

# Academic Optimism and Enabling School Structure: Predictors of Professional Learning Communities

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*Organizational properties of schools can explain why some schools are successful and others are not. We explored the role of enabling school structures and academic optimism, comprised of teacher trust in clients, collective efficacy, and academic emphasis, in the development of professional learning communities (PLCs). Both of our hypotheses were confirmed via correlational analysis and structure equation modeling about the relationships of enabling school structures and academic optimism in the development of PLCs, our outcome variable. These empirical findings validate the importance of enabling school structures as an antecedent to the development of PLCs and contribute to organizational theory about school structure and health. School districts should consider the role of academic optimism and enabling school structures in relationship to developing PLCs.*

**Keywords:** professional learning communities, academic optimism, teacher trust, collective efficacy, and academic emphasis

Over the last few decades, we have learned more about the importance of the organizational properties of our schools and why some schools are successful, while others fail. In this study, we explore the role of enabling school structures and the three components of academic optimism, teacher trust in clients, collective efficacy, and academic emphasis, in the development of professional learning communities (PLCs). Enabling school structures will represent the formal aspect of the school as an organization, while the three components of academic optimism will comprise the informal part of the organization. PLCs offer a model for school reform that involves the community, in this case students and parents, as well as teachers and instructional leaders, in facing the challenges that exist in our schools today. In this study, we reason that enabling school structures and academic optimism predict the level of development of PLCs. We believe that parents, teachers, school leaders, and students must work in partnership to improve our schools, increase student achievement, and overcome obstacles to do such.

### **Purpose**

The purpose of this study is to examine how enabling school structures and academic optimism predict the development of professional learning communities. Many states and school districts across the United States have mandated or recommended PLCs as a model for teachers to use during professional development time. Unfortunately, PLCs are not being implemented and supported by school leaders as they were intended to be effective. Further, the implementation and support of PLCs varies from school to school and from district to district, which can alter their outcomes and effectiveness. Research-based best practices can provide the foundation upon which PLCs can be established, maintained, and supported (Battersby, 2019; Hord, 2004; Louis, Marks & Kruse, 1996; Park, Lee & Cooc, 2019; Schaap & Bruijn, 2018; Stoll et al., 2006; Vescio et al, 2008; Wahlstrom & Louis, 2008; Yin & Zheng, 2018).

### **Conceptual Framework**

In this section, we will discuss our framework; which will explain how professional learning communities are developed, based on enabling school structures working through academic optimism and its three components (teacher trust in clients, academic emphasis, and collective efficacy) despite the effects of school level and socio-economic status.

### **Professional Learning Communities**

Many schools in the United States and around the world are implementing PLCs, although how they are defining such and organizing themselves varies tremendously. Recognizing the need for research-based characteristics of a professional learning community, Hord summarized that PLCs should possess the following components: supportive and shared leadership, collective creativity, shared values and vision, supportive conditions, and shared personal practice (Hord, 1997; Hord & Sommers, 2008). Hord has been credited with developing the definition of a professional learning community as a collegial group of staff and faculty who are united in their commitment to student learning and as “communities of continuous inquiry and improvement” (Hord, 1997, p. 2).

### ***Characteristics of PLCs***

PLCs should focus on improving learning for teachers and students alike, within the supportive structures that exist in schools (i.e.: time for professional development during school day) (Hargreaves & Fullan, 2013; Stoll et al., 2006). Generally speaking, a PLC has been described as a norm-based model for small groups of educators who work collaboratively toward student-focused achievement and academic improvement (Dogan et al., 2015; Kruse & Johnson, 2016). While PLCs are intended to be teacher-led and learning-focused initiatives, often times this is not what is happening in schools. Disregarding research-based best practices, school districts and states are mandating that schools implement PLCs and then monitor and supervise such efforts.

In many schools, shared decision making is an important aspect of developing PLCs, which lead to teachers' sense of empowerment. Teachers' actions are guided by the shared norms of the PLC and focused on improving learning and teaching (Bryk et al., 1999). As an organizing model for improvement, the members of the PLC establish common goals, strategies, and a process for making decisions and instructional changes, based upon research-based best practices and student data gathered (Kruse & Johnson, 2017). Trust, openness to improvement and change, supportive leadership, and opportunities for collaboration and socialization are essential in the development of healthy relationships within a PLC (Kruse et al., 1994).

### ***Benefits of PLCs***

When teacher-led and implemented as intended (Hord, 1997), members of a PLC, as well as the school climate and culture, tend to benefit from participation. Teachers tend to feel more supported, trusted and trusting of colleagues, respected as professionals, and motivated in working toward a common goals and purpose within the PLC (Pirtle & Tobia, 2014). PLCs have been credited with larger scale school improvement by "strengthening district and school cultures, modifying organizational structures and building collaborative processes" (Leithwood et al., 2004, p. 25). McLaughlin and Talbert (2001) maintain teachers who worked in innovative PLCs described their careers as more 'enriched' due to the opportunity for collaboration, sharing of best practices, and professional growth. Furthermore, highly effective and functioning PLCs can positively influence student academic progress and achievement (Bryk et al., 1999; Gray, 2011; Gray et al., 2016, 2017; Harris et al., 2017; Louis & Marks, 1998; McLaughlin & Talbert, 2006; Schaap & Bruijn, 2018; Wahlstrom & Louis, 2008).

### ***How PLCs Form***

Many school districts in the United States have mandated PLCs as the chosen model for school improvement, which goes against the premise of PLCs being teacher-driven and developed (Hord, 1997). As common planning time has been established in most schools, naturally, teachers with the same students or who teach the same subject areas would begin to plan lessons together and share instructional ideas for practice. As this de-privatization of practice has evolved, teachers become more open about sharing what is really happening in their classrooms, the good and the not so good (Hord, 1997). Some of these teachers' collaborative efforts could be viewed as 'communities of continuous inquiry and improvement' (Hord, 1997), while others that are more structured and organized with common values and goals would be considered PLCs. Unfortunately, in many school districts the supports needed for PLCs to be effective are lacking.

School districts decided to implement PLCs, as a model for school improvement, prior to determining ways to support such efforts. The cart came before the horse, so to speak. The need for supportive conditions is described here and in the section about enabling school structures.

