Professional Learning Communities:
An Examination of 21st Century and Traditional Facility Designs

by

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Abstract

Today's educational structures require teachers to move from isolation to collaboration to improve knowledge, skills, and instructional practices for effective teaching and learning. To do this, many schools across the United States have implemented professional learning communities as the framework for collaboration. The purpose of this framework is to improve the professional culture of schools by providing formal opportunities for educators to work together to strengthen instructional practices.

In addition to Professional Learning Communities (PLCs), the spaces that educators occupy represent the educational philosophy of the school as well as their own. Schools of the 21st century are undergoing facelifts or new buildings are being designed to create workspaces that serve as flexible spaces for teachers and students to teach and learn.

To bring awareness to the role that the physical design/floor plan of a school plays in collaboration based on the professional learning community, an explanatory sequential mixed method study was conducted in 21st century and traditional schools. The purpose of this study was to identify if there was a relationship between school type (21st century and traditional) and supportive conditions-structural (a dimension of a professional learning community). Also, the study sought to determine if differences existed between the six dimensions of a professional learning community; and to identify facilitators and barriers of the professional learning community in 21st century and traditional layouts.

This study utilized the *Professional Learning Community Assessment- Revised (PLCA-R)* (Olivier et al, 2010) with elementary educators in the two design types to answer research questions from phase one, qualitative. Results from the *PLCA-R* were analyzed using SPSS (v. 28.0). The findings were analyzed according to research questions one and two. Research

questions one and two did not indicate statistical significance when determining if there was a relationship between school type and the six dimensions of a professional learning community.

To further explain quantitative results and get more information regarding the professional learning community within a 21st century and traditional layout, focus group interviews were conducted to answer research question three. Findings from the focus group interviews identified three themes and six subthemes as facilitators and two themes as barriers to the professional learning community in the 21st century and traditional layout.

Although quantitative results did not yield evidence that there was a relationship between school type and the dimensions of a PLC; findings from the qualitative phase will make contributions to the literature on collaboration based on the professional learning community framework in different design types. This is the first known study that explored professional learning communities in 21st century and traditional layouts. The study provided evidence on the importance of schools having collaborative structures in place for an effective professional learning community regardless of the physical design layout. Also, findings from this study identified that the learning community gives educators an opportunity to come together and discuss instructional practices that will improve teaching and student learning. Lastly, the study identified that colleagues being in proximity to one another provides opportunities for informal collaboration and supportive learning environment for educators.

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Chapter 1: Introduction

Numerous external factors such as educational reforms, the push for 21st century skills, rigorous standards, and high stakes testing has led to changes in the way teachers teach and students learn. The Partnership for 21st Century Learning (P21) identified Four C's that learners need to be successful in college and careers. Those Four Cs were collaboration, communication, creativity, and critical thinking skills (P21, n.d.). Successful incorporation of these skills in the learning environment requires supportive systems for teachers such as professional development, standards-based instruction, assessments, and curriculum which will result in higher student engagement in the learning process and more effective preparation for a digitally and globally interconnected world (P21, n.d.).

Professional development (PD) has undergone a paradigm shift that has moved from "a one-day drive by workshop" to PD that is content focused, collaborative, engages teachers in active learning, provides for feedback and reflection, modeling, coaching, and support from experts (Darling-Hammond et al., 2017). A systematic process for collaboration that has served as a model for effective professional development since the 1990s is Professional Learning Communities (PLCs). PLCs provide ongoing, job-embedded learning that is active, collaborative, and reflective. Research supports the notation that interactions among teachers can lead to innovative practices and expose educators to the beliefs of their colleagues regarding teaching and learning (Vescio et al., 2008). Effective collaboration improves the ability of teachers to analyze and improve their instructional practices and leads to changes in their pedagogical beliefs (Briscoe & Peters, 1997; Shirrell & Spillane, 2019). Implementation of teacher collaboration has been the foundation for addressing educational reform because teachers work in collaborative groups to engage in data-driven decision-making for the improvement of

teaching and learning (Datnow, 2020). The basis of PLC philosophy involves collaboration at all levels of the school hierarchy with particular emphasis placed on teacher collaboration (Dufour et. al, 2008).

The macro politics in education from federal and state governments on policies as well as the influence from the community, parents, and other stakeholders who demand student achievement has influenced teaching and learning to address an ever-changing society. 20th century reform efforts in public education recognized that the nation was at risk and needed reformation. In 1981, the National Commission of Excellence in Education examined educational systems in the United States. Some of the findings revealed a high number of illiterate children, a lack of students' critical thinking skills, and a seventy-two percent increase in the number of American college students enrolled in remedial mathematics classes (National Commission on Excellence in Education, 1983). Because of these findings, former President Ronald Reagan declared that the nation was "at risk." During this era, it was believed that society should transition to a learning society that involved students, parents, teachers, and the community dedicated to excellence in education.

In addition to *A Nation at Risk,* another reform effort of the 20th century that led to the work of principals and teachers drastically changing was the *No Child Left Behind Act of 2001* (*NCLB*), which reauthorized the Elementary and Secondary Act of 1965. *NCLB* led to a shift in district initiatives and teacher instructional practices. The goal of this reform was that by 2014, all teachers would be highly qualified, all students would receive an education in schools that were safe and conducive to learning, all students that were limited in their English would be proficient, and all students would be high school graduates *(NCLB, 2001).*

In recent years, there has been a call for students to be college and career ready. State leaders, governors, and commissioners for forty-eight states and the District of Columbia met in 2009 and recognized that consistent, real-world learning goals were essential for students to be college and career ready (Common Core Standards Initiative, 2009). The standards were divided into two categories: college career readiness standards (what students are expected to know and understand by the time they graduate high school) and K-12 standards (expectations for elementary through high school). Implementation of these standards again led to changes in the educational infrastructures of school districts to ensure that teachers were equipped to teach the standards and that students were able apply the skills that were taught.

Fullan (1993) addressed reform as an uphill battle due to the educational system wanting the most up-to-date innovations and policies. Innovations in education extend past policies and into the physical design of school buildings. Seminal researchers such as John Dewey recognized the importance the learning environment plays in the success of the learner (Dewey, 1985). In one of Dewey's most notable works, *Democracy and Education* (1916), he discussed that the environment could promote or hinder a living being (the learner). Other researchers support Dewey's earlier claims that learning environments can influence the learner's experiences. Therefore, it is important to ensure school buildings are designed to fit that purpose (Konings et al., 2017). Educators around the world have been challenged to provide innovative curriculum that gives students an opportunity to develop their collaborative skills, a desire to remain a life-long learner, opportunities to use new technology, and opportunities to participate in critical thinking relating to society. To do this successfully, there must be an alignment with the curriculum and built environment.

According to Woolner et al. (2018), the layout of physical learning environments is different in various countries based on their philosophies of education and resources. Moore and Lackney (1993) discussed the relationship between the design of a school and educational reform. The researchers identified school building designs consisting of traditional classrooms, pod schools, team suites, and open plan schools. The framework of pod schools, team suites, and open plan schools were based on the premise that teachers and students collectively were a small community. Within this community, cooperative learning amongst students and team teaching took place to mirror the emerging workplace of the 21st Century. Examples of physical learning environments described in the work of Moore and Lackney coincide with the statement made by Proshansky and Wolfe (1974) noting that "The environment of the classroom is a direct expression of the educational philosophy; and it takes an active part in the educational process" (p. 573).

Statement of the Problem

Research supports the benefits of interactions between teachers; however, collaboration has not always been the norm for educators. Teaching has been identified as an isolated career field in the United States due to a teacher's schedule (Johnston & Tsai, 2018). Teacher isolation has also stemmed from schools having a culture of competition instead of collaboration. Barth (2006) said that teachers "guard their tricks like great magicians" (p. 11) which leads to isolation. As a result of isolation, educators have relied on trial and error and their memories of schooling as a model for effective teaching (Goddard et al., 2007).

Additionally, spaces to which teachers and students are assigned can be barriers or provide learning opportunities (Scott-Webber, 2019). Although research provides the importance of teacher interactions and the role learning environments play in the development of the learner,

many learning environments of the 21st century continue to focus on efficiency rather than student learning (Mayher & Brause, 1986). The layout of many classroom spaces continues to employ that of a factory model in which teachers stand in the front of the classroom delivering instruction where teachers work in isolation and students sit in rows with minimal conversations (Hord & Tobia, 2012; Nair, 2014). The learning environment described is not conducive to the expectations that have been placed on teachers and students as they are required to be creative, think critically, communicate, and collaborate. The shift away from the factory model and toward an environment that promotes collaboration among teachers and students requires change in the educational system.

Hord's and Sommers' (2008) theory of the dimensions of a professional learning community provides some of the general needs for PLC implementation, to include the need for supportive conditions-structural (resources, facilities, and communication systems). The conditions needed to equate to supportive conditions are not only broad, but these needs may look different across physical design types. Research is needed to examine the supportive conditions-structural within the 21st century and traditional physical design types.

Purpose of the Study

The purpose of this explanatory sequential mixed methods study (Creswell & Plano-Clark, 2018) is to investigate the relationship between the physical design/floor plans of the 21st century and traditional schools based on Shirley M. Hord's Dimensions of PLCs (a. shared values and vision; b. shared and supportive leadership; c. intentional collective learning; d. shared personal practice; e. supportive conditions- collegial/relational; and f. supportive conditions-structural) (Hord,1997/2004; Hord & Tobia, 2012). This study will specifically examine: (a) supportive conditions-structural because an attribute of this dimension is the

physical proximity of grade-level teams to each other for ease of collaboration; (b) examine if differences exist between supportive conditions-structural dimension and the other dimensions of PLCs in 21st century and traditional schools; and (c) identify factors that facilitate or present barriers to the professional learning community within the two physical design types.

Research Questions

1. What is the relationship between the physical design/floor plan (21st century and traditional) elementary schools and supportive conditions- structural dimension of the professional learning community?
2. What differences exist between supportive conditions-structural dimension and the other dimensions of the professional learning community (a. shared values and vision; b. shared and supportive leadership; c. collective learning and application; d. supportive conditions-collegial/relational; and e. shared personal practice) in 21st century and traditional elementary schools?
3. What do teachers perceive as factors that facilitate or present barriers to the professional learning community in 21st century and traditional schools?

Research Design

The proposed study will employ an explanatory sequential mixed method research design to examine the role the physical design/floor plan plays in the implantation of the professional learning community. Explanatory sequential research design involves the collection of quantitative and qualitative data (Creswell & Plano-Clark, 2018). This study will begin with the collection of quantitative data using the Professional Learning Community Assessment-Revised questionnaire (Olivier et al., 2010). Quantitative data will be connected to and expanded on by the qualitative data through focus group interviews as well as the analysis of documents such as

professional learning community agendas, schedules, and minutes (Bloomberg & Volpe, 2016; Creswell & Plano-Clark, 2018). This mixed method study is guided by the Dimensions of a Professional Learning Community (Hord, 1997/2004; Hord et al., 2010). Research design for this study is described further in Chapter Three.

Conceptual Framework

From 1995-2000, the Southwest Educational Laboratory (SEDL) conducted a study designed to look at professional learning communities from a theoretical perspective. The SEDL study, *Creating Communities of Continuous Inquiry and Improvement* (CCCII), provided valuable insight into the framework of PLC features and added critical points of understanding into the necessary factors that influence the formation and success of PLCs (Hipp & Huffman, 2010; Hord, 1997).

Over the years, the study of professional learning communities led to identifying that the supportive conditions dimension (physical and structural and collegial/relational) should be broken into two dimensions because they each bring valuable factors to the learning community (Hord et al., 2010). Therefore, the noted five dimensions of successful professional learning communities is now six. The six dimensions that guide this study are: (a) shared values and vision, (b) shared and supportive leadership, (c) collective learning, (d) shared personal practice, (e) supportive conditions-structural, and (f) supportive conditions- collegial/relational.

Shared Values and Vision

Members of the learning community must share the same values and vision and identify ways they can achieve the agreed upon purpose. The focal point of this dimension is for educators to put student learning at the forefront of all decisions as they work collaboratively within the community.

Shared and Supportive Leadership

Instructional leaders must build the capacity of teachers by being supportive and sharing leadership responsibilities. Shared and supportive leadership creates a trusting relationship between school leaders and teachers.

Collective Learning and the Application of Learning

Educators throughout the organization are intentional when they collaborate so that they can seek new knowledge, skills, and strategies to improve student learning opportunities.

Shared Personal Practice

Colleagues informally observing each other to offer new knowledge, skills, and encouragement that will improve instructional practices. Peer observation can only be successful if a culture of trust and respect exists within the community.

Supportive Conditions: Structural

This dimension identifies when (time), where (place), and how (money and materials) members can collaborate to make decisions, solve problems, and work creatively. PLCs meet on a regular basis to discuss student data, instructional practices, etc.

Supportive Conditions: Collegial/Relational

Relationships are considered the "soul" of professional learning communities. The development of collegial relationships among members establishes professional trust and respect within the learning community. These relationships also keep educators current on best practices and trends in education.

Assumptions

- Each participant understands the type of school facility in which they teach (21st century or traditional).

- Participants will answer survey questions truthfully based on their experiences.
- Participants are familiar enough with the PLC process to answer questions about their experiences collaborating with colleagues.
- Participants are elementary teachers that are members of a professional learning community.

Significance of the Study

A thorough review of the literature revealed a plethora of research on professional learning communities as a school improvement strategy to enhance teaching and student learning (Hord, 1997; Hord, 2004; Hord & Sommers, 2008; Hord & Tobia, 2012; Hord & Roussin, 2013). Also, there is a great body of research regarding the importance that the physical learning environment plays in the development of teachers and students (Asiyai, 2014; Earthman, 2004; Graetz & Goliber, 2002; Kensler & Uline, 2017; Lippman, 2010; Martin-Horne, 2002; Uline & Tschannen-Moran, 2008; Uline et al., 2009; Uline et al., 2010; Woolner et al., 2007; Woolner et al., 2012b) and student outcomes (Barrett et al., 2015; Bowers & Urick, 2011; Cash, 1993; Earthman, 1995; Picus et al., 2005; Tanner, 2008).

Although there is some literature that has studied how school buildings affect collaboration, this research did not explore the physical design/floor plan of elementary schools that have implemented professional learning communities, which leaves a gap in the literature that needs to be studied (Reagans, 2011; Spillane et al., 2017). This study is significant in the field of education because there is a push for teachers to participate in collaboration within the professional learning community and employ 21st century skills within their assigned learning environment. To best prepare teachers to be effective in their learning environments as they

educate students, school districts and leaders must understand the role the physical design/floor plans of elementary schools plays in the structures of the professional learning community.

Definitions of Terms

- Collaboration - teachers working together to support one another, share instructional practices, and identify problems and strategies to improve classroom practices.
- No Child Left Behind - federal law in the United States that sought to improve the performances of schools by making sure that states, school districts, and schools were held accountable for student outcomes *(No Child Left Behind Act of 2001).*
- Physical environment - location where teaching and learning takes place (Asiyai, 2014).
- Physical design/floor plan - layout of the school buildings, room assignments, and traffic patterns (Shirrell & Spillane, 2019).
- Professional Learning Community - teachers working collaboratively to reflect on their practices and examine the relationship between practice and student outcomes (McLaughlin & Talbert, 2010).
- School leaders - principals and assistant principals.
- Traditional school - a school with identical self-contained classrooms along hallways (Spillane & Shirrell, 2018). The schools have incorporated innovative features that emphasize the integration of technology to support 21st century teaching, learning, and leading. Some school buildings include a teacher preparation area and multi-purpose training facility.
- Twenty-first century schools - built around each grade level in a "neighborhood." Each grade level has a learning hub, four to six learning studios, and at least one group learning and one-to-one learning space. The learning environment includes a common collaboration room for which all teachers in a grade-level share an office and meeting space.

Organization of the Study

This study is organized into five chapters. Chapter One introduced the topic being researched, discussed the statement of the problem, purpose of the study, significance of the study, conceptual framework that guides the study, identified assumptions, and defined key terms. Chapter Two provides a review of the literature pertaining to the conceptual framework, physical environment, and professional learning community. Chapter Three discusses the research questions, design, and methodology of the study. The questions from the study and the results pertaining to those questions will be discussed in Chapter Four. Chapter Five includes a summary, conclusions, implications, and a discussion of areas for future research.

Chapter 2: Review of the Literature

This chapter provides a historical overview of professional learning communities and the role the physical environment has played in education over the years. The literature review is divided into two sections with accompanying subsections: professional learning communities and the physical learning environment. Section one of the review defines professional learning communities (PLCs) and presents the dimensions of PLCs that served as the conceptual framework for this study (Hord 1997; Hord, 2004; Hord & Tobia, 2012). Collaboration is a subsection of professional learning communities that derived from a review of the literature. Section two defines the physical learning environment and is divided into the following subsections: a.) learning environment and student learning; b.) teacher and student perceptions of the learning environment; c.) physical learning environment and collaboration; and d.) 21st century learning environment.

