share my beliefs and values about what the central mission of the school should be” (SSPMISS) and “In this school the teachers and the administration are in close agreement on school discipline policy” (SSPDISC).

Because the original sub-scale reliability was good, ODE did not develop additional items. This study’s internal scale reliability for shared sense of purpose was good (Cronbach Alpha = .790) and higher than Louis and Marks’ original sub-scale of \( \alpha = .740 \) (1998a). Therefore, the 3-item unidimensional scale for Shared Sense of Purpose remained the scale used for subsequent analysis of data in this study.

**Collaborative activity.**

The original unidimensional subscale for collaborative activity included six original, ordinal items with different item structures.

For example, the COLLCOOP measure used a six-point Likert scale that ranges from 1 (Strongly Disagree) to 6 (Strongly Agree) to ask, “Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: There is a great deal of cooperative effort among staff members.” The COLLCOOR measure had a similar structure.

Another item structure asked about the frequency of a particular practice. For example, the ordinal COLLCUR measure asked, “How often, since the beginning of the current school year did you receive useful suggestions for curriculum materials from
colleagues in your department/grade level?” Participants could answer "1" (Never), "2" (Once), “3” (Twice), “4” (3-4 times), “5” (5-9 times), or “6” (10+ times). The COLLBTCH measure had a similar structure.

The final, ordinal item structure assessed the amount of time spent on an instructional practice. For example, the COLLTCC measure asked, “In a typical planning period where you meet with other teachers, please indicate about how much time is spent on Time coordinating content. (Teachers decide common themes, suggest related materials and activities to guide instruction.)” The COLLTFRQ measure had a related structure.

Because the original sub-scale reliability was good, ODE did not develop additional items. This study’s internal scale reliability for collaborative activity was strong (Cronbach Alpha = .833) and higher than Louis and Marks’ (1998a) original measure with these six items (α = .68). Therefore, the six-item unidimensional scale for collaborative activity remained the scale used for subsequent analysis of data in this study.

**Reflective dialogue.**

The original unidimensional subscale for reflective dialogue (RD) used only two items (Louis & Marks, 1998a) – one item fewer than the three or more loadings generally preferred for stability (Pallant, 2007). Because the original sub-scale demonstrated one of the higher Cronbach alphas (α = .68) of the Professional Community Index, ODE never developed additional items to strengthen it.
The two original, ordinal items had the same basic structure. The REFLTDIS measure asked, “In a typical planning period where you meet with other teachers, please indicate about how much time is spent on time diagnosing individual students (Teachers discuss problems of specific students and arrange appropriate help.)” Participants could answer "1" (None), "2" (Less than half), “3” (About half), or “4” (More than half).

The REFLTAT measure was identical except that it asked, “In a typical planning period where you meet with other teachers, please indicate about how much time is spent on time analyzing teaching (Teachers discuss specific teaching practices and behaviors of team members.)”

This study’s internal scale reliability for reflective dialogue was the lowest of all sub-scales in the study (Cronbach Alpha = .608) and lower than Louis and Marks’ (1998a) original measure with these two items ($\alpha = .680$). Therefore, the two-item unidimensional scale for collaborative activity remained the scale used for subsequent analysis of data in this study.

**Professional learning community.**

The five theorized sub-scales (as outlined above) of Focus On Student Learning, Deprivatized Practice, Shared Sense of Purpose, Collaborative Activity, and Reflective Dialogue were subjected to PAF analysis ($n = 105$) to explore if they could serve as a unidimensional single-scale of Professional Learning Community (Louis & Marks, 1998a).

Only reflective dialogue failed to load as high as the other four sub-scales loaded. As this was an exploratory study, maintaining a unidimensional measure of the five sub-
scales from Louis and Marks (1998a) added considerable theoretical and exploratory value. As such, the measure of Reflective Dialogue was kept to support an overall measure of Professional Learning Community.

The scale adaptation’s reliability was good (Cronbach Alpha = .802) and stronger than the other Professional Community Index scale that Louis and Marks developed, \( \alpha = .690 \) (1998a). Therefore, this adaptation of the five-item unidimensional scale for Professional Learning Community remained the scale used for subsequent analysis of data in this study.

**Survey B: academic optimism.**

The second survey, Survey B, provided data from additional instruments to measure school wide level of academic optimism. The *Teacher Academic Optimism Survey for Elementary, Middle, and High Schools* measures 3 factors of collective efficacy, faculty trust, and academic emphasis (Hoy et al., 2006; McGuigan & Hoy, 2006; Smith & Hoy, 2007). Because previous research suggested that the measures were reliable and valid, no additional items were developed by ODE for consideration.

This study examined specific sub-scale measures as well as overall composite measure of academic optimism. The focus on sub-scales underscored the exploratory research of this study. Concurrently, this study also utilized variables as composite constructs both to support the well-established concepts and reflections of latent constructs. In addition, composite constructs are used when issues of multicollinearity arose (as outlined later in Chapter 4).
As with the sub-scales from Survey A, the exploratory factor analyses for the three sub-scales and single scale of academic optimism in Survey B were all developed using Principal Axis Factoring. The specific factor results, decisions, and adaptations are also outlined in the next chapter. However, the following paragraphs summarize each sub-scale in general as well as provide details of some sample survey items. A comprehensive list of all possible and final survey items (and their abbreviations) used in this study are also outlined in Appendix A.

**Faculty trust.**

The first factor, faculty trust in students and parents, is measured by the 10-item short version of the Omnibus Trust Scale by Hoy and Tschannen-Moran (2003). The items are ordinal measures on a 6-point Likert scale ranging from “1” meaning “Strongly Disagree” to “6” representing “Strongly Agree.” Items include “Parents in this school are reliable in their commitments” (FT_PTREL) and “Teachers in this school trust their students” (FT_TSTST). Only one of the items (“Students are secretive”) required reverse scoring. Previous alpha coefficients of reliability yielded high measures, including a .96 in 2006 (McGuigan & Hoy).

This study’s scale reliability was similarly excellent (Cronbach Alpha = .922). Therefore, the ten-item unidimensional scale for faculty trust remained the scale used for subsequent analysis of data in this study.
**Collective efficacy.**

The second factor is *collective efficacy* and it is measured by the 12-item short version of the *Collective Efficacy Scale* (R. D. Goddard, 2002; Hoy et al., 2006). The items are ordinal measures on a 6-point Likert scale ranging from “1” meaning “Strongly Disagree” to “6” representing “Strongly Agree.” Items include “Teachers in this school are able to get through to the most difficult students” (CE_ABLE) and “Teachers in this school believe that every child can learn” (CE_BELIV). Six of the items required reverse scoring. Previous alpha coefficients of reliability yielded high measures, including a .94 in 2006 (McGuigan & Hoy, 2006).

Ultimately, this study’s scale reliability was lower, but still strong (Cronbach Alpha = .837). Therefore, a 12-item unidimensional scale for Collective Efficacy remained the scale used for subsequent analysis of data in this study.

**Academic emphasis.**

Academic emphasis is measured by the three different unidimensional *Organizational Health Inventories* (OHI) for different school types -- Elementary, Middle, and High versions (Hoy, Tarter, & Bliss, 1990; Hoy & Tarter, 1997a; Hoy & Tarter, 1997b; Hoy & Sabo, 1998; Tarter et al., 1995; Tarter & Hoy, 1997). While many items appear on more than one grade-band scale, this variable has been conventionally calculated with separate sets of items by grade band: five items for elementary schools (OHI-E), nine items for middle schools (OHI-M), and eight items for secondary schools (OHI-S). Their previously reported internal reliability measures were good to excellent (Cronbach Alphas of $\alpha = .87$, $\alpha = .94$, and $\alpha = .93$, respectively).
The items are ordinal measures on a 4-point Likert scale ranging from “1” (Rarely Occurs), “2” (Sometimes Occurs), “3” (Often Occurs), to “4” (Very Often Occurs). Items include “Students respect others who get good grades.” ([AEEMS1](#)) and “The learning environment is orderly and serious.” ([AE_MS1](#)). Only two of the items (“Students neglect to complete homework” and “Academically oriented students in this school are ridiculed by their peers”) required reverse scoring.

All 13 items were included in the PAF to determine if a universal academic emphasis scale could be utilized in this study across all schools. As such, the initial effort was set to extract a single, unidimensional factor that could be employed in any school, regardless of students’ ages or grade levels. Ultimately, the study’s universal, unidimensional scale reliability used 12 items and had an excellent internal reliability (Cronbach Alpha = .907). Therefore, a 12-item unidimensional scale for academic emphasis remained the scale used for subsequent analysis of data in this study.

While the result may be an adapted academic emphasis version that is a few questions longer (and less parsimonious) than the previous longest version, it also ensures a universal instrument that could be more-easily used for subsequent analysis of data in this study across all types of schools.

*Academic optimism.*

The three theorized sub-scales (as outlined above) of Faculty Trust, Collective Efficacy, and Academic Emphasis were subjected to PAF analysis (n = 105) to explore if they could represent a unidimensional single-scale of Academic Optimism. The scale adaptation’s reliability was excellent (Cronbach Alpha = .906). Therefore, this
adaptation of the three-item unidimensional scale for academic optimism remained the scale used for subsequent analysis of data in this study.

**School-level characteristics.**

**Student achievement.**

The state’s Performance Index (PI) school data are used to measure the observed variable of student achievement in the school years of 2007-08 and 2008-09. The Performance Index is a metric that is consistently measured and applicable to Ohio schools and can also be compared across years -- especially useful for measuring and controlling for school-level current achievement (PerfIndex0809) and school-level previous achievement (PerfIndex0708). The state describes this PI metric in the following manner:

“The performance index rewards the achievement of every student, not just those who score proficient or higher. Traditional school districts and school buildings, including community schools, earn points based on how well each student does on all tested subjects in grades 3-8 on Ohio’s Achievement Assessments and on the 10th grade Ohio Graduation Test. All assessments have five performance levels which include: advanced, accelerated, proficient, basic and limited. The percentage of students scoring at each performance level is calculated and then multiplied by the point value assigned to that performance level” (Ohio Department of Education, 2012).
Advanced scores are weighted at 1.2, accelerated at 1.1, proficient at 1.0, basic at 0.6, limited at 0.3, and untested students at 0.0. The total points are added up for each respective school’s Performance Index score, ranging from 0-120 points. This data will be treated as ordinal because even though it appears that the intervals are equal, the aggregated weights ensure that the difference in points are not always similarly obtained.

Socioeconomic status.

The school-level measure of socioeconomic status (SES) is derived from the percentage of students in a school who qualify for free or reduced-lunch prices. The qualification thresholds are based upon household income and size. School-level SES reflects a school measure where higher scores represent a higher aggregate percentage of students from high income homes (those not qualifying for free/reduced lunch).

Statistical Methodology

While the two surveys were comprised of previously-constructed and published instruments that have yielded statistically valid and reliable results, adaptations were used and validities explored. Specifically, additional items were added to improve the lowest scale reliabilities: PLC’s Focus on Student Learning ($\alpha = .61$) and Deprivatized Practice ($\alpha = .62$). In addition, the shared items used to measure AO’s Academic Emphasis across all school types had the potential to serve as a single universal scale operational in all grade bands. As a result, principle axis factor analysis (PAF) was performed on these three sub-scales. Items that did not fit well were eliminated. The minimum loading level required to consider keeping an item was Tabachnick and
Fidell’s (2001) use of .32, as it represents approximately a 10% overlap with other variables (as cited in Costello & Osborne, 2005, p. 4). These results are reported later with scale reliability measures and descriptive statistics for all sub-scales and constructs in the study.

This study helped explore how professional learning community (PLC) can serve as a normative and cultural mechanism that helps explain a school culture of academic optimism (AO) and student achievement. More precisely, the research questions and statistical methodologies are outlined in Table 4:
Table 4: Summary of Research Questions and Statistical Methodologies

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Statistical Method(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can professional learning community be reliably represented by the five (5) subscales of shared sense of purpose, collaboration, reflective dialogue, deprivatized practice, and focus on student learning?</td>
<td>Exploratory Factor Analysis</td>
</tr>
<tr>
<td>Can academic optimism be reliably represented by the three (3) subscales of collective efficacy, academic emphasis, and faculty trust?</td>
<td>Exploratory Factor Analysis</td>
</tr>
</tbody>
</table>
| How are the two constructs of professional learning community and academic optimism, and their respective subscales, associated? | Pearson Product Correlations  
Confirmatory Factor Analysis |
| Do the five sub-scales of professional learning community explain academic optimism, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) school-level student achievement? | Sequential Multiple Regression  
(Hierarchical) |
| Do the five sub-scales of professional learning community have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement? | Sequential Multiple Regression  
(Hierarchical) |
| Do the three sub-scales of academic optimism have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement? | Sequential Multiple Regression  
(Hierarchical) |
| Do the constructs of professional learning community and academic optimism as single scales have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement (transformed)? | Sequential Multiple Regression  
(Hierarchical) |
Summary

This chapter defined and discussed this exploratory quantitative study and its research questions, data collection, research survey items, sample, and methods for data analysis. In doing so, a description of three Principal Axis Factoring analyses were outlined to explain the data used for subsequent analysis and investigation of the five research questions.

The next chapter will outline the results and analyses of the study.
CHAPTER 4

RESULTS

This chapter reports the results of the data analysis from 105 Ohio public schools representing 2,020 teacher responses. It begins with a description of the major variables used to explore the five research questions, including validity, reliability, and general descriptive statistics. The chapter then includes results of correlations, confirmatory factor analyses, and sequential multiple regression analyses of variables.

Description of Variables

Professional Learning Community’s (PLC) five subscales of Shared Sense of Purpose (SSP), Collaborative Activity (COLL), Focus on Student Learning (FOSL), Deprivatized Practice (DPRV), and Reflective Dialogue (REFLT) as well as Academic Optimism’s (AO) three subscales of Collective Efficacy (CE), Faculty Trust (FT), and Academic Emphasis (AE) were measured by survey questionnaires using Likert-style responses. Negatively-worded items were reverse-scored when applicable. So for each variable, the higher the score, then the higher the level of construct under consideration. School Socioeconomic Status (SES), therefore, reflects a school with higher scores for higher aggregate percentages of students from high income homes (those not qualifying for free/reduced lunch).
As the school was the unit of study, all variables were aggregated to the school level. To begin, missing data was analyzed with SPSS 21 to examine frequency and patterns of non-responses. The individual teacher data were subjected to multiple imputation. The resulting five imputed data sets were averaged to create a school-level mean for each item. Then, each item's school mean was aggregated into an overall school mean for each variable (Louis et al., 1996b; McGuigan & Hoy, 2006). All student data (socioeconomic status, current achievement, and prior achievement) represent school summaries and aggregates of the data.

While the instruments used to measure Professional Learning Community and Academic Optimism have been previously published, additional items were added to improve the lower scale reliability for PLC’s Focus on Student Learning ($\alpha = .61$) and Deprivatized Practice ($\alpha = .62$). In addition, the shared items used to measure AO’s Academic Emphasis across all school types may serve as a single universal scale operational in all grade bands. As a result, principal axis factor analysis (PAF) was performed on these three sub-scales first. Items that did not fit well were eliminated. The minimum loading level required to consider keeping an item was (Tabachnick & Fidell, 2007) use of .32, as it represents approximately a 10% overlap with other variables (as cited in Costello & Osborne, 2005, p. 4).

Descriptive statistics and scale reliability were assessed for all sub-scales and constructs in the study and are reported later.
Research Question #1

Can professional learning community be reliably represented by the five (5) subscales of shared sense of purpose, collaboration, reflective dialogue, deprivatized practice, and focus on student learning? Exploratory factor analysis, specifically Principal Axis Factoring, was used to investigate research question number one.

Focus on student learning.

The 15 items from a collective Focus on Student Learning were subjected to PAF analysis ($n = 105$). Prior to performing PAF, the suitability of data for factor analysis was assessed. Spot checks of variable combinations showed no clear evidence of curvilinear relationships (Pallant, 2007). Even though Costello and Osborne (2005) describe Principal Axis Factoring as robust for non-parametric data, a review of the mean and 5% trimmed mean for each variable found they were similar, thus supporting little influence of possible outliers. Inspection of the Correlation Matrix showed evidence of many correlations $r = .3$ or greater. The Kaiser-Meyer-Olkin value was .719 -- above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant ($p < .001$). These support the factorability of the correlation matrix.

Principal Axis Factoring revealed four factors with initial eigenvalues greater than 1 (4.49, 1.77, 1.60, 1.22), explaining 27.1%, 8.9%, 7.0%, and 5.3% of the shared variance respectively. Review of the screeplot suggested a large drop after the first component and a slight levelling off after the third component. Keeping three components was supported by the results of Monte Carlo PCA for Parallel Analysis (Watkins, 2000).
where each of the three exceeded the corresponding criterion values for a randomly generated data matrix of the same size (15 variables x 105 schools).

A 15-item, three-component solution (Table 4.1) was forced. Inspection of the Correlation Matrix showed evidence of many correlations $r = .3$ or greater. The Kaiser-Meyer-Olkin value was .719 -- above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant ($p < .001$). These support the factorability of the correlation matrix.

Review of the screeplot suggested a large drop after the first component and a slight levelling off after the third component. Keeping three components was supported by the results of Monte Carlo PCA for Parallel Analysis (Watkins, 2000) where each of the three exceeded the corresponding criterion values for a randomly generated data matrix of the same size (15 variables x 105 schools).

The three-component solution explained a total of 41.9% of the shared variance with the first component contributing 27.0%, the second component contributing 7.9%, and the third component contributing 7.0%. The overall scale’s internal reliability with the 15 items had a high Cronbach Alpha ($\alpha = .714$). Upon review of the component matrix (Table 5), two items (rGOALEXC and rGOALCIT) were initially removed because they failed to meet the minimum loading levels on any of the three factors.

Interpretability of the third factor was unreliable as only one item (rGOALWORK, .498) loaded uniquely at the minimum level of .32 or higher on the factor. Two items (FOCTIME and FOCGROUP) loaded on two factors though
FOCTIME loaded higher on the third (.557) and FOCGROUP loaded higher (.528) on the first factor.