### ***Supportive Conditions***

For PLCs to be productive and effective, certain supportive conditions need to be in place within the school environment. Teachers need a place and time to meet, the social capacity for collaborative relationships with colleagues, and the support of school leaders to work toward school improvement (Hord, 2007). A PLC should be a collaborative effort of teachers to learn from one another, support mutual professional growth, and improve instructional practices (Dogan et al., 2015; McLaughlin & Talbert, 2001). Kruse et al. (1994) assert that teachers need certain structural conditions for professional learning and collaboration to occur in PLCs. These conditions include: time to talk and meet, physical proximity, interdependent teaching roles, communication structures, teacher empowerment, and school autonomy (Kruse et al., 1994). School leaders can support teachers' efforts of PLCs by allowing the time for such during regular work hours and protecting this time from interruptions (Harris et al., 2017; Hord, 2007; Kruse et al., 1994; Park et al., 2019; Schaap & Bruijn, 2018;). These structural conditions encompass what we refer to as enabling school structures, which will be discussed in the next section.

### **Enabling School Structures**

Enabling school structures (ESS) are described as teachers' belief that the rules and administration of the school help them in doing their work more effectively (Hoy & Sweetland, 2001). These structures are "characterized by principals who are disposed to help teachers solve problems, encourage open communication, and help teachers do their jobs" (Hoy & Sweetland, 2001, p. 310). In an earlier study, the term enabling bureaucracy was used, which has since evolved into enabling school structures (Hoy & Sweetland, 2000). Enabling school structures establish "a hierarchy of authority and a system of rules and regulations that help rather than hinder the teaching learning mission of the school" (Hoy, 2002, p. 91). Teachers in schools with enabling school structures tend to have more flexibility to solve problems and make decisions in innovative ways, as is typically done in professional learning communities (Hoy & Sweetland, 2001).

In contrast, a hindering school structure is more controlled or tightly managed with a top-down approach by the leader (Hoy, 2002). The bureaucratic structures of organizations vary in the scope of rules, policies, centralization, formalization, and approach to decision making (Hoy, 2002). The centralization of the organization ranges along a continuum from hindering to enabling, much as it does for the degree of formalization of the organization (Adler & Borys, 1996; Hoy, 2002). Schools with enabling structures in place promote problem solving, collaboration, flexibility, and innovation, while protecting participants from external interference (Hoy & Sweetland, 2001). Enabling school structures allow for creative, innovative solutions to problems by encouraging collaborative, open communication among teachers and leaders in working to attain instructional and academic goals together (Hord, 1997). As principals promote enabling school structures by encouraging the development of PLCs, the school's climate improves and student achievement increases (Park et al., 2019). Principals tend to lead from a professional or bureaucratic orientation (Tschannen-Moran, 2009). For a PLC to be effective, the principal needs to establish enabling school structures that are professionally oriented and allow teachers to use

their instructional expertise in their daily work. Another factor related to the climate and relationships of stakeholders of the school is academic optimism, which we will discuss in the next section.

### **Academic Optimism**

Hoy et al. (2006) theorized that the three properties of faculty trust in clients, collective efficacy, and academic emphasis combine to create a latent variable known as academic optimism. They stated that these three variables collectively “create a positive academic environment we have named *academic optimism*” (Hoy et al., 2006, p. 143). These properties are characterized by the collective perceptions of the group, in this case teachers, rather than those of individual faculty members (Bandura, 1986, 1997; Hoy et al., 2006). All three are similar in their purpose, development, and character, as well as positive influence on school improvement and student achievement (Hoy, et al. 2006; Mitchell et al., 2016a).

Hoy et al. (2006) found that teacher trust in clients, collective efficacy, and academic emphasis shared a reciprocal and transactional relationship with one another. As teacher trust in parents and students is developed and nurtured, collective efficacy tends to increase (Hoy et al., 2006; Bevel & Mitchell, 2012). When teachers set high academic expectations for students, have a high sense of collective efficacy and trust students and parents their relationships with students and parents are strengthened (Forsyth et al., 2011). These three aspects of academic optimism interact with one another, while developing a school culture that is optimistic about school achievement, academics, and learning (Forsyth et al., 2011). When teachers believe all students can learn and are open to partnerships with clients (students and parents) academic success can be achieved for all stakeholders (Cassity, 2012; Gray et al., 2016, 2017; Gray & Tarter, 2012; Krier, 2014; Mitchell et al., 2016c; Mitchell & Tarter, 2016).

### ***Teacher Trust in Clients***

Teachers who trust their principal were more likely to trust their colleagues, students, and parents (Brewster & Railsback, 2003; Goddard et al., 2001; Hoy & Tschannen-Moran, 2003). While some might argue that teacher trust in parents and teacher trust in students should be considered separately, several factor analyses have demonstrated that when teachers trust their students they also trust the parents and vice versa; leading to this variable being combined into one variable representing ‘teacher trust in clients’ (Hoy et al., 2006, p. 139; Hoy & Tschannen-Moran, 1999, 2003; Goddard et al., 2001; Smith et al., 2001; Tschannen-Moran et al., 2013). Finally, strong teacher trust in clients leads to greater school improvement and academic achievement (Hoy et al., 2006).

### ***Academic Emphasis***

Academic emphasis is defined as the “extent to which the school is driven by a quest for academic excellence” (Hoy et al., 1991, p. 62). Academic goals that are high and achievable are set for students by parents and teachers (Hoy et al., 1991). Students are expected to do their best, earn good grades, work hard, cooperate with others, and achieve academic success (Hoy et al., 1991). The teachers, parents, and leaders view the learning environment as a serious place and believe in their students’ ability to do well academically (Hoy, 2012). A school climate that demonstrates a

strong academic emphasis has the potential to influence individual students and teachers alike and reinforced the benefits of collective beliefs (Goddard, Sweetland, & Hoy, 2000). Academic emphasis is represented by teacher and student behaviors that celebrated, honored, and emphasized academic and intellectual accomplishments (Gray & Tarter, 2012; Hoy, 2012; Hoy et al., 1991; Mitchell et al., 2016b, 2016c; Tschannen-Moran et al., 2013). Finally, the school vision, mission, and improvement plan express elevated expectations for academic accomplishments and high instructional goals for students (Gray & Tarter, 2012; Hoy et al., 2006; Roney et al., 2008).