Extensive research has been conducted on the conditions of school facilities as well as the impact the school building has on student outcomes (Barrett et al., 2015; Bowers & Urick, 2011; Cash, 1993; Earthman, 1995; Picus et.al., 2005; Tanner, 2008); however, there is a limited body of research regarding the role school building design plays in professional learning communities, which is known as a systematic process for collaboration and has been identified as a school improvement strategy (DuFour, 2004; Shirrell et al., 2019; Spillane et. al., 2017; Spillane & Shirrell, 2018;).

Churchill (2014) explained that learning spaces support small-group and whole-group relationships. He further states that flexible learning transforms classrooms into spaces for collaborative learning. Brooks (2011) adds that 21st century learning spaces increase pedagogical innovation and result in an increase of student engagement. School buildings continue to undergo

renovations or are completely new constructions. Although it is a difficult task to design buildings that will sustain the future needs of occupants, revealing the internal factors that are facilitators or barriers for collaboration based on the professional learning community framework within the learning environment will bridge the gap in the literature.

Professional Learning Communities

Experts in the areas of math, literacy, science, and social studies as well as state departments of education have identified standards for each grade level that outlines what students should know and be able to do (Hord & Tobia, 2012). Standards identify the information teachers must teach and the skills that students need to be considered proficient once the standards have been taught. With the expectation that teachers are to ensure success for all students in their diverse classrooms, it is impossible for teachers to rely solely on their own knowledge and experiences with curriculum and instruction.

The shift to teacher accountability and the implementation of innovative curriculum has led to professional development that supports more than the acquisition of new skills but includes rethinking practices (Vescio et. al., 2008). Educators rethinking instructional practices requires them to unpack standards with colleagues to gain an in-depth understanding of what students should be able to do and analyze assessments that align to the standards. For teachers to feel comfortable discussing their instructional practices and needs, school leaders must establish effective professional learning communities that support intentional and high-quality learning for all students (Hord & Tobia, 2012).

Hord and Tobia (2012), defined professional learning communities (PLCs) as: *Professionals* in schools which are teachers, administrators, counselors, media specialists, etc. These professionals are held responsible and accountable for delivering effective instruction to

students and ensure that they achieve high levels of learning. Professionals assemble as a group, in a *community* that provides supportive conditions-structural for meeting. The purpose for professionals assembling in the community is for all educators to *learn* so that all students receive high quality teaching and attain successful learning.

Additionally, Hord (2009) defined PLCs as colleagues who share a common purpose and meaning and are learning together. PLCs are also defined as a group of four to six teachers or administrators who meet regularly, work between meeting times, identify a shared goal, and they work together to meet their shared goal (Strickland, 2009). McLaughlin and Talbert (2010) add to the definition that PLCs are organizational structures in which teachers work collaboratively to reflect on their practices and examine the relationship between practice and student outcomes.

Lastly, Hipp and Huffman (2010) defined PLCs as educators working collectively and purposefully to create and sustain a culture of learning for teachers and students. PLC teams can be organized by grade levels, departments, or interdisciplinary groups (Jones & Stanford, 1973). Although there are many definitions of PLCs, the commonality between each definition is that it involves a group of educators who collaborate regularly regarding teaching and learning and share a common purpose.

PLCs were patterned after Communities of Practice (CoP) which have been used in the business sector to build the capacity of employees to learn (Vescio et al., 2008). In the educational realm the term learning community has been used to develop a culture of collaboration among educators. There are two assumptions that guide the learning community. The first assumption says that knowledge is based on the lived experiences of teachers and is best understood through critical reflection with colleagues who share the same experience. Secondly, teachers who actively participate in PLCs increase their professional knowledge and

improve student learning. Implementation of PLCs has led to professional development being structured around teachers learning within a community that focuses on meeting the educational needs of students by reflecting individually and collectively on their daily instructional practices.

According to the National Council of Staff Development, PLCs are a critical standard for effective staff development (Hirsh, 2007). The purpose of staff development is for educators to enhance their instructional practices for the improvement of student learning. Handy (1995) said: "Preferred organizations will be learning organizations...It has been said that people who stop learning stop living. This is also true of organizations" (p. 55). Effective PLCs are continuously learning to improve their practices and student outcomes. DuFour (2004) found that the work of the professional learning community is more effective when the work occurs within a collaborative environment. DuFour explains that in a collaborative environment, members of the PLC are more likely to test their ideas, challenge each other's assumptions, and process new information.

Hord and Sommers (2008) discussed that PLCs have served as a school improvement strategy that focuses on ways to increase student and teacher learning. Hord (1997) noted positive outcomes for implementation of PLCs for teachers and students which are:

- A decrease in teacher isolation
- Educators committed to the mission and goals of the school and working collectively to strengthen the mission of the community
- All members share the responsibility of developing students for success
- Learning among teachers improves practices and creates new knowledge and beliefs about teaching and learning

- Teachers understand what they are teaching as well as the part they play in helping all students achieve expectations

Dimensions of a Professional Learning Community

The conceptual framework of this study is based on the dimensions or principles of professional learning communities. Hord et al. (2010) and Hord & Tobia (2012) identified six dimensions that serve as the framework for effective learning among professionals as they collaborate regarding teaching and learning. Those dimensions are: (a) shared values and vision, (b) shared and supportive leadership, (c) intentional collective learning and application, (d) supportive conditions-structural, (e) supportive conditions-relational factors, and (f) shared personal practice.

Shared Values and Vision. The first dimension of a professional learning community is shared values and vision. Educators who have shared values and vision have a common purpose that has been agreed upon by all (Hord & Sommers, 2008). This dimension assists staff members in identifying how they will collaboratively achieve the purpose that has been identified. As members of the professional learning community collaborate, they begin to grow as individuals and as a community that is focused on the agreed upon values and vision that guide teaching and learning (Morrissey, 2000). Shared values and vision require members of the community to focus on student learning by continuously building their own knowledge.

Shared and Supportive Leadership. The second dimension of PLCs is shared and supportive leadership. School leaders play a vital role in implementing change within schools. They serve as the driving force in getting staff members to believe in the change that is transpiring. Implementation of PLCs can be difficult for some school leaders because it requires them to share power and decision making with faculty and staff when applicable (Hord &

Sommers, 2008). PLCs are designed for collaboration, democracy, and continuous learning of staff members.

For this dimension to successfully exist, school leaders can no longer be the most powerful person in the room. It has been said that PLCs do not serve as "teachers teach, students learn, and administrators manage… [There is] the need for everyone to contribute" (Kleine-Kracht, 1993, p. 393). Everyone contributing involves shared decision making among members with the understanding that there are some decisions that can only be made by school leaders. Boundaries for decision making within the community must be identified during the beginning phases of PLC implementation (Hord & Sommers, 2008).

An important characteristic of shared and supportive leadership is distributed leadership. Distributed leadership involves members taking on leadership actions to influence the team or to make the team effective (Northouse, 2016). Spillane (2005) discussed that distributed leadership involves leadership practices instead of roles, functions, or routines. Leadership practice is an interaction between school leaders, followers, and the situation. Through distributed leadership, people expand upon the practices of others which creates reciprocal interdependence between leaders and stakeholders which is built through situations.

In the professional learning community, school leaders seek to build teachers' individual and collective capacity to improve student learning (Balyer et al., 2015). By building the individual and collective capacity of teachers, they will be able to step in and provide the necessary leadership in a situation and step back to allow others the opportunity to lead (Northouse, 2016). Distributing leadership in the learning community gives teachers an opportunity to develop as teacher leaders and allows for successful implementation of new initiatives and policies within the school (Morrissey, 2000).

Collective Learning and the Application of Learning. The third dimension of PLCs, intentional collective learning and application involves educators from all disciplines coming together to "study collegially and to work collaboratively" (Hord & Sommers, 2008). During collective learning and application, members question, investigate, search for solutions to improve the school, and participate in reflective dialogue (Barth, 2006; Louis et al., 1995). This dimension is focused on effective teaching which leads to student learning. For teaching to be effective, not only must teachers constantly put their new knowledge into action, but they must reflect on their practices and have discussions with other educators regarding skills being taught to have a variety of instructional practices within their toolkit if needed.

Supportive Conditions: Structural. The fourth dimension of PLCs, supportive conditions- structural, determines the physical factors or logistics of PLCs such as when, where, what, and how the staff meets as a group to problem solve, reflect, learn, and inquire (Hord & Sommer, 2008). Before an effective PLC can be established, logistics such as time, space, communication, and materials and resources must be well planned out to ensure professionalism and functionality of the community (Hord & Tobia, 2012).

Time. A logistical factor that has been deemed a barrier in schools is the lack of time to perform day-to-day operations. The incorporation of one more thing leaves school leaders as well as faculty and staff wondering how to fit it all in. Over the years, school districts have found ways to provide time for educators to collaborate within the instructional day by adding minutes to the beginning and end of the day four days a week, and students are dismissed early on the fifth day (Hord & Sommers, 2008). Some school districts have designated one day a week for colleagues to engage in professional learning activities (Hord & Tobia, 2012). Darling-Hammond et al. (2009) noted:

> When schools are strategic in creating time and productive working relationships within academic departments or grade levels, across them, or among teachers' school-wide, the benefits can include greater consistency in instruction, more willingness to share practices and to try new ways of teaching, and more success in solving problems of practice. (p. 11)

Space. Another component of supportive conditions-structural is space. Numerous schools have exceeded the capacity of students the facility can accommodate. This has led to schools turning art and music rooms into classrooms to accommodate the increased number of students in the facility. Art and music teachers have transitioned to being mobile due to these circumstances. School leadership teams have been creative in identifying a space for faculty and staff to collaborate for professional learning.

For example, a school encouraged grade levels or subject area departments to meet in a teacher's classroom and rotate amongst the grade level or department by creating a schedule of when and where they would come together for professional learning (Hord & Tobia, 2012). Teachers were able to select the date that their classrooms would be used for collaboration. A benefit to teachers collaborating in their colleague's environment was that it gave teachers a chance to view learning materials that were exhibited such as bulletin boards, anchor charts, classroom library, word wall, etc. Teachers were able to ask questions about the items they saw or request to come back to the classroom another time to ask more questions and view items more thoroughly. Other benefits to teachers collaborating in other classrooms is that it builds the self-esteem of teachers regarding the learning environment they establish for students, and it provides an opportunity for teachers to gain knowledge that can be incorporated into their own classrooms.

Communication. A well-organized PLC identifies structures for communication amongst grade level or department teams. Communication in schools has consisted of faculty meetings, e-mails, newsletters, faculty mailboxes, social networking, and texting (Hord & Tobia, 2012). Each of these examples provides faculty and staff with pertinent information regarding the learning community. It is important that the professional learning community identifies the modes for communication and establishes how often the communication will be used. For example, School A will send a digital weekly newsletter on Mondays at 8:00 a.m. to faculty and staff. This provides the learning community with the mode of communication, frequency, and when the communication will happen.

Material Resources. In addition to communication, material and human resources are structures that support the professional learning community. To ensure that PLCs support an increase in teachers' professional practices, materials must be available for individuals as well as the community to study and learn (Hord & Tobia, 2012). Material resources consist of journals that are relevant to the school, grade level, and academic discipline. CDs or DVDs that relate to the standards being taught can be found in the media center. Also, in the media center, teachers can find print sources such as books or magazines to assist in standards-based instruction. Media specialists have been trained to navigate the databases the school district has access so they can aid when requested.

Human Resources. The purpose of PLCs is for members to continue learning to enhance teaching and student learning. It is important that teachers have access to human resources such as instructional coaches, curriculum specialists, consultants, and other experts as needed (Hord & Tobia, 2012). The community is composed of experts that can provide advice, counsel, and learn about how to teach a certain standard that will yield improved results. However, there are times

when the expert does not reside in the community and school leaders must search for individuals that can provide the professional learning for members based on their needs.

Supportive Conditions: Collegial/Relational. The fifth dimension of PLCs is collegial/relational conditions. Hord and Tobia (2012) identified relationships as "the soul of professional learning communities" (p. 87). The authors described two scenarios of elementary teachers who were analyzing student work. Scenario one involved teachers being encouraged to bring student work samples from a lesson that was previously discussed to the professional learning community. The grade level team arrived to discuss evidence of student learning in the work. A teacher shared the work samples she brought and began to feel defensive with other teachers who described how the level of the work samples showed or did not show mastery of the standard based on the expectations that were identified in the lesson. The more the team discussed the work sample, the more the teacher became anxious and left the room upset.

In scenario two, teachers came together to analyze student work samples just like in the first scenario. The teachers were discussing the samples that a teacher presented. During this discussion, the teacher who provided the samples experienced an "aha" moment and realized the assignment and work samples had little connection to the standards and was appreciative to her colleagues for providing this insight. The team developed a new strategy to teach the standard and assess student understanding of the skill effectively (Hord & Tobia, 2012). Both scenarios involved a team analyzing and discussing student work as well as providing feedback that would enhance the assessment of the lesson. It is evident that scenario one had not developed a community built upon trust which left the teacher feeling attacked versus supported.

Implementation of PLCs has been described as making teaching a public act that is no longer secretive behind an assigned classroom door (Hord & Tobia, 2012). Within the

professional learning community, a teacher's content knowledge and skill set are open for discussion with colleagues. These scenarios show the importance of creating a school climate that encourages open and trusting relationships so that teachers can collaborate without feeling judged or inadequate by their colleagues.

Trust. Building relationships in PLCs requires trust amongst teachers and school leaders. Trust has been identified as the foundation of a positive school climate. Palmer (2007) identified fear as a challenge for establishing a culture of trust. There are many underlying causes that lead to teachers being fearful, such as: fear of not being able to engage and motivate students such as those who live in poverty, violence, or abuse; fear of administrators, colleagues, parents, and students believing they are not good teachers; or the fear of having to change what they identify as good teaching (Hord & Tobia, 2012). As professionals, teachers must tackle their fears and reflect to identify what actions or reactions on their part may have contributed to being fearful. To tackle their fears, teachers must have the support of their peers. As mentioned earlier in this section, trust is the foundation that gives teachers the courage to be open and honest to collaborate and develop collective efficacy (Goddard et al., 2000).

Collective efficacy is defined as the shared beliefs of a group to collectively organize and fulfill the actions required to meet the goal (Bandura, 1997). The term collective efficacy has been noted as a positive association with student achievement (Bandura, 1993; Goddard et al., 2000). According to Hord & Tobia (2012), schools that develop a mindset that they will work as a team no matter what challenges arise, develop a culture of openness and trust which is the foundation for PLCs. The establishment of trust requires leaders to possess certain qualities and behaviors that create a culture of trust within a school. Tschannen-Moran (2004) identified these

qualities as the *Five Facets of Trust*. The facets of trusts and the characteristics of each are as follows:

- Benevolence - caring, having good intentions, supporting teachers, expressing appreciation to staff, being fair, and guarding confidential information.
- Honesty - having integrity, telling the truth, honoring agreements, accepting responsibility, and being true to oneself.
- Openness - engaging in open communication, sharing important information, delegating, and sharing decision-making and power.
- Reliability - being consistent, dependable, and committed.
- Competence- setting an example, engaging in problem-solving, fostering conflict resolution (rather than avoidance), handling difficult situations, and being flexible (p. 39).

Establishing trust with members of the professional learning community takes a long time. Tschannen-Moran (2004) described trust as a "multidimensional and dynamic phenomenon" (p. 47). Trust transpires differently based on timing and location. Depending on the type of relationship, the relationship deepens the more people interact with each other over time. It is critical that leaders understand the developmental nuances of trust to establish and sustain trust within the school.