Table 5: Factor Matrix for Initial Three-Factor Solution (Focus on Student Learning)

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOCALTER*</td>
<td>.804</td>
<td>-.055</td>
<td>-.038</td>
</tr>
<tr>
<td>FOCVISN</td>
<td>.778</td>
<td>-.014</td>
<td>-.145</td>
</tr>
<tr>
<td>FOCSWBAT*</td>
<td>.755</td>
<td>-.134</td>
<td>.255</td>
</tr>
<tr>
<td>FOCPREAS*</td>
<td>.742</td>
<td>.039</td>
<td>-.282</td>
</tr>
<tr>
<td>FOCOPPTN*</td>
<td>.695</td>
<td>.151</td>
<td>-.157</td>
</tr>
<tr>
<td>FOCWHAT</td>
<td>.678</td>
<td>-.065</td>
<td>-.068</td>
</tr>
<tr>
<td>FOCGROUP*</td>
<td>.528</td>
<td>.205</td>
<td>-.350</td>
</tr>
<tr>
<td>rGOALBASIC</td>
<td>.406</td>
<td>-.368</td>
<td>.190</td>
</tr>
<tr>
<td>rGOALREL</td>
<td>.163</td>
<td>.758</td>
<td>.312</td>
</tr>
<tr>
<td>rGOALGROW</td>
<td>.185</td>
<td>.356</td>
<td>.098</td>
</tr>
<tr>
<td>rGOALHIGH</td>
<td>-.022</td>
<td>-.324</td>
<td>.035</td>
</tr>
<tr>
<td>rGOALEXC</td>
<td>.010</td>
<td>-.279</td>
<td>-.153</td>
</tr>
<tr>
<td>rGOALCIT</td>
<td>-.117</td>
<td>.147</td>
<td>-.074</td>
</tr>
<tr>
<td>FOCTIME*</td>
<td>.396</td>
<td>-.212</td>
<td>.557</td>
</tr>
<tr>
<td>rGOALWORK</td>
<td>.254</td>
<td>.057</td>
<td>.498</td>
</tr>
</tbody>
</table>

Variance Explained (%) 41.9
Scale Reliability (α) .714

Note. Bold = Major loading; * = New Item
Because factors with fewer than three items loading on that factor are generally considered weak and unstable (Costello & Osborne, 2005; Pallant, 2007), oblimin rotation was consulted to clarify interpretation of the third factor (Table 6). Examination of the Pattern and Structure Matrices showed rGOALWORK and FOCTIME loaded strongly only on the third factor while FOCGROUP loaded strongly only on the first factor. As a result, the two items of FOCTIME and rGOALWORK that loaded uniquely on the third factor were removed for the next iteration when only an 11-item, two-factor solution was forced.
Table 6: Pattern and Structure Matrix of Three-Factor Solution (Focus on Student Learning)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Pattern Coefficients</th>
<th>Structure Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor 1</td>
<td>Factor 2</td>
</tr>
<tr>
<td>FOCALTER*</td>
<td>.721</td>
<td>-.019</td>
</tr>
<tr>
<td>FOCVISN</td>
<td>.761</td>
<td>-.022</td>
</tr>
<tr>
<td>FOCSWBAT*</td>
<td>.508</td>
<td>.016</td>
</tr>
<tr>
<td>FOCPREAS*</td>
<td>.811</td>
<td>-.026</td>
</tr>
<tr>
<td>FOCOPPTN*</td>
<td>.710</td>
<td>.122</td>
</tr>
<tr>
<td>FOCWHAT</td>
<td>.626</td>
<td>-.046</td>
</tr>
<tr>
<td>FOCGROUP*</td>
<td>.676</td>
<td>.090</td>
</tr>
<tr>
<td>rGOALBASIC</td>
<td>.217</td>
<td>-.247</td>
</tr>
<tr>
<td>rGOALREL</td>
<td>.039</td>
<td>.832</td>
</tr>
<tr>
<td>rGOALGROW</td>
<td>.140</td>
<td>.379</td>
</tr>
<tr>
<td>rGOALHIGH</td>
<td>-.068</td>
<td>-.290</td>
</tr>
<tr>
<td>rGOALEXC</td>
<td>.069</td>
<td>-.317</td>
</tr>
<tr>
<td>rGOALCIT</td>
<td>-.048</td>
<td>.102</td>
</tr>
<tr>
<td>FOCTIME*</td>
<td>.019</td>
<td>.036</td>
</tr>
<tr>
<td>rGOALWORK</td>
<td>-.049</td>
<td>.256</td>
</tr>
</tbody>
</table>

*Note. Bold = Major loadings; *New Items.*
The third iteration of the PAF analysis used the remaining 11 items and forced a two-component solution (Table 4.3). A review of data suitability again produced good evidence of many correlations >.3 and factorability [Kaiser-Meyer-Olkin value was .783 and Bartlett’s test of Sphericity was significant (p<.001)]. The screeplot broke sharply after the first factor and smaller after the second and third factor. Keeping two components for these eleven items was supported by the results of Monte Carlo PCA for Parallel Analysis (Watkins, 2000) where each of the two factors exceeded the corresponding criterion values for a randomly generated data matrix of the same size (11 variables x 105 schools).

This two-factor solution explained slightly more shared variance (42.9%) -- with the first component contributing 34.7% and the second component contributing 8.2% -- than the previous three-factor model. The scale’s internal reliability with the 11 items had a higher Cronbach Alpha (α = .760). Upon review of the component matrix (Table 7), one item (rGOALHIGH) was initially removed because it failed to meet the minimum loading level on either factor.

As with the previous three-factor solution, interpretability of the last factor in this solution was difficult. Three items loaded on the second factor though one item (rGOALBASIC) loaded above the minimum level on both factors (.365, -.372). Oblimin rotation was consulted to clarify interpretation of the second factor (Table 7). Examination of the Pattern and Structure Matrices showed rGOALREL and rGOALGROW loaded only on the second factor while rGOALBASIC loaded stronger on the first factor. Again, factors with fewer than three items loading on that factor are
generally considered weak and unstable factors with fewer than three loadings are
generally considered weak and unstable (Costello & Osborne, 2005; Pallant, 2007) so
rGOALREL and rGOALGROW were removed. As a result, the next iteration was forced
as an eight-item, unidimensional solution.

Table 7: Factor, Pattern, and Structure Matrix of Two-Factor, 11-Item Solution (Focus on Student Learning)

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>PAF (11 Items)</th>
<th>Pattern Coefficients</th>
<th>Structure Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor 1</td>
<td>Factor 2</td>
<td>Factor 1</td>
</tr>
<tr>
<td>FOCALTER*</td>
<td>.810</td>
<td>-.083</td>
<td>.817</td>
</tr>
<tr>
<td>FOCVISN</td>
<td>.796</td>
<td>-.052</td>
<td>.798</td>
</tr>
<tr>
<td>FOCPREAS*</td>
<td>.768</td>
<td>-.005</td>
<td>.762</td>
</tr>
<tr>
<td>FOCOPPTN*</td>
<td>.710</td>
<td>.159</td>
<td>.678</td>
</tr>
<tr>
<td>FOCSWBAT*</td>
<td>.689</td>
<td>-.110</td>
<td>.701</td>
</tr>
<tr>
<td>FOCWHAT</td>
<td>.676</td>
<td>-.074</td>
<td>.682</td>
</tr>
<tr>
<td>FOCPGROUP*</td>
<td>.559</td>
<td>.140</td>
<td>.532</td>
</tr>
<tr>
<td>rGOALREL</td>
<td>.145</td>
<td>.671</td>
<td>.035</td>
</tr>
<tr>
<td>rGOALGROW</td>
<td>.182</td>
<td>.417</td>
<td>.114</td>
</tr>
<tr>
<td>rGOALBASIC</td>
<td>.365</td>
<td>-.372</td>
<td>.422</td>
</tr>
<tr>
<td>rGOALHIGH</td>
<td>-.036</td>
<td>-.263</td>
<td>.007</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explained (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale Reliability (α)</td>
<td>.760</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. **Bold** = Major loading; * = New Item

The fourth iteration of the PAF analysis used the remaining eight items and forced
a single factor solution (Table 8). A review of data suitability again produced good
evidence of many correlations >.3 and factorability [Kaiser-Meyer-Olkin value was .832
and Bartlett’s test of Sphericity was significant ($p<.001$). The screeplot leveled off after the first factor. Keeping one components for these eight items was supported by the results of Monte Carlo PCA for Parallel Analysis (Watkins, 2000) where only one factor exceeded the corresponding criterion values for a randomly generated data matrix of the same size (8 variables x 105 schools).

This unidimensional solution explained more shared variance (47.0%) than the previous two-factor model. The scale’s overall internal reliability with the eight items had an improved Cronbach Alpha ($\alpha = .855$). Upon examination of the Factor Matrix, each item loaded above the minimum level and at least one of the respective loadings could be considered a strong loading (.811, .802, .766). In addition, the items loaded in a way that represented an aligned- and theoretically-sound mix of new and old measures.

Therefore, the eight-item unidimensional scale for Focus on Student Learning was the scale used for subsequent analysis of data in this study. The final eight items used to measure a collective Focus on Student Learning are listed in italics in Table 8.
Table 8: Factor Matrix for Final Eight-Item Unidimensional Solution (Focus on Student Learning)

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FOCALTER</strong></td>
<td>Teachers in this school are expected to alter their lessons if students are confused.</td>
<td>.811</td>
</tr>
<tr>
<td><strong>FOCVISN</strong></td>
<td>A focused school vision for student learning is shared by most staff in this school.</td>
<td>.802</td>
</tr>
<tr>
<td><strong>FOCPREAS</strong></td>
<td>Teachers in this school often pre-assess what their students know before planning lessons and units</td>
<td>.766</td>
</tr>
<tr>
<td><strong>FOCOPPTN</strong></td>
<td>Teachers provide multiple options for students to express what they have learned.</td>
<td>.697</td>
</tr>
<tr>
<td><strong>FOCSWBAT</strong></td>
<td>In this school, teachers plan lessons based upon clear learning objectives.</td>
<td>.692</td>
</tr>
<tr>
<td><strong>FOCWHAT</strong></td>
<td>In this school, teachers focus on what and how well students are learning rather than how they are teaching.</td>
<td>.683</td>
</tr>
<tr>
<td><strong>FOCGROUP</strong></td>
<td>Teachers in this school group students based upon a lesson’s learning goals.</td>
<td>.550</td>
</tr>
<tr>
<td><strong>rGOALBASIC</strong></td>
<td>Basic Literacy skills (reading, math, writing, speaking) are important to our teaching.</td>
<td>.370</td>
</tr>
</tbody>
</table>

Variance Explained (%) 47.0
Scale Reliability (α) .855

*Note. Bold = Major loading; Italics = Item kept; * = New Item

**Deprivatized practice.**

The eight items from Deprivatized Practice were subjected to PAF analysis (n = 105). These items included four new ones ODE added to address issues of the low scale reliability measure (α = .61) reported by Louis and Marks (1996b).
The suitability of data for factor analysis was assessed. Spot checks of variable combinations showed no clear evidence of curvilinear relationships. Inspection of the correlation matrix showed evidence of many correlations $r = .3$ or greater, including correlations among previous and new variables. The Kaiser-Meyer-Olkin value was .698 -- above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant ($p<.001$). These support the factorability of the correlation matrix.

Principal Axis Factoring analysis revealed two components with eigenvalues greater than 1 (2.44, 1.02), explaining 43.3% of the common variance. Review of the screeplot appeared to have a modest drop after the second component. However, the results of Monte Carlo PCA for Parallel Analysis (Watkins, 2000) supported keeping only the first of the two components (1.43, 1.26). The scale reliability was unacceptably low at $\alpha = .585$.

An eight-item unidimensional solution was forced, and it explained a total of 29.9% of the shared variance. The suitability of data for factor analysis remained good with evidence of many qualifying correlations ($r = .3$ or greater) and factorability of correlations (Kaiser-Meyer-Olkin = .698 and Bartlett’s test of Sphericity, $p < .001$). The Factor Matrix showed all but two items loading above .32 (Table 9). The two low loading items (DPRVCOME and DPRVVSIT) were subsequently removed and a six-item unidimensional solution was run.

A six-item unidimensional factor was extracted (Table 4.5). Inspection of the correlation matrix maintained evidence of many correlations $r = .3$ or greater, including correlations among previous and new variables. The Kaiser-Meyer-Olkin value was .792
above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant ($p < .001$). These measures support the factorability of the correlation matrix.

The screeplot appeared to break sharply after the first component and the results of Watkins’ (2000) Monte Carlo PCA for Parallel Analysis supported keeping one component (6 variables x 105 schools). The solution explained 38.5% of the shared variance and demonstrated an acceptable scale reliability (Cronbach $\alpha = .749$). In addition, the six items are a theoretically-sound mix of old and new measures. The final six items used to measure Deprivatized Practice in future analyses are listed in italics in Table 9.
Table 9: Factor Matrix for Unidimensional Solution (Deprivatized Practice)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>PAF #1</th>
<th>PAF #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPRVSLC*</td>
<td>How often does School Literacy Consultant/Coach regularly observe your students' academic performance or review their grades or achievement data?</td>
<td>.697</td>
<td>.687</td>
</tr>
<tr>
<td>DPRV2TS</td>
<td>How often do two or more teaching colleagues regularly observe your students' academic performance or review their grades or achievement data?</td>
<td>.664</td>
<td>.683</td>
</tr>
<tr>
<td>DPRVPRIN*</td>
<td>How often does Principal regularly observe your students' academic performance or review their grades or achievement data?</td>
<td>.646</td>
<td>.655</td>
</tr>
<tr>
<td>DPRVDEPT*</td>
<td>How often does Grade Level/Department Chair regularly observe your students' academic performance or review their grades or achievement data?</td>
<td>.635</td>
<td>.634</td>
</tr>
<tr>
<td>DPRVDADM*</td>
<td>How often does District Administrator regularly observe your students' academic performance or review their grades or achievement data?</td>
<td>.558</td>
<td>.554</td>
</tr>
<tr>
<td>DPRVFEED</td>
<td>How often, since the beginning of the current school year did you receive meaningful feedback on your performance from supervisors or peers?</td>
<td>.510</td>
<td>.483</td>
</tr>
<tr>
<td>DPRVCOME</td>
<td>Since the beginning of the current school year, how often has another teacher or peer come to your classroom to observe your teaching?</td>
<td>.217</td>
<td></td>
</tr>
<tr>
<td>DPRVVVSIT</td>
<td>Except for monitoring student teachers or substitute teachers, how often have you visited another teacher's classroom to observe and discuss their teaching since the beginning of the school year.</td>
<td></td>
<td>-.151</td>
</tr>
</tbody>
</table>

Variance Explained (%)  

| Variance Explained (%) | 29.8 | 38.5 |

Scale Reliability (α)  

| Scale Reliability (α) | .585 | .749 |

*Note: Bold = Major loading; Italics = Item kept; * = New Item*
Shared sense of purpose.

The three items from Shared Sense of Purpose (SSP) were subjected to PAF analysis \((n = 105)\) with the suitability of data for factor analysis first assessed. Checks of variable combinations showed no clear evidence of curvilinear relationships. Inspection of the correlation matrix showed evidence of all possible correlations \(r = .3\) or greater. The Kaiser-Meyer-Olkin value was .690 -- above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant \((p < .001)\). These support the factorability of the correlation matrix.

Principal Axis Factoring analysis revealed one component with an eigenvalue greater than one (2.15, .52, .33), which singularly explained 58.5\% of the common variance. Review of the screeplot found a significant drop after the first component and the results of Monte Carlo PCA for Parallel Analysis (Watkins, 2000) supported keeping only one component (3 variables x 105 schools).

All variables loaded strongly on the factor (.839, .799, and .642). The scale reliability was good (Cronbach Alpha = .790) and higher than the original published reliability measure \(\alpha = .740\) (Louis & Marks, 1998a). Therefore, the 3-item unidimensional scale for Shared Sense of Purpose remained the scale used for subsequent analysis of data in this study. The final three items used to measure a collective Shared Sense of Purpose are listed in italics in Table 10.
Table 10: Factor Matrix for Unidimensional Solution (Shared Sense of Purpose)

<table>
<thead>
<tr>
<th>Item</th>
<th>PAF</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td></td>
</tr>
<tr>
<td>SSPGOALS</td>
<td>Goals and priorities for the school are clear.</td>
</tr>
<tr>
<td>SSPDISCP</td>
<td>In this school the teachers and the administration are in close agreement on school discipline policy.</td>
</tr>
<tr>
<td>SSPMISS</td>
<td>Most of my colleagues share my beliefs and values about what the central mission of the school should be.</td>
</tr>
</tbody>
</table>

Variance Explained (%) | 58.5
Scale Reliability (α)  | .790

*Note. Bold = Major loading; Italic = Item kept*

**Collaborative activity.**

The six items from Collaborative Activity (CA) sub-scale were subjected to PAF analysis (n = 105). First, the suitability of data for factor analysis was assessed. Spot checks of variable combinations showed no clear evidence of curvilinear relationships. Inspection of the correlation matrix showed many of the possible correlations are $r > .3$. The Kaiser-Meyer-Olkin value was .772 -- above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant ($p < .001$). These support the factorability of the correlation matrix.