### ***Collective Efficacy***

Collective efficacy represents the “groups’ shared belief in its conjoint capabilities to organize and execute courses of action required to produce given levels of attainments” (Bandura, 1997, p. 477). Teachers’ beliefs about their colleagues’ capability to successfully educate students are represented by the norm-based concept known as collective efficacy (Goddard et al., 2000). Collective efficacy explains more “school-level variability in faculty trust in clients than other school-level predictors” (Tschannen-Moran & Goddard in Forsyth et al., 2010, p. 60; Tschannen-Moran & Goddard, 2001). When a school’s collective efficacy beliefs are strong, teachers were more likely to exert greater and sustained efforts to achieve academic and organizational goals (Goddard & Skrla, 2006). In summary, collective efficacy represents the judgment the faculty, as a whole, make about the group’s ability to plan and provide effective instruction (Gray et al., 2016, 2017; Gray & Tarter, 2012; Voelkel & Chrispeels, 2017). In the next section, we summarize our theoretical rationale, which serves as our theoretical framework.

## **Theoretical Rationale**

This study hypothesizes that enabling school structures, the components of academic optimism, and PLCs will be positively correlated with each other. We look to the organizational theory literature as related to school structures (Hoy & Sweetland, 2001) and academic optimism (Hoy et al., 2006), as well as organizational learning research which led to development of PLCs; (Senge, 1990; Serrat, 2009). There is emerging research about these variables and their relationships with one another, especially in the areas of trust in clients, academic emphasis, collective efficacy, and enabling school structures (Adams & Forsyth, 2006; Forsyth et al., 2006; Goddard et al., 2009). Further, there is research to support our framework of the formal aspects of the school (policies, rules, and regulations) and leaders enabling teachers to do their jobs (enabling school structures) effectively, in conjunction with the informal or relational factors (trust and collective efficacy), all in the development of PLCs (Gray, 2011).

When working effectively, PLCs promote academic progress and an increase of student achievement (Bryk et al., 1999; Gray, 2011; Louis and Marks, 1998; McLaughlin & Talbert, 2003; Wahlstrom & Louis, 2008). However, the existing literature does not address how to cultivate and sustain of PLCs over time (Louis & Marks, 1998; McLaughlin & Talbert, 2003; Spillane, 2005; Supovitz). As a school improvement model, PLCs provide teachers a structured time to improve the climate and culture while working toward increasing student achievement (Gray, 2011). We suggest that enabling school structures support the work of PLCs and vice versa. Within the literature, it is suggested that PLCs increase teachers’ sense of professionalism, trust in colleagues and clients, and participation in collaboration and shared decision making (Gray, 2011; Harris et al., 2017; Hipp & Huffman, 2010; Hord, 1997, 2004, 2007, 2009; Huffman & Hipp, 2003; Kruse & Gray, 2019; Kruse & Louis, 1993a, 1993b; Kruse et al., 1994; Louis & Kruse, 1995; Lieberman & Miller, 2008; McLaughlin & Talbert, 2001, 2006; Wahlstrom & Louis, 2008).

## Hypotheses

Teachers' sense of academic optimism for the school and the school's enabling structures are essential to developing PLCs (Mitchell et al., 2016b, 2016c). In this study, we predict that there is a correlation between teachers' perceptions of academic optimism and enabling school structures and the development of PLCs.

**H1:** Enabling School structures, the components of academic optimism, and perceptions of professional learning community development will be positively correlated with each other.

We plan to determine if these effects are direct or indirect and beyond the influence of socioeconomic status (SES) and school level (elementary, middle or high). Therefore, we seek to add to the theoretical knowledge base through empirical data and guide organizational practices in schools. In Figure 1, we provide the conceptual diagram for our theoretical model. Enabling school structure is the exogenous predictor variable, academic optimism is the mediating variable, school level and SES are our control variables, and PLC development is our outcome variable.

**H2:** Enabling school structures will have a direct effect on academic optimism and together ESS and AO will explain a significant proportion of the variance in developing PLCs over and above the effects of SES and school level.

We predict that these two factors, enabling school structures and academic optimism, are essential elements in the development of PLCs. Prior research had shown that there is a relationship between enabling school structure and the individual components that make up academic optimism, specifically: trust in clients, collective efficacy, and academic emphasis (Goddard, 2002; Gray, 2011; Gray & Tarter, 2014; Hord, 1997, 2004; Hoy & Sweetland, 2000; Mitchell et al, 2016).

However, the relationships between enabling school structure, academic optimism and professional learning community development were untested; we reasoned because of the known relationship that enabling school structure had with the components of academic optimism that it would also be related to academic optimism as a unified latent construct and professional learning community development.

## Methodology

The unit of analysis for this study was the school: therefore, individual subject scores were aggregated to the school. The predictor variables included; one exogenous variable, (Enabling School Structure) and one latent mediating variable, (Academic Optimism) which was made up of three indicator variables; collective teacher efficacy, academic emphasis, and teacher trust in clients. As enabling school structures and the components of academic optimism are school-level variables, it was essential to analyze PLCs as a collective, school-level variable, as well (Johnson, 2009). Two exogenous control variables were included in the study: socio-economic status (SES), as determined by the proportion of students not eligible for the free and reduced lunch program, and school level, which was dummy coded to reflect elementary and secondary schools in our sample. SES and school level were included because of their known relationship with several of the variables in our study in prior research (Adams, 2008; Forsyth et al., 2011; Mitchell, 2008).

## Sample

An existing database from a large southeastern school district provided the data for this study. The sample consisted of 67 schools in a large metropolitan school district, including 44 elementary schools, 17 middle schools, and 6 high schools. Enrollment for these schools totaled over 62,000 students, ranging from 90 to 2,123 students per school. The mean enrollment for the schools were 685 students. Each school had from 12 to 126 teachers, with a mean of 41 teachers per school for this district. Of the 3,700 teachers invited to participate in the study, 42% held a bachelor's degree,

while 51% also had a master's degree, and 4% held more advanced degrees. Teachers completed surveys online via the Qualtrics Research Suite™ software, which was exported to Excel and then SPSS for statistical analysis. There was a 75% completion rate with 67 of the 89 schools in the district participating. Principals of the schools not represented mentioned busy schedules, time constraints, and the voluntary status of the survey as reasons for non-participation.