Kensler et al. (2009) conducted a study with middle school teachers in Pennsylvania and New Jersey. In the study teachers from the schools completed one of the three studies that measured democratic community, faculty trust, or continuous and team learning. The purpose of the study was to relate democratic community, trust, and organizational learning. Results from the study revealed that faculty trust yielded a positive relationship between a democratic community and continuous and team learning. The result from this study confirms that trust

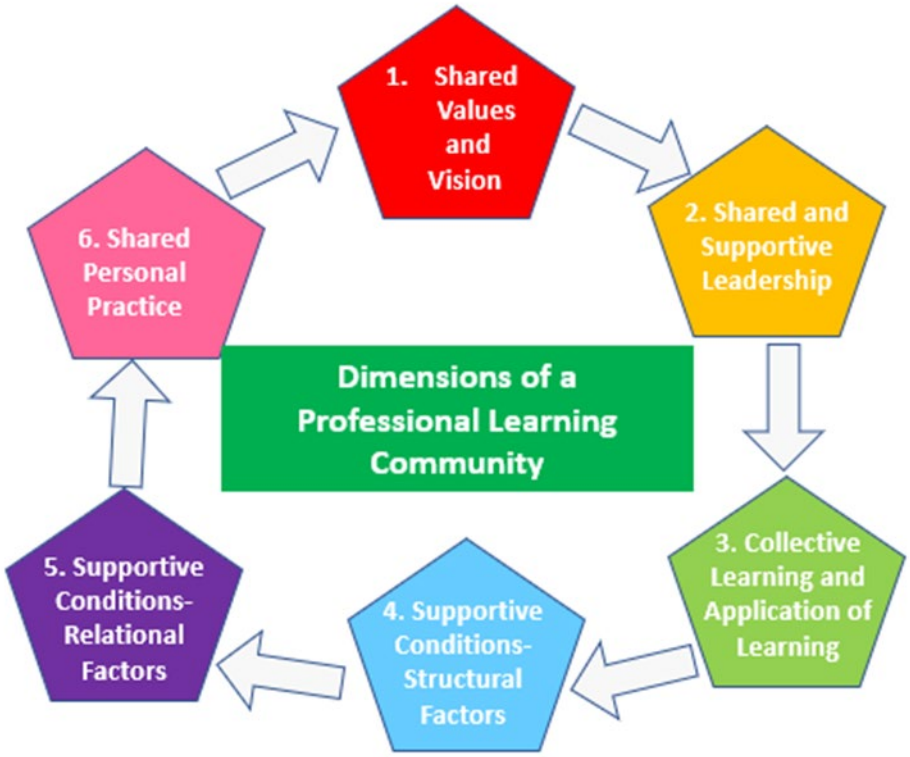
serves as the building block for a sustainable professional learning community. Relationships among school leaders and colleagues are the "soul of the community" because they provide sustainability for continuous learning.

Shared Personal Practice. The last dimension to sometimes develop in the PLC is shared personal practice because it requires educators to shift their thinking from isolation to collaboration (Hord, 1997). Hord and Sommers (2008) discussed that colleagues reviewing a teacher's instructional practices is evaluative, but it is a way for colleagues to assist one another in improving instructional practices. Examples of shared personal practice are visiting each other's learning environment, taking notes, and discussing observations with colleagues. Participating in shared practice allows teachers to facilitate the work needed in changing their current practice through discussion with colleagues.

Through peer coaching and feedback, colleagues can provide support to one another when implementing a new instructional practice. Success of shared practice is grounded in mutual respect and trust among the community. Since teaching has been an isolated field for many years, this dimension is last because it takes time to build trust and respect. Being able to visit other learning environments, observe, and provide meaningful feedback should be modeled for colleagues by school leaders and instructional coaches. It is imperative that administrators (district and school level), provide the necessary professional development to staff members to teach the skills of shared personal practice. Figure 1 provides a model of the six dimensions of professional learning communities.

Figure 1

Dimensions of a Professional Learning Community



Six Principles of PLCs. The National Commission on Teachers and America's Future (NCTAF) *Team Up for 21st Century Teaching and Learning: What Research and Practice Reveal about Professional Learning (2010)* has many similarities to Hord's framework of PLCs. NCTAF identified six principles for PLCs. Those principles are:

Principle 1: Shared Values and Goals. The team should have a shared vision that identifies the capabilities of students and teachers. The problem should be identified so that the team can come together to solve the problem.

Principle 2*: *Collective Responsibility. Team members should share and differentiate responsibility based on experience and level of knowledge. Accountability is mutual among the members.

Principle 3: Authentic Assessment. Educators in the community are collectively accountable for improving student achievement using assessments and timely feedback on student learning and teaching effectiveness. Assessments are valued because it identifies the instructional needs of students.

Principle 4**: **Self-Directed Reflection. Members establish a "feedback loop of goal setting, planning, standards, and evaluation driven by the needs of both teacher and student" (National Commission on Teaching and America's Future, 2010, p.10).

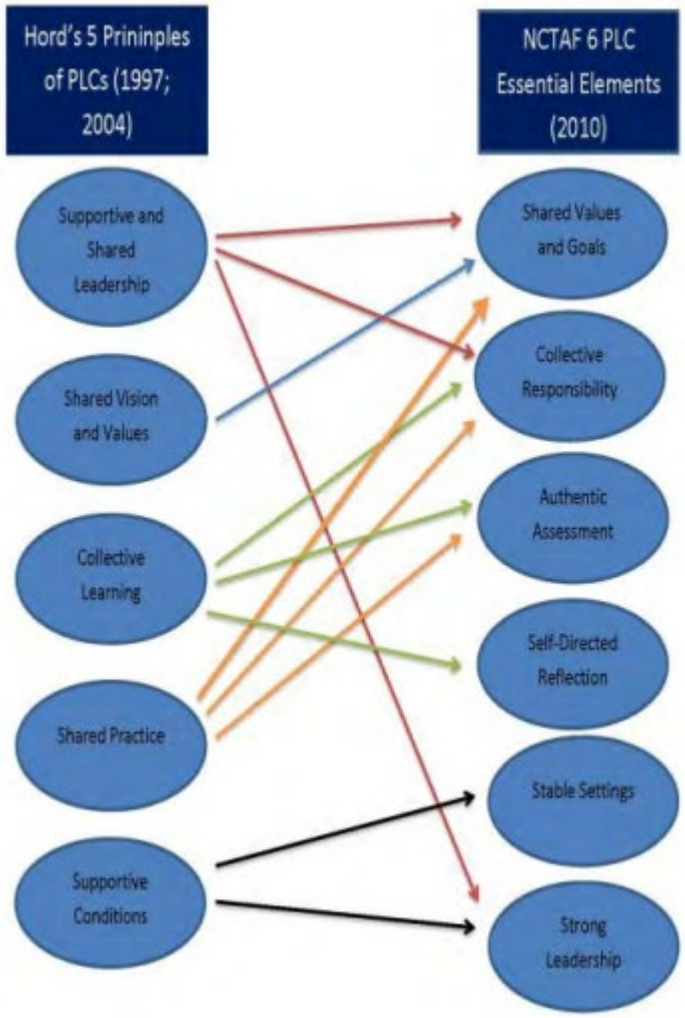
Principle 5**: **Stable Settings. There is dedicated time and space for collaboration as well as support and positive pressure from leadership.

Principle 6: Strong Leadership Support. A successful team is supported by school leaders who build a climate of trust and openness. Leaders empower teams to make decisions based on student needs.

Irwin (2014) identified a connection between Hord's dimensions and NCTAF's principles. Figure 2 shows the connection between the dimensions of PLCs and the six principles of PLCs. Permission to reprint this figure can be found in Appendix M.

Figure 2

Connection of PLC Dimensions to NCTAF PLC Elements



A Study of the Implementation of Professional Learning Community Practices and their Relationship Teacher Practices and Student Learning Outcomes (p. 42), L. Irwin, 2014, Auburn, AL: 2014 by Auburn University. Reprinted with permission.

Effective PLCs. Effective PLCs improve the interpersonal interactions between teachers and administrators as they work together to support each other and meet the needs of all learners by establishing a healthy culture (Hipp et al., 2008). The authors defined culture as the shared assumptions, beliefs, values, and behaviors that shape how professionals think, feel, and act.

Schools that are considered high performing, have a professional community that is said to hold culture in a "container." This means that culture is held close to the school community and leads to teachers feeling energized, challenged, engaged, and empowered by their learning community.

Effective PLCs consist of teachers collaborating to review student data, develop lessons, share instructional practices that were beneficial to student learning, identify interventions and enrichment activities, and serve as a community of learners for new teachers (Buttram & Fairly-Ripple, 2016). PLCs require teachers to participate in collaborative inquiry in which they reflect and question instructional practices to meet the needs of all learners. Effective collaboration takes place over time as teachers interact formally and informally through their commitment to learning about their instructional practices (Carpenter, 2017). Also, effective PLCs have identified workspaces where teachers can collaborate. Intellectual workspaces allow educators to interact with one another through professional discourse to produce something that will benefit teachers and students.

In addition, effective PLCs facilitate teacher leaders. Wilson (2016) defined teacher leadership as teachers leading inside and outside of the classroom to influence others toward improved practice. Building teacher leaders in PLCs gives teachers the opportunity to participate in in-depth learning that helps them grow professionally while meeting the needs of all learners (Charner-Laird et al., 2016). Creating good schools without good teachers is difficult (Wilson, 2016).

Furthermore, effective PLCs impact student learning (Stoll et al., 2006). The researchers conducted a two-and-a-half-year study on professional learning communities in England. Stoll and colleagues explored the effectiveness of PLCs. Schools in the study were able to identify which stage of implementation their PLC was in (starter, developer, or mature). Findings

revealed that learning-enriched workplace in high school math was positively affected by increased learning in schools with a professional learning community. Schools where teachers were focused on authentic pedagogy in their professional communities also saw an increase in student learning. PLCs that establish a community built on the six dimensions can improve instructional practices as well as student outcomes by being open to sharing and acquiring new knowledge for the betterment of all involved.

Barriers of PLCs. Although the literature has identified benefits to PLCs there are also barriers. Organizations moving towards a collaborative culture require a systematic change. This change can be difficult for teachers based on their beliefs and practices which are established through their experiences, biographies, and priorities (Hargreaves, 2003). Stoll et al. (2006) identified individuals accepting change, dynamics of the group, and school context as barriers for implementation of PLCs.

Another barrier that was addressed earlier in the literature review and is being mentioned again as a barrier is time. The numerous tasks that are placed on teachers serve as barriers to PLCs. Teachers are constantly rushed throughout the day to complete these numerous tasks. Educators are consumed with paperwork, multiple data points, and receive new directives regularly from district leadership (DeMatthews, 2014). These cumbersome tasks result in teachers struggling to participate in professional discourse due to lack of time and energy. Effective collaboration involves teachers having a designated time to work together. Little (2002) emphasized that time should be built into schedules for teachers to collaborate, observe each other's teaching practices, discuss curriculum issues, plan, and engage.

In addition to time, the personalities of members of the collaborative group have been identified as barriers to collaboration. Discourse during collaboration in PLCs reveals the

varying beliefs of members. Kruse (2001) mentioned that collaboration brings difficulties to the forefront and through dialogue members work collectively to solve those problems for the betterment of teaching and learning. Participants understanding the change that is transpiring and being willing to listen and learn from others will assist in overcoming this change. The barriers of PLCs discussed in this section make it challenging for school leaders and teachers to embrace professional learning communities as an effective strategy for school improvement instead of being labeled as "one more thing."

Successful PLCs require principals to implement supportive conditions for collaborative work that consists of a designated time for members to collaborate, to provide physical proximity of colleagues to each other, to encourage teacher empowerment, and to establish trust with members (Hord & Sommers, 2008).

Collaboration. The term "collaboration" has become a buzzword in education due to external factors such as high stakes testing, implementation of rigorous standards, and 21st century skills. To address these factors, school systems have implemented professional learning communities as a school improvement strategy. Collaboration is the central component of PLC implementation and sustainability (Irwin, 2014). According to Eastwood and Louis (1992), "The single most important factor for successful school restructuring and the first order of business for those interested in increasing the capacity of their schools is building a collaborative internal environment that fosters cooperative problem-solving and conflict resolution" (p. 215). Gajda and Koliba (2008) defined collaboration as a group of teachers who are constantly engaged in collaborative inquiry based on their shared purpose that guides collaborative discourse. Vangrieken et al. (2015) described collaboration as a "joint interaction in the group in all activities that are needed to perform a shared task" (p. 23).

Goddard et al. (2007) identified possible structures for collaboration such as: a) collaboration between general and special education teachers to meet the needs of students with disabilities; b) collaboration with teachers working in the same departments (i.e., Math department); c) collaboration among groups of educators who were brought together to solve specific problems; and d) collaboration between teachers to discuss professional work (i.e., student data or instructional practices).

Behaviors of Collaboration. Little (1982) identified four behaviors of collaboration. The first behavior is that teachers in collaborative environments frequently communicate about their teaching practices. Next, teachers in a collaborative environment observe one another's teaching to provide constructive feedback that will improve their instructional practices. Third, teachers in a collaborative environment plan, design, evaluate, prepare instructional materials, and examine the curriculum to meet their instructional goals. Lastly, teachers in a collaborative environment share their teaching knowledge with one another by teaching each other strategies that will improve their teaching practices. According to Woodland et al. (2013), effective teacher collaboration involves teachers working directly together with their colleagues during the school day to examine student data and solve problems relating to instructional practices through a continuous cycle of dialogue, decision making, action taking, and evaluation which are known as the elements of teacher collaboration cycle.

Additionally, DuFour & Reeves (2016) identified four critical questions collaborative teams use to focus on student learning within the professional learning community. Those questions are:

1. What do we want students to learn and be able to do (standards)?
2. How will we know if they know it (assessment)?

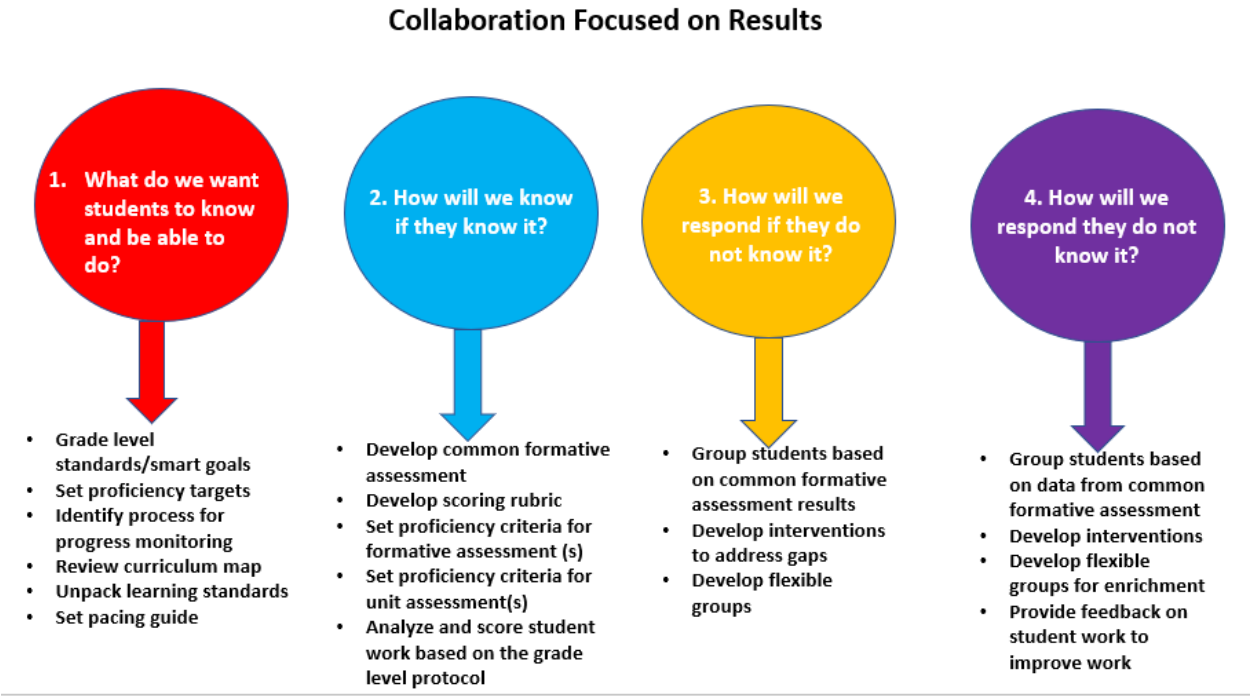
3. How will we respond if they do not know it (instructional strategies for challenged learners)?

4. How will we respond if they know it (instructional strategies for enrichment)?

Critical question one identifies the standards that will be taught. The standards identified guide the instruction for teachers and the activities that will be used to assist students in mastering the skills. Critical question two addresses how students will be assessed on the standards that have been taught. During collaboration, grade levels decide on a common formative assessment that is used to determine student understanding of skills taught. The third critical question requires the learning community to identify the instructional strategies that will be used to help students that did not master the skill. The team decides on the instructional strategies, how they will monitor progress, and how often progress will be monitored. Lastly, critical question four identifies the instructional strategies needed for students that have mastered the skill. These strategies involve enrichment activities that require critical thinking. These questions foster collaborative inquiry that is needed for the third dimension of PLCs. Figure 3 provides a visual representation of collaboration that is focused on results.

Figure 3

Summary of Collaboration Focused on Results (DuFour & Reeves, 2016)



Benefits of Collaboration. Moreover, there are benefits to a collaborative environment in schools. Goddard et al. (2015) identified that schools that have a successful collaborative environment improve teacher efficacy, increase teacher job satisfaction, decrease first-year teacher turnover, increase levels of trust in administration, colleagues, and clients, and improve student outcomes due to teacher involvement in the development of curriculum and instruction. Also, when teachers work collaboratively, teacher isolation is decreased and there is more focus on the academic and behavior outcomes of students (Goddard et al., 2007).