Principal Axis Factoring analysis revealed two components with an eigenvalue greater than one (3.41, 1.01), which explained 59.9% of the common variance, respectively (51.2% and 8.7%). Review of the screeplot found a significant drop after the first component and a slight drop after the second. The results of Monte Carlo PCA for Parallel Analysis (Watkins, 2000) supported keeping only one component (6 variables x 105 schools).
The second iteration was forced to extract a single factor from six items. Principal Axis Factoring analysis as a unidimensional solution explained 50% of the shared variance. All variables loaded at a level greater than the minimum used for this study (.32) and a majority could be considered strong loadings (.893, .814, .763, .741). The scale reliability was good (Cronbach Alpha = .833) and higher than Louis and Marks’ α = .68 (1998a). Therefore, the six-item unidimensional scale for Collaborative Activity remained the scale used for subsequent analysis of data in this study. The final six items used to measure a collective Collaborative Activity are listed in italics in Table 11.
Table 11: Factor Matrix for Unidimensional Solution (Collaborative Activity)

<table>
<thead>
<tr>
<th>Item</th>
<th>PAF</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLLBCUR</td>
<td>.893</td>
</tr>
<tr>
<td>COLLBTCH</td>
<td>.814</td>
</tr>
<tr>
<td>COLLTFRQ</td>
<td>.763</td>
</tr>
<tr>
<td>COLLCOOR</td>
<td>.741</td>
</tr>
<tr>
<td>COLLCOOP</td>
<td>.508</td>
</tr>
<tr>
<td>COLLTCC</td>
<td>.390</td>
</tr>
</tbody>
</table>

Variance Explained (%) 50.0
Scale Reliability (α) .833

Note. Bold = Major loading; Italics = Item kept

Reflective dialogue.

The original Reflective Dialogue (RD) scale used only two items (Louis & Marks, 1998a) – one item fewer than the three or more loadings generally preferred for stability (Pallant, 2007). Because the original sub-scale demonstrated one of the higher Cronbach
alphas ($\alpha = .68$) of the Professional Community Index, ODE never developed additional items to strengthen it.

As previously published, the two RD items were subjected to PAF analysis ($n = 105$) with the suitability of data for factor analysis first assessed. A check of the variable combination showed no evidence of a curvilinear relationship. The correlation matrix was .448, larger than the recommended $r > .3$. The Kaiser-Meyer-Olkin value was .500, below the recommended .6 (Pallant, 2007). However, Kaiser (1974) and Hutcheson and Sofroniou (1999) respectively suggest that a KMO value of .5 can be considered “barely acceptable” or within the “mediocre” range (as cited in Field, 2009, p. 647). Bartlett’s test of Sphericity was significant ($p < .001$). These, then, support the factorability of the correlation matrix.

Principal Axis Factoring analysis revealed one component with an eigenvalue greater than one (1.45, .55), which explained 44.7% of the shared variance (and 72.4% of the total variance). Review of the screeplot showed a significant drop after the first component though with only two possible factors, other tests were consulted. Similar issues with the Monte Carlo PCA for Parallel Analysis (Watkins, 2000) arose as random eigenvalues were not available for a calculation of two variables and 105 cases. When random numbers were generated for an acceptable calculation (3 variables x 105 cases), the random eigenvalues (1.15, 0.99, 0.85) suggest that keeping the single component appears logical.

Both variables loaded strongly on the factor (each at .669). The Cronbach Alpha ($\alpha = .608$) was a bit lower than Louis and Marks’ original $\alpha = .68$ (1998a) though still on
the lower cusp of acceptability (George & Mallery, 2003). The mean inter-item correlation is .448, which underscores the acceptability of the scale reliability (Pallant, 2007).

Therefore, the original two-item unidimensional scale for Reflective Dialogue remained the scale used for subsequent analysis of data in this study. The final two items used to measure a collective Reflective Dialogue are listed in italics in Table 12.

Table 12: Factor Matrix for Unidimensional Solution (Reflective Dialogue)

<table>
<thead>
<tr>
<th>Item</th>
<th>PAF #1</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFLTDIS</td>
<td>In a typical planning period where you meet with other teachers, please indicate about how much time is spent on [diagnosing individual students -- Teachers discuss problems of specific students and arrange appropriate help].</td>
</tr>
<tr>
<td>REFLTAT</td>
<td>In a typical planning period where you meet with other teachers, please indicate about how much time is spent on [analyzing teaching -- Teachers discuss specific teaching practices and behaviors of team members].</td>
</tr>
</tbody>
</table>

Variance Explained (%) 44.7
Scale Reliability (α) .608

Note. Bold = Major loading; Italics = Item kept

Professional learning community.

The five theorized sub-scales of Focus On Student Learning, Deprivatized Practice, Shared Sense of Purpose, Collaborative Activity, and Reflective Dialogue were subjected to PAF analysis (n = 105) to explore if they could serve as a unidimensional single-scale of Professional Learning Community (Louis & Marks, 1998a). First, the
suitability of data for factor analysis was assessed. Spot checks of variable combinations showed no clear evidence of curvilinear relationships. Inspection of the correlation matrix showed many of the possible correlations are \( r > .3 \). The Kaiser-Meyer-Olkin value was .810 -- above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant (\( p < .001 \)). These support the factorability of the correlation matrix.

Principal Axis Factoring analysis revealed one component with an eigenvalue greater than one (3.03), which explained 53.7% of the common variance. Review of the screeplot found a significant drop after the first component and a slight drop after the second. The results of Monte Carlo PCA for Parallel Analysis (Watkins, 2000) supported keeping only one component (5 variables x 105 schools) as only the first factor exceeded the corresponding criterion values for a randomly generated data matrix of the same size (1.28).

A second iteration was forced to extract a single factor from the five items. Principal Axis Factoring analysis as a unidimensional solution explained the same 53.7% of the shared variance. All but one variable (Reflective Practice, .203) loaded at a level greater than the minimum used for this study (.32) and all four could be considered strong loadings (.867, .833, .786, .759).

As this is an exploratory study, maintaining a unidimensional factor of the five sub-scales from Louis and Marks (Louis & Marks, 1998a) added considerable theoretical and exploratory value. As such, the measure of Reflective Dialogue from this five-item PAF analysis was kept to support an overall measure of Professional Learning.
Community (Table 4.9). The scale reliability was good (Cronbach Alpha = .802) and higher than the Professional Community Index scale that Louis and Marks developed, \( \alpha = .69 \) (1998a).

The review of possible Cronbach Alpha scores if a single item were deleted indicated that the scale reliability could only increase (to .852) if the measure of Reflective Dialogue was removed. While the scale reliability could increase, the improvement was not so great that it added a commensurate advantage in its theoretical and exploratory value of future analysis. Therefore, the five-item unidimensional scale for Professional Learning Community remained the scale used for subsequent analysis of data in this study. The final five items used to measure a Professional Learning Community are listed in italics in Table 13.

### Table 13: Factor Matrix for Unidimensional Solution (Professional Learning Community)

<table>
<thead>
<tr>
<th></th>
<th>Principal Axis Factoring #1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on Student Learning</td>
<td>.867</td>
</tr>
<tr>
<td>Shared Sense of Purpose</td>
<td>.833</td>
</tr>
<tr>
<td>Collaborative Activity</td>
<td>.786</td>
</tr>
<tr>
<td>Deprivatized Practice</td>
<td>.759</td>
</tr>
<tr>
<td>Reflective Dialogue</td>
<td>.203</td>
</tr>
<tr>
<td>Variance Explained (%)</td>
<td>53.7</td>
</tr>
<tr>
<td>Scale Reliability (( \alpha ))</td>
<td>.802</td>
</tr>
</tbody>
</table>

*Note. Bold = Major loading; Italic = Item kept*
Research Question #2

Can academic optimism be reliably represented by the three (3) subscales of faculty trust, academic emphasis, and collective efficacy? Exploratory factor analysis, specifically Principal Axis Factoring, was used to investigate research question number two.

Faculty trust.

The ten Faculty Trust items were subjected to single-factor PAF analysis as previously published (Tschannen-Moran & Hoy, 2000). The suitability of data for factor analysis was assessed first. Spot checks of variable combinations showed no clear evidence of curvilinear relationships. Inspection of the correlation matrix showed most correlations $r = .3$ or greater. The Kaiser-Meyer-Olkin value was high at .907 -- above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant ($p<.001$). These support the factorability of the correlation matrix.

Principal Axis Factoring analysis revealed two components with eigenvalues greater than 1 (5.96 and 1.34), explaining 66.5% of the common variance (respectively, 56.4% and 10.1%). Review of the screeplot appeared to have a steep drop after the first component followed by a very modest drop after the second dimension. However, keeping only one component for these ten items was supported by the results of Watkin’s (2000) Monte Carlo PCA for Parallel Analysis (10 variables x 105 schools) where only the first factor exceeded the corresponding criterion values for a randomly generated data matrix of the same size (1.528 and 1.357).
When the ten items were forced into a unidimensional solution, it explained 55.3% of the shared variance. All ten variables loaded strongly with only two items loading below .700 (.681 and .622). The scale reliability was excellent (Cronbach Alpha = .922), consistent with previous results (Hoy & Tschannen-Moran, 2003; Hoy et al., 2006). Therefore, the original ten-item unidimensional scale for Faculty Trust remained the scale used for subsequent analysis of data in this study. The final ten items used to measure a collective Faculty Trust are listed in italics in Table 14.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>PAF #1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT_TSTST</td>
<td>Teachers in this school trust their students.</td>
<td>.851</td>
</tr>
<tr>
<td>FT_TSTPT</td>
<td>Teachers in this school trust the parents.</td>
<td>.793</td>
</tr>
<tr>
<td>FT_PTGOD</td>
<td>Teachers think that most of the parents do a good job.</td>
<td>.776</td>
</tr>
<tr>
<td>FT_STWRK</td>
<td>Students in this school can be counted upon to do their work.</td>
<td>.772</td>
</tr>
<tr>
<td>FT_PTEL</td>
<td>Parents in this school are reliable in their commitments.</td>
<td>.766</td>
</tr>
<tr>
<td>FT_STLRN</td>
<td>Teachers here believe that students are competent learners.</td>
<td>.730</td>
</tr>
<tr>
<td>FT_PTSUP</td>
<td>Teachers can count upon parental support.</td>
<td>.711</td>
</tr>
<tr>
<td>FT_PTEL</td>
<td>Teachers can believe what parents tell them.</td>
<td>.707</td>
</tr>
<tr>
<td>FT_STCAR</td>
<td>Students in this school care about each other.</td>
<td>.681</td>
</tr>
<tr>
<td>FT_STST</td>
<td>Students here are secretive. [REVERSED]</td>
<td>.622</td>
</tr>
</tbody>
</table>

Variance Explained (%): 55.3

Scale Reliability ($\alpha$): .922

*Note. Bold = Major loading; Italics = Item kept*
Academic emphasis.

The 13 items from the three Academic Emphasis scales were used in various Organizational Health Inventory scales designed for the grade bands of elementary (5 items total), middle (9 items total), and secondary schools (8 items total). Each of the three scales was developed as unidimensional scales (Hoy & Tarter, 1992; Hoy & Tarter, 1997a; Hoy & Tarter, 1997b; Hoy & Sabo, 1998), and their reported internal reliability measures are good to excellent (Cronbach Alphas of $\alpha = .87$, $\alpha = .94$, and $\alpha = .93$, respectively).

Even though each of the 13 items could seemingly apply to each grade band, just seven of the 13 items are normally shared across at least two grade bands. Of those seven items, three of the items are normally shared across all three grade bands. Six of the 13 items are normally only used on one unidimensional grade band scale; respectively, either elementary or middle or secondary scales. The six original items (of 13 total items) that were only used in previous research on one grade band scale are outlined below:

1. OHI-Elementary School Scale:
   a. AE_E: Students are cooperative during classroom instruction.

2. OHI-Middle School Scale:
   a. AE_M1: Good grades are important to the students of this school.
   b. AE_M2: Students make provisions to acquire extra help from teachers.

3. OHI-Secondary School Scale:
a. AE_S1: The students in this school can achieve the goals that have been set for them.

b. AE_S2: Academic achievement is recognized and acknowledged by the school.

c. AE_S3: The school sets high standards for academic performance.

The initial PAF analysis was run \((n = 105)\) to determine if a universal scale could be utilized in this study. As such, it was set to extract a single, unidimensional factor that could be employed in any school, regardless of students’ ages or grade levels.

The suitability of data for factor analysis was assessed. Spot checks of variable combinations showed no clear evidence of curvilinear relationships. Inspection of the Correlation Matrix showed many correlations \(r = .3\) or greater. The Kaiser-Meyer-Olkin value was .861 -- above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant \((p < .001)\). These support the factorability of the correlation matrix.

Principal Axis Factoring analysis revealed three components with eigenvalues greater than one \((6.14, 1.90, 1.05)\), explaining 45%, 11%, and 6% of the shared variance respectively. Review of the screeplot showed a steep drop after the first factor and a much smaller, though potentially relevant, levelling after the second factor. Watkins’ (2000) Monte Carlo PCA for Parallel Analysis \((13 \text{ variables } \times 105 \text{ schools})\) supported keeping two components \((\text{as they were larger than random Eigenvalues of } 1.63 \text{ and } 1.47, \text{ respectively})\). As this is an exploratory study, maintaining a unidimensional factor – and
universal scale – added considerable theoretical value. As such, this initial 13-item PAF analysis was kept to investigate (Table 15).

As a unidimensional factor, the 13-item PAF explained 43.3% of the shared variance and had a high internal reliability ($\alpha = .902$). Table 4.6 details twelve of the 13 items that loaded above the minimum .32 level with five items loaded at .7 or higher. The only item not meeting the minimum loading was one that all three scales normally shared (AE_EMS2, .265). It was removed on the second iteration.

The second iteration with 12 items forced as a unidimensional solution was better. It continued to produce many correlations greater than $r = .3$ and demonstrated factorability [Kaiser-Meyer-Olkin of .866 and significant Bartlett’s test ($p<.001$)].

Principal Axis Factoring revealed three components with eigenvalues greater than one (6.10, 1.55, 1.04). As compared to the first PAF iteration, the review of the second screeplot still showed a steep drop after the first factor and less-definitive drop after the second factor. However, Watkins’ (2000) Monte Carlo PCA for Parallel Analysis (12 variables x 105 schools) again supported keeping two components (as they were larger than random Eigenvalues of 1.60 and 1.44, respectively).

As a unidimensional factor, the second PAF explained 46.3% of the shared variance and had a high internal reliability ($\alpha = .907$) – slight increases for both measures. All 12 items loaded above the minimum .32 level; with an increase to five of the items loading .7 or higher. As this is an exploratory study, this unidimensional factor – and universal scale – was maintained. While the result may be a scale three items longer and slightly less parsimonious than the previous longest scale (the nine-item Organizational
Health Inventory: Middle School scale by Hoy & Sabo, 1998), it also ensures that a reliable and valid universal measure is used across the 105 elementary, middle, and high schools in this sample. The final 12 items (PAF #2) used to measure Academic Emphasis in future analyses are listed in italics in Table 15.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>PAF #1</th>
<th>PAF #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE_MS1</td>
<td>The learning environment is orderly and serious.</td>
<td>.797</td>
<td>.803</td>
</tr>
<tr>
<td>AE_M1</td>
<td>Good grades are important to the students of this school.</td>
<td>.795</td>
<td>.783</td>
</tr>
<tr>
<td>AE_EMS1</td>
<td>Students respect others who get good grades.</td>
<td>.773</td>
<td>.769</td>
</tr>
<tr>
<td>AE_S3</td>
<td>The school sets high standards for academic performance.</td>
<td>.742</td>
<td>.756</td>
</tr>
<tr>
<td>rAE_M3</td>
<td>Academically oriented students in this school are ridiculed by their peers. [Reversed]</td>
<td>.705</td>
<td>.722</td>
</tr>
<tr>
<td>AE_MS2</td>
<td>Teachers in this school believe that their students have the ability to achieve academically.</td>
<td>.695</td>
<td>.704</td>
</tr>
<tr>
<td>AE_E</td>
<td>Students are cooperative during classroom instruction.</td>
<td>.687</td>
<td>.693</td>
</tr>
<tr>
<td>AE_S1</td>
<td>The students in this school can achieve the goals that have been set for them.</td>
<td>.657</td>
<td>.656</td>
</tr>
<tr>
<td>AE_EMS3</td>
<td>Students try hard to improve on previous work.</td>
<td>.653</td>
<td>.640</td>
</tr>
<tr>
<td>AE_S2</td>
<td>Academic achievement is recognized and acknowledged by the school.</td>
<td>.585</td>
<td>.595</td>
</tr>
<tr>
<td>rAE_EM</td>
<td>Students neglect to complete homework. [Reversed]</td>
<td>.512</td>
<td>.495</td>
</tr>
<tr>
<td>AE_M2</td>
<td>Students make provisions to acquire extra help from teachers.</td>
<td>.473</td>
<td>.450</td>
</tr>
<tr>
<td>AE_EMS2</td>
<td>Students seek extra work so that they can get good grades.</td>
<td>.278</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Variance Explained (%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>43.3</td>
</tr>
<tr>
<td>Scale Reliability (α)</td>
<td></td>
<td>.902</td>
</tr>
</tbody>
</table>

Note: **Bold** = Major loadings; *Italics* = Items kept
E = Item originally from the OHI: Elementary School scale
M = Item originally from the OHI: Middle School scale
S = Item originally from the OHI: Secondary School scale
Collective efficacy.