### ***Data Source***

Data for this study were collected from a previously established data base of teachers from one large predominantly urban school system in the southern portion of the United States made up of 89 schools that served 61,181 students. The student population was primarily African American (49%), and white (45%). The proportion of students eligible for the free and reduced lunch program ranged from 33-99% with an average of 76% per school for the schools in our sample.

Seventy-four percent of the schools invited to participate agreed to participate for a total of 66 schools. Forty-six percent of teachers invited participated for a total of 1,713 teachers out of 3,700 teachers in the district. On average 51% of the teachers in each school responded to the surveys. Of the 66 schools that were included in the final sample 45 of the schools had 50% or greater teacher participation and 58 of the schools had 30% or better. Surveys were emailed to teachers with a link to Qualtrics Research Suite™. Teachers filled out the surveys using Qualtrics software. Data were imported into Excel, IBM SPSS Statistics 22, and IBM SPSS Amos 21 for analysis.

### **Measures**

Teachers completed three surveys; the Enabling School Structure survey (ESS), the School Academic Optimism Scale (SAOS) (which included three subscales; faculty trust in clients, collective teacher efficacy, and academic emphasis) and the shortened Professional Learning Communities Assessment Scale – Revised (PLCA-R). Data were coded to reflect school of origin and school level. Data for the school level variable called elementary level (Elem) and the percentage free and reduced lunch (FRL) per school were collected from the State Department of Education website. FRL was used as a proxy variable for SES of the school (NCES, 2012).

#### ***Enabling School Structure (ESS)***

The ESS scale is a 12-item, five-point Likert-type scale that measures the degree to which the school's administration and rules hinder or enable the work of teachers. Responses on this scale range from never (coded as 1) to always (coded as 5). Sample items include "in this school red tape is a problem", "administrative rules help rather than hinder", and "the administrative hierarchy of this school enables teachers to do their job" (Hoy & Sweetland, 2000). The validity of this scale has been supported by multiple studies and the reported reliability of this scale ranges from .90 - .96 (Gray, 2011; Hoy & Sweetland, 2000, 2001). In the current study the coefficient alpha was .91.



### ***School Academic Optimism Scale (SAOS)***

The SAOS is a 30-item, Likert-type scale made up of three subscales. Faculty Trust in Clients (FTC), Collective Efficacy (CE), and Academic Emphasis (AE) are designed to measure the cognitive (CE), affective (FTC), and behavioral dimensions (AE) of a culture of hopefulness and optimism that has been linked to student achievement in previous studies (Gray & Tarter, 2012; 2012b; Hoy, Tarter, & Woolfolk-Hoy, 2006; McGuigan & Hoy, 2006; Smith & Hoy, 2007). Twenty two of the items measure FTC and CE. These items have a six-point response scale that ranges from strongly disagree (coded as 1) to strongly agree (coded as 6). Eight of the items measure AE. These items have a four-point response scale that ranges from rarely (coded as 1) to very often (coded as 4). Multiple factor analytic studies have confirmed the construct and predictive validity of these scales (Hoy et al., 2006; McGuigan & Hoy, 2006; Smith & Hoy, 2007).

**Faculty Trust in Clients (FTC).** The FTC subscale is a ten-item scale that measures faculty trust in students and parents (Hoy & Tschannen-Moran, 1999). Sample items on the FTC subscale are “teachers in this school trust the parents,” “teachers here believe that students are competent learners,” and “teachers in this school trust their students” (Hoy & Tschannen-Moran, 1999). The reported reliability of this scale ranges from .92 - .98 (Bevel & Mitchell, 2012; Hoy et al., 2006; Hoy & Tschannen-Moran, 1999; Kirby & DiPaola, 2011; McGuigan & Hoy, 2006; Smith & Hoy, 2007). The coefficient alpha for this scale in the current study was .92.

**Collective Efficacy Scale (CE).** The CE scale is a 12-item scale that measures the shared perceptions of teachers regarding their collective ability to effectively carry out the teaching task (Goddard, 2002). Sample items on the CE scale are “teachers in this school are able to get through to the most difficult students,” “teachers here are confident they will be able to motivate their students,” and “teachers in this school believe that every child can learn.” The reported reliability of this scale ranges from .91-.98 (Kirby & DiPaola, 2011; Smith & Hoy, 2007; McGuigan & Hoy, 2006). In the current study the coefficient alpha for this scale was .87.

**Academic Emphasis (AE).** The AE scale is an eight-item scale that measures the press in the school for academic excellence. Sample items on the AE scale are “the school sets high standards for performance,” “students respect others who get good grades,” and “the learning environment is orderly and serious” (Hoy et al., 2006). The reported reliability of this scale ranges from .89 - .94 (Gray & Tarter, 2012; Hoy et al., 2006; Kirby & DiPaola, 2011; McGuigan & Hoy, 2006; Smith & Hoy, 2007). The coefficient alpha for this scale in the current study was .90.

### ***Professional Learning Community Assessment - Revised (PLCA – R)***

Professional learning community development was measured by a shortened version of the Professional Learning Community Assessment (PLCA) instrument, which was developed by Olivier et al. (2003), but revised to form the PLCA-R (2010). The shortened version of the PLCA-R was a 12-item, four-point, Likert-type scale with answers ranging from “strongly disagree” to “strongly agree” (Olivier et al., 2003, 2010). The alphas for the subscales ranged from .82 to .94 (Olivier & Hipp, 2010). The subscales of the PLCA-R included: shared and supportive leadership, shared values and vision, collective learning and application, shared personal practice, supportive conditions – relationships, and supportive conditions – structures (Olivier, 2003, p. 69; Olivier, et

al., 2003, 2010). Sample items included: “leadership is promoted and nurtured among staff members,” “professional development focuses on teaching and learning,” and “opportunities exist for coaching and mentoring” (Olivier, et al., 2003, 2010).