Vangrieken and colleagues (2015) mentioned that teachers cannot teach collaborative skills unless they "practice what they preach" (p. 18). An example of teachers working collaboratively is detailed in a study conducted by Haycock (2007). Results of the study revealed collaboration being a benefit amongst teachers and teacher-librarians. These interactions led to

teachers discovering their creativity which, in turn, ignited the creativity of students.

Implementation of collaboration caused other faculty members in schools to collaborate, and it influenced students, teachers, and parents to share ideas. Students working in collaborative teams resulted in teachers serving as facilitators of learning. Teachers serving as facilitators of learning encouraged students to interact with peers inside and outside of the school. Students were more involved in their learning and showed an increase in creativity. In this same study, the researcher found that not only did teachers benefit from collaboration, but principals did, as well. Principals were able to communicate more frequently with teachers and teacher librarians regarding technology in a collaborative group.

Goddard et al. (2007) conducted a study on teacher collaboration for the purpose of school improvement and student achievement in public elementary schools. The researchers hypothesized that when teachers collaborate to discuss instructional issues, there are improvements in teaching and learning. The study's sample consisted of 47 elementary schools with 452 teachers and 2,536 fourth grade students in a Midwestern school district. Findings from the study revealed a moderate association between teacher collaboration and student achievement. The study also revealed that teacher collaboration as it relates to school improvement was positively related to the difference amongst schools in mathematics and reading achievement.

Professional learning communities provide a framework for teachers improving their instructional practices through continuous learning, working in collaborative teams, and, most importantly, putting the needs of the learner first to improve student outcomes. The next portion of this literature review will discuss the historical context of the physical learning environment and the role it has played in teaching and learning.

Physical Learning Environment. The physical environment is described as the space where teaching and learning is ignited for all that are involved. Learning environments are defined as all the physical elements (color, lighting, space, social, and furniture) where students are expected to learn (Asiyai, 2014). Also, the physical environment is defined as school buildings, classroom furniture, materials, equipment, laboratories, libraries, and so on.

Additionally, the physical learning environment is the spatial arrangement of furniture, walls, ceiling, chalkboard, lighting, fittings, and all fiscal enablers of teaching and learning in the classroom. Based on these descriptions, it can be determined that regarding the physical environment, there are tangible things (school building, ceilings, equipment, furniture, etc.) that serve as the infrastructure for teaching and learning.

Lippman (2010) discussed practice theory and how this theory examines the link between the learner and the environment. The author poses the following question: "How does the environment shape the learner and, in turn, how does the learner influence the learning environment?" (p. 1). To answer this question, he suggests that the motivation of the learner as well as when and where the learning takes place must be identified. The learning environment, according to Lippman, consists of the learner, other pupils, teachers, and the physical environment. The twentieth century's approach to learning viewed the learner as active and the learning environment as passive; however, practice theory sees the learner and the learning environment as active and transformed by their interactions with others and the physical setting.

Student interactions with the learning environment are based on how their teachers interact in the environment. Teachers must be able to accommodate and adapt the learning environment to meet the diverse needs of learners (Martin-Horne, 2002). Although the structure of the physical learning environment is important, it does not replace high quality teaching.

Teachers are the developers of the learning environment because it is their role to establish an environment that achieves their objectives and meets the needs of all learners. Changes to the physical learning environment should be ongoing based on the behavioral responses of students and learning objectives.

Furthermore, classrooms have been identified as a system that has physical and organizational units (Martin-Horne, 2002). Classrooms serve as an element of the system and the physical and organizational units are the interrelated parts that make-up the larger system (classroom). Each part is needed to form the output which is the learning environment. The physical attributes of the learning environment can influence behavior and educational programs. Martin-Horne (2002) conducted a study on how the classroom environment affects the practice of teachers. This study took place in primary and secondary schools located in the United Kingdom. The author observed numerous lessons in twelve schools. Lesson observations were categorized into different clusters of activities.

Results of the study revealed that academic subject lessons were teacher-centered and occurred in classrooms with less space and higher numbers of pupils. Teacher-centered lessons also took place in general spaces and student desks were arranged in rows. (Martin-Horne, 2002). As classrooms were denser, the movement rate of teachers increased. Lessons that exhibited child-centered pedagogy occurred in rooms with a large proportion of space per pupil. Student desks were organized in groups for collaborative purposes. Summary of findings identified that larger spaces in classrooms limited teacher movement.

In addition, it was found that when teachers with a child-centered pedagogy examined their spaces while planning lessons, they discovered their teaching style was affected by the physical learning environment (Martin-Horne 2002). Based on the results of the study, three

types of attitudes were identified. The first attitude is that teachers do not perceive their surroundings in a constructive way and are unaware of the impact the settings have on their teaching styles. Secondly, teachers who are aware of the impact the learning environment has on their teaching and student learning were victims of the environment. They knew that something was not working but could not identify what it was and how they would solve it. Lastly, there were teachers that were aware of the impact of the physical learning environment and used it to fit their needs and the needs of students.

The physical learning environment is an influential teaching instrument that is at the disposal of teachers (Martin- Horne 2002). Design of the physical learning environment and how space is used by occupants can establish practice amongst teachers and students (Woolner et al., 2012b). Loughlin and Suina (1982) note that the lack of awareness of the physical and spatial needs in the classroom environment can interfere with the optimal functioning of the classroom. Teachers being cognizant of how to use the learning environment to meet their own needs and the needs of students is an essential part of an effective learning environment.

Relationship Between the Learning Environment and Student Learning. School buildings serve as the physical structure where student learning develops. Conditions of the school building can positively or negatively influence the views of stakeholders and student health and learning outcomes (Earthman, 1995). Research has been conducted on school building conditions and its relationship to student learning outcomes (Earthman, 2015; Earthman & Lemaster, 2009; Schneider, 2002). Studies on school building design and its relationship to student achievement have researched climate control (Cash, 1993; Earthman, 2004), lighting (Wurtman, 1975), air quality (Cash, 1993; Earthman, 2004), noise (Woolner et. al, 2012a; Earthman, 2004) and acoustics (Maxwell & Evans, 2000; Woolner et.al, 2007).

Cash (1993) examined the relationship between the condition of school facilities, student achievement, and student behavior. The study was conducted in rural high schools in Virginia. Conditions of the building were determined by the Commonwealth Assessment of Physical Environment (CAPE) which was completed by 47 rural schools in Virginia. Lighting, acoustics, climate control, color density, science laboratory quality, and aesthetics were observed by CAPE. The study also measured student achievement based on scores from the Test of Academic Performance (TAP) from the 1991-1992 academic school year as well as student behaviors. The researcher examined student behavior based on the expulsions, suspensions, violence, and substance abuse that were reported from each of the schools in the study to retrieve data on student behaviors as it relates to building conditions. Cash found that schools with better building conditions had higher student achievement. Although schools with better building conditions had higher student achievement, they also had higher discipline issues.

Woolner et al. (2007) discussed that the conditions of school buildings can be detrimental to students and result in health problems, a decrease in student morale, and lead to poor academic performance. Although terrible conditions of school facilities can yield negative effects, Earthman (2004) was not convinced that a school needs to be any more than suitable. A suitable school meets the standard needs of the occupants and still yields positive outcomes for students. There is no evidence that suggests that the performance of students will rise if a school goes from a basic vehicle to a luxury vehicle. The comparison of the school buildings to vehicle types gives a visual perspective that although updated facilities are considered “wow factors” to the eye, there is not substantial evidence that a lavish school building is a contributing factor to high student achievement. The learning environment, whether it is considered a basic vehicle or a

luxury vehicle, must be a place that is safe, inviting, and meets the needs of teachers and students.

Woolner et al. (2007) conducted a study in the United Kingdom. The researchers investigated aspects of the physical environment such as acoustics and noise. It was found that how sound is transmitted in the learning environment can be positive or negative for learners. Loud noises that have an echo in the learning environment can be negative to the learner and lead to stress. Continuous exposure to loud noises is said to impair one's cognitive functioning and can yield reading issues. Good acoustics can have positive effects on the learning environment such as teachers' and learners' productivity, improved student behavior, improved academic performance, and a reduction in teacher and learner stress.

Another condition of the school building that has been considered is air quality. Air quality includes temperature, heating, and air. Poor air quality can have a negative impact on the health conditions of occupants (Woolner et al., 2007). The negative impact of air quality can lead to an increase in teacher and student absences, which results in poor student achievement and loss of productivity in the learning environment. Good air quality can reduce health issues of the occupants and enhance the outcomes of the learner and the retention of teachers.

In a study entitled *Designing Classrooms to Maximize Student Achievement*, the authors examined effects of the building and student achievement. It was found that attributes of the classroom such as lighting, acoustics, temperature, and air quality have an impact on student achievement (Cheryan et al., 2014). The roles that lighting, acoustics, temperature, and air quality play in the health of occupants and student achievement has led to these items being focal points of new school constructions or remodels.

Tanner (2008) conducted another study that examined school building conditions. His study sought to compare student achievement with school design based on movement and circulation, day lighting, and views. The sample consisted of 71 rural and suburban elementary schools in Georgia with a total sample size of 10,650. Three school design factors were measured using a 13-item instrument scored by a ten-point Likert scale. Three researchers that were trained in school design and assessment used the instrument to conduct a site visit at each school. The instrument was completed within one hour of the visit to the school and before another site visit was conducted. The instrument that was created on school design was compared to the results of the Iowa Test of Basic Skills (ITBS) (Tanner, 2008). Results from reading comprehension, reading vocabulary, language arts, mathematics, social studies, and science were analyzed in the study.

Findings from the study identified a significant effect on school design factors (movement and circulation, daylighting, and views) as it relates to student achievement in the areas of reading vocabulary, reading comprehension, mathematics, and science. It was concluded that the environment in which students learn does make a difference in their academics (Tanner, 2008).

An investigation of 153 schools in the United Kingdom was conducted between the years 2011-2013 by Barrett et al. (2015). The study sought to assess the impact of the physical classroom features on academic progress. Researchers found that attributes of the classroom were related to student learning rather than the school facility. The researchers concluded that "there is no such thing as a good or bad school, but there are very clearly more and less effective classrooms" (p. 130). Researchers found that the structural aspects of classrooms (lighting, acoustics, temperature, and air quality) have an impact on student achievement. An increased

amount of natural light during the daytime can lead to increased scores on math and reading tests as compared to learners who are exposed to less light.

Differing from the research that has been discussed regarding physical conditions of schools as it relates to student achievement, there have been other studies that have not found the condition of a building to impact student achievement. For example, data from the Wyoming Comprehensive Assessment System (WyCAS) (Picus, et al., 2005), an assessment that measures student achievement for students in fourth, eighth, and eleventh grades in the areas of reading, writing, and mathematics, was used in a study to determine if the conditions of the school contributed to student achievement. WyCAS assessed the structure of the school facility such as the foundation, ceilings, and floors. Results from the study discovered that there was no relationship between the quality of the building's structure and student achievement (Picus et al., 2005).

An additional study by Bowers and Urick (2011) researched the relationship between the quality of the school and student achievement. Data from an Educational Longitudinal Survey (ELS) in 2002 which surveyed 11th graders enrolled in United States high school facilities focused on maintenance and disrepair. Mathematics scores were viewed to determine student achievement Bowers & Urick, 2011). The results from the study revealed that there was no link between the quality of the school building (maintenance and despair) and student achievement. Although there have been differing results on the physical conditions and its relationship to student achievement, it is known that the physical learning environment has been influential in the overall growth and development of people (Kensler & Uline, 2017).

Teacher and Student Point of View of the Physical Learning Environment. "To facilitate learning, the facility must be designed such that occupants feel comfortable enough to

take the individual and collective risks necessary for meaningful interaction and learning" (Uline et. al., 2010, p. 601). Teachers spend approximately 2,000 hours each year in their classrooms instructing students or preparing materials for lessons (Earthman & Lemasters, 2009). Since most of a teacher's time is spent in the learning environment, it can be concluded that the environment can influence how teachers work and feel. Distractions in the physical learning environment can influence how effective a teacher can be.

To prove the claim that the learning environment influences the effectiveness of teachers, a study by Karst (1984) was conducted and revealed that school buildings that were considered good quality, had better scores on the attitude scale from teachers and students; however, teachers in unfavorable schools had better results on the attitude scale than students. It was also found that as the quality of the school building improved, the score of teachers remained constant. The perception from students was that when the school building declines, their attitudes about the school suffer.

Another study conducted by Lowe (1990) examined three elementary schools through observations, interviews, and perception questionnaires. The perception questionnaire was created to determine teachers' feelings about the buildings in which they taught. The researcher wanted to know how building age, building design appearance, building square footage, the size and organization of instructional space, and building maintenance impacted the learning climate of the school. Results of the study showed that schools near busy streets caused a lot of noise which interrupted instruction. The neighborhoods in which the schools were located caused teachers to perceive the schools as being unappealing. Teachers in the study perceived the locations of the schools as negative and that the physical environment influenced their teaching and the learning of students (Lowe, 1990).

An ongoing study entitled “The Walls Speak” consisted of three phases. Phase one examined 82 middle schools in one Mid-Atlantic state. The study examined school climate, school facility quality, maintenance of the school building, and the impact they had on student achievement in the areas of reading and math. Results from phase one showed that facility qualities were positively linked to the variables student achievement, teacher professionalism, and community engagement. Building quality was a strong factor in how teachers rated the resources needed for instruction (Uline & Tschannen-Moran, 2008).

Phase two of the study continued to investigate how the physical environment influences teaching and learning. (Uline & Tschannen-Moran, 2008). Participants in this phase were some of the middle schools that were in the previous phase discussed above, whose students receive free and reduced lunch, and ratings of the school building were in the top percentage. Only one urban and one rural school met the criteria for the purpose of phase two. Researchers examined how high- quality school buildings could possibly help create a positive school climate and high academic achievement in schools that serve low socioeconomic students. Results from the study found a connection between building design and the occupants. School building design influenced the occupants; however, the occupants made the space their own by creating a learning environment that was flexible (Uline et al., 2009).

Phase three of the study examined nine schools, two of which were set to be renovated from 2009-2011(Uline et al., 2010). This phase explored how school climate interacted with attributes of facility quality (movement, aesthetics, play of light, flexible and responsive classrooms, elbow room, and security). Data collection consisted of school climate surveys, photo interviews with students, walking tours of the school facility, and formal interviews. The

results supported findings from the other phases that the quality of the building does affect school climate and student learning (Uline et al., 2010).

A recent qualitative study by Bonine (2017) examined the perceptions of teachers and students in 21st century learning environment classrooms. The study took place at a charter school that educated middle and high school students. Participants consisted of five teachers, two instructional coaches, and twenty-four students (grades sixth, seventh, tenth, eleventh, and twelfth). Students in the study were a part of a focus group. There were six focus groups, and four students were in each group. Data for the study was collected through classroom observations, interviews, artifacts, and photos. Fourteen themes surfaced in the study and the overall findings revealed that teachers and students believed that the 21st century learning environment had a positive impact on teaching and learning. Results from this study showed that the type of learning environment teachers and students occupy can affect teaching and learning.

Physical Learning Environment and Collaboration. Spillane et al. (2017) and Spillane & Shirrell (2018) discussed that the physical arrangement of workspaces can facilitate and hinder interactions amongst individuals in an organization. To further examine workspaces and interactions amongst organizational members, the researchers sought to examine the role of physical proximity and the interactions of staff regarding teaching. This study was a longitudinal mixed methods study that consisted of fourteen elementary schools in the United States (Spillane et al., 2017; Spillane & Shirrell, 2018). Researchers collected data from elementary teachers and administrators over a span of four years. Results from the study revealed that staff whose workspaces are located near one another whose paths are likely to cross throughout the day will interact more about teaching. These results led to researchers arguing that when assigning staff to workspaces, physical proximity should be considered because it is a determining factor in the

interactions teachers have with one another regarding instruction. Also, teachers who taught in schools with long hallways and self-contained classrooms will share ideas with colleagues who are near their workspace (Spillane et al., 2017; Spillane & Shirrell, 2018).

Another study on social interactions examined physical interactions of school leaders and the physical infrastructure. Physical infrastructure in the study was defined as the school's layout regarding room and office assignments of staff (Shirrell & Spillane, 2019). Data from this study derived from a larger study relating to math reform. Information for this study focused on responses from those who held formal leadership positions in the schools such as school leaders, mentors, coaches, and teacher leaders. Researchers sought to gather information regarding work-related social networks such as close colleagues' networks and instructional advice and information networks. Findings in the study revealed that the workspaces of school leaders were in a central location in the building. Unplanned interactions between school leaders and colleagues were few. It was found that school staff travel further in school buildings to get advice from leaders. Leaders in the study worked to decrease isolation among them and colleagues by maintaining visibility throughout the building so that they could interact with colleagues (Shirrell & Spillane, 2019).