The 12 items from Collective Efficacy were assessed for suitability before being subjected to a two-factor PAF analysis reflecting the two dimensions of Task Analysis and Group Competence (R. D. Goddard, 2002). Spot checks of variable combinations showed no clear evidence of curvilinear relationships. Inspection of the correlation matrix showed more than half of the correlations with values $r > 0.3$. The Kaiser-Meyer-Olkin value was 0.819 -- above the recommended 0.6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant ($p<0.001$). These support the factorability of the correlation matrix.
Table 16: Factor Matrix for Two-Factor and Unidimensional Solution (Collective Efficacy)

<table>
<thead>
<tr>
<th>Item</th>
<th>Item</th>
<th>GC/TA</th>
<th>2-Factor Model</th>
<th>1-Factor Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE_CONF</td>
<td>Teachers here are confident they will be able to motivate their students.</td>
<td>GC</td>
<td>.752</td>
<td>-.256</td>
</tr>
<tr>
<td>CE_ABLE</td>
<td>Teachers in this school are able to get through to the most difficult students.</td>
<td>GC</td>
<td>.735</td>
<td>-.105</td>
</tr>
<tr>
<td>CE_BELIV</td>
<td>Teachers in this school believe that every child can learn.</td>
<td>GC</td>
<td>.700</td>
<td>-.309</td>
</tr>
<tr>
<td>rCE_GIVUP</td>
<td>If a child doesn’t want to learn teachers here give up. [REVERSED]</td>
<td>GC</td>
<td>.697</td>
<td>-.476</td>
</tr>
<tr>
<td>rCE_SAFE</td>
<td>Learning is more difficult at this school because students are worried about their safety. [REVERSED]</td>
<td>TA</td>
<td>.657</td>
<td>.156</td>
</tr>
<tr>
<td>rCE_STMOT</td>
<td>Students here just aren’t motivated to learn. [REVERSED]</td>
<td>TA</td>
<td>.550</td>
<td>.111</td>
</tr>
<tr>
<td>rCE_SKLRS</td>
<td>Teachers here don’t have the skills needed to produce meaningful results. [REVERSED]</td>
<td>GC</td>
<td>.526</td>
<td>-.500</td>
</tr>
<tr>
<td>rCE_SKLDIC</td>
<td>Teachers in this school do not have the skills to deal with student disciplinary problems. [REVERSED]</td>
<td>GC</td>
<td>.483</td>
<td>-.207</td>
</tr>
<tr>
<td>CE_HOME</td>
<td>Home life provides so many advantages that students are bound to learn.</td>
<td>TA</td>
<td>.321</td>
<td>.728</td>
</tr>
<tr>
<td>CE_READY</td>
<td>These students come to school ready to learn.</td>
<td>TA</td>
<td>.532</td>
<td>.583</td>
</tr>
<tr>
<td>CE_COMM</td>
<td>The opportunities in this community help ensure that these students will learn.</td>
<td>TA</td>
<td>.361</td>
<td>.571</td>
</tr>
<tr>
<td>rCE_DRUG</td>
<td>Drug and alcohol abuse in the community make learning difficult for students here. [REVERSED]</td>
<td>TA</td>
<td>.491</td>
<td>.543</td>
</tr>
</tbody>
</table>

Variance Explained (%) 34.0 18.5 37.9
Scale Reliability (α) .858 .810 .837

*Note.* GC = Group Competence; TA = Task Analysis (Goddard, 2002);
**Bold** = Major loading; *Italic* = Items kept
Principal Axis Factoring analysis revealed two components with eigenvalues greater than one (4.543 and 2.647), explaining 52.5% (respectively, 34.0% and 18.5%) of the common variance. Review of the screeplot demonstrated a steep drop after the second factor followed by a nearly-flat horizontal line after the third. The results of Monte Carlo PCA for Parallel Analysis (Watkins, 2000) supported keeping two components with each of the two factors exceeding the corresponding criterion values for a randomly generated data matrix of the same size (12 variables x 105 schools).

As Table 16 shows, all variables loaded higher than the minimum used for this study (.32) on at least one factor. All six Group Competence items loaded on the first factor with two items loading on the Task Analysis factor (rCE_GIVUP -- “If a child doesn’t want to learn teachers here give up.” and rCE_SKLRS -- “Teachers here don’t have the skills needed to produce meaningful results.”). Most Task Analysis items loaded on the second factor though two loaded on the first (rCE_SAFE -- “Learning is more difficult at this school because students are worried about their safety” and rCE_STMOT -- “Students here just aren’t motivated to learn”).
To clarify interpretation of the two factors, oblimin rotation was performed (Table 17). Upon examination of the Pattern and Structure Matrices, the items again loaded like the factor matrix except for the two previously-mentioned pairs of Group Competence and Task Analysis items. The two Group Competence items strongly loaded only on the first factor. The two Task Analysis items now appeared to, at least, more closely
crossload on both factors; an outcome aligned with the original theoretical dimensions outlined by Goddard (2002).

The Factor Correlation Matrix continued to show a low correlation ($r < .3$) between the two factors suggesting it reasonable to assume the factors are not related to each other ($r = .215$). The scale reliability for each sub-factor was good (Group Competence, Cronbach Alpha = .858 and Task Analysis, Cronbach Alpha = .810). The final 12 items used to measure a two-factor scale for Collective Efficacy are listed in italics in Table 16.

The measure of Collective Efficacy has historically been treated as a single factor in past research of Academic Optimism (R. D. Goddard, 2002; R. D. Goddard et al., 2004; Hoy et al., 2002; Hoy et al., 2006). Because the original scale’s 12 items were all retained in the two-factor Principal Axis Factoring, a unidimensional version of the scale was also considered in order to support its generalizability to previous and future research. Table 16 outlines the twelve factor loadings for a forced unidimensional factor that explained 37.9% of the shared variance where every item exceeded the minimum loading factor of .32. Five variables loaded strongly (> .700), and the overall internal scale reliability was excellent (Cronbach Alpha = .837). Therefore, the 12-item unidimensional scale for Collective Efficacy was the scale used for subsequent analysis of data in this study. The final twelve items used to measure a unidimensional Collective Efficacy are listed in italics in Table 16.
Academic optimism.

The three theorized sub-scales of Faculty Trust, Collective Efficacy, and Academic Emphasis were subjected to PAF analysis \((n = 105)\) to explore if they could serve to represent either a single factor of Academic Optimism or up to three separate factors as analyzed above. First, the suitability of data for factor analysis was assessed. Spot checks of variable combinations showed no clear evidence of curvilinear relationships. Inspection of the correlation matrix showed many of the possible correlations are \(r > .3\). The Kaiser-Meyer-Olkin value was .733 -- above the recommended .6 (Pallant, 2007) -- and Bartlett’s test of Sphericity was significant \((p < .001)\). These support the factorability of the correlation matrix.

Principal Axis Factoring analysis revealed one component with an eigenvalue greater than one (2.597), which explained 80.2% of the common variance. Review of the screeplot found a significant drop after the first component and a slight drop after the second. The results of Watkins’ (2000) Monte Carlo PCA for Parallel Analysis supported keeping only one component (3 variables x 105 schools) as only the first factor exceeded the corresponding criterion values for a randomly generated data matrix of the same size (1.17).

A second iteration was forced to extract a single factor from the three items. Principal Axis Factoring analysis as a unidimensional solution explained the same 80.2% of the shared variance. All three variables loaded at a level greater than the minimum used for this study (.32) and all could be considered strong loadings (.967, .863, .852). The scale reliability was excellent (Cronbach Alpha = .905); consistent with previous
research outlined earlier. Review of possible Cronbach Alpha scores if a single item was
deleted indicated that the scale reliability could only negligibly increase (to .906) if the
measure of Academic Emphasis was removed. While the scale reliability could increase,
the improvement was so small that it added no advantage to the theoretical and
exploratory value of future analysis. Therefore, the three-item unidimensional scale for
Academic Optimism remained the scale used for subsequent analysis of data in this
study. The final three items used to measure Academic Optimism are listed in italics in
Table 18.

<table>
<thead>
<tr>
<th>Table 18: Factor Matrix for Unidimensional Solution (Academic Optimism)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Axis Factoring #1</td>
</tr>
<tr>
<td>Collective Efficacy</td>
</tr>
<tr>
<td>Faculty Trust</td>
</tr>
<tr>
<td>Academic Emphasis</td>
</tr>
<tr>
<td>Variance Explained (%)</td>
</tr>
<tr>
<td>Scale Reliability (α)</td>
</tr>
</tbody>
</table>

*Note. Bold = Major loading; Italics = Item kept*

**General Descriptive Statistics**

All of the school wide variables mentioned above as well as the school-level
student demographic had reasonable means, ranges, standard deviations, and alpha
coefficients. The school demographic and academic achievement characteristics also
demonstrated reasonable means, ranges, and standard deviations (Table 19).
Table 19: General Descriptive Statistics (n=105)

<table>
<thead>
<tr>
<th></th>
<th>Number of Items</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof Learning Community</td>
<td>5</td>
<td>2.66</td>
<td>3.61</td>
<td>3.115</td>
<td>.18722</td>
<td>.802</td>
</tr>
<tr>
<td>FOSL</td>
<td>8</td>
<td>3.20</td>
<td>4.53</td>
<td>3.8966</td>
<td>.24878</td>
<td>.855</td>
</tr>
<tr>
<td>DPRV</td>
<td>6</td>
<td>1.88</td>
<td>2.66</td>
<td>2.2319</td>
<td>.14669</td>
<td>.749</td>
</tr>
<tr>
<td>SSP</td>
<td>3</td>
<td>3.03</td>
<td>4.61</td>
<td>3.8016</td>
<td>.36014</td>
<td>.790</td>
</tr>
<tr>
<td>COLL</td>
<td>6</td>
<td>2.60</td>
<td>3.80</td>
<td>3.2445</td>
<td>.26250</td>
<td>.833</td>
</tr>
<tr>
<td>REFLT</td>
<td>2</td>
<td>1.79</td>
<td>2.83</td>
<td>2.4010</td>
<td>.17953</td>
<td>.608</td>
</tr>
<tr>
<td>Academic Optimism</td>
<td>3</td>
<td>2.77</td>
<td>3.69</td>
<td>3.2488</td>
<td>.20321</td>
<td>.905</td>
</tr>
<tr>
<td>CE</td>
<td>12</td>
<td>3.15</td>
<td>4.13</td>
<td>3.6133</td>
<td>.22820</td>
<td>.837</td>
</tr>
<tr>
<td>AE</td>
<td>12</td>
<td>2.27</td>
<td>2.98</td>
<td>2.6022</td>
<td>.16390</td>
<td>.907</td>
</tr>
<tr>
<td>FT</td>
<td>10</td>
<td>2.86</td>
<td>4.23</td>
<td>3.5308</td>
<td>.26148</td>
<td>.922</td>
</tr>
<tr>
<td>School SES</td>
<td>1</td>
<td>2.30</td>
<td>99.04</td>
<td>42.0524</td>
<td>20.46729</td>
<td>---</td>
</tr>
<tr>
<td>PerfIndex0708</td>
<td>1</td>
<td>64.32</td>
<td>104.19</td>
<td>87.6600</td>
<td>7.66148</td>
<td>---</td>
</tr>
<tr>
<td>PerfIndex0809</td>
<td>1</td>
<td>59.92</td>
<td>106.78</td>
<td>87.9830</td>
<td>8.32584</td>
<td>---</td>
</tr>
</tbody>
</table>

Data were examined for normality via histograms, Kolmogorov-Smirnov (K-S) tests of normality, and measures of skewness and kurtosis. All histograms appeared reasonably normally distributed (Figure 2).
Figure 2: Histograms of Variables (n=105)

- Collaborative Activity
- Shared Sense of Purpose
- Reflective Dialogue
- Focus on Student Learning
- Deprivatized Practice
- Professional Learning Community
- Faculty Trust
- Collective Efficacy
- Academic Emphasis
- Academic Optimism
- Socioeconomic Status
- School Achievement (07-08)
- School Achievement (08-09)
Only one variable -- PerfIndex0809 representing Current School wide Academic Achievement – was problematic. When examining skewness, no variable had a skewness level greater than 1.0 (Afifi, Clark, & May, 2004, p. 62) with PerfIndex0809 being the closest (-.741). The variable of PerfIndex0809 was also the only one considered highly kurtotic (1.350). The Kolmogorov-Smirnov (K-S) test also indicated that the variable of PerfIndex0809, $D(105) = .032, p < .05$, was significantly non-normal. Examination of normal probability plots (Normal Q-Q Plot) found reasonably straight lines suggesting normal distribution (with the exception of the two Performance Index measures). The two school Performance Index measures had similar patterns of deviation from normal, though the PerfIndex0809 deviation was more pronounced than the PerfIndex0708.

For further research, the current school PerfIndex0809 was transformed to adjust for skewness and non-normality. The prior school PerfIndex0708 was also transformed to adjust for skewness, but also to maintain similar measurement interpretations between both years of Performance Indices. The negatively-skewed school Performance Indices were each transformed to normal distribution by the reflect and square root method (Field, 2009; Osborne, 2002; Pallant, 2007). The scores were then reversed to maintain the same direction of data where lower valued scores represent lower achievement and higher value scores, higher academic achievement (Table 20).
Table 20: Descriptive Statistics of Transformations (n=105)

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>K-S Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stat</td>
<td>Std.</td>
<td>Stat</td>
<td>Std.</td>
<td>Sig</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PerfIndex0809</td>
<td>59.92</td>
<td>106.78</td>
<td>87.98</td>
<td>8.33</td>
<td>-.741</td>
<td>.236</td>
<td>1.350    .467</td>
</tr>
<tr>
<td>PI0809^+</td>
<td>1.00</td>
<td>6.92</td>
<td>3.58</td>
<td>.96</td>
<td>.228</td>
<td>.236</td>
<td>1.204    .467</td>
</tr>
<tr>
<td>PerfIndex0708</td>
<td>64.32</td>
<td>104.19</td>
<td>87.66</td>
<td>7.66</td>
<td>-.468</td>
<td>.236</td>
<td>.265     .467</td>
</tr>
<tr>
<td>PI0708^+</td>
<td>1.00</td>
<td>6.39</td>
<td>3.31</td>
<td>.96</td>
<td>319</td>
<td>.236</td>
<td>.478     .467</td>
</tr>
</tbody>
</table>

*Note.* ^+ = Transformed

The transformed school wide achievement data were subjected to the Kolmogorov-Smirnov (K-S) test of normality and indicated that the two similarly-transformed variables of PI0809^+, \( D(105) = .095, p < .05 \) and PI0708^+, \( D(105) = .200, p < .05 \) showed no significant departure from normality. Histograms (Figure 3) and Q-Q plots also supported the assumption of normality.

Figure 3: Histograms of Transformed Performance Indices (Prior and Current School-level Achievement)
Future interpretations using these transformations support best practices outlined by Affifi, et al. (2004) who state that “if a particular transformation is selected, then all analyses should be performed on the transformed data, and the results should be presented in terms of the transformed values. Inferences and statements of results should reflect this fact” (p. 63). Ultimately, such transformations preserved the chance to explore how PLC and AO could associate with student achievement, past and present.

There was an occasional presence of potential outliers. Upon review, all potential outliers were legitimate values and none were the result of incorrect inputs. That being stated, there were no cases that could be considered an extreme point, though two variables had three or more outlier school cases (FOSL’s cases 9, 16, & 38 and PerfIndex0809’s cases 24, 29, 50, 57, & 87). The differences between mean values and trimmed means for each of these two variables were very small, respectively (3.897 and 3.892; 3.575 and 3.568) suggesting the outliers had little impact.

Inspection of the maximum Mahalanobis Distances value (17.46) was found to be below the critical chi-square value ($X^2 = 20.52$, df = 5), indicating no outliers. Additionally, a review of standard residuals and Casewise Diagnostics was carried out and found no potential outliers (Std. Residual Min = -1.71, Std. Residual Max = 2.67) with values above 3.0 or below -3.0 (Pallant, 2007). In instances when Casewise Diagnostics identify cases with standard residuals greater than 3.0 or less than -3.0, the maximum Cook’s Distance value should be reviewed. In instances when Cook’s Distance exceeds a value larger than 1.0, the case may have detrimental impact (Pallant,
2007). The Cook’s Distance was well below the limit of concern (.155). As a result, all cases of exceptional values were kept for this study.

**Research Question #3**

*How are the two constructs of professional learning community and academic optimism, and their respective subscales, associated?* The quantitative methods of Pearson Product Correlations and Confirmatory Factor Analyses were used to investigate research question number three.

**Correlation.**

Preliminary analyses included conducting scatterplots among all research variables to check for violation of assumptions. The distribution of data points appeared to indicate no distributions of curved lines nor uneven clustering. Scatterplots involving academic optimism and its three subscales all suggested strong correlations through narrow cigar shapes that were frequently tight. Scatterplots involving PLC and its subscales frequently had cigar shapes though scatterplots with reflective dialogue had more instances of data points spread all over. These displays suggest that many relationships among major variables and/or their subscales are roughly linear and that the assumption of homoscedasticity is likely.

Table 21 summarizes the Pearson product-moment correlation coefficients among the study’s variables. All intra-correlations between PLC and its subscales were statistically significant and strong ($r > .5$) with the exception of the moderate strength correlation between reflective dialogue and PLC ($r = .360$, $n=105$, $p<.01$). When
exploring the intra-correlations between AO and its three subscales, all were strong and significant with the smallest between Academic Emphasis and AO ($r=0.893$, $n=105$, $p<0.01$).
Table 21: Pearson Product Correlations (n = 105)

<table>
<thead>
<tr>
<th></th>
<th>COLL</th>
<th>SSP</th>
<th>REFLT</th>
<th>FOSL</th>
<th>DPRV</th>
<th>PLC</th>
<th>FT</th>
<th>CE</th>
<th>AE</th>
<th>AO</th>
<th>SES</th>
<th>PI0809*</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLL</td>
<td>---</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SSP</td>
<td>.661**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>REFLT</td>
<td>.169</td>
<td>.144</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOSL</td>
<td>.671**</td>
<td>.754**</td>
<td>.086</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPRV</td>
<td>.601**</td>
<td>.598**</td>
<td>.275**</td>
<td>.660**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLC</td>
<td>.840**</td>
<td>.892**</td>
<td>.360**</td>
<td>.864**</td>
<td>.783**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FT</td>
<td>.243*</td>
<td>.302**</td>
<td>.080</td>
<td>.299**</td>
<td>.159</td>
<td>.304**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE</td>
<td>.203*</td>
<td>.334**</td>
<td>.106</td>
<td>.292**</td>
<td>.165</td>
<td>.309**</td>
<td>.835**</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AE</td>
<td>.391**</td>
<td>.515**</td>
<td>.253**</td>
<td>.429**</td>
<td>.297**</td>
<td>.517**</td>
<td>.735**</td>
<td>.824**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AO</td>
<td>.285**</td>
<td>.393**</td>
<td>.142</td>
<td>.353**</td>
<td>.210*</td>
<td>.385**</td>
<td>.939**</td>
<td>.954**</td>
<td>.893**</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td>-.150</td>
<td>-.201*</td>
<td>-.151</td>
<td>-.249*</td>
<td>-.292**</td>
<td>-.260**</td>
<td>.398**</td>
<td>.372**</td>
<td>.154</td>
<td>.351**</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>PI0809*</td>
<td>.155</td>
<td>.108</td>
<td>-.174</td>
<td>.056</td>
<td>-.046</td>
<td>.059</td>
<td>.503**</td>
<td>.503**</td>
<td>.463**</td>
<td>.528**</td>
<td>.572**</td>
<td>---</td>
</tr>
<tr>
<td>PI0708*</td>
<td>.115</td>
<td>.130</td>
<td>-.132</td>
<td>.032</td>
<td>-.082</td>
<td>.053</td>
<td>.490**</td>
<td>.489**</td>
<td>.430**</td>
<td>.509**</td>
<td>.586**</td>
<td>.889**</td>
</tr>
</tbody>
</table>

*Note. + = Transformed

*Correlation is significant at the 0.05 level (2-tailed), p<0.05
** Correlation is significant at the 0.01 level (2-tailed), p<0.01
The school wide totals of PLC and AO share a moderate, positive correlation \( (r=.385, n=105, p<.01) \). Relationships across PLC, AO, and their respective subscales were generally weaker and less consistent than the correlations outlined above. Professional Learning Community had significant, positive correlations of mostly moderate strength with Academic Optimism and its subscales; only the relationship between PLC and Academic Emphasis is considered strong \( (r=.517, n=105, p<.01) \).