This version of the PLCA-R scale was shortened by selecting two items from each of the subscales of the original scale. A pilot study was conducted in eight schools (elementary, middle, and high) in a small southeastern school district. Further, factor analysis was performed to determine that the shortened version of the PLCA-R was valid and reliable with a Cronbach’s alpha of .92 for this study.

### ***Elementary Level (Elem)***

School level or elementary school status was added as a control variable. Information regarding the school level was collected from the State Department of Education website. Schools in our sample were dummy coded 1 for elementary and 0 for middle and high school.

### ***Socio-economic Status (SES)***

As a proxy for SES we used the proportion of students in the school who were not eligible for the free and reduced lunch program (NCES, 2012). This figure was calculated by subtracting the percent of students eligible for the free and reduced lunch program from 1, such that schools with fewer students eligible for the free and reduced lunch program were considered to have higher SES and schools with more students eligible for the free and reduced lunch program were deemed lower SES schools. Data were retrieved from the State Department of Education’s website.

### **Analytic Technique**

We reasoned, because of prior research studies that have used these variables, that enabling school structure, school academic optimism (and its subcomponents; teacher trust in clients, collective teacher efficacy, and academic emphasis), and the level of professional learning community development are school properties (Hoy & Sweetland, 2001; Hoy et al., 2006; McGuigan & Hoy, 2006; Smith & Hoy, 2007; Olivier et al., 2003, 2008, 2010). In addition, items on these scales indicate teachers’ perceptions about the school as a whole. Therefore, in order to justify aggregation of teacher responses to the school we used the Intra-class Correlation, which is a reliability index commonly used to explain aggregation of data (Shrout & Fleiss, 1979). We calculated intra-class correlations for ESS, the indicator variables of school academic optimism (CE, TTC, and AE) and PLC, as well as both the ICC-1 and the ICC-2. While ICC-1 represents the variance attributed to group membership, ICC-2 represents the within group agreement between teachers in the sample. Both ICCs were calculated using a Random Effects ANOVA, which measured the reliability of the group means (Bliese, 2000).

We investigated the relationships between enabling school structure (ESS), school academic optimism (SAOS), collective efficacy (CE), faculty trust in clients (FTC), academic emphasis (AE), and professional learning community development (PLC), as well as our control variables; elementary level (Elem) and SES were explored using descriptive and bivariate correlational analysis. We tested the reliability of our scales using the Cronbach's Alpha coefficient of internal consistency.

A confirmatory factor analysis was performed to determine whether FTC, CE, and AE would come together to create the latent construct referred to as academic optimism, as in prior studies. Next, a structural equation Multiple Indicator Multiple Cause (MIMIC) model, using IBM SPSS AMOS 22, was performed to test the effects of ESS on a latent variable (AO) and our outcome variable professional learning community development (PLC), while controlling for SES and elementary level. Finally, the  $\chi$  test of model fit, the root-mean-square-error of approximation (RMSEA), the Goodness of Fit index (GFI), and the Tucker Lewis Index (TLI) were used to assess our model fit, along with G\*Power 3.1.7, which was used to assess the power of our model to accurately reject the null hypothesis.

## **Results**

This study examined the relationships between enabling school structure, a latent mediating variable school academic optimism (made up of three indicator variables; faculty trust in clients, academic emphasis, and collective efficacy) and an outcome variable (professional learning community development), while controlling for elementary level and SES.

### **Intra-Class Correlations**

The first step in the analysis involved obtaining ICC-1 and ICC-2 values in order to justify aggregation of our variables to the school as a unit of analysis. We began by conducting five random effects ANOVAs using IBM SPSS 22 to estimate the extent to which our exogenous predictor variable (enabling school structure), our observed indicator variables (faculty trust in clients, collective efficacy, and academic emphasis) that make up our latent mediating variable school academic optimism, and our outcome variable professional learning community development varied within and between schools. The ICC coefficients confirmed the nested nature of our variables. Our ICC-1's confirmed the school level variability in our observed variables. The F test of significance indicated that as expected the proportions of variance among teachers in enabling school structure (23%), faculty trust in clients (48%), collective efficacy (39%), academic emphasis (46 %) and professional learning community development (28%) were statistically significant.

**Table 1***Intra-Class Correlation Coefficients*

<b>Variable</b>	<b>ICC-1</b>	<b>ICC-2</b>	<b>F-ratio</b>
ESS	.23	.64	2.76**
TTC	.48	.92	11.85**
CE	.39	.83	5.92**
AE	.46	.91	11.21**
PLC	.28	.72	3.61**

*n* = 66, \*\* *p* < .01

Large ICC-2s for enabling school structure (ICC-2 = .64, *p* < .01), faculty trust in client (ICC-2 = .92, *p* < .01), collective efficacy (ICC-2 = .83, *p* < .01), and academic emphasis (ICC-2 = .91, *p* < .01), professional learning community development (ICC-2 = .72, *p* < .01) indicated strong within group agreement among schools that exceed the 0.60 threshold recommended by Cohen et al. (2001) and Ostroff (1993). Together, these results indicate a significant variance among teachers attributed to school differences, as well as strong within group agreement among teachers. See Table 1 for the results of this analysis.

### **Descriptive Summary & the Reliability of the Scales**

Descriptive statistics were calculated for enabling school structure, faculty trust in clients, collective efficacy, academic emphasis, professional learning community development, SES, and elementary status. On average, teachers tended to be most alike in their perceptions of professional learning community development and least alike in their perceptions of trust in students and parents. The percentage of schools with students eligible for free and reduced lunch services ranged from 34-99%. Schools in this district were largely urban and poor. There were 44 elementary schools and 22 secondary schools in the sample. The Cronbach's alphas for the scales were: ESS ( $\alpha$  = .91), CE ( $\alpha$  = .87), FTC ( $\alpha$  = .92), AE ( $\alpha$  = .90), and PLCs ( $\alpha$  = .92). See Table 2 for a depiction of the descriptive analyses of the variables and the reliability of the scales in our study.