The physical proximity of teachers and school leaders are an important component of removing the barrier of isolation based on study results in this section. The reduction of physical proximity is an important factor in supportive conditions-structural in professional learning communities.

21st Century Learning Environments. In the late 1960s and 1970s, open learning classrooms began to surface as part of the programmatic reform movement. These schools were a way to facilitate autonomy for the learner and the teacher facilitated activities that coincided

with progressive traditions of the time (Saltmarsh et al., 2015). During this time, half of the schools constructed in the United States incorporated open plan schools. Open plan schools were considered flexible spaces that could be adapted based on learning needs. This environment promoted interactions between students and teacher collaboration and flexibility of space to meet the needs of the learner; however, there were some challenges to the learning environment. Those challenges consisted of high noise levels which caused distractions for students and teachers, disagreements between colleagues, and reduction of spontaneity was found to have undermined the goals that were associated with the reform of the time. Because of this, open plan schools began to lose support from educators. In recent years, however, the concept has begun to resurface in countries such as Australia, New Zealand, the United Kingdom, Germany, Finland, and Spain.

Redesigning learning environments of the 21st century, requires professional learning for teachers and administrators, discussions of how the spaces will be occupied, the size and shape of the spaces, and the needs of the learners. The Organization for Economic Cooperation and Development (OECD) has identified learning environments as their focal point. The OECD's target is to examine pedagogical beliefs of educators and to redesign learning spaces based on those beliefs and the needs of the occupants (Charteris & Smardon, 2018).

21st century learning environments require teachers to work in collaborative teams with other teachers and students (Campbell et al., 2013). These environments have flexible classrooms, multiple teachers working together collaboratively, and students collaborating with their peers. One of the goals of school design is to have access for everyone. It is important that architects and educational researchers identify elements that inspire or hinder integration of

services, inclusive practices, and personalized and cooperative learning (Sigurdardottir & Hjartarson, 2011).

A study on innovative environments was conducted in Iceland. The study examined four municipalities. Four schools were built in the 21st century and sixteen were designed in the 20th century. The schools were identified as schools A-D. Data for the study was collected through informed observation, photography, review of technical documents, drawings, and writings, and the study of environmental and architectonic features (Sigurdardottir & Hjartarson, 2011).

Results from the study revealed that the four recent schools (A-D) differed from the older schools. For example, school A has large classroom spaces that can accommodate 80-100 students of various ages. Classrooms are partly divided by closets or walls, staff room, and one breakout room. School B consists of three classrooms for 12 to 29 pupils, and they are grouped to form three clusters. Two of the three rooms consist of foldable walls and accessibility to the third room is through wide doors. School C consists of open classrooms for 30 to 60 students of various ages. Students can sit in groups and have direct access to the media center and computer lab. School D has large open classroom spaces for 90 to 120 students of various ages. Each classroom has access to a community hall. The learning space also has a rooftop garden or an outdoor platform (Sigurdardottir & Hjartarson, 2011).

The effects of an open learning environment on teaching and learning remains unanswered. Twenty-three percent of teachers in this study said that the learning environment suits their teaching methods rather badly, very badly, or neither well nor badly (Sigurdardottir & Hjartarson, 2011). There was no significant difference between those who taught in a traditional classroom and those who taught in an open classroom environment. Results from the study

showed that teacher collaboration was more common among teachers in an open plan environment.

Additionally, Campbell et al., (2013) conducted a study in three primary schools in Australia that were recently built or renovated based on the concept of 21st century learning environments. The purpose of the study was to determine how these environments shaped the instructional practices of teachers and the challenges that they encountered within the environment. Researchers observed teaching and learning activities over a three- day period, informal interviews were conducted with staff during the observation, and semi-structured interviews were conducted with principals and teachers. Findings of the study identified that students were able to effectively work and learn in groups while teachers working in a collaborative environment was identified as a learning challenge (Campbell et al., 2013). Although students working collaboratively is a desired practice within a 21st century learning environment, issues can arise such as students staying on task. To solve this challenge, researchers discussed students being accountable for their work during student collaboration time.

Further, principals in this study desired for teachers to team teach, and they worked to create an environment that promoted and supported the practice. (Campbell et al., 2013). The challenge that was identified with team teaching was personality issues. One principal from the study mentioned that teachers must identify the common goal which is student learning, and that communication is the best to address a disagreement (Campbell et al., 2013). Although this strategy was identified to address teacher teams working together, principals still found that teaching teams were a struggle that resulted in some relationships being broken.

Another challenge that was identified was teacher leadership. Team teaching as mentioned above involves teachers working together for a common goal. Teacher leadership in this study is defined as teachers being leaders of pedagogy or facilitating the necessary actions to achieve success (Campbell et al., 2013). Researchers observed that leaders of the team were not chosen by the principal but agreed upon by members of the team. The roles were filled by veteran teachers or those that had been at the school for a certain period. Also, other members of the team were given an opportunity to take on leadership roles in a chosen subject area or leading an activity in the classroom. The challenge in teacher leadership that was identified was teachers moving out of their comfort zones so that they can be experts in a variety of areas that would improve their practices.

Though there were challenges identified in the 21st century learning environment, there were also advantages. Some advantages mentioned were sharing teaching and administrative responsibilities. Teachers felt that working together gave them the opportunity to see how more experienced teachers approached instruction or situations. It was also reported that sharing ideas and trying things led to a positive feeling about team teaching. Kindergarten teachers at one school mentioned that each member was required to take responsibility for a designated task as well as leadership activities that were agreed upon by the team (Campbell et al., 2013). Transitioning to the 21st century learning environment requires professional learning for educators as well as reflection of pedagogical beliefs as they evolve into the beliefs of the environment.

A study on Catholic primary schools in Sydney, Australia researched how teaching and learning are impacted in an open plan, 21st century learning environment (Saltmarsh et al., 2015). Buildings researched in this study consisted of those that were purposefully built and ones that

were redesigned. Teachers and administrators were interviewed regarding their experiences in 21st century learning spaces as well as their perceptions of student learning and interpersonal experiences in these spaces. Results from the study revealed that all three schools supported individual student learning through space. For example, one school used colors to group tables. The colors identified the students using the materials and the tables they could collaborate at with their peers.

Challenges were discussed in this study. At one school, teachers arranged furniture such as bookcases to block colleagues who were mistrusted and to protect themselves from unwanted negative feedback. This posed a challenge to the learning environment because cohesiveness is non-existent amongst the team and teachers did not have access to the students (Saltmarsh et al., 2015). Teachers that were excited to be a part of an open-plan learning environment became frustrated when working with other staff members regarding technology access and effectively arranging furniture in the shared learning environment. These frustrations sometimes led to conflict which made it difficult to work in the learning environment. Based on the results from the study, researchers found that when there is less emphasis on timetables, routines, sound, movement, and other variables and more emphasis is placed on teachers and students working and learning together on how to best use the space as a learning resource then collective learning can take place (Saltmarsh et al., 2015).

Charteris and Smardon (2018) discussed the need for professional learning and development in the environments they call New Generation Learning Environments (NGLE). Like 21st century learning environment characteristics, NGLE identified that the environment must be a flexible learning space that addresses the needs of learners and can improve student outcomes. NGLE suggests that space and objects influence the pedagogy of teachers. To build

pedagogical capacity of teachers, they must first identify their own beliefs, understand the beliefs of the environment they are seeking to build, identify similarities and differences in their beliefs and the beliefs of the new learning environment, and identify ways they can connect the two beliefs to one.

Design of NGLE learning environments is not just a change in the physical environment but also in the practices of teachers. Review of the literature in this section noted that most challenges in the learning environment consisted of teachers working cohesively to support one another, meet the needs of students; and understand effective use of the physical space. For this challenge to no longer be a barrier, it is critical that schools of the 21st century build a community amongst faculty and staff that encourages professional learning through a systematic process for collaboration known as professional learning communities to understand the spaces in which they occupy and gain instructional strategies that will lead to effective teaching and improved student outcomes.

Summary

The review of the literature supports the importance of teachers collaborating to strengthen current practices and gain new knowledge, build their capacity, and improve instruction which leads to improved student outcomes. Implementation of professional learning communities provides the framework for effective collaboration based on the dimensions of PLCs.

Literature discussed in this chapter also described the role of the learning environment in public education as it relates to teacher and student development, collaboration, and student outcomes. Since the literature has identified the importance of the physical learning environment and collaboration using professional learning communities as the systematic process, it is

necessary that this study takes an in-depth look into the floor plan of elementary schools that are traditional and 21st century to understand the role the floor plans have in the success of the learning community. Chapter Three will focus on the methods that will be used to conduct this study.

Chapter 3: Methodology

There is currently a pressing need for teachers to build their knowledge base, participate in dialogue with colleagues regarding practices and student data, and reflect on instructional practices and pedagogical beliefs to address the diverse needs of students. Implementation of the systematic process for collaboration, professional learning communities (PLCs) serves as the framework for improving teaching and student learning because teachers are intentionally learning to increase their effectiveness, which leads to improved student outcomes (Hord & Sommers, 2008; Hipp & Huffman, 2010).

Additionally, school buildings are being constructed or remodeled to support 21st century skills and the workforce's desire for students to be collaborators, critical thinkers, communicators, and creators. To effectively prepare students to be college and career ready, the layout of 21st century environment requires teachers to work in collaborative teams with colleagues and students (Campbell et al., 2013). Beery and colleagues (2013) mentioned that the changing of spaces will change practice. Examining the role physical design/floor plans of 21st century and traditional schools plays in collaboration based on the professional learning community framework will add to the limited body of research regarding building design and collaboration.

Purpose of the Study

The purpose of this explanatory sequential mixed methods study (Creswell & Plano-Clark, 2018) was to investigate the relationship between the physical design/floor plans of the 21st century and traditional schools based on Shirley M. Hord's Dimensions of PLCs (a. shared values and vision; b. shared and supportive leadership; c. intentional collective learning; d. shared personal practice; e. supportive conditions- collegial/relational; and f. supportive conditions-structural) (Hord,1997/2004; Hord & Tobia, 2012). The study specifically examined:

(a) supportive conditions-structural because an attribute of this dimension is the physical proximity of grade level teams to each other for ease of collaboration; (b) examine if differences existed between supportive conditions-structural dimension and the other dimensions of PLCs in 21st century and traditional schools; and (c) identify factors that facilitated or presented barriers to the professional learning community within the two physical design types.

Research Questions

1. What is the relationship between the physical design/floor plan (21st century and traditional) elementary schools and supportive conditions- structural dimension of the professional learning community?

2. What differences exist between supportive conditions-structural dimension and the other dimensions of the professional learning community (a. shared values and vision; b. shared and supportive leadership; c. collective learning and application; d. supportive conditions-collegial/relational; and e. shared personal practice) in 21st century and traditional elementary schools?

3. What do teachers perceive as factors that facilitate or present barriers to the professional learning community in 21st century and traditional schools?

Role of the Researcher

I was an elementary teacher for eleven years and taught in physical design/floor plans that were pod, traditional, and 21st century. Also, I served as the Professional Learning Community (Focused Collaboration) Chairperson and have implemented the Four C's of 21st century learning (collaboration, critical thinking, creativity, and communication) in the learning community. These experiences led me to want to gain a better understanding of the role the

physical design/floor plan of a school plays in collaboration based on the professional learning community framework.

Research Design and Rationale

Explanatory Sequential Design

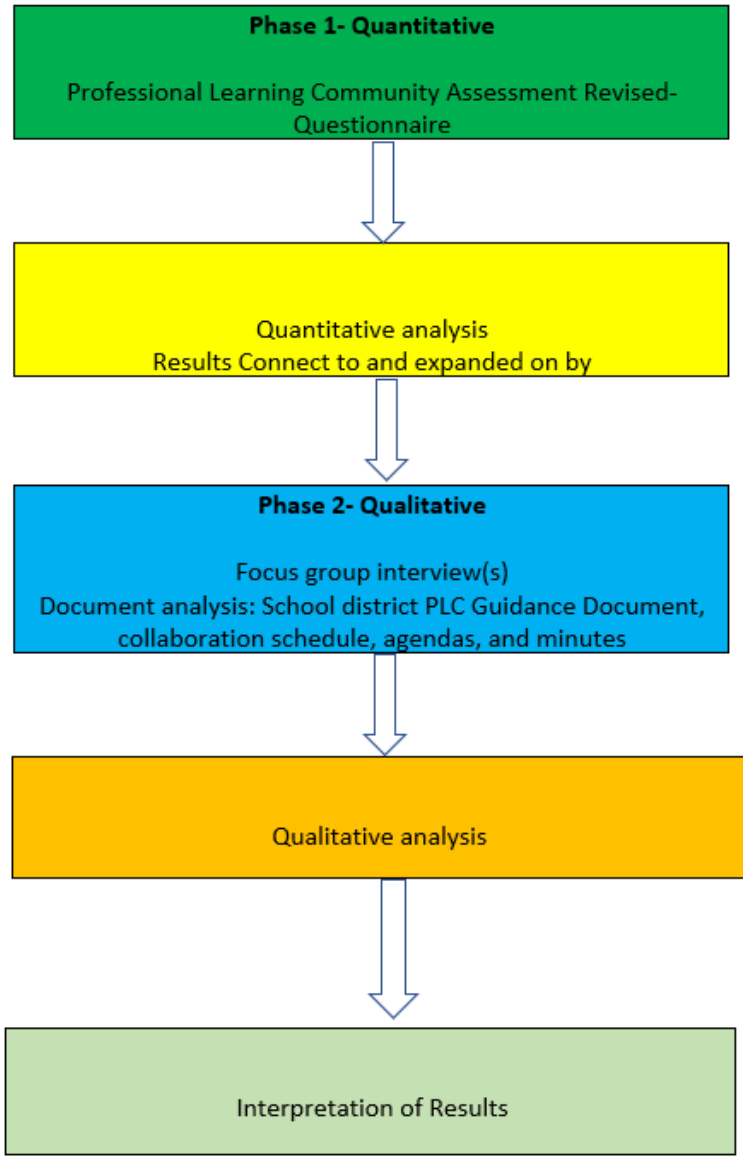
To examine the role the physical learning environment played in the quality of the professional learning community, an explanatory sequential mixed method design was used (Creswell & Plano- Clark, 2018). Mixed method research design employs an intentional combination of quantitative and qualitative data collection to answer each research question. This methodology is described as "multiple ways of seeing and hearing" (Greene, 2007, p. 20). Johnson et al. (2007) defined mixed methods research as the following:

> …the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purposes of breadth and depth of understanding and corroboration. (p. 123)

Explanatory sequential mixed method research design is considered a two-stage design process. Phase one of data collection involves collecting and analyzing quantitative data. Results from phase one informs the researcher that certain findings need further explanation. To further explain results from phase one, qualitative data is collected and analyzed in phase two (Creswell & Plano-Clark, 2018). This design was appropriate because the quantitative data collected and analyzed identified specific results that required further explanation of the phenomena that was studied. Figure 4 provides a visual representation of the research design.

Figure 4

Adapted from the Explanatory Sequential Design (Creswell & Plano-Clark, 2018)



Rationale

Explanatory sequential design gave me an opportunity to study professional learning communities in traditional and 21st century schools with breadth and depth (Johnson et al., 2007). The intent of this design is to collect quantitative data in phase one through a questionnaire that assesses everyday classroom and school practices as it relates to the

dimensions of a professional learning community (Hipp & Huffman, 2010). *The Professional Learning Community Assessment-Revised* questionnaire is useful in assessing the schools progress as a professional learning community by analyzing their practices.

Collecting qualitative data through focus group interviews and document analysis assisted in explaining significant or non-significant results in phase one as well as results that needed further explanation (Creswell & Plano-Clark, 2018). Focus group interviews were essential in exploring the role the physical design plays in the structural conditions of the PLC and provided helpful insight into the phenomena being studied (Knapp, 2017).

The analysis of documents such as collaboration schedules, minutes, and agendas serve as a data source for triangulation that provides evidence that yields credibility. An examination of information from the documents reduced the impact of potential biases (Bowen, 2009; Gross, 2018).

Phase one of the study using a quantitative methods approach answered the following research questions: What is the relationship between the physical design/floor plan (21st century and traditional) elementary schools and collective learning and application dimension of the professional learning community; and What differences exist between collective learning and application and the other dimensions of the professional learning community (a. shared values and vision; b. shared and supportive leadership; c. shared personal practice; d. supportive conditions-collegial/relational; and e. supportive conditions-structural) in 21st century and traditional elementary schools? This phase was guided by a post-positivist approach because the *Professional Learning Community Assessment- Revised* was used to measure variables and analyze the statistical results (Creswell & Plano-Clark, 2018).