Academic Optimism and its positive correlations with PLC subscales were less obvious. Four of the five correlations are considered significant [Focus on Student Learning \( (p<.01) \), Collaborative Activity \( (p<.01) \), Shared Sense of Purpose \( (p<.01) \), and Deprivatized Practice \( (p<.05) \)]. Of those, two were moderate strength correlations (Shared Sense of Purpose and Focus on Student Learning) and two were small correlations (Collaborative Activity and Deprivatized Practice). Only Reflective Dialogue failed to share a significant correlation with Academic Optimism \( (r=.142, n=105, p>.05) \).

The relationships among PLC, its subscales, and school wide demographics of SES and current- and prior-achievement had few significant correlations. Of the three subscales that were significant [Shared Sense of Purpose \( (p<.05) \), Focus on Student Learning \( (p<.05) \), and Deprivatized Practice \( (p<.01) \)], all had small and negative correlations with SES.

All correlations between AO, its subscales, and school wide demographics were positive and significant \( (p<.01) \) with them split between moderate and large strengths. The only exception was between Academic Emphasis and SES \( (r=.154, n=105, p>.05) \).
Unlike the negative relationships between SES and PLC, all other correlations were positive between SES, AO, and its subscales.

**Confirmatory factor analysis.**

A confirmatory factor analysis (CFA) was performed to measure the correlation between the two latent variables, professional learning community and academic optimism. The explicit, a priori model used five factors (focus on student learning, deprivatized practice, shared sense of purpose, collaborative activity, and reflective dialogue) for professional learning community and three factors (collective efficacy, academic emphasis, and faculty trust) for academic optimism.

The Principal Axis Factor analyses and bivariate correlations outlined earlier in the chapter (Table 21) suggest that high, strongly positive relationships exist between academic optimism’s three subscales, where the lowest correlation is between academic emphasis and faculty trust ($r = .735$). The correlations among professional learning community’s five subscales are strong except for the correlations involving reflective dialogue. The four possible bivariate relationships with reflective dialogue were generally weak as deprivatized practice was the only statistically significant correlation (small strength, $r = .275$). Even if the others were statistically significant, they would be too small to be considered especially impactful: collaborative activity ($r = .169$), shared sense of purpose ($r = .144$), and focus on student learning ($r = .086$). Such correlations suggest that reflective dialogue may have a low loading on the theorized construct of professional learning community.
The model for the confirmatory factor analysis for these two constructs is shown in Figure 4. SPSS Amos 21 was used to perform the CFA of the two latent variables. The initial model allowed the latent variables to correlate and noted one measurement error variance for each observed variable.

Figure 4: Initial Two-Construct a priori Model for Confirmatory Factor Analysis (with Standardized Loadings)
Test 1: initial confirmatory factor analysis.

The result of the initial model (Figure 4) demonstrated high and significant factor loadings for the two unconstrained factors theorized to load on Academic Optimism. The two factors were academic emphasis ($\beta = .866, p < .001$), and collective efficacy, ($\beta = .953, p < .001$).

All factors theorized to associate with Professional Learning Community had strong, though statistically insignificant, parameter loadings for every factor except reflective dialogue, which also had a quite low standardized regression weight ($\beta = .18$). Such a beta weight can be thought of as when PLC goes up by one standard deviation, reflective dialogue also goes up by 0.18 standard deviations. In comparison, the strongest parameter loading of the five factors on PLC was focus on student learning ($\beta = .88$). With its standardized regression weight, focus of student learning would increase .77 standard deviations for every one standard deviation that PLC increases.

The other four theorized factors for PLC loaded strongly – though insignificantly – and reflected strong multiple correlation: focus on student learning ($\beta = .88, R^2 = .774$), deprivatized practice ($\beta = .74, R^2 = .544$), collaborative activity ($\beta = .77, R^2 = .600$), and shared sense of purpose ($\beta = .85, R^2 = .724$). The three factors theorized to load and reflect strong multiple correlation on academic optimism did: academic emphasis ($\beta = .87, R^2 = .750$), faculty trust ($\beta = .87, R^2 = .756$), and collective efficacy ($\beta = .95, R^2 = .908$).

Unlike the previous unidimensional bivariate correlations described earlier, the two constructs of PLC and AO failed to correlate at a statistically significant level ($r = .39, p$
In general, the data failed to support the initial model well, $\chi^2 = 46.94$ ($p < .001$) with $df = 19$. This poor fit is indicated when the value of Chi-Square is statistically significant and the Chi-Square also fails to be similar to the number of degrees of freedom. Because Chi-Square is a global fit measure sensitive to sample size and that “an ideal fit index just does not exist,” other goodness of model fit indices were also consulted (Schumacker & Lomax, 2004, p. 116). Like Chi-Square, the root-mean-square-error of approximation (RMSEA) is another global fit measure. A value < .05 is good and < .08 is tolerable. The RMSEA fit for the initial model is poor at .119.

Schumacker and Lomax (2004) write that the goodness-of-fit index (GFI) measures variance and covariance while the adjusted goodness-of-fit index (AGFI) does the same, but adjusts for degrees of freedom. Both measures range from zero to one with measures > .95 characterized as good (though tolerable if > .90). The GFI was tolerable at .909 and the AGFI failed to meet an acceptable level (.828).

The standardized root-mean-square residual index (SRMR) is the standardized difference between observed and predicted correlations; suggested cutoff values < .08 indicate a good fit (Hu & Bentler, 1999). The SRMR of the initial model was good at .0714.

Three model comparison fit indices are also helpful in assessing the initial model. The Tucker-Lewis index (TLI), which is sometimes called the non-normed fit index (NNFI), compares a null model to the proposed model. The value ranges in scale from zero (no fit) to one (perfect fit) with values close to > .95 representing the threshold for a good model fit (Hu & Bentler, 1999). The TLI for the initial model failed to achieve an
acceptable level at .919. The other comparison fit index is the comparative-fit index (CFI) which represents the improvement from the least restrictive model to the most saturated model (Schumacker & Lomax, 2004). A cutoff value close to .95 represents a good model (Hu & Bentler, 1999); accordingly, the CFI is tolerable at .945.

The modification indices from the initial model suggested five possible revisions. The suggested revision with the largest estimated change (16.45) was to add a theoretically illogical covariance between the crossloading error of academic emphasis and PLC. Three more suggested covariance revisions also failed to make a priori theoretical sense, including: collective efficacy’s error (e8) with PLC, shared sense of purpose’s error (e3) with the error of academic emphasis, and the error of reflective dialogue (e1) with the error of academic emphasis (e7).

Of the five revisions, the only one supported by the theoretical model was to add an error covariance between reflective dialogue (e1) and deprivatized practice (e4) as displayed in Figure 4.4.

In summary, the initial model was assessed for goodness of fit. Of the seven goodness of fit indices, three suggested the model was an acceptable fit (GFI, SRMR, and CFI) while four (Chi-square, RMSEA, AGFI, and TLI) suggested the model was a poor fit of the data. Thus the model was not strongly supported. As a result, modification indices were consulted to refine and improve the model. Of the five modification indices suggested, only one maintained alignment with the theoretical model.
Test II: refined confirmatory factor analysis

The goodness of fit indices for the refined model (Figure 5) suggested that the model was modestly improved ($\chi^2 = 41.33, p = .001, df = 18$), but still not supported well by the fit statistics. The RMSEA continues to be poor (.112). The GFI was slightly more tolerable at .917 and the AGFI again failed to meet an acceptable level (.834). The standardized root-mean-square residual (SRMR) index was again good (.069). The
baseline comparison provided by the TLI moved closer to a tolerable value (.929).

Finally, the CFI value increased beyond tolerable to good (.954).

In summary, the refined model in Test II was assessed for goodness of fit. Of the seven indices, four suggested the model was an acceptable fit (GFI, SRMR, CFI, and TLI) while three (Chi-square, RMSEA, AGFI) suggested the model was a poor fit of the data. While the second model represented an improvement, it still was not strongly supported. Because no additional modification indices remained that were substantively viable, the refinement of the CFA was stopped. Table 22 outlines a comparison of fit statistics for the two CFA models in this study with acceptable levels adapted from Schumacker and Lomax (2004, p. 82).
Table 22: Comparison of fit statistics for the two Confirmatory Factor Analysis models

<table>
<thead>
<tr>
<th>Model fit Indices</th>
<th>Acceptable Levels</th>
<th>Test I</th>
<th>Test II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square ($\chi^2$)</td>
<td>Non-significance and $\chi^2$ close to degrees of freedom ($df$)</td>
<td>46.94</td>
<td>41.33</td>
</tr>
<tr>
<td></td>
<td>$df = 19$ ($p &lt; .001$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$df = 18$ ($p = .001$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Root-mean-square error of approximation (RMSEA)</td>
<td>Value $&lt; .05$ is good and $&lt;.08$ is tolerable</td>
<td>.119</td>
<td>.112</td>
</tr>
<tr>
<td>Goodness-of-fit (GFI)</td>
<td>Range from zero to one with measures $&gt;.95$ characterized as good (though tolerable if $&gt;.90$)</td>
<td>.909*</td>
<td>.917*</td>
</tr>
<tr>
<td>Adjusted GFI (AGFI)</td>
<td>Range from zero to one with measures $&gt;.95$ characterized as good (though tolerable if $&gt;.90$)</td>
<td>.828</td>
<td>.834</td>
</tr>
<tr>
<td>Standardized root-mean-square residual index (SRMR)</td>
<td>Suggested cutoff values $&lt; .08$ indicate a good fit</td>
<td>.071**</td>
<td>.069**</td>
</tr>
<tr>
<td>Tucker-Lewis (TLI)</td>
<td>Value ranges in scale from zero (no fit) to one (perfect fit) with values close to $&gt;.95$ representing the threshold for a good model fit</td>
<td>.919</td>
<td>.929*</td>
</tr>
<tr>
<td>Comparative Fit (CFI)</td>
<td>Cutoff value close to $.95$ or greater represents a good model</td>
<td>.945*</td>
<td>.954**</td>
</tr>
</tbody>
</table>

Note. * = tolerable fit, ** = good fit

In short, high and significant factor loadings associated with the latent variable of academic optimism, generally high but insignificant factor loadings associated with the latent variable of professional learning community, and mixed model-fit statistics indicated that the hypothesized factor structure was either poorly or only partially supported by the confirmatory factor analysis.
Research Question #4

Do the five sub-scales of professional learning community explain academic optimism, controlling for school-level characteristics of (A) school-level student socioeconomic status and (B) school-level student achievement (transformed)? A sequential multiple regression was used to evaluate the ability of PLC’s five subscales (Focus on Student Learning, Deprivatized Practice, Shared Sense of Purpose, Collaborative Activity, and Reflective Dialogue) to explain the school wide measure of Academic Optimism, controlling for school characteristics of socioeconomic status (SES) and school-level academic achievement (prior and current).

The high bivariate correlation \((r = .889, p < .001)\) shared between the transformed independent variables of prior school achievement \((\text{PI0708}^+)\) and current school achievement \((\text{PI0809}^+)\) outlined in Table 4.17 indicated the presence of multicollinearity. Pallant (2007) suggests that such correlations \((r > .7)\) should be addressed by either omitting one of the two variables or forming a composite variable. To resolve the violation, only current school achievement was retained. By keeping current school achievement instead of prior school achievement, the teacher data better match the study’s snapshot of current conditions and possible school-level outcomes.

Additional tests to see if data met the assumption of collinearity indicated that multicollinearity was not a concern as no VIF measures were above 10 and no Tolerance levels below .10 (FOSL, Tolerance = .879, VIF = 1.14; DPRV, Tolerance = .893, VIF =
The histogram of standardized residuals indicated that the data contain approximately normally distributed errors (though evidence of a slight positive skew was evident), as did the normal P-P plot of standardized residuals, which showed points adhering relatively closely on the line. The scatterplot of standardized predicted values showed that the data met the assumptions of homogeneity of variance and linearity as the data looked roughly like a sideways oval.

For this two-step model, SES and current achievement (PI0809⁺) were entered at Step One, explaining 28.3%, \[F(2, 102) = 20.09, p < .001\] of the variance in the school wide level of academic optimism. After entry of the five PLC variables at Step Two, the total variance explained by the model as a whole was 48.7% , \[F(7, 97) = 13.14, p < .001\]. The five variables that comprise PLC explained an additional statistically significant 20.4% of the variance in school wide level of academic optimism, after controlling for socioeconomic status and current achievement, \(R^2\) change = .204, \[F\text{ change}(5, 97) = 7.72, p < .001\].

In the final model (Table 23), five independent variables were statistically significant measures. Ranging from highest to lowest beta values, they were current achievement PI0809⁺ (\(\beta = .39, p < .001\)), Focus on Student Learning (\(\beta = .28, p = .031\)), SES (\(\beta = .26, p = .009\)), Shared Sense of Purpose (\(\beta = .25, p = .039\)), and Reflective Dialogue (\(\beta = .21, p = .007\)). According to Cohen (1992), an impact effect size greater than .15, but less than .35 is considered medium strength (p. 99). The effect of the five
PLC variables on academic optimism, controlling for school-level characteristics ($R^2 = .204, f^2 = .398$) is considered to be medium strength (Soper, 2014).

Table 23: Hierarchical Multiple Regression of Academic Optimism on Professional Learning Community Subscales, Controlling for School-level Characteristics

<table>
<thead>
<tr>
<th>Step 1</th>
<th>B</th>
<th>SE B</th>
<th>(\beta)</th>
<th>(\Delta R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>2.85</td>
<td>.065</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td>.001</td>
<td>.001</td>
<td>.073</td>
<td></td>
</tr>
<tr>
<td>PI0809*</td>
<td>.103</td>
<td>.022</td>
<td>.486***</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>B</td>
<td>SE B</td>
<td>(\beta)</td>
<td>(\Delta R^2)</td>
</tr>
<tr>
<td>(Constant)</td>
<td>1.19</td>
<td>.327</td>
<td></td>
<td>.204***</td>
</tr>
<tr>
<td>SES</td>
<td>.003</td>
<td>.001</td>
<td>.255**</td>
<td></td>
</tr>
<tr>
<td>PI0809*</td>
<td>.083</td>
<td>.020</td>
<td>.394***</td>
<td></td>
</tr>
<tr>
<td>COLL</td>
<td>-.086</td>
<td>.084</td>
<td>-.111</td>
<td></td>
</tr>
<tr>
<td>SSP</td>
<td>.140</td>
<td>.067</td>
<td>.248*</td>
<td></td>
</tr>
<tr>
<td>REFLT</td>
<td>.242</td>
<td>.088</td>
<td>.214**</td>
<td></td>
</tr>
<tr>
<td>FOSL</td>
<td>.226</td>
<td>.104</td>
<td>.277*</td>
<td></td>
</tr>
<tr>
<td>DPRV</td>
<td>-.028</td>
<td>.148</td>
<td>-.020</td>
<td></td>
</tr>
</tbody>
</table>

Note. $R^2 = .487$; Adj $R^2 = .450$; *\(p < .05\), **\(p < .01\), ***\(p < .001\); * = transformed

Research Question #5

Do the five sub-scales of professional learning community have an association with current school-level student achievement, controlling for school-level
characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement (transformed)? A sequential multiple regression \((n = 105)\) was used to evaluate the ability of PLC’s five subscales (Focus on Student Learning, Deprivatized Practice, Shared Sense of Purpose, Collaborative Activity, and Reflective Dialogue) to explain the school wide measure of current academic achievement, controlling for school characteristics of socioeconomic status (SES) and prior school-level academic achievement.

Inspection of the Mahalanobis Distances value (23.07) was found to be below the critical chi-square value \((X^2 = 24.32, df = 7)\), indicating no outliers. Additionally, a review of standard residuals and casewise diagnostics was carried out and found no new evidence of potential outliers (Std. Residual Min = -1.92, Std. Residual Max = 2.49) with values above 3.0 or below -3.0 (Pallant, 2007).

Tests to see if data met the collinearity assumption found no VIF measures above 10 nor Tolerance levels below .10; thus, multicollinearity was not a concern.

The histogram of standardized residuals indicated that the data contain approximately normally distributed errors, as did the normal P-P plot of standardized residuals, which showed points adhering closely to the line. The scatterplot of standardized predicted values showed that the data met the assumptions of homogeneity of variance and linearity as the data looked roughly like a non-descript circle.