**Table 2***Descriptive Analysis & Scale Reliabilities*

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>	<b>Cronbach's <math>\alpha</math></b>
Professional Community	66	2.39	3.81	3.0218	.33181	.92
Enabling Structure	66	2.43	4.77	3.9948	.43759	.91
Teacher Trust in Clients	66	1.87	5.14	3.9446	.71887	.92
Academic Emphasis	66	1.83	3.80	3.0252	.46063	.90
Collective Efficacy	66	2.50	5.19	4.1065	.58611	.87
SES	66	.01	.66	.2474	.18327	
ELEM	66	.00	1.00	.6667	.47502	

### **Correlational Analysis**

Hypothesis 1, which stated that enabling School structures, the components of academic optimism, and perceptions of professional learning community development will be positively correlated

with each other, was confirmed. The results from the correlational analysis indicated that enabling school structure was positively correlated with collective efficacy ( $r = .40, p < .01$ ), teacher trust in clients ( $r = .34, p < .01$ ), academic emphasis ( $r = .40, p < .01$ ) and professional learning community development ( $r = .79, p < .01$ ). Enabling school structure was not correlated with the control variables; SES or elementary school level. In Hypothesis 2, our three observed indicator variables that were hypothesized to come together to make up our latent variable school academic optimism were all positively correlated with each other, collective efficacy and faculty trust ( $r = .79, p < .01$ ), collective efficacy and academic emphasis ( $r = .73, p < .01$ ), and faculty trust and academic emphasis ( $r = .82, p < .01$ ). SES was not correlated with any of the variables in this study. Elementary level was positively correlated with collective efficacy ( $r = .44, p < .01$ ), teacher trust in clients ( $r = .51, p < .01$ ), academic emphasis ( $r = .44, p < .01$ ), and professional learning community development ( $r = .35, p < .01$ ). This indicated that these variables tended to be positively associated with elementary school level and tended to decline at the secondary level. Elementary level was not correlated with enabling school structure or SES.

**Table 3**  
*Bivariate Correlations*

	ESS	CE	TTC	AE	SES	Elem.
PLC	.79**	.60**	.50**	.63**	-.01	.35**
ESS		.40**	.34**	.40**	.05	.12
CE			.79**	.73**	.22	.44**
TTC				.82**	.17	.51**
AE					.17	.44**
SES						-.06

\*\*  $p < .01$ , \* $p < .05$ ,  $N = 66$

### Measurement Model and Structural Equation Model

Hypothesis 1, which stated enabling school structures, the components of academic optimism, and perceptions of professional learning community development will be positively correlated with each other, was confirmed. Therefore, we conducted a confirmatory factor analysis and a structural equation model. Structural equation modeling was chosen as the best means of analysis for this data, because the variables in this study are viewed as properties of the school. Further, structural equation modeling is considered “a useful tool because it allows the researcher to propose and subsequently test theoretical propositions about the interrelationships among the constructs in a multivariate setting” (Johnsrud & Rosser, 2002). We were interested in testing the direct and indirect effects of enabling school structure on two variables school academic optimism and professional learning community development and in extending the body of research on academic optimism, thus identifying antecedents and consequents of academic optimism.

### Confirmatory Factor Analysis

The first phase of this analysis involved a confirmatory factor analysis using IBM SPSS AMOS 21 to test whether the three observed indicator variables (faculty trust in clients, collective teacher efficacy, and academic emphasis) would serve as indicator variables for the unobserved latent

mediating variable called school academic optimism. This allowed us to determine whether the shared variance-covariance of these three variables defined our latent construct and provided a more precise way to account for the error variances, which if untested could lead to biased parameter estimates (Schumacker and Lomax, 2010).

Results from the confirmatory factor analysis demonstrated that the three indicator variables did come together to create the latent variable called school academic optimism. This was indicated by high factor loadings for teacher trust in clients (.90), collective efficacy (.85), and for academic emphasis (.89). Academic optimism accounted for 82% of the variance in faculty trust in clients, 73% of the variance in collective efficacy, and 78% of the variance in academic emphasis. See Table 4 for our measurement model.

**Table 4**  
*Measurement Model*

Latent	Observed	Factor Loadings	Error	$h^2$
AO	TTC	.90	.17	.82
	CE	.85	.27	.73
	AE	.89	.22	.78

### Structural Equation MIMIC Model

Our Structural Equation Multiple Indicator Multiple Causes (MIMIC) Model consisted of one exogenous predictor variable (enabling school structure) and two exogenous control variables (SES and Elementary Level) that were predicted to have direct and indirect effects on our latent unobserved variable (academic optimism) and our outcome variable (professional learning community development). Three observed endogenous indicator variables (collective efficacy, teacher trust in clients, and academic emphasis) were used to define our latent variable (academic optimism). Our path model indicated that academic optimism would have a direct effect on professional learning community development and would act as a mediator between enabling school structure and professional learning community development. Five unobserved exogenous variables were added to the model to represent the error variance in our indicator variables, our latent variable, and our dependent variable (Err\_FTC, Err\_CE, Err\_AE, Err\_AO, Err\_PLC). Maximum likelihood estimation was used to estimate the parameters of the variables in this study.

H1 stated enabling school structure will have a direct effect on academic optimism and academic optimism will explain a significant proportion of the variance in developing PLCs over and above the effects of SES and school level, which was confirmed. Enabling school structure had a significant direct effect on academic optimism ( $\lambda = .36, p < .01$ ) and professional learning community development ( $\lambda = .65, p < .01$ ) and a significant indirect effect on professional learning community development ( $\lambda = .13, p < .01$ ). Academic optimism had a significant direct effect on professional learning community development ( $\lambda = .35, p < .01$ ). Despite the fact that SES was not correlated with any of the variables in the bivariate correlations, it had a small but significant effect on AO ( $\lambda = .22, p < .05$ ) and elementary level had a significant direct effect on AO ( $\lambda = .51, p < .01$ ). SES and elementary level did not have a significant effect on professional learning community development.