Post-positivists believe there is an independent reality that needs to be studied, people's views are partially biased as they perceive reality, and the truth about reality is only approximate (Onwuegbuzie et al., 2009). Because post-positivist thinkers believe that reality is approximate, this phase identified questions that needed further explanation through the collection of qualitative data by conducting focus group interviews and triangulating information through document analysis.

Phase two qualitative data provided an in-depth description of the phenomena being studied shifted the philosophical assumption to constructivism. The qualitative phase answered research question three: What do teachers perceive as factors that facilitate or present barriers to the professional learning community in 21st century and traditional schools? Hearing the participant's experiences as members of a professional learning community in the two physical design types as well as the actions taken within the community through document analysis provided understanding of the lived experiences from the perspective of elementary educators.

Phase One: Quantitative

Sampling. The sampling method for phase one, quantitative, and phase two, qualitative, was non-probability purposive sampling with greater emphasis placed on the qualitative phase (Merriam & Tisdell, 2016). The sampling is purposeful since I wanted to provide insight and understanding of the relationship between the professional learning community and the physical design/floor plan; and I assumed that the sample selected would provide the most information that can be learned (Bloomberg & Volpe 2016; Merriam & Tisdell, 2016).

The school district has identified 21st century learning environments and professional learning communities as critical factors of their continuous improvement plan. Twenty-first century learning environments were built to facilitate the philosophy of 21st century rigorous and

tiered teaching and learning. Professional learning communities serve as a structured way for educators to collaborate and make decisions based on data.

Participants. Participants in phase one quantitative, were elementary classroom teachers and other certified faculty (physical education, counselor, media specialist, special area teachers, and instructional support) (*n*=111) who teach in a military-connected school district with floor plans that are 21st century (*n*=5) and traditional (*n*=3) and are members of a professional learning community. Five of the elementary schools that agreed to participate in the study educate students in grades pre-kindergarten through fifth grade; two schools, pre-kindergarten through sixth grade; and one school, pre-kindergarten to eighth grade.

This study was bound by time and location because it was focused on the 2020-2021 school year and in two communities (Berg & Lune, 2012; Merriam & Tisdell, 2016). Inclusion criteria for the study included participants who were elementary teachers and members of a professional learning community in schools that have floor plans that are 21st century and traditional.

Recruiting. Once I received approval from Auburn University's Institutional Review Board (IRB) (Appendix A) and the research department of the school district, recruiting of participants began. I hand delivered or mailed electronic questionnaire informational letters (Appendix B) and questionnaire flyers (Appendix C) to each of the schools that consented to participate in the study. Information about the questionnaire was placed in all certified faculty's mailboxes. Also, I posted the electronic questionnaire flier on social media outlets such as Facebook to recruit participants meeting the inclusion criteria.

Data Collection. Collection of data for phase one involved a questionnaire, *Professional Learning Community Assessment- Revised*. Electronic Questionnaire data collection began on

April 5, 2021, and ended on April 30, 2021, giving the participants approximately three weeks to complete the online questionnaire. An electronic questionnaire follow-up letter was placed in the teachers' mailboxes (Appendix D) and the social media platform, Facebook. Multiple contacts for questionnaires have been shown to increase the response rate (Mehta & Sivadas, 1995; Smith, 1997).

Professional Learning Community Assessment Revision. A review of the literature found that there are 49 appropriate instruments (31 quantitative and 18 qualitative) that measure professional learning communities (Blitz & Schulman, 2016). This study collected quantitative data using the *Professional Learning Community Assessment- Revised (PLCA-R)* by Olivier et al. (2010) (see Appendix F). Permission was granted from Dr. Dianne F. Olivier to use the *PLCA-R* for the study (see Appendix E). According to Blitz & Schulman (2016), the *PLCA-R* measures "beliefs about school/PLC functioning" (p. D-1).

The *Professional Learning Community Assessment (PLCA)* was created to assess daily classroom and school practices as it relates the dimensions of the professional learning community (Olivier et al., 2003). *PLCA* has been used in various school districts in different grade levels throughout the United States. The assessment has provided educators and researchers with information regarding the strength of PLC practices in schools in relation to the dimensions (Hipp & Huffman, 2010). Creators of the instrument found that the collection, interpretation, and use of data for school improvement was a missing component of the instrument that needed to be added. This change was based on research conducted by Hord and Hirsch (2008) that discussed the following:

> Staff learning precedes student learning, and its focus derives from the study of both student and staff data that reveal specific needs. Thus, the staff engages in intentional and collegial learning aligned with the needs and goals determined by data. (p.29)

The *Professional Learning Community Assessment- Revised (PLCA-R)*, incorporates items relating to data in each of the dimensions.

PLCA-R (2010) is a 52- item assessment that measures daily classroom and school practices based on the dimensions of PLCs identified in Hord's earlier work (Hord 1997/2004; Hord & Tobia, 2012; Olivier et al., 2010). Those dimensions were: (1) shared and supportive leadership; (2) shared values and vision; (3) collective learning and application; (4) shared personal practice; (5) supportive conditions- relational; and (6) supportive conditions-structures. Participants answered questions about their perceptions of the professional learning community based on the dimensions of PLCs. *PLCA-R* uses a four-point Likert scale to record perceptions of PLC practices within the learning community. Possible responses are (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree for each item. Below is a table that shows the relationship between the dimensions of PLCs and the *PLCA-R*.

Table 1

Relationship between the dimensions of PLCs and the PLCA-R

Dimensions of PLCs	**PLCA-R Item Numbers**
Shared and Supportive Leadership	Items 1-11
Shared Values and Vision	Items 12-20
Collective Learning and Application	Items 21-30
Shared Personal Practice	Items 31-37

Supportive Relational Conditions	Items 38-42
Supportive Structural Conditions	Items 43-52

Additional items were added to the questionnaire such as demographics (years of teaching, grade level, and gender, etc.), selection of the name of the school for identification of physical design/floor plan type, how often participants collaborate, and with whom do they collaborate.

Reliability and Validity. As mentioned earlier, the *Professional Learning Community Assessment- Revised* has been used in school districts and research studies to examine PLC practices based on the dimensions of a learning community. Blitz and Schulman (2016) and Hipp and Huffman (2010) provided the Cronbach's alpha for each of the PLC dimensions in *PLCA-R*. Cronbach's alpha assesses the consistency of responses on a composite measure that contains more than one item (Lewis-Beck, et al., 2004). Cronbach's alpha ranges between 0 and 1. According to Lavrakashe (2008), the greater the value of the Cronbach's alpha, the more the scale is considered consistent and reliable. *PLCA-R* contains coefficients for the following factored subscales (n=1209): (a) Shared and Supportive Leadership (.94), (b) Shared Values and Vision (.92), (c) Collective Learning and Application (.91), (d) Shared Personal Practice (.87), (e) Supportive Conditions-Relationships (.82), and (f) Supportive Conditions-Structures (.88). Based on Cronbach's alpha for each of the dimensions of PLCs, it can be concluded that the scale is reliable. The alpha for each dimension is greater than .70, which suggests that the variance is shared among the items being scaled together (Lavrakshe, 2008).

Quantitative Data Analysis. *Professional Learning Community Assessment- Revised* was exported from Qualtrics into Statistical Package for the Social Sciences (SPSS) Version

28.0. To organize the data, dummy codes were created for the design types (0- traditional and 1-21st century).

Next, descriptive statistics were analyzed to understand and provide a visual representation of the data. Descriptive statistics tables provide information such as the number of cases in the study, means, and standard deviations as it relates to the dimensions of PLCs in the 21st century and traditional design types. To measure reliability, Cronbach's Alpha analysis was conducted to measure the internal consistency of the dimensions of the professional learning community.

Furthermore, to answer research questions one and two, a Multivariate Analysis of Variance (MANOVA) was conducted. The purpose of MANOVA is to measure multiple dependent variables that are continuous measures with categorical independent variables. Also, MANOVA analyzes differences across two or more groups. The independent variables for this study were school type, 21st century and traditional, and dependent variables were the following six dimensions of a professional learning community: a.) shared and supportive leadership; b.) shared values and vision; c.) collective learning and application; d.) shared personal practice; e.) supportive conditions-collegial/relational; and f.) supportive conditions-structural (Salkind, 2010). MANOVA was the appropriate test to use for this study since there were multiple dependent variables (six dimensions of PLCs), and they were continuous in the two school types (21st century and traditional). This test was also appropriate because question two sought to explore if differences existed between the design type and the six dimensions.

Phase Two: Qualitative

Phase two, qualitative, involved the collection of new and existing data. Focus group interview protocol and questions (Appendix G) were developed to explain results from the

questionnaire that were significant or non-significant (Creswell & Plano-Clark, 2018). Existing data consisted of PLC agendas, minutes, and schedules from the 2020-2021 school year.

Participants. Participants in phase two, qualitative, are a subgroup of elementary teachers that were participants in phase one, quantitative, which is considered a nested sample (Creamer, 2018). There were 11 focus group participants who were members of the professional learning community in 21st century or traditional elementary schools.

Recruiting. After the questionnaire data was collected and analyzed, a focus group recruitment flier (Appendix H) was hand delivered or mailed to each of the schools that consented to participate in the study. The flyers were placed in all certified faculty's mailboxes. The recruitment flier explained the purpose of the study and what participants would be asked to do. Prospective participants who wished to participate in the focus group, were asked to email me. Once I received an email indicating their desire to participate in the focus group, an informed consent document (Appendix I) was sent to sign electronically.

When the signed consent document was received, an email was sent to participants providing them with a Doodle poll link (Appendix J). Doodle poll is an online scheduling tool that was used for participants to identify the best days and times for the focus group. Poll responses were hidden so that prospective interviewees could not see the names of other participants. A follow-up email informing participants of the day and time the interview would take place as well as the link to the teleconference software Zoom was sent (Appendix K).

Focus Group Interviews. Focus groups are defined as discussions that are the "focus" of the conversation and are facilitated by a moderator (Bloomberg & Volpe, 2016). Interviews involve a maximum of 12 participants who discuss an identified topic under the guidance of a moderator or facilitator who ensures the discussion stays on topic.

Focus groups are characterized as planned and structured yet flexible which address a problem (Stewart et al., 2007). According to Kreuger and Casey (2015), focus groups provide a range of feelings, ideas, opinions, and understanding of different perspectives. Focus groups also uncover and provide insight into specific factors that influence opinions and ideas emerge from the groups in their own words.

The use of a focus group provided some strengths to this study. This method is socially orientated and gives the researcher an opportunity to study participants in an atmosphere that is considered natural and relaxed versus a one-on-one interview (Bloomberg & Volpe, 2016). As the facilitator during focus group interviews, the researcher established truthful conversations with participants regarding their PLC experiences in their assigned physical design types.

Interviewees were certified elementary educators in the two physical design types and members of a professional learning community who were willing to share their experiences related to the study (Bloomberg & Volpe, 2016). There were two to four participants in each focus group interview. The interview took place using a teleconferencing software that Auburn uses, ZOOM. Audio recording of focus group interviews was necessary to ensure that information was accurately documented. Recordings were used for transcription purposes only.

Qualitative Analysis. The use of inductive and deductive content analysis was used to analyze focus group interview transcripts regarding professional learning communities. Inductive content analysis is when open coding is conducted line by line to determine the most appropriate code. Deductive content analysis is when initial codes are gained from the literature search and knowledge gained from a review of the literature (Gross, 2018).

Transcripts from focus group interviews were downloaded from the One Drive to Excel so that I could notate codes and themes. Audio transcription was analyzed by listening to the interviews and comparing information from the interviews to the transcript from the recording. According to Bloomberg and Volpe (2016), it is important for researchers to immerse themselves into the data. First, I read the transcript from the interview before coding and identifying themes. Next, I reread the transcription and began coding information by assigning words or phrases. Verbal and nonverbal communication such as pauses, laughter, or interruptions were documented (Bloomberg & Volpe, 2016). I read the transcription again to notate similarities and differences using a color-coding system. A codebook was created in Microsoft Excel to keep track of the codes identified. Themes or patterns from focus group interviews were noted and assisted in connecting and expanding the quantitative data when analyzing documents.

Document Analysis. Document review in qualitative research is considered a primary source (Bloomberg & Volpe, 2016). A document is defined as a variety of written records, visual artifacts documents that have been archived. Analyzing documents requires repeated review and interpretation of the data to gain meaning of the construct being studied (Gross, 2018). In mixed methods study, document analysis is used to triangulate results from other data sources such as focus groups, surveys, observation, and interviews (Bowen, 2009).

For this study the researcher requested PLC schedules, agendas, and minutes (see Appendix L) from elementary principals that represent a variety of grade levels and departments to gain deeper insight into the PLC structures and actions within the two design types. Collecting data from various sources such as document analysis corroborated findings (triangulate) and reduced potential biases (Bowen, 2009). Analyzing documents from the 2020-2021 school year such as PLC agendas, minutes,

and schedules served as a method for triangulating information to corroborate information gained from focus group interviews (Bowen, 2009). Table 2 identifies how the data collected answered the research questions and the method for analysis.

Table 2

Data Sources and Analysis used for each Research Question

Research Questions	Data Sources	Data Analysis
1. What is the relationship between the physical design/floor plan (21st century and traditional) elementary schools and supportive conditions-structural dimension of the professional learning community?	● *Professional Learning Community Assessment-Revised*	● Multivariate Analysis of Variance (MANOVA)
2. What differences exist between supportive conditions-structural dimension and the other dimensions of the professional learning community (a. shared values and vision; b. shared and supportive leadership; c. collective learning and application; d. supportive conditions-collegial/relational; and e. shared personal practice) in 21st century and traditional elementary schools?	● *Professional Learning Community Assessment-Revised*	● Multivariate Analysis of Variance (MANOVA)

3. What do teachers perceive as factors that facilitate or present barriers to the professional learning community in 21st century and traditional schools?	● *Professional Learning Community Assessment-Revised* ● Focus Group Interview(s) ● Archived documents: PLC schedules, agendas, and minutes	● Qualitative content analysis (color coding for themes)

Assumptions

I assumed that the use of an explanatory sequential design is the best approach to answer the research questions identified in this study. Explanatory sequential research design provided an in-depth explanation to quantitative results through the collection of qualitative data. Focus group interviews gave participants an opportunity to discuss their experiences in a professional learning community as a teacher within the design types and members of the learning community. The use of artifacts such as agendas, minutes, and schedules provided triangulation of results for phases one and two.

Delimitations

- Study participants were elementary school teachers and other certified staff.
- Elementary schools in the study have two physical design types (21st century and traditional).
- Schools in the study implemented professional learning communities as a systematic process for collaboration that improves the effectiveness of teaching.

Limitations

- The study is limited to eight out of twenty-one elementary schools in the district that have implemented professional learning communities as a systematic process for collaboration and school improvement.
- Six of the eight schools that agreed to participate provided documents for analysis.
- There was not a representative from two of the schools during focus group interviews.
- There were more 21st century school participants (n=83) than traditional school participants (n=28) that completed the questionnaire which could limit generalizability.

Summary

This chapter provided an explanation and rationale for the methodology chosen. Explanation included the alignment of the research design, data collection, and analysis of the research questions. Study participants, research instruments, data sources, data collection, data analysis, ethical considerations, assumptions, delimitations, and limitations were identified and explained. This chapter also provided reliability coefficients for the *Professional Learning Community Assessment- Revised* questionnaire.

Chapter 4: Findings

This chapter presents the results of the explanatory sequential mixed methods study for each of the research questions. The phrase that continues to linger in 21st century education is "the work of teaching is changing" (Spillane & Shirrell, 2018). To improve student learning outcomes, teachers have been required to collaborate with colleagues because research has shown that interactions among educators can improve teacher development and effectiveness within the learning community. Schools across the United States are creating opportunities for educators to formally collaborate through common planning time, professional learning communities, and teacher leadership (Spillane & Shirrell, 2018).

Although formal structures are in place in many schools to promote teacher collaboration, Spillane and Shirrell (2018) identified that legacy school buildings, self-contained classrooms where students receive instruction from one teacher all day, are not created for collaboration between educators. Since research has identified the importance of educator collaboration to improve teaching and learning, it was important to take a closer look at the spaces teachers occupy. As stated in chapter one, the purpose of this study was to investigate the relationship between the physical design/floor plans of the 21st century and traditional schools based on Shirley M. Hord's Dimensions of PLCs (a. shared values and vision; b. shared and supportive leadership; c. intentional collective learning; d. shared personal practice; e. supportive conditions- collegial/relational; and f. supportive conditions-structural) (Hord,1997/2004; Hord & Tobia, 2012). The study specifically examined: (a) supportive conditions-structural because an attribute of this dimension is the physical proximity of grade level teams to each other for ease of collaboration; (b) examine if differences exist between supportive conditions-structural dimension and the other dimensions of PLCs in 21st century and traditional schools; and (c)

identify factors that facilitate or present barriers to the professional learning community within the two physical design types.