For this two-step model, SES and the transformed school wide prior achievement (PI0708) were entered at Step One, explaining 79.5\%, \(F(2, 102) = 197.78, p < .001\) of the variance in the school wide level of academic achievement. After entry of the five PLC variables at Step Two, the total variance explained by the model as a whole was
80.7%, $F(7, 97) = 58.02, p < .001$. The five variables that comprise PLC explained a statistically insignificant 1.2% of the variance in school wide level of current academic achievement, after controlling for school wide socioeconomic status and school wide prior achievement, $R$ squared change = .012, $F$ change $(5, 97) = 1.30, p = .301$.

In the final model (Table 24), only one independent variable was a statistically significant measure, and none was a PLC sub-scale. School-level prior achievement (PI0708$^+$) was the only significant factor ($\beta = .83, p < .001$).

Table 24: Hierarchical Multiple Regression of Current School-level Achievement on Professional Learning Community Subscales, Controlling for School-level Characteristics

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>$\beta$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>(Constant)</td>
<td>.612</td>
<td>.155</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SES</td>
<td>.004</td>
<td>.003</td>
<td>.077</td>
</tr>
<tr>
<td></td>
<td>PI0708$^+$</td>
<td>.848</td>
<td>.056</td>
<td>.844***</td>
</tr>
<tr>
<td>Step 2</td>
<td>(Constant)</td>
<td>.179</td>
<td>.952</td>
<td>.012</td>
</tr>
<tr>
<td></td>
<td>SES</td>
<td>.004</td>
<td>.003</td>
<td>.094</td>
</tr>
<tr>
<td></td>
<td>PI0708$^+$</td>
<td>.831</td>
<td>.059</td>
<td>.827***</td>
</tr>
<tr>
<td></td>
<td>COLL</td>
<td>.348</td>
<td>.242</td>
<td>.095</td>
</tr>
<tr>
<td></td>
<td>SSP</td>
<td>-.212</td>
<td>.197</td>
<td>-.079</td>
</tr>
<tr>
<td></td>
<td>REFLT</td>
<td>-.368</td>
<td>.254</td>
<td>-.069</td>
</tr>
<tr>
<td></td>
<td>FOSL</td>
<td>.112</td>
<td>.301</td>
<td>.029</td>
</tr>
<tr>
<td></td>
<td>DPRV</td>
<td>.260</td>
<td>.431</td>
<td>.040</td>
</tr>
</tbody>
</table>

*Note. $R^2 = .807$; Adj $R^2 = .793; *p < .05, **p < .01, ***p < .001; ^+ = transformed*
Research Question #6

Do the three sub-scales of academic optimism have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement (transformed)? A sequential multiple regression ($n = 105$) was used to evaluate the ability of Academic Optimism’s three subscales (Collective Efficacy, Academic Emphasis, and Faculty Trust) to explain the school wide measure of current academic achievement, controlling for school characteristics of school-level socioeconomic status (SES) and prior school-level academic achievement.

Because the three subscales of academic optimism had high correlations among themselves (AE and FT, $r = .735$; AE and CE; $r = .824$; CE and FT, $r = .835$) as independent variables, it indicated the presence of multicollinearity. Pallant (2007) suggests that such correlations ($r > .7$) should be addressed by either omitting one of the variables or forming a composite variable. It made sense to then explore the theorized associations by using the school wide construct of total academic optimism, instead of creating new composite variables. After this adjustment, the violation was resolved. Tests to see if data then met the collinearity assumption found no VIF measures above 10 nor Tolerance levels below .10; thus, multicollinearity was not a concern.

Inspection of the Mahalanobis Distances value (17.09) was found to be modestly above the critical chi-square value ($X^2 = 16.27$, df = 3), indicating possible outliers. Only one case (school #64) exceeded the critical chi-square value. Upon review, the outlier was a legitimate value and not the result of incorrect inputs. The case was the largest
school in the study with a staff of 176 teachers. Though the school’s twenty returned surveys represented a fairly balanced submission mix of Survey A (nine) and Survey B (eleven), the total percentage returned was one of the lower response rates (11.36%) used in the study. A review of standard residuals and casewise diagnostics was carried out and no evidence of potential outliers with values above 3.0 or below -3.0 existed (Std. Residual Min = -2.05, Std. Residual Max = 2.28). As a result, this extreme value was retained for this study.

The histogram of standardized residuals indicated that the data contain approximately normally distributed errors, as did the normal P-P plot of standardized residuals, which showed points adhering closely to the line. The scatterplot of standardized predicted values showed that the data met the assumptions of homogeneity of variance and linearity as the data looked mostly rectangularly distributed.

For this two-step model, SES and the transformed school wide prior achievement (PI0708) were entered at Step One, explaining 79.5%, $F(2, 102) = 197.78, p < .001$ of the variance in the school wide level of academic achievement. After entry of the composite single-scale Academic Optimism variable at Step Two, the total variance explained by the model as a whole was 80.2%, $F(3, 101) = 136.3, p < .001$. The composite single-scale variable of Academic Optimism explained a statistically insignificant 0.7% of the variance in school wide level of current academic achievement, after controlling for school wide socioeconomic status and school wide prior achievement, $R^2$ change = .007, $F$ change (1, 101) = 3.53, $p = .063$. 
In the final model (Table 25), only School-level prior achievement \((\text{PI0708}^+)\) was a statistically significant measure \((\beta = .799, p < .001)\).

Table 25: Hierarchical Multiple Regression of Current School-level Achievement on Academic Optimism, Controlling for School-level Characteristics

<table>
<thead>
<tr>
<th>Step</th>
<th>(Constant)</th>
<th>(B)</th>
<th>SE (B)</th>
<th>(\beta)</th>
<th>(\Delta R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>(Constant)</td>
<td>.612</td>
<td>.155</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SES</td>
<td>.004</td>
<td>.003</td>
<td>.077</td>
<td></td>
</tr>
<tr>
<td></td>
<td>\text{PI0708}^+</td>
<td>.848</td>
<td>.056</td>
<td>.844***</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>(Constant)</td>
<td>-.717</td>
<td>.724</td>
<td>.007</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SES</td>
<td>.003</td>
<td>.003</td>
<td>.069</td>
<td></td>
</tr>
<tr>
<td></td>
<td>\text{PI0708}^+</td>
<td>.803</td>
<td>.060</td>
<td>.799***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Academic Optimism</td>
<td>.460</td>
<td>.245</td>
<td>.097</td>
<td></td>
</tr>
</tbody>
</table>

Note: \(R^2 = .802; \text{Adj } R^2 = .796; *p < .05, **p < .01, ***p < .001; ^+ = \text{transformed}\)

**Research Question #7**

Do the constructs of professional learning community and academic optimism as single scales have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement \((\text{transformed})\)? A sequential multiple regression \((n = 105)\) was used to evaluate the ability of the single scales of Professional Learning Community and Academic Optimism to explain the school wide
measure of current academic achievement, controlling for school characteristics of 
school-level socioeconomic status (SES) and prior school-level academic achievement.

Inspection of the Mahalanobis Distances value (17.114) was found to be below the 
critical chi-square value ($X^2 = 18.47, df = 4$), indicating no outliers. Additionally, a 
review of standard residuals and casewise diagnostics was carried out and found no new 
evidence of potential outliers (Std. Residual Min = -2.04, Std. Residual Max = 2.27) with 
values above 3.0 or below -3.0 (Pallant, 2007).

Tests to see if data met the collinearity assumption found no VIF measures above 
10 nor Tolerance levels below .10; thus, multicollinearity was not a concern.

The histogram of standardized residuals indicated that the data contain 
approximately normally distributed errors, as did the normal P-P plot of standardized 
residuals, which showed points adhering closely to the line. The scatterplot of 
standardized predicted values showed that the data met the assumptions of homogeneity 
of variance and linearity as the data looked mostly rectangularly distributed.

For this two-step model, SES and the transformed school wide prior achievement 
($PI0708^+$) were entered at Step One, explaining 79.5%, $F (2, 102) = 197.78, \ p < .001$ of 
the variance in the school wide level of academic achievement. After entry of the two 
composite single-scales of Professional Learning Community and Academic Optimism 
variables at Step Two, the total variance explained by the model as a whole was 80.2% , 
$F (4, 100) = 101.22, \ p < .001$. The composite single-scale variables of Professional 
Learning Community and Academic Optimism explained a statistically insignificant 
0.7% of the variance in school wide level of current academic achievement, after
controlling for school wide socioeconomic status and school wide prior achievement, \( R^2 \) squared change = .007, \( F \) change \((2, 100) = 1.75, p = .179. \)

In the final model (Table 26), only School-level prior achievement (PI0708*) was a statistically significant measure \((\beta = .800, p < .001)\).

Table 26: Hierarchical Multiple Regression of Current School-level Achievement on Professional Learning Community and Academic Optimism, Controlling for School-level Characteristics

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>SE B</th>
<th>( \beta )</th>
<th>( \Delta R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.612</td>
<td>.155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td>.004</td>
<td>.003</td>
<td>.077</td>
<td></td>
</tr>
<tr>
<td>PI0708*</td>
<td>.848</td>
<td>.056</td>
<td>.844***</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>-.691</td>
<td>.870</td>
<td></td>
<td>.007</td>
</tr>
<tr>
<td>SES</td>
<td>.003</td>
<td>.003</td>
<td>.068</td>
<td></td>
</tr>
<tr>
<td>PI0708*</td>
<td>.803</td>
<td>.060</td>
<td>.800***</td>
<td></td>
</tr>
<tr>
<td>Professional Learning Community</td>
<td>-.016</td>
<td>.280</td>
<td>-.003</td>
<td></td>
</tr>
<tr>
<td>Academic Optimism</td>
<td>.467</td>
<td>.280</td>
<td>.099</td>
<td></td>
</tr>
</tbody>
</table>

Note. \( R^2 = .802; \) Adj \( R^2 = .794; * p < .05, ** p < .01, *** p < .001; \) transformed
Summary

Chapter four reported the results from this study’s statistical research efforts. All factors were first examined through theoretically-based principal axis factoring, a type of exploratory factor analysis. In addition to determining reliable and valid factors for the study’s, four of the five original PLC factors were subjected to PAF in order to address issues of low internal reliability (all but shared sense of purpose were $\alpha < .7$). One PLC factor (focus on student learning) was subjected to PAF to address an item omitted from the original survey (focus on student learning). One academic optimism scale was subjected to PAF to develop a unidimensional solution that can be applied to all types of schools: elementary, middle, and high.

Internal reliabilities of the eight factors and of the two latent constructs were generally consistent or improved from results of previous research. The only factor with a poor Cronbach alpha was reflective dialogue ($\alpha < .61$). Of the others, two were acceptable ($ .7 < \alpha < .8$), four were good ($ .8 < \alpha < .9$), and three were excellent ($ .9 < \alpha$).

All assumptions were met for all analyses except for one violation of non-normality (skewness) that occurred with the school-level characteristic of current academic achievement. Because maintaining a similar metric with prior academic achievement was advantageous for the study, both school-level achievement variables were transformed to normal distribution by the Reflect and Square Root method.

Pearson product-moment correlations and confirmatory factor analyses were run. The school wide totals of PLC and AO shared a moderate, positive correlation ($r=.385$, $n=105$, $p<.01$) for the Pearson correlation analysis. Unlike the previous unidimensional
bivariate correlations, the same theorized association between PLC and AO failed to correlate at a statistically significant level ($r = .39, p = .115$).

The Pearson Correlations between Professional Learning Community and its five subscales were obviously strong, with the exception of a medium correlation of reflective dialogue ($r = .360, p < .05$). The same five factors theorized to associate with PLC in the CFA analysis had mostly strong parameter loadings, though all failed to load at a statistically significant level.

Pearson correlations between Academic Optimism and its subscales were also obviously all strong. The result of the initial CFA model (Figure 4.3) supported the relationships between AO and its three subscales as they demonstrated high and significant factor loadings for the two unconstrained factors theorized to load on AO. The two factors were academic emphasis ($\beta = .866, p < .001$), and collective efficacy, ($\beta = .953, p < .001$).

The school wide measures of PLC and AO shared a positive medium-strength Pearson correlation which also extended to the correlated relationships between PLC and academic optimism’s subscales. Professional Learning Community had significant, positive correlations of mostly moderate strength with Academic Optimism and its subscales; only the relationship between PLC and Academic Emphasis is considered strong ($r=.517, n=105, p<.01$).

Correlations between academic optimism and professional learning community’s subscales were generally good – significant for four of the five factors – with the
exception of Reflective Dialogue which failed to share a significant correlation with
Academic Optimism ($r=.142$, $n=105$, $p>.05$).

The relationships among PLC, its subscales, and school wide demographics of SES
and current- and prior-achievement had few significant correlations. Of the three
subscales that were significant [Shared Sense of Purpose ($p<.05$), Focus on Student
Learning ($p<.05$), and Deprivatized Practice ($p<.01$)], all had small and negative
correlations with SES.

All correlations between AO, its subscales, and school wide demographics were
positive and significant ($p<.01$) with them split between moderate and large strengths.
The only exception was between Academic Emphasis and SES ($r=.154$, $n=105$, $p>.05$).
Unlike the negative relationships between SES and PLC, all other correlations were
positive between SES, AO, and its subscales.

In summary, the refined CFA model ($\chi^2 = 41.33$, $p = .001$, $df = 18$) with two PLC
errors covaried (e1 to e4) was assessed for goodness of fit and, while the model was
modestly improved, it was still not supported well by the fit statistics. Of the seven
indices, four suggested the model was an acceptable fit (GFI, SRMR, CFI, and TLI)
while three (Chi-square, RMSEA, AGFI) suggested the model was a poor fit of the data.
Because no additional modification indices remained that were substantively viable, the
refinement of the CFA was stopped.

A two-step sequential multiple regression was used to evaluate the ability of PLC’s
five subscales (Focus on Student Learning, Deprivatized Practice, Shared Sense of
Purpose, Collaborative Activity, and Reflective Dialogue) to explain the school wide
measure of Academic Optimism, controlling for school characteristics of socioeconomic status (SES) and current school-level academic achievement. The total variance explained by the model as a whole was 48.7%. The five variables that comprise PLC explained an additional 20.4% of the variance in school wide level of academic optimism. Five variables were statistically significant measures of AO: school socioeconomic status, current school achievement, focus on student learning, shared sense of purpose, and reflective dialogue. The effect of these five PLC variables on academic optimism is considered to be medium strength.

A second two-step sequential multiple regression ($n = 105$) was used to evaluate the ability of PLC’s five subscales (Focus on Student Learning, Deprivatized Practice, Shared Sense of Purpose, Collaborative Activity, and Reflective Dialogue) to explain the school wide measure of current academic achievement, controlling for school characteristics of socioeconomic status (SES) and prior school-level academic achievement. The total variance explained by the model as a whole was 80.7%. Each of the five PLC subscales failed to contribute a statistically significant variance to current school-level achievement. School-level prior achievement was the only significant factor.

A third two-step sequential multiple regression ($n = 105$) was used to evaluate the ability of Academic Optimism’s three subscales (Collective Efficacy, Academic Emphasis, and Faculty Trust) to explain the school wide measure of current academic achievement, controlling for school characteristics of school-level socioeconomic status (SES) and prior school-level academic achievement. Because of multicollinearity issues, the single composite school wide construct of Academic Optimism was used in the
sequential multiple regression. The total variance explained by the model as a whole was 80.2%. The composite single-scale variable of Academic Optimism failed to explain a statistically significant variance to current school-level achievement. School-level prior achievement was again the only significant factor.

A fourth and final two-step sequential multiple regression \((n = 105)\) was used to evaluate the ability of the single scales of Professional Learning Community and Academic Optimism to explain the school wide measure of current academic achievement, controlling for school characteristics of school-level socioeconomic status (SES) and prior school-level academic achievement. The total variance explained by the model as a whole was 80.2%. The composite single-scale variables of Professional Learning Community and Academic Optimism failed to explain a statistically significant variance to current school-level achievement. The only statistically significant measure was again school-level prior achievement.

A discussion of these results will occur in Chapter Five.
 CHAPTER 5

DISCUSSION

The purpose of this study was to explore the associations and possible relationships among professional learning community (PLC), academic optimism (AO), and school-level academic achievement. This chapter will summarize the major findings as well as discuss the results and their implications for practice and future research.

Major Findings

Research question #1.

*Can professional learning community be reliably represented by the five (5) subscales of shared sense of purpose, collaboration, reflective dialogue, deprivatized practice, and focus on student learning?* Exploratory factor analysis, specifically Principal Axis Factoring (PAF), was used to investigate research question number one. Analysis of the final sample found five unidimensional subscales that represented each of the theorized variables. Two subscale adaptations – focus on student learning and deprivatized practice – included a balance of original (Louis & Marks, 1998a) and new items. A composite scale for professional learning community was developed using all five sub-scales explaining 53.7% of the shared variance though reflective dialogue failed to load at the minimum level pre-determined for this study. Internal scale reliabilities for
the five sub-scales and one composite measure were generally strong with only one low Cronbach alpha value (reflective dialogue, \( \alpha = .608 \)).

**Research question #2.**

*Can academic optimism be reliably represented by the three (3) subscales of faculty trust, academic emphasis, and collective efficacy?* Exploratory factor analysis, specifically Principal Axis Factoring (PAF), was used to investigate research question number two. Analysis of the final sample determined three unidimensional subscales representing each of the theorized variables. A composite scale for academic optimism was developed using all three sub-scales explaining 80.2\% of the shared variance with strong loadings for each. Internal scale reliabilities for the three sub-scales and one composite measure were generally excellent with only collective efficacy lower demonstrating a Cronbach alpha lower than .900 (\( \alpha = .837 \)).

**Research question #3.**

*How are the two constructs of professional learning community and academic optimism, and their respective subscales, associated?* The quantitative methods of Pearson Product Correlations and Confirmatory Factor Analyses (CFA) were used to investigate research question number three.

The different analyses found different associations between the composite measures of PLC and AO. The Pearson Product bivariate correlation suggested a positive,
statistically significant and moderate relationship between the two composite measures \((r=.385, n=105, p<.01)\). However, there was no significant correlation under CFA.