Together, enabling school structure, academic optimism, and our control variables explained 74% of the variance in PLC development with enabling school structure making the largest contribution followed by academic optimism. The fact that neither SES nor elementary

level had a significant direct effect on PLC development was encouraging. This study also confirmed that AO is indeed made up the three observed variables (collective efficacy, teacher trust in clients, and academic emphasis) as previous studies have demonstrated (Hoy, Tarter Woolfolk Hoy, 2006; McGuigan and Hoy, 2006; Smith & Hoy, 2007). Our factor scores were high and ranged from .84 -.91. Finally, enabling school structure and our control variables explained 43% of the variance in academic optimism with elementary level having the most significant effect on academic optimism. See Figure 1 for our path model. See Table 5 for our Structural Model results.

### ***Goodness-of-Fit Indices***

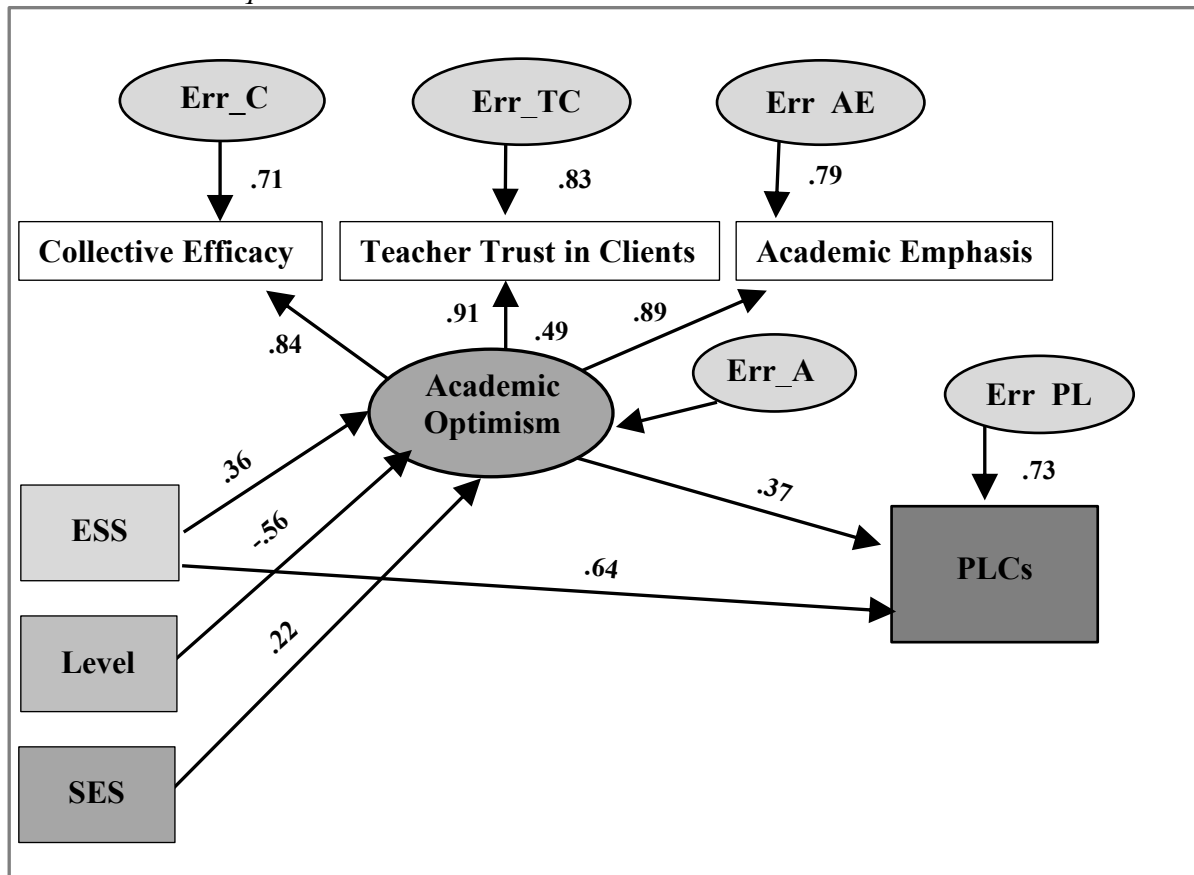
To test our theoretical model, we used the  $\chi$  test of model fit. Our model had good model fit as evidenced by a non-significant  $\chi$  of 17.85,  $p = .085$ . The Root Mean Square Error of Approximation (RMSEA) was .098, which is slightly higher than the recommended .05 -.08 (Schumacker & Lomax, 2010). The Goodness of Fit Index (GFI) was .94, which is within the recommended range of .90-.95, indicating good data to model fit. Furthermore, a post hoc analysis of power using G\*Power 3.1.7 to test the power of our theoretical model, with an NCP of 6.85, 11 degrees of freedom, and  $p < .05$ , yielded a power of .99, which indicates that we had a 99% chance of correctly rejecting the null hypothesis.

**Table 5**  
*Structural Model*

<b>Path</b>	<b>Standardized Coefficient</b>	<b>Unstandardized Coefficient</b>	<b>Standard Error</b>	<b>t-value</b>	<b>P</b>
<b>AO ← ESS</b>	.36	.40	.12	3.45	***
<b>AO ← ELEM</b>	.51	.53	.11	4.73	***
<b>AO ← SES</b>	.22	.59	.27	2.14	.03
<b>CE ← AO</b>	.85	1.00			
<b>TTC ← AO</b>	.91	1.30	.14	9.49	***
<b>AE ← AO</b>	.89	.82	.09	9.20	***
<b>PLC ← AO</b>	.35	.23	.06	3.64	***
<b>PLC ← ESS</b>	.65	.48	.05	9.03	***
<b>PLC ← ELEM</b>	.08	.06	.05	1.04	.30
<b>PLC ← SES</b>	-.11	-.20	.12	-1.65	.10

Our sample size of 66 schools is below Costello and Osborne’s (2005) recommended criteria of ten subjects per variable or the MacCallum et al. (1999) recommendation of 20 subjects per variable. However, to deal with this question of minimum sample size needed we used Schumacker and Lomax (2010) formula to estimate the minimum sample size (N) that would be needed to correctly reject the null hypothesis. This formula is  $N = (NCP/Fmin) + g$  Fmin is calculated by using the minimum fit function  $\chi$  and the formula  $Fmin = \text{Minimum Fit Function } \chi / (N-g)$  where N is the sample number and g is the number of groups. In our case,  $Fmin = 17.85/65 = .274$ . Using an NCP of 6.85 our estimated sample size  $N = (6.85/.274) + 1$  gave us a minimum sample size of 25. Therefore, while the sample size may be small, we have met the minimum sample size recommended by Schumacker and Lomax (2010) and given that the other estimations of model fit are good we suggest that the sample size for this study was adequate.