Research Questions

1. What is the relationship between the physical design/floor plan (21st century and traditional) elementary schools and supportive conditions- structural dimension of the professional learning community?

2. What differences exist between supportive conditions-structural dimension and the other dimensions of the professional learning community (a. shared values and vision; b. shared and supportive leadership; c. collective learning and application; d. supportive conditions-collegial/relational; and e. shared personal practice) in 21st century and traditional elementary schools?

3. What do teachers perceive as factors that facilitate or present barriers to the professional learning community in 21st century and traditional schools?

Phase One: Quantitative

This phase of the study gave me an opportunity to collect basic information about participants, answer research questions one and two, and identify information from the results of the quantitative analysis that needed further explanation. Data sources in phase one consisted of *Professional Learning Community Assessment -Revised (PLCA-R),* a 52- item assessment that assessed daily classroom and school practices as it related to the dimensions of the professional learning community (Olivier, et al., 2003).

Participants. There were 111 participants in phase one of the study. Participants were elementary educators who were members of a professional learning community and taught in 21st century (n=83) or traditional (n=28) physical design layouts. Participants in the study were

pre-kindergarten through sixth grade teachers, media specialists, special area teachers (art, music, physical education), instructional support (math, reading, and English as a second language), school counselors, and educational technologists.

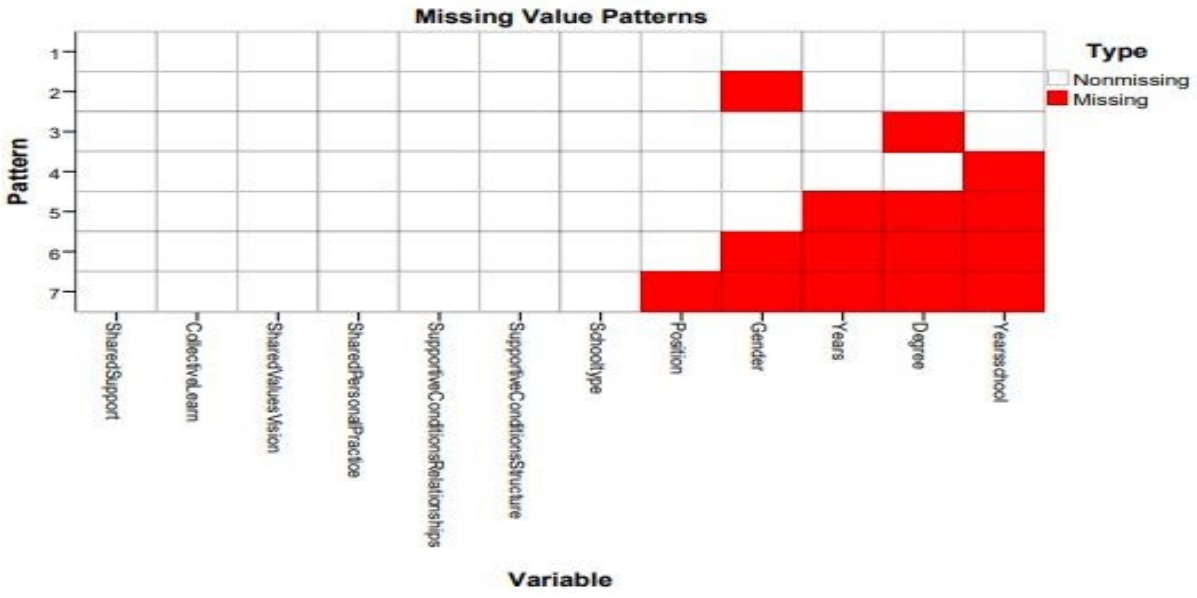
Data Analysis

Missing Data

Analysis of missing data was conducted in SPSS (v. 28.0) to determine if there was missing information from the set. The analysis revealed that there were 12 missing cases. Missing data consisted of demographic information about participants such as: highest degree earned, gender, years of experience, and current position at the school. Although data was missing, cases were not deleted because research questions one and two were about professional learning communities in the two design types and participants answered all questions relating to those factors. Demographics were not a factor in the questions. Figure 5 provides a visual of missing cases.

Figure 5

Patterns of Missing Values



Reliability

Reliability evidence was obtained by conducting Cronbach's Alpha analysis in SPSS (v. 28.0). Cronbach's Alpha measures the internal consistency and tells how closely related the dimensions of a professional learning community were within the *Professional Learning Community Assessment-Revised.* Results greater than .70 shows that items are closely related. Each dimension was analyzed separately due to questionnaire items for the subscales varying. The following subscales were analyzed: shared and supportive leadership (items 1-11), shared values and vision (items 12-20), collective learning and application (items 21-30), shared personal practice (items 31-37), supportive conditions-relationships (38-42), and supportive conditions-structures (43-52).

Shared and supportive leadership consisted of 11 items with Cronbach Alpha of α=.92. Next, there were 9 items analyzed for shared values and vision dimension. Cronbach Alpha for this dimension was α=.90. The third dimension, collective learning and application, consisted of 10 items and with a Cronbach Alpha of α=.92. Shared personal practice was the fourth dimension analyzed with 7 items and a Cronbach alpha of α=.88. Supportive conditions-relationships consisted of 5 items and a Cronbach Alpha of α=.85. The last dimension analyzed for reliability was supportive conditions-structural. There were 10 items, and the reliability statistic was α=.87. Results of Cronbach's Alpha revealed that scores received for each dimension were reliable. Table 3 shows the reliability statistics for each dimension that was analyzed.

Table 3

Reliability Comparisons

Dimension	**# Of Items**	**Reliability from literature**	**Reliability based on the current study**
Shared and Supportive Leadership	11	.94	.92
Shared Values and Vision	9	.92	.90
Collective Learning and Application	10	.91	.92
Shared Personal Practice	7	.87	.87
Supportive Conditions-Relationships	5	.82	.84
Supportive Conditions-Structural	10	.88	.87

Research Findings

Research Question 1: What is the relationship between the physical design/floor plan (21st century and traditional) elementary schools and supportive conditions- structural dimension of the professional learning community?

Research Question 2: What differences exist between supportive conditions-structural dimension and the other dimensions of the professional learning community (a. shared values and vision; b. shared and supportive leadership; c. collective learning and application; d. supportive conditions-collegial/relational; and e. shared personal practice) in 21st century and traditional elementary schools?

To answer research questions one and two, a Multivariate Analysis of Variance (MANOVA) design was conducted to determine if there was a relationship between the independent variable, school type (21st century and traditional) and the dependent variable, supportive conditions-structural. Also, this analysis looked at the other dimensions which were: shared and supportive leadership, shared values and vision, collective learning, and application, shared personal practice, and supportive conditions-relationships using *PLCA-R* to determine if differences existed between each dimension in the two design types.

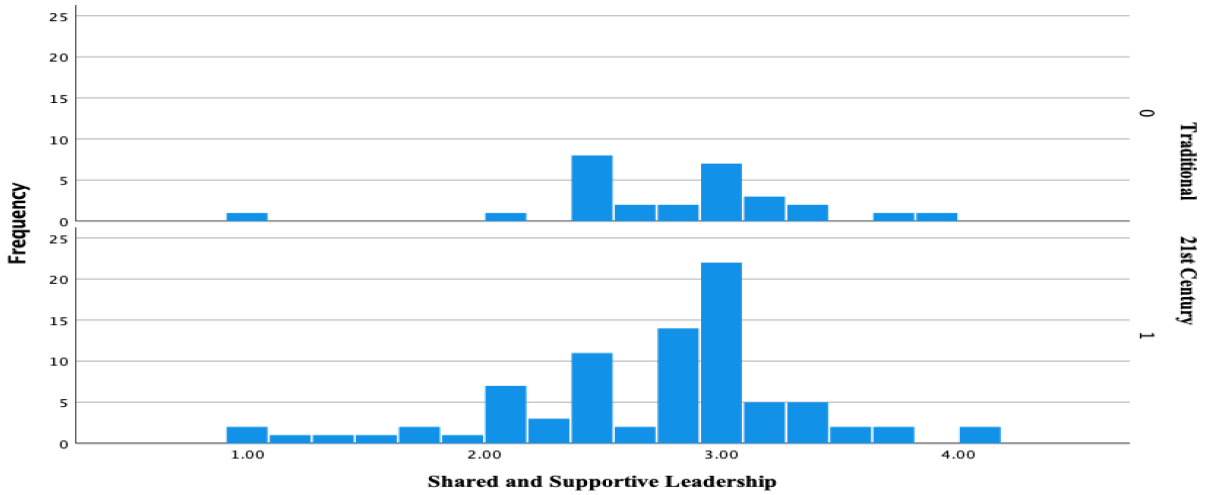
The sample consisted of 111 elementary educators from schools located in the Southern Region of the United States. Of the 111 educators, none were excluded from the analysis. Educators were asked survey questions relating to the six dimensions of a professional learning community: shared and supportive leadership, collective learning and application, shared values and vision, shared personal practice, supportive conditions-relational, and supportive conditions-structural.

Descriptive statistics provided the means of each of the dimensions that were analyzed. The mean numbers are representatives of the average of dimensions in each design type. The mean differences of the six dimensions in traditional and 21st century was small. The small standard deviation band was from 0.47 to 0.64, indicating that the dimensions of a professional learning community ratings were closely ranged.

First, the subscale of shared and supportive leadership consisted of 11 items regarding administrators sharing decision making with teachers and building their leadership capacity. The mean of traditional schools for shared and supportive leadership was slightly higher than 21st century schools by 0.09. Figure 6 provides a visual representation of the mean for shared and supportive leadership in the two design types.

Figure 6

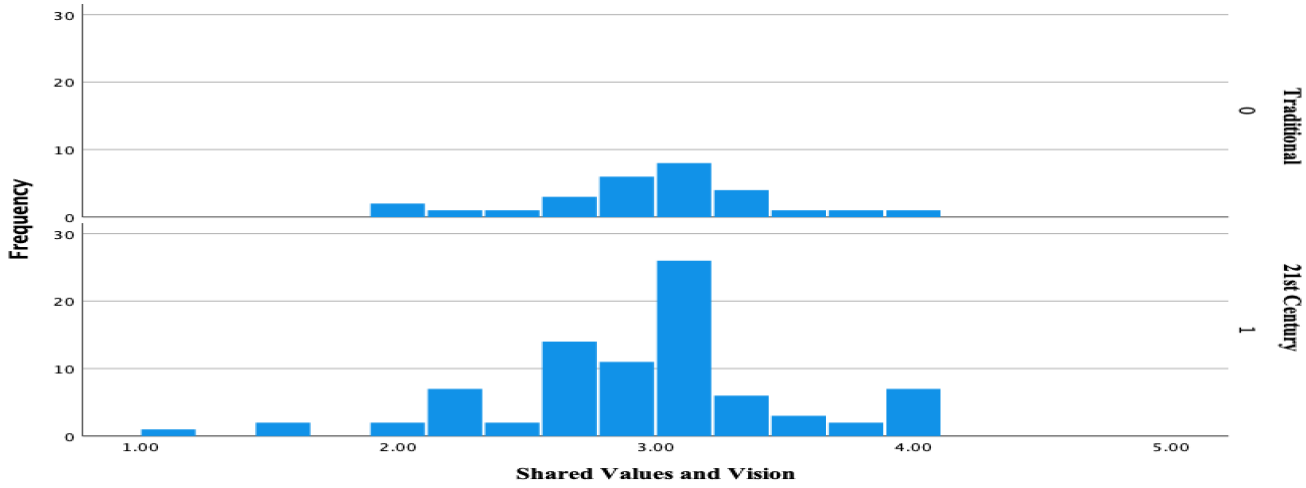
Histogram Mean Differences for Shared and Supportive Leadership



Next, the shared values and vision dimension consisted of ten items relating to educators making decisions relating to the school vision for continuous school improvement. The mean difference for this subscale between the design types was 0.04. Figure 7 provides a histogram of the small mean difference between the two design types and shows that traditional design mean was higher.

Figure 7

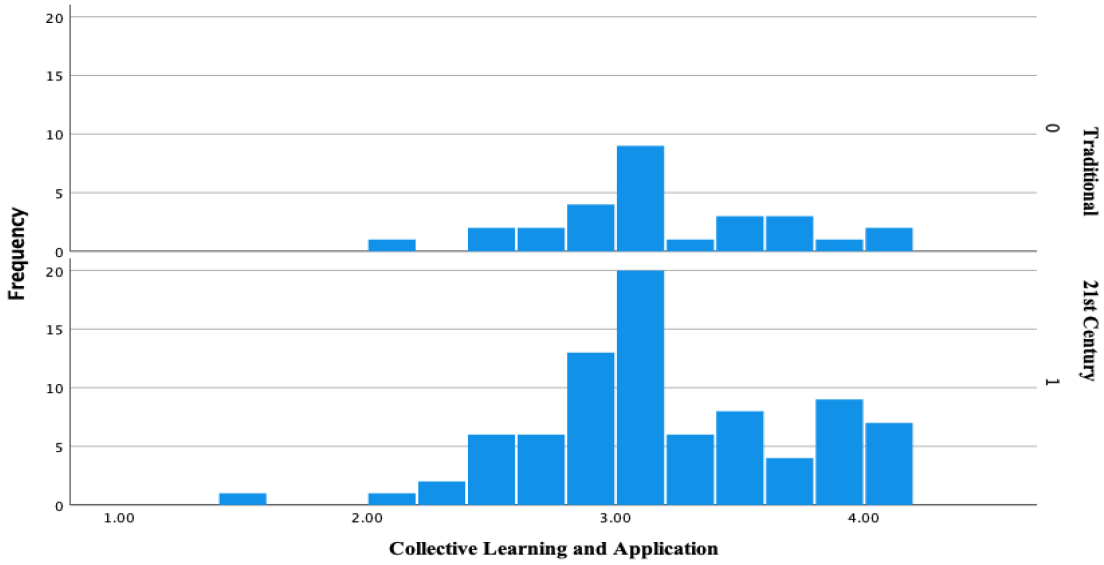
Histogram of Mean Differences for Shared Values and Vision



Another subscale that was analyzed was collective learning and application and there were ten items regarding members learning together to analyze data and gain new knowledge to enhance teaching and learning. The mean difference in 21st century schools was only 0.01 higher than traditional schools. This dimension had the highest average compared to the other dimensions in both school types. Figure 8 provides a visual of the minute difference in the two design types.

Figure 8

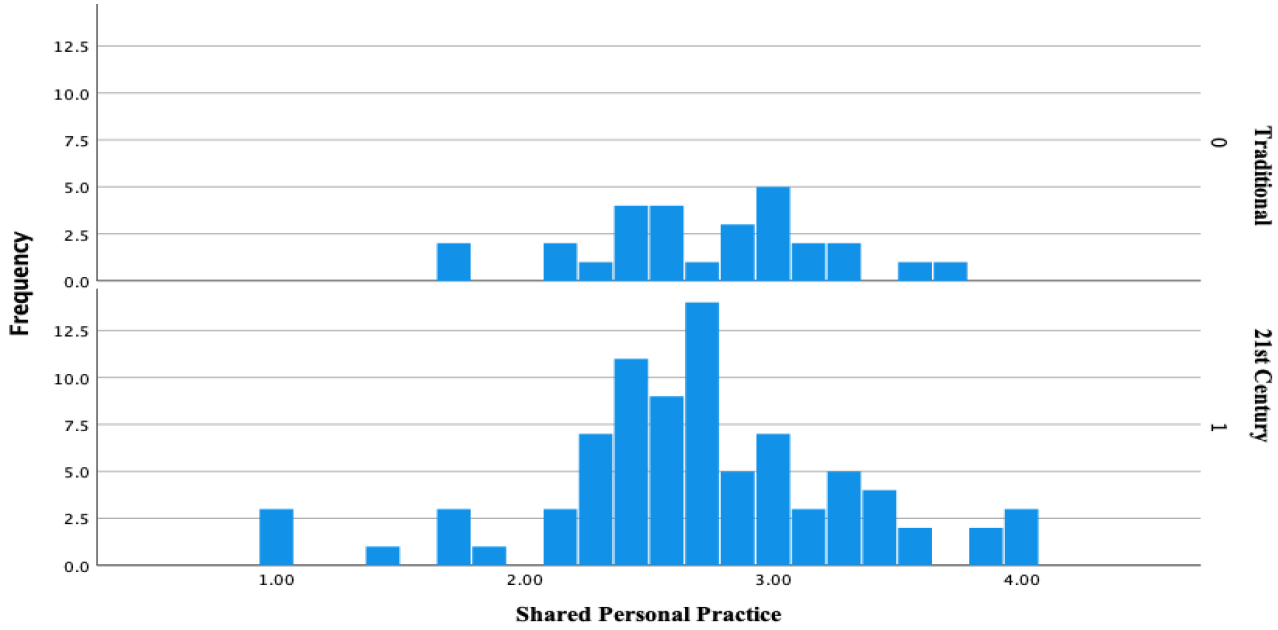
Histogram of Mean Differences for Collective Learning and Application



The fourth subscale shared personal practice had seven items that asked PLC members about how the community provides opportunity for feedback and individual improvement. Like the previous subscales discussed, the mean difference of shared personal practice was small (0.03). The histogram below shows that the mean for this subscale was higher in traditional design than 21st century.