The \textit{a priori} constructs of PLC and AO also had mixed results with both analyses. All Pearson Product correlations between PLC and its subscales were statistically significant and most were strong. Similarly, the Pearson Product correlations between AO and its three subscales were all strong and significant. However, the CFA results differed. The unconstrained exploratory factors associated with the latent variable of academic optimism were high and significant factor loadings. Conversely, there were no significant factor loadings associated with the unconstrained exploratory latent variable of professional learning community. It was of little surprise then that the final mixed model-fit statistics indicated that the hypothesized factor structure was either poorly or only partially supported by the confirmatory factor analysis. Of the seven indices, four suggested the model was an acceptable fit (GFI, SRMR, CFI, and TLI) while three (Chi-square, RMSEA, AGFI) suggested the model was a poor fit of the data.

The Pearson Product correlations demonstrated statistically significant associations among most sub-scales and composite measures. The composite measure of professional learning community had positive correlations of mostly moderate strength with Academic Optimism and AO’s subscales. The composite measure of Academic Optimism and its positive correlations with PLC subscales were less obvious as four of the five correlations had small or moderate strength correlations. Only Reflective Dialogue failed to share a significant correlation with Academic Optimism.
The Pearson Product correlation analysis suggested that associations among the composite measures, their subscales, and school wide demographics were also varied. There were large, significant correlations ($p < 0.01$) between AO and the transformed measures of current and prior school-level achievement ($r = .528$ and $r = .528$, respectively). All of the correlations between AO’s three subscales and the transformed measures of current and prior school-level achievement were significant and most were strong. Conversely, there were no significant relationships between PLC and its five subscales with the transformed measures of current and prior school-level achievement.

**Research question #4.**

*Do the five sub-scales of professional learning community explain academic optimism, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) school-level student achievement (transformed)?* A two-step sequential multiple regression was used to explore this question. Because multicollinearity issues existed between current and prior school-level achievement measures, only the current achievement measure was used in this research question.

The five variables that comprise PLC explained an additional statistically significant 20.4% of the variance in school wide level of academic optimism, after controlling for socioeconomic status and current achievement, $R$ squared change = .204, $F$ change (5, 97) = 7.72, $p < .001$. The effect is considered to be medium strength (Soper, 2014). Ultimately, five independent variables were statistically significant measures, including:
current school-level achievement, socioeconomic status, focus on student learning, shared sense of purpose, and reflective dialogue.

**Research question #5.**

*Do the five sub-scales of professional learning community have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement (transformed)?* A two-step sequential multiple regression was also used to explore this question. Based upon earlier Pearson Product correlation analysis that indicated no significant correlations among the composite PLC measure, any of its subscales, and the two transformed measures of current and prior school-level achievement measures, it was not surprising then when no statistically significant association materialized. Only school-level prior achievement was a statistically significant measure.

**Research question #6.**

*Do the three sub-scales of academic optimism have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement (transformed)?* As with the previous research question, a two-step sequential multiple regression was used. Because of an indication of multicollinearity among the AO’s three sub-scales, the composite AO variable was used for this analysis.
Despite the earlier encouraging Pearson Product correlation analysis of medium to large, significant correlations between the subscales of AO and the two transformed measures of current and prior school-level achievement measures, there was no statistically significant relationship between AO and current achievement. Again, only school-level prior achievement was a statistically significant measure.

**Research question #7.**

Do the constructs of professional learning community and academic optimism as single scales have an association with current school-level student achievement, controlling for school-level characteristics of (A) school-level student socio-economic status and (B) prior school-level student achievement (transformed)? A two-step sequential multiple regression was also used to explore this final research question. Despite the earlier encouraging Pearson Product correlation analysis of large, significant correlations between AO and the two transformed measures of current and prior school-level achievement measures, there was no statistically significant relationship between AO and current achievement. Again, only school-level prior achievement was a statistically significant measure.

**Discussion of Results**

The findings of this study added to the understanding explored through the seven research questions outlined throughout this study as well as confirmed some of the theoretical associations outlined specifically in Chapter 2. The results of this study can
be summarized in four basic areas of focus. First, the study’s theorized components of PLC and AO were validated. Second, most of the PLC components correlated with the components of AO; these correlations extended to their relationships with and across the composite measures of PLC and AO too. Third, the components of PLC significantly explained the variance of AO across the final sample when controlling for other school-level characteristics. Finally, the theorized impact of PLC and AO on student achievement did not materialize for either of the two constructs. Instead, school-level prior achievement was the only variable that impacted school-level current achievement; even when considering SES too.

**The construct of AO.**

The cultural construct of academic optimism has been identified as a powerful school force that impacts teaching and learning, but which also shares positive orientations with those who deal with education’s increasing challenges (Hoy et al., 2006). The results of this study supported the three theorized sub-scales of AO: academic emphasis as it prods academically-focused teacher behaviors; collective efficacy as it represents a cognitive belief in the success of a faculty’s academically-focused behavior attempts; and, faculty trust as it serves as an affective condition that supports a sense of protection permitting the encouraged risk-taking necessary to successfully implement academically-focused behaviors, even if they are inventive or different from previously-normed academic behaviors or efforts (Hoy et al., 2006).
Additionally, the composite measure of AO was supported as a stable factor through principal axis factoring though its stability was less obvious through a two-construct model fitted via confirmatory factor analysis. The factor analysis result is consistent with previous factor analyses, but the CFA result is less consistent than the previous structural equation modelling (SEM) findings (Beard, 2011; Hoy et al., 2006; McGuigan & Hoy, 2006; Smith & Hoy, 2007; Wu et al., 2013).

The factor analyses of two subscales were of interest – collective efficacy and academic emphasis. Collective efficacy has historically been treated as a unidimensional single factor in previous research of academic optimism (R. D. Goddard, 2002; R. D. Goddard, LoGerfo, & Hoy, 2004; R. D. Goddard et al., 2004; Hoy et al., 2002; Hoy et al., 2006). However, Goddard’s (2002) original theoretical conception of the construct developed two dimensions of collective efficacy: group competence and task analysis.

In this study, the collective efficacy analysis supported both Goddard’s (2002) original bidimensional component as well as the continued viability of the unidimensional measure too. Goddard’s two-factor subscale explained 52.5% of the shared variance as compared to the unidimensional subscale that explained only 37.9% of the shared variance. Because the latter unidimensional model was consistent with all previous AO research, it was used throughout this study. However, the bidimensional construct might offer insight on the explanatory perspective and collective agentic understanding of AO with future study (Bandura, 2006a; Bandura, 2006b; R. D. Goddard et al., 2000; C. Peterson, 2000; C. Peterson & Seligman, 2004; Seligman, 1991). Such understanding could impact how the cognitive element of AO impacts schools’
sense of control over their mission and their aligned goal setting and expectation levels (Bandura, 2001; Bandura, 2006a; McGuigan & Hoy, 2006).

The factor analysis of academic emphasis was also interesting in that a strongly-reliable adaptation was developed. This adaptation is a universal instrument applicable across multiple school types and grade bands. Potential practical and research implications are addressed later.

**The construct of PLC.**

The construct of professional learning community (PLC) can be defined most simply as an organizational structure characterized by enabling behaviors and cultural norms that permit sustained, structured educator collaboration for quality talk, constructivist knowledge building, and – ultimately – the potential to improve the quality of learning in schools (DuFour & Eaker, 2005; Louis & Kruse, 1995b; Louis & Marks, 1998a; Louis, 2008; Schmoker, 2005a; Vescio et al., 2008).

The results of this study support the five theorized sub-scales of PLC and add to the empirical body of research; a body of research that previously has been described as sparse (Y. L. Goddard et al., 2007; Vescio et al., 2008). Of the five unidimensional sub-scales (collaboration, shared sense of purpose reflective dialogue, focus on student learning, and deprivatized practice), two were adaptations of previous components (focus on student learning and deprivatized practice) and are a balance of old and new items. The other three components (reflective dialogue, shared sense of purpose, and collaboration) were developed using the same items from Louis and Marks (1998a).
The composite principal axis factoring analysis of PLC failed to reflect an adequate loading of one component -- reflective dialogue. Similarly, a two-construct model tested via confirmatory factor analysis found poor fit and no statistically significant loadings among PLC components on the theorized latent construct. The factor analysis result is consistent with previous factor analyses, but the CFA result is less consistent than the previous HLM findings (Louis & Marks, 1998a).

As this was an exploratory study and the first of its kind, the failure for the composite PLC measure to materialize as a stable construct underscores the challenge of defining PLC consistently and empirically. To that end, principals and school leaders interested in developing a culture of PLC, must first recognize that what makes a PLC difficult to define is that it is not a prescription, a new program, a model, or an innovation to be implemented. Rather, a PLC is an infrastructure or a way of working together that results in continuous school improvement (Hord, 1997). One of this study’s main objectives was to explore the potential role of PLC as an antecedent for improved schools by serving as an antecedent to academic optimism.

**Relationships between PLC and AO.**

Although research has suggested that antecedents for the development of academic optimism range from enabling leadership to humanistic pupil control ideologies, implications also exist for school wide norms and organizational properties to impact its development (McGuigan & Hoy, 2006). The increasingly popular school practice of
developing professional learning community held promise for explaining schools’ sense of academic optimism. Indeed, all eleven studies of PLC in Vescio, et al. (2008) described a consistent impact on school culture. Bolam et al.’s (2005) research also suggested an impact on and fostering of an optimistic change in school culture.

As stated previously, most of PLC’s components correlated with the components of AO, and these correlations extended to their relationships with and across the composite measures of PLC and AO too. The components of a school wide PLC were associated with academic optimism’s tenets of academic emphasis, collective efficacy, and faculty trust of students and parents.

The strongest, positive correlations between PLC’s components and AO’s components were among PLC’s shared sense of purpose and focus on student learning with AO’s academic emphasis. These associations share a logical relationship as elements of academic press driving a mission-oriented alignment of expectations for learning and achievement (R. D. Goddard et al., 2000; Hoy et al., 2002).

Interestingly, PLC’s components of collaboration, deprivatized practice, and reflective dialogue had less in common with their theorized, logical associations to collective efficacy than with academic emphasis. To that end, those three PLC components shared their strongest (and in the case of reflective dialogue, the only one) correlations with academic emphasis. This may indicate that the organizational mechanisms of transparency and co-development of understanding are important norming structures necessary to develop shared expectations of teacher behaviors.
The study found a positive correlation of medium effect between PLC and AO ($r = .385, p < 0.01$) though a two-construct *a priori* model tested by CFA did not support a statistically significant correlation between constructs.

The most encouraging finding between the organizational and normative structure of PLC as a possible antecedent of a school wide culture of AO was confirmed through a hierarchical multiple regression. The five variables that comprise PLC explained an additional statistically significant 20.4% of the variance in school wide level of academic optimism, after controlling for socioeconomic status and current achievement. This medium strength effect underscored previous research (Louis et al., 1995; Saunders et al., 2009; Vescio et al., 2008) that PLCs characterized by certain elements can positively impact the professional culture of the school – in this case, the school culture as defined by the study’s target of academic optimism.

This exploratory study was the first of its kind and found that professional learning communities in schools are an important construct to understand because they effectively serve as an enabling organizational and cultural antecedent explaining the development of academic optimism. As such, practitioners and researchers have an encouraging path to consider if their goal is to develop a stronger school culture of academic optimism.

**Relationships among PLC, AO, and achievement.**

Both the constructs of academic optimism and professional learning community have previously demonstrated an impact on school-level academic achievement. Though newer than PLC, previous research of the construct of academic optimism has
consistently demonstrated a statistically significant impact on academic achievement controlling for school-wide prior achievement and SES (Beard, 2011; Hoy et al., 2006; McGuigan & Hoy, 2006; Smith & Hoy, 2007). The construct of PLC has had fewer studies investigating its associations with school-level academic achievement, but its most empirically-robust studies by Louis and Marks (1998), Bolam et al. (2005), and Saunders et al. (2009) found that PLC had a statistically significant impact on student performance controlling for such school-wide characteristics as prior achievement, SES, and mobility.

In this study, the relationships among PLC, AO, and school-level academic achievement failed to support previous research. Academic optimism had large, positive bivariate correlations with both prior school wide achievement ($r = .509, p < 0.01$) and current school wide achievement ($r = .528, p < 0.01$). However, in multiple regressions when controlling for the potential impact of SES and prior achievement, there was consistently no impact of AO on school wide levels of academic achievement.

Professional learning community had no significant correlations with either prior school wide achievement or current school wide achievement. As with multiple regressions controlling for the potential impact of SES and prior achievement, there was consistently no impact of PLC on school wide levels of academic achievement.

Such findings are difficult to explain though it is important to recognize that each construct had at least one component that was an adaptation from its’ previous research efforts. Professional learning community had two new adaptations with deprivatized
practice and focus on student learning; and, academic optimism had the adaptation of academic emphasis.

**Practical Implications**

The study’s findings may provide utility and real-life applications to certain professionals, including:

1. Researchers who can employ some refined and new subscales. They can use some PLC subscales by Louis and Marks (1998a) that have demonstrated improved reliabilities with only the second sampling of published results. Researchers can also investigate school wide academic optimism with a useful, generalizable unidimensional adaptation of the academic emphasis scale. While the subscale is slightly less parsimonious than any of the single “school type” scales from which it is derived, it is one that supports a reliable and valid universal measure for use in the assessment of AO across elementary, middle, and high schools both in this study and future studies of academic optimism.

2. Principals and other school administrators whose effect on classroom practice appears impactful when principal leadership -- “as manifested by the creation of school structures and processes that enable teachers’ work” -- is associated with a school wide culture of enabling bureaucracy and what may serve as an antecedent to the development of academic optimism (McGuigan, 2005; McGuigan & Hoy, 2006, p. 3). When considering this study’s findings that PLC explained a moderate effect
of more than 20% of the variance in AO, school leaders may be warranted in investing scarce resources to pilot their own PLC efforts in their buildings.

3. Teacher leaders, building leadership teams, and building administrators who should feel encouraged that the requisite attention to shared sense of purpose, focus on student learning, and academic emphasis represent important shared norms and values that help explain an academically-optimistic school culture. Indeed, effective PLCs can exhibit important core cultural elements that manifest themselves through AO: values, defined as the set standards of what is considered good in a school; beliefs and assumptions, thought of as the perceptions that guide behaviors; and norms, conceived as the non-articulated rules that school members should follow (K. D. Peterson & Deal, 2002; Strahan, 2003).

4. Those interested in the effective reculturing of a school – especially when it is underscored with possible explanations associated with the cultural construct of academic optimism. Specifically, then, the presence of a school culture with high levels of academic optimism represents a group’s cognitive process of assessing the requisite task for a specific context and concurrently evaluating one's own capacity to deliver the requisite action (Bandura, 2006b; R. D. Goddard et al., 2000; Woolfolk Hoy et al., 2009b; Zimmerman & Cleary, 2006). This subjective judgment and perceived belief can manifest the necessary effort and skills required to accomplish a certain task, and the result can impact one’s sense of organizational agency and contribute to a school staff's higher goals, stronger effort, enduring persistence, and greater resiliency (R. D. Goddard et al., 2000; Woolfolk Hoy et al., 2009b;
Zimmerman & Cleary, 2006). In short, schools that have developed high levels of 
PLC through organizational practices and school wide norms have an explanatory 
relationship for their levels of academic optimism – and have a far better chance of 
getting done what needs to get done to support their teaching and learning goals.

**Research Implications**

As this is the first study of its kind, additional research may help clarify, extend, add, 
and/or replicate these areas of research and their related body of knowledge including:

1. More robust quantitative measures that support these exploratory findings. 
This can include additional work and refinement on scale validation that capitalizes 
on increased scale reliabilities, new items, and more potentially-valid adaptations of 
subscales. The useful adaptation to academic emphasis for its use in various school 
grades and types may afford researchers more flexibility too. In addition, structural 
equation modelling would support clarifying research on path models that include 
causal explanations between PLC, AO, and germaine school-level characteristics 
like academic achievement. Indeed, if the implications of this research suggests that 
PLC explains a school’s normative and behavioral culture of AO which normally 
contributes to increased academic achievement (Hoy et al., 2006; Kirby & DiPaola, 
2009; McGuigan & Hoy, 2006; Smith & Hoy, 2007; Wu et al., 2013), additional 
research confirming the theoretical impact on achievement is important.
2. Additional research identifying and/or developing school structures for adults to develop their intellectual understanding and to construct school culture that supports a normative and behavioral mechanism for developing academically optimistic schools. In particular, explore the elements and potential impact of teacher collaboration protocols such that the school settings support sustained collaboration, frequent deprivatized practice, increased focus on student learning, depth of reflective dialogue, effective shared sense of purpose, and development of sources for increased efficacy.

3. Consider rigorous research methodologies that focus on efforts beyond the current research body of professional learning community theory and conceptualizations that have included descriptions of PLCs, anecdotal findings, or reflective self-reports with little empirical grounding (Vescio et al., 2008). In particular, consider additional research and findings that align to the suggestions of Vescio et al. (2008) that include some of the following benchmarks: (a) research must have an empirical approach; (b) the conception of PLCs must explicitly or implicitly align to the five major characteristics of PLC used in this study’s conceptualization; (c) the works must be vetted by a peer-reviewed or adjudicated process; and, (d) the methodological objective must include connecting the research to its possible impact on teacher practice and/or student achievement.
Limitations and Delimitations

This study had a number of limitations. While the general sample represented a broad breadth of regions from around the state as well as a diverse representation of school typology and grade bands, schools in the sample were all similar in that they had been targeted by the state as needing additional Title I assistance with literacy instruction. As such, care should be used in generalizing results from the sample.

Because the voluntary study used previously developed extant data, not all schools’ demographics were available. For example, unavailable demographics for non-participating schools prevented additional analysis of the sample’s generalizability. Also, because this study was a voluntary self-survey whose protocol for administration at the close of the school year sometimes deviated from normal, care should be used in generalizing results from the sample.

When data from individual participants were aggregated to school-level measures, care should be taken to avoid ecological fallacies by extending the findings to individual teachers, grade level teams, or departments.