**Figure 1**  
*Final Structural Equation MIMIC Model*



### Theoretical Implications

Our study validates that schools should be built upon a foundation of enabling school structures and characteristics of a professional learning community with the positive influence of academic optimism. The formal structure provided by a PLC allows for change, as related to curricula, instruction, and assessment practices. In line with years of research about PLCs and the school organization, this study confirmed that certain structural and physical conditions need to be in place for a PLC to be established and sustained over time (Gray, 2011; Gray et al., 2016, 2017; Hord, 2007; Hoy & Sweetland, 2000; Huffman & Hipp, 2003; Kruse & Louis, 1993; Louis & Kruse, 1995; Louis & Marks, 1998; McLaughlin & Talbert, 2006).

The empirical findings emphasize the relationships of enabling school structures, academic optimism, and the development of PLCs. One cannot exist or be sustained without the others. This reciprocal relationship confirms the hypotheses, further extending what is known about PLCs. Prior to this study, the importance of establishing enabling school structures and academic optimism in PLCs, as described by Hord, had not been addressed in the literature (Gray, 2011; Gray et al., 2017). These findings suggest the need for more professionally oriented leadership within our schools in the form of enabling school structures to support and further develop PLCs (Tschannen-Moran, 2009). Further, the aspects of academic optimism lead to greater student achievement and teacher professional growth (Mitchell et al., 2016b). Therefore, our study adds



to the knowledge base about PLCs and the relationship with enabling school structures and academic optimism and to the field of literature.

### **Scholarly and Practical Significance of the Study**

This study demonstrates the importance and necessity of enabling school structure, trust in clients, collective efficacy, and academic emphasis, yet the structural equation model shows the critical role that enabling school structures have in the development of PLCs. Further, this is the first study to investigate and confirm the effects of enabling school structure and academic optimism on the development of PLCs. These empirical findings validate the importance of establishing enabling school structures as an antecedent to the development of PLCs. The reciprocal relationship of PLCs and ESS confirms the Hypothesis 1 and the dependence of one variable upon the other and vice-versa.

In order for PLCs to be sustained, the leadership of the school must ensure the following opportunities for teachers: reflective dialogue, de-privatization of practice, collective focus on student learning, collaboration, and shared norms and values (Kruse et al., 1994; Kruse & Gray, 2019; Louis & Kruse, 1995). From a practical perspective this study predicts that the development of PLCs relies upon the leader's ability to foster collaboration amongst teachers and a school-wide focus on student learning outcomes. "It is clear that the role of the principal is paramount in any endeavor to change pedagogical practice, adopt new curricula, reshape the school's culture and climate, or take on other improvement targets" (Hord & Sommers, 2008, p. 6).

School leaders need to model trust-building behavior and encourage a trusting school culture for teachers by sharing responsibilities, involving teachers and parents in decisions, promoting high expectations for students, and supporting teacher collaboration (Bryk & Schneider, 2002). "By creating the organizational conditions where teachers can exercise greater discretion in using their professional judgment to respond to the needs of students, principals can foster among teachers stronger professional norms, greater energy and enthusiasm for one's work, and greater trust in their relationships with students and colleagues" (Tschannen-Moran, 2009, p. 241). For PLCs to be effective, it is important for principals and districts to protect professional development time, provide it during regular work hours, and to encourage collaborative, professional behaviors.

By understanding the importance of enabling school structures and aspects of academic optimism for the school climate and promoting each within the school, the principal and school faculties have a better opportunity for improvement and increased student achievement (Hord, 2007; Huffman & Hipp, 2003; Kruse & Louis, 1993a, 1993b; Louis & Kruse, 1995; Louis & Marks, 1998; McLaughlin & Talbert, 2006). Beard (2011) conducted a study that also investigated academic optimism and enabling school structures, although not PLCs. She found that "the more enabling a school structure is, the greater a teacher's degree of academic optimism," which further supports some of our findings (Beard, 2011, p. 102).

### **Limitations of Study**

We acknowledge that the sample size of 66 schools is lower than some of the recommendations discussed earlier for conducting factor analysis (Costello & Osborne, 2005; MacCallum et al., 1999). However, Costello and Osborne (2005) and Tabachnick and Fidell (2012) argued that strict rules regarding sample size are less important when there are high commonalities and well-

determined factors yielding good data to model fit. We do advise caution in generalizing these findings because of the concerns with sample size and encourage others who have access to larger sample sizes to conduct further analysis on the variables in this study. We also caution that the findings of this study were based on one large school system in a southern state that had a high rate of poverty. Therefore, these findings may not be generalizable to districts and school systems outside of this general area and with different demographics.

### **Recommendations for Future Research**

In this study, we focused on the relationship of these variables across schools, but did not explore how these variables differ among teachers. Our research has laid a foundation for further research on these variables and supports prior research that suggests that these variables are school properties. However, until now no study has compared these variables in relation to one another. We encourage future research to extend this research to explore how these relationships may differ among teachers, as well as across schools using hierarchical linear modeling. While we have argued that our sample size was adequate, we have also acknowledged that a larger sample size would be better in uncovering the relationships among these variables. So, we encourage future researchers to confirm these relationships using a larger sample size.

We have also acknowledged the limitations, based on the demographics and location of our study. We were surprised by the finding that SES was not related to some of the indicator variables that make up academic optimism. This could be due to the fact that the schools in our sample were largely poor. Future research that has a more diverse sample may be able to test these relationships further. While our study has demonstrated that there are relationships between these variables, qualitative research may be able to shed light on precisely how enabling school structure and academic optimism work to facilitate the development of professional learning communities. Finally, the fact that the positive conditions brought about academic optimism seem to be associated most closely with elementary schools, leads us to believe that more research is needed in secondary schools that will help us to understand how these favorable conditions can be established there, also.

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