A limitation for consideration is the quality of measures. As previously detailed in Chapter 3, a few of the PLC sub-scales may warrant attention. While many of the sub-scales’ adaptations from the original Louis and Marks (1998a) research have improved Cronbach alpha reliability measures, reflective dialogue (alpha = .608) was slightly lower and barely acceptable. In addition, the factor measure of shared sense of purpose was comprised of only two items. Thus, care should be utilized when considering generalizability.
Another limitation to this study is the use of 0.32 as the minimum loading level for factor analysis, a level that represents 10% overlap between a variable and its intended construct (Costello & Osborne, 2005; Tabachnick & Fidell, 2007). While its use was at least consistent throughout the study to explore theory and sub-scales, Stevens (2002) states that “it is time that investigators stopped blindly using the rule of interpreting factors with loadings greater than |.30| and take sample size into account”. Furthermore, he suggests that “one would want in general a variable to share at least 15% of its variance with the construct (factor) it is going to be used to help name”; this equates to loadings of .40 or larger (p. 394). As such, care should be taken in generalizing interpretation of the study’s findings.

Factor analysis in this study used new items to develop some sub-scale adaptations. These new items and scales could use additional investigation and refinement beyond this study. As such, care should be used in interpretation of the results and comparing the results to the frequently-cited work of Louis and Kruse (1995b) and Louis and Marks (1998a).

**Conclusion**

As the complexities of global 21st Century educational demands increase, schools will face increased pressure to support effective teaching and learning for students (Azzam, 2009). Schools characterized by high levels of academic optimism demonstrate a commitment to higher goals, stronger effort, enduring persistence, greater resiliency,
and increased academic achievement (R. D. Goddard et al., 2000; Hoy et al., 2006; Woolfolk Hoy et al., 2009b; Zimmerman & Cleary, 2006).

While previous research has suggested that antecedents for the development of academic optimism range from enabling leadership to humanistic pupil control ideologies, implications also existed for school wide norms and organizational properties to impact its development (McGuigan & Hoy, 2006).

The increasingly popular school practice of developing professional learning community encouragingly explained a medium amount of schools’ sense of academic optimism.

This exploratory study was the first of its kind and found that professional learning communities in schools are an important construct to understand because they effectively serve as an enabling organizational and cultural antecedent explaining the development of academic optimism. As such, practitioners and researchers have an encouraging path to consider if their goal is to develop a stronger school culture of academic optimism. Such a culture is an optimistic culture based upon a school structure that ensures all stakeholders are members of a community of learners – both students and adults.
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**APPENDIX: Ordinal Survey Items for PLC and AO subscales**

Note: * = New Item

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOCWHAT</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: In this school, teachers focus on what and how well students are learning rather than how they are teaching. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>FOCVSN</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: A focused school vision for student learning is shared by most staff in this school. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>FOCALTER*</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: Teachers in this school are expected to alter their lessons if students are confused. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>FOCSWBAT*</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: In this school, teachers plan lessons based upon clear learning objectives. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>Question</td>
<td>Description</td>
<td>Scale</td>
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<tr>
<td>FOCPREAS*</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: Teachers in this school often pre-assess what their students know before planning lessons and units. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>FOCTIME*</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: Most teachers believe they have no time to spare if they are going to get through the entire curriculum in one year. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>FOCGROUP*</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: Teachers in this school group students based upon a lesson’s learning goals. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>FOCOPPTN*</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: Teachers provide multiple options for students to express what they have learned. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>GOALBASIC (reversed)</td>
<td>If you had to choose from among the seven goals for students listed below, how would you rank them according to their importance in your teaching? A) Basic literacy skills (reading, math, writing, speaking)</td>
<td>Answer a &quot;1&quot; for the most important goal, a &quot;2&quot; for the next most important goal, and so on, through &quot;7&quot; for the least important goal. (First read goals, and then circle the corresponding rank of each.)</td>
</tr>
<tr>
<td>GOALEXC (reversed)</td>
<td>If you had to choose from among the seven goals for students listed below, how would you rank them according to their importance in your teaching? B) Academic excellence or mastery of the subject matter of the course</td>
<td>Answer a &quot;1&quot; for the most important goal, a &quot;2&quot; for the next most important goal, and so on, through &quot;7&quot; for the least important goal. (First read goals, and then circle the</td>
</tr>
<tr>
<td>Goal</td>
<td>Description</td>
<td>Answer Instructions</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>GOALHIGH (reversed)</td>
<td>If you had to choose from among the seven goals for students listed below, how would you rank them according to their importance in your teaching? C) <strong>Higher level skills.</strong> (reasoning, problem-solving, critical, and creative thinking)</td>
<td>Answer a &quot;1&quot; for the most important goal, a &quot;2&quot; for the next most important goal, and so on, through &quot;7&quot; for the least important goal. (First read goals, and then circle the corresponding rank of each.)</td>
</tr>
<tr>
<td>GOALCIT (reversed)</td>
<td>If you had to choose from among the seven goals for students listed below, how would you rank them according to their importance in your teaching? D) <strong>Citizenship</strong> (understanding institutional and public values)</td>
<td>Answer a &quot;1&quot; for the most important goal, a &quot;2&quot; for the next most important goal, and so on, through &quot;7&quot; for the least important goal. (First read goals, and then circle the corresponding rank of each.)</td>
</tr>
<tr>
<td>GOALWORK (reversed)</td>
<td>If you had to choose from among the seven goals for students listed below, how would you rank them according to their importance in your teaching? E) <strong>Good work habits and self-discipline.</strong></td>
<td>Answer a &quot;1&quot; for the most important goal, a &quot;2&quot; for the next most important goal, and so on, through &quot;7&quot; for the least important goal. (First read goals, and then circle the corresponding rank of each.)</td>
</tr>
<tr>
<td>GOALGROW (reversed)</td>
<td>If you had to choose from among the seven goals for students listed below, how would you rank them according to their importance in your teaching? F) <strong>Personal growth and fulfillment</strong> (self-esteem, personal efficacy, self-knowledge)</td>
<td>Answer a &quot;1&quot; for the most important goal, a &quot;2&quot; for the next most important goal, and so on, through &quot;7&quot; for the least important goal. (First read goals, and then circle the corresponding rank of each.)</td>
</tr>
</tbody>
</table>
GOALREL (reversed)

If you had to choose from among the seven goals for students listed below, how would you rank them according to their importance in your teaching? G) Human relations skills (cultural understanding, getting along with others)

Answer a "1" for the most important goal, a "2" for the next most important goal, and so on, through "7" for the least important goal. (First read goals, and then circle the corresponding rank of each.)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPRVVSIT</td>
<td>Except for monitoring student teachers or substitute teachers, how often have you visited another teacher's classroom to observe and discuss their teaching since the beginning of the current school year?</td>
<td>1 - Never</td>
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<td></td>
<td></td>
<td>2 - Once</td>
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<td></td>
<td></td>
<td>3 - Twice</td>
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<td></td>
<td></td>
<td>4 - 3-4 times</td>
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<td></td>
<td></td>
<td>5 - 5-9 times</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 - 10+ times</td>
</tr>
<tr>
<td>DPRVCOME</td>
<td>Since the beginning of the current school year, how often has another teacher or peer come to your classroom to observe your teaching (exclude visits by student teachers or those required for formal evaluations)?</td>
<td>1 - Never</td>
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<td></td>
<td></td>
<td>2 - Once</td>
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<td></td>
<td></td>
<td>3 - Twice</td>
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<td></td>
<td></td>
<td>4 - 3-4 times</td>
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<td></td>
<td></td>
<td>5 - 5-9 times</td>
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<tr>
<td></td>
<td></td>
<td>6 - 10+ times</td>
</tr>
<tr>
<td>DPRVFEED</td>
<td>How often, since the beginning of the current school year did you receive meaningful feedback on your performance from supervisors or peers?</td>
<td>1 - Never</td>
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<td></td>
<td></td>
<td>2 - Once</td>
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<tr>
<td></td>
<td></td>
<td>3 - Twice</td>
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<tr>
<td></td>
<td></td>
<td>4 - 3-4 times</td>
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<td></td>
<td></td>
<td>5 - 5-9 times</td>
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<tr>
<td></td>
<td></td>
<td>6 - 10+ times</td>
</tr>
<tr>
<td>DPRV2TS</td>
<td>How often do Two or more teaching colleagues regularly observe your students' academic performance or review their grades or achievement data? (mark only one for each)</td>
<td>1 - Never</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 - Once or Twice a Year</td>
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<td></td>
<td></td>
<td>3 - 3 or more times a Year</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Description</td>
<td>Response</td>
</tr>
<tr>
<td>---------------</td>
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</tr>
<tr>
<td>Professor</td>
<td>How often do Grade Level/Department Chair regularly observe your students' academic performance or review their grades or achievement data? (mark only one for each)</td>
<td>1 - Never</td>
</tr>
<tr>
<td>DPRVDEPT</td>
<td>2 - Once or Twice a Year</td>
<td>3 - 3 or more times a Year</td>
</tr>
<tr>
<td>DPRVPRIN</td>
<td>How often do Principal regularly observe your students' academic performance or review their grades or achievement data? (mark only one for each)</td>
<td>1 - Never</td>
</tr>
<tr>
<td>DPRVDADM</td>
<td>2 - Once or Twice a Year</td>
<td>3 - 3 or more times a Year</td>
</tr>
<tr>
<td>DPRVSLEN</td>
<td>How often do District Administrator regularly observe your students' academic performance or review their grades or achievement data? (mark only one for each)</td>
<td>1 - Never</td>
</tr>
<tr>
<td>DPRVSLEN</td>
<td>2 - Once or Twice a Year</td>
<td>3 - 3 or more times a Year</td>
</tr>
</tbody>
</table>

### Professional Learning Community (Shared Sense of Purpose)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPMISS</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: Most of my colleagues share my beliefs and values about what the central mission of the school should be. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>SSPGOALS</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: Goals and priorities for the school are clear. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>SSPDISCP</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: In this school the teachers and the administration are in close agreement on school discipline policy. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Description</td>
<td>Response</td>
</tr>
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</tr>
<tr>
<td>COLLBCUR</td>
<td>How often, since the beginning of the current school year did you receive useful suggestions for curriculum materials from colleagues in your department/grade level?</td>
<td>1 - Never</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 - Once</td>
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<tr>
<td></td>
<td></td>
<td>3 - Twice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 - 3-4 times</td>
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<td></td>
<td></td>
<td>5 - 5-9 times</td>
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<td></td>
<td></td>
<td>6 - 10+ times</td>
</tr>
<tr>
<td>COLLBTCH</td>
<td>How often, since the beginning of the current school year did you receive useful suggestions for teaching techniques or student activities from colleagues in your department/grade level?</td>
<td>1 - Never</td>
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<td></td>
<td></td>
<td>2 - Once</td>
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<td></td>
<td></td>
<td>3 - Twice</td>
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<tr>
<td></td>
<td></td>
<td>4 - 3-4 times</td>
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<tr>
<td></td>
<td></td>
<td>5 - 5-9 times</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 - 10+ times</td>
</tr>
<tr>
<td>COLLCOOP</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: There is a great deal of cooperative effort among staff members. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>COLLCOOR</td>
<td>Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements: I make conscious efforts to coordinate the content of my courses with other teachers. Circle only one response per statement.</td>
<td>1-6 Low (Strongly Disagree)-High (Strongly Agree)</td>
</tr>
<tr>
<td>COLLTFRQ</td>
<td>Since the beginning of the current school year, how much time per month (on the average) have you spent meeting with other teachers on lesson planning, curriculum development, guidance and counseling, evaluation of programs, or other collaborative work related to instruction? (Mark only one)</td>
<td>1: &lt;15 minutes</td>
</tr>
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<td></td>
<td></td>
<td>2: 15-29 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3: 30-59 minutes</td>
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<td></td>
<td></td>
<td>4: 1 hour or more, less than 5</td>
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<td></td>
<td></td>
<td>5: 5 hours or more, less than 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6: 10 hours or more</td>
</tr>
<tr>
<td>COLLTCC</td>
<td>In a typical planning period where you meet with other teachers, please indicate about how much time is spent on Time coordinating content. (Teachers decide common themes, suggest related materials and activities to guide instruction.) (Mark one for each)</td>
<td>1: None</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2: Less than Half</td>
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<tr>
<td></td>
<td></td>
<td>3: About Half</td>
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<tr>
<td></td>
<td></td>
<td>4: More than Half</td>
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</tbody>
</table>
### Professional Learning Community (Reflective Dialogue)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFLTAT</td>
<td>In a typical planning period where you meet with other teachers, please indicate about how much time is spent on time analyzing teaching. (Teachers discuss specific teaching practices and behaviors of team members.) (Mark one for each)</td>
<td>1: None, 2: Less than Half, 3: About Half, 4: More than Half</td>
</tr>
<tr>
<td>REFLTDIS</td>
<td>In a typical planning period where you meet with other teachers, please indicate about how much time is spent on time diagnosing individual students. (Teachers discuss problems of specific students and arrange appropriate help.) (Mark one for each)</td>
<td>1: None, 2: Less than Half, 3: About Half, 4: More than Half</td>
</tr>
</tbody>
</table>

### Academic Optimism (Faculty Trust)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT_TSTST</td>
<td>Teachers in this school trust their students.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>FT_TSTPT</td>
<td>Teachers in this school trust the parents.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>FT_STCAR</td>
<td>Students in this school care about each other.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>FT_PTREL</td>
<td>Parents in this school are reliable in their commitments.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>FT_STWRK</td>
<td>Students in this school can be counted upon to do their work.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>FT_PTSUP</td>
<td>Teachers can count upon parental support.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>FT_STLRN</td>
<td>Teachers here believe that students are competent learners.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Description</td>
<td>Response</td>
</tr>
<tr>
<td>---------------</td>
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<td>----------</td>
</tr>
<tr>
<td>FT_PTGOD</td>
<td>Teachers think that most of the parents do a good job.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>FT_PTTEL</td>
<td>Teachers can believe what parents tell them.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>FT_STST</td>
<td>Students here are secretive.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>FT_STST (reversed)</td>
<td></td>
<td></td>
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</tbody>
</table>

### Academic Optimism (Collective Efficacy)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE_ABLE</td>
<td>Teachers in this school are able to get through to the most difficult students.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_CONF</td>
<td>Teachers here are confident they will be able to motivate their students.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_GIVUP (reversed)</td>
<td>If a child doesn’t want to learn teachers here give up.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_SKLRS (reversed)</td>
<td>Teachers here don’t have the skills needed to produce meaningful results.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_BELIV</td>
<td>Teachers in this school believe that every child can learn.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_READY</td>
<td>These students come to school ready to learn.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_HOME</td>
<td>Home life provides so many advantages that students are bound to learn.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_STMOT (reversed)</td>
<td>Students here just aren’t motivated to learn.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_SKLDIC (reversed)</td>
<td>Teachers in this school do not have the skills to deal with student disciplinary problems.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_COMM</td>
<td>The opportunities in this community help</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
</tbody>
</table>
ensure that these students will learn. (1) - Strongly Agree (6)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE_SAFE (reversed)</td>
<td>Learning is more difficult at this school because students are worried about their safety.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
<tr>
<td>CE_DRUG (reversed)</td>
<td>Drug and alcohol abuse in the community make learning difficult for students here.</td>
<td>1-6 [Strongly Disagree (1) - Strongly Agree (6)]</td>
</tr>
</tbody>
</table>

## Academic Optimism (Academic Emphasis)

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE_EM (reversed)</td>
<td>Students neglect to complete homework.</td>
<td>1: Rarely Occurs 2: Sometimes Occurs 3: Often Occurs 4: Very Often Occurs</td>
</tr>
<tr>
<td>AE_E</td>
<td>Students are cooperative during classroom instruction.</td>
<td>1: Rarely Occurs 2: Sometimes Occurs 3: Often Occurs 4: Very Often Occurs</td>
</tr>
<tr>
<td>AE_EMS1</td>
<td>Students respect others who get good grades.</td>
<td>1: Rarely Occurs 2: Sometimes Occurs 3: Often Occurs 4: Very Often Occurs</td>
</tr>
<tr>
<td>AE_EMS2</td>
<td>Students seek extra work so that they can get good grades.</td>
<td>1: Rarely Occurs 2: Sometimes Occurs 3: Often Occurs 4: Very Often Occurs</td>
</tr>
<tr>
<td>AE_EMS3</td>
<td>Students try hard to improve on previous work.</td>
<td>1: Rarely Occurs 2: Sometimes Occurs 3: Often Occurs 4: Very Often Occurs</td>
</tr>
<tr>
<td>AE_S1</td>
<td>The students in this school can achieve the goals that have been set for them.</td>
<td>1: Rarely Occurs 2: Sometimes Occurs 3: Often Occurs 4: Very Often Occurs</td>
</tr>
<tr>
<td>AE_S2</td>
<td>Academic achievement is recognized and acknowledged by the school.</td>
<td>1: Rarely Occurs 2: Sometimes Occurs 3: Often Occurs 4: Very Often Occurs</td>
</tr>
</tbody>
</table>
| AE_MS1     | The learning environment is orderly and serious. | 1: Rarely Occurs  
2: Sometimes Occurs  
3: Often Occurs  
4: Very Often Occurs |
| AE_M1      | Good grades are important to the students of this school. | 1: Rarely Occurs  
2: Sometimes Occurs  
3: Often Occurs  
4: Very Often Occurs |
| AE_M2      | Students make provisions to acquire extra help from teachers | 1: Rarely Occurs  
2: Sometimes Occurs  
3: Often Occurs  
4: Very Often Occurs |
| AE_MS2     | Teachers in this school believe that their students have the ability to achieve academically. | 1: Rarely Occurs  
2: Sometimes Occurs  
3: Often Occurs  
4: Very Often Occurs |
| AE_M3      | Academically oriented students in this school are ridiculed by their peers. | 1: Rarely Occurs  
2: Sometimes Occurs  
3: Often Occurs  
4: Very Often Occurs |
| AE_S3      | The school sets high standards for academic performance. | 1: Rarely Occurs  
2: Sometimes Occurs  
3: Often Occurs  
4: Very Often Occurs |