Figure 9

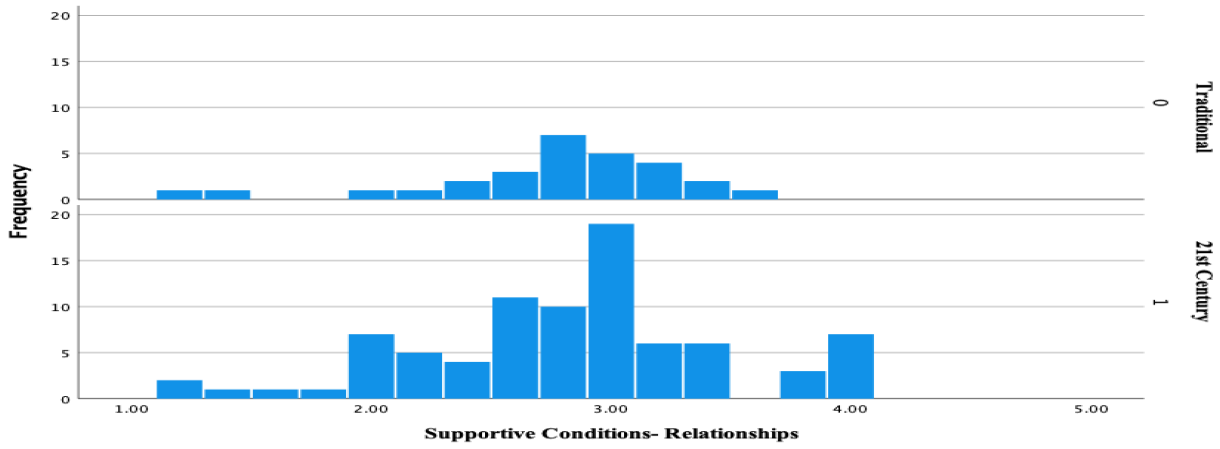
Histogram of Mean Differences for Shared Personal Practice



The subscale, supportive conditions-relationship dimension consisted of five items that asked participants about their experiences regarding support either human or interpersonal in the learning community. Supportive conditions-relationships too had a small mean difference, which was 0.07 (see figure 10).

Figure 10

Histogram of Mean Differences for Supportive Conditions-Relationships



The last subscale, supportive conditions- structural, had ten items relating to time, place to meet for collaboration, actions, and proximity of colleagues. The mean difference for this subscale in the two design types was 0.02 (see figure 11) which also is a small difference. Additionally, table 4 provides the means for each dimension in the two design types.

Figure 11

Histogram of Mean Differences for Supportive Conditions-Structural

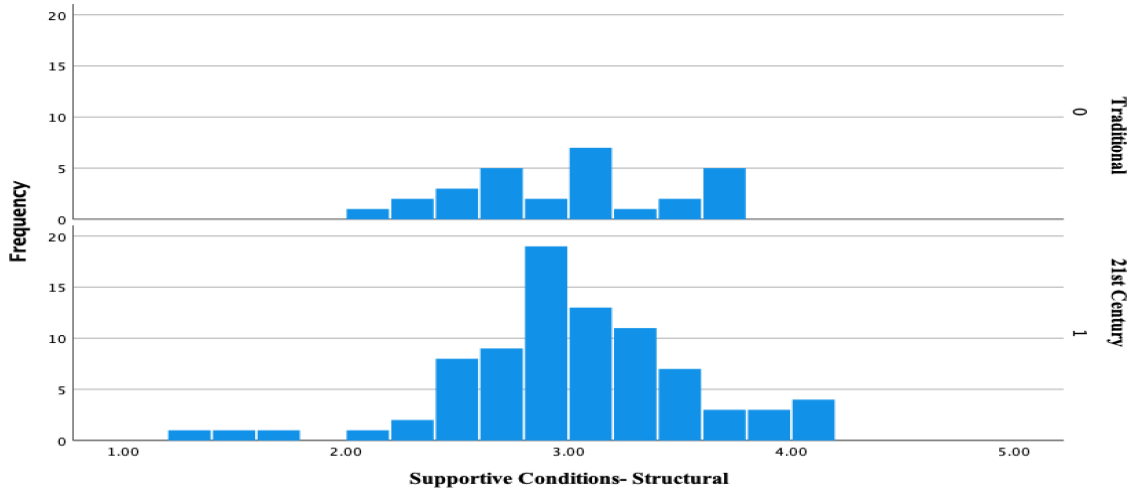


Table 4

Descriptive Statistics

Scale Title	Group 1- Traditional n= 28 M(SD)	Group 2- 21st Century n= 83 M(SD)	Total n= 111 M(SD)
Shared and Supportive Leadership	2.78(*SD*=.5494)	2.69(*SD*=.61078)	2.72(*SD*=.59465)
Shared Values and Vision	2.93(*SD*=.4737)	2.89(*SD*=.55661)	2.90(*SD*=.53515)

Collective Learning	3.12(*SD*=.4755)	3.13(*SD*=.52875)	3.13(*SD*=.51377)
Shared Personal Practice	2.72(*SD*=.4892)	2.69(*SD*=.61929)	2.70(*SD*=.58730)
Supportive Conditions-Relationships	2.75(*SD*=.5480)	2.82(*SD*=.64195)	2.80(*SD*=.61787)
Supportive Conditions-Structural	2.94(*SD*=.4740)	2.96(*SD*=.52322)	2.95(*SD*=.50926)

Box's Test of Equality of Covariance Matrices was analyzed [Box's M= 27.413, *F (*21, 9704.949) = 5.849, p>.246.] The p value of .246 was greater than .05 suggesting that there is no evidence against the null hypothesis and the matrices are equal in the population. Next, I examined the multivariate effect using Wilk's Lambda: Wilks' λ= .975, *F* (6, 104) = 0.447, p=.846, partial $|^2$= .025, observed power= .177). The effect size was small showing there was a small difference between school types (21st and traditional) and the combined dependent variables. The observed power was .177, indicating a low probability of detecting real effect of the size estimated by the final model. Based on the results, there was no evidence to conclude that there is a relationship between school type and the six dimensions of a professional learning community.

Summary of Phase One

Phase one focused on providing analysis of *Professional Learning Community Assessment-Revised* in the 21st century layout and the traditional school layout. Descriptive statistics for each of the subscales according to the dimensions of a professional learning community were reported including means and standard deviation. Results for MANOVA determined that there was no evidence of a relationship between school type and the six

dimensions of the professional learning community. Although there were no statistically significant findings, the information from this phase revealed that the six dimensions were closely related in each of the design types. Results also indicated that collective learning and application was slightly higher than the other dimensions in the two design types. To get further information regarding collaboration in the two design types based on the professional learning community framework, qualitative data was collected to provide insight into the collaborative experiences of elementary educators.

Phase Two: Qualitative

Phase two of the study consisted of qualitative data collection and analysis to answer research question three: What do teachers perceive as factors that facilitate or present barriers to the professional learning community in 21st century and traditional schools? Results from phase one, quantitative, were used to develop focus group interview questions. Appendix N, interview protocol, was created to: (1) learn about the physical design of the school; (2) learn what educators felt facilitated PLCs in 21st century and traditional schools; (3) learn what educators felt were barriers to PLCs in 21st century or traditional schools; and (4) to get a complete picture of PLCs within the two physical design types.

The source of qualitative data was generated from four focus groups conducted with elementary educators in 21st century and traditional schools. There was a range of two-four participants in each focus group with a total of 11 participants. Participants in the focus groups were a subgroup of elementary educators that were participants in phase one, quantitative, which is considered a nested sample (Creamer, 2018).

In addition to focus group interviews, other data sources that were analyzed in this phase were collaboration agendas, minutes, and schedules. Documents were analyzed to corroborate

information shared during the focus group interviews. Data sources collected in this phase helped answer research question three by identifying factors and barriers of PLCs in 21st century and traditional schools.

Data analysis. Inductive content analysis was used to analyze transcripts. I used open coding to analyze line by line the information shared by participants to determine an initial code. This approach allowed me to identify recurring concepts throughout the focus group transcripts. Emerging concepts were color coded based on the connection between the concepts and the review of the literature. Open codes were put into categories based on the researcher's interpretation of meaning and the review of the literature regarding the characteristics of professional learning community dimensions which was the conceptual framework for the study.

Physical Design Description. To get a visual depiction of the physical design of the 21st century and traditional schools that were a part of this study, participants were asked to describe their school's physical design. Educators described the physical design using terms such as neighborhood, open concept, legacy school, office spaces, j. The following statements from participants describe the physical design of the schools in which they are educators.

- Focus Group 1, Participant A (21st century design):

  So, I am housed in what we call a neighborhood and the 21st century school and that neighborhood consists of an open collaboration area as the primary entrance with. And one office space, where the teachers hold their desks and can collaborate during their planning and then my space is a small one of those offices, so I have room for about six students and two teacher desks in there, I would call it a half size classroom. [Lines 22-24]

- Participant B in the same focus group described their 21st century design by saying:

We have four studios and then we actually have a large classroom in our neighborhood which is not very common and some of the other 21st century schools that "District A" (pseudonym) has built. And then we also have another classroom like what "participant A" was talking about for our speech teacher. She is in that small group classroom and can house four to six students. Then we also have a space and it's a reading room. It's a small group reading room the math IS uses and the reading support teacher will also use it, and then we also, you know, pull students. [Lines 31-34]

- Focus Group 2, Participant E (21st century design) used the term "open concept" to describe the physical design.

The open concept is just what you said we don't have those walls. We can create those walls by closing glass panels. And like I said again because I'm in that big space where I share another teacher. I'm not closed off to and from the other teacher. We share that space with both of our students. We both have 20 students. Now, with the open concept we have what we call a hub area, which is just kind of like a community workspace. And we do have different specialist teachers coming. We have speech coming in, we have other teachers with and special ED teachers that might pull some small groups. We also as the grade level will pull groups in there. We also have our math support teacher that comes in. And we'll pull groups in the hub. The hub is also shared without the grade level, and they can do stations. Now before COVID we used to let them work together. But now they only work within their general education classroom. And we are also attached to another grade level, and that is not that is semi closed off. So, there are times being in the open studio we can hear fourth grade their activities or what they might be doing. [Lines 36-46]

- Focus Group 2, Participant C (21st century design) added the following information about the design of the building:

> *And for us our setup is similar. Other than that, we do not have any of our glass. Okay, again, I have my glass doors closed, I have four walls and in our what closes between us are these whiteboard panels. And so, those are all right now put together so that teachers are not seeing anyone else. You only see your basically your four walls well three walls and it's open to the hub area. That hub area is in an open area where the students meet. We have been using it all year. Our fifth grade is what we share next to us but there's a door that closes so that we don't typically hear them. We have a one-on-one room in a small group room within our area. Right now, our IS math teacher uses a small group room. So, she'll come out and she still works with students. And then the one-on-one room we don't typically use. Before COVID we did, but we haven't just because they feel it's too small for us to be using with students. But before that's where a lot of people would pull into. For small groups, but instead we try to keep everything in the hub for a small group so that they can spread out a little bit more and kind of have that space. We just have to wipe down in between, but otherwise I think closed and open it's very similar to what Participant 5 was saying.* [Lines 47-52]

- Focus Group 2, Participant D (traditional) used the term "legacy" to describe the physical design of a traditional school. *Participant D said the following:*

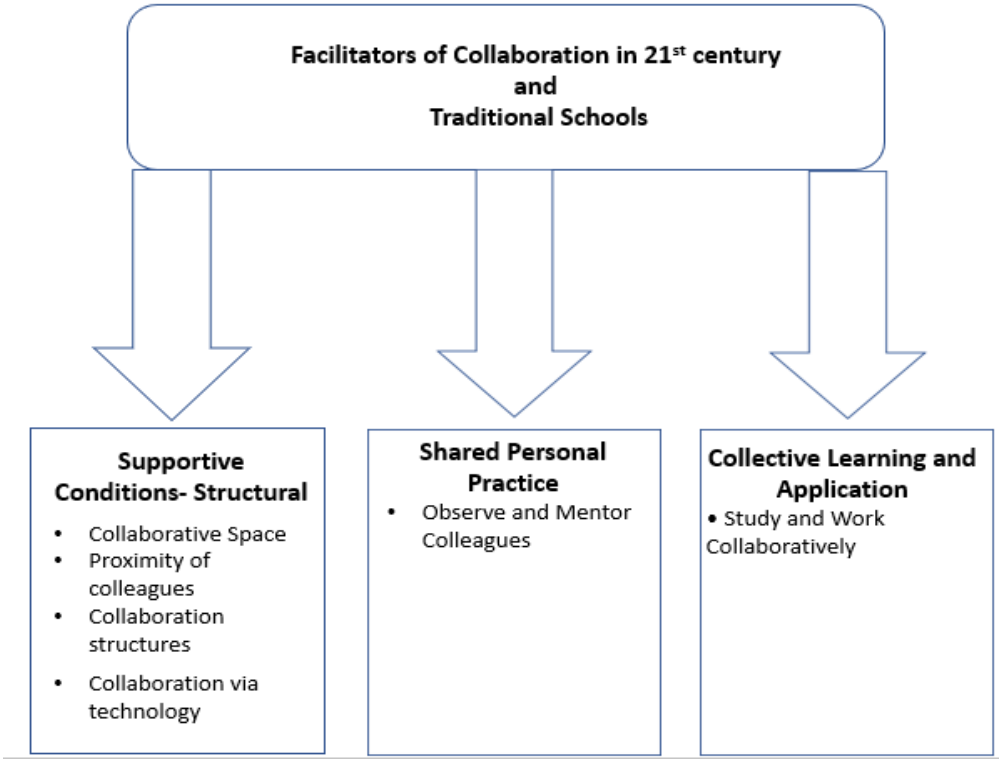
> *A legacy school for my understanding is a traditional school where you have individual classrooms that are closed off three walls and a door. You know the school is over 50 years old. So, it's what you would imagine if you knew the old classroom setup to look like. [Lines 32-35]*

The physical layout description of 21st century and traditional schools given by focus group participants provided a clear depiction of the workspaces in which they occupy. This description also introduced terms from the design types such as neighborhood, open concept, and one-on-one room to describe the spaces in the 21st century design. In a traditional layout, the term legacy school was introduced as a synonym for a traditional layout based on the description being classrooms that are closed off with walls and a door. Information provided in the above description of the design layout is discussed further in the proceeding sections.

Facilitators of PLCs. From the open-coding approach, key concepts emerged from focus group interviews regarding facilitators of professional learning communities within the two design types. The information shared by interviewees regarding their collaborative experiences aligned with the conceptual framework of the study, dimensions of a professional learning community. There were three themes and six subthemes that were identified as facilitators in the professional learning community in 21st century and traditional layouts. Figure 12 provides a visual representation of the themes and sub themes that were identified by focus group participants as facilitators of PLCs in 21st century and traditional schools.

Figure 12

Facilitators of PLCs in 21st Century and Traditional Schools



Supportive Conditions: Structural. The first theme that emerged from the focus group discussions as a facilitator of collaboration was supportive conditions structural. Seven characteristics of supportive-conditions-structural were identified as facilitators of collaboration within the two design types. Those characteristics were: collaborative space, proximity of colleagues, collaboration resources, communication, flexible spaces, and collaboration through technology.

Collaborative space. Participants identified the space in which they collaborate and provided a description of what the space looks like, the materials in the space, and who is within those spaces.

- Focus Group 1, Participant A (21st century design), described the collaborative space using the following words:

  One of the teams that I've seen sometimes are in that small office space and they're just working in a closer area and that's where maybe the instructional materials are so they can pull those off the wall, they can say okay, this is what we need to apply. Let's look at the standard, let's use this tool to be able to teach the information. [Lines 189-193]

Another participant whose physical design is 21st century in the same focus group added:

In a normal year, I'll say pre-covid year we would use the teacher office, the collaborative office. We would sit at the table; admin would come in and we have a SMART Board up there. I think all the schools are designed, just like that, where we could all collaborate. [Lines 194-195]

- Focus Group 2, Participant C- 21st century design:

  At school "X", we have a neighborhood and in there we have our grade level team office area. It is the other teachers, myself, and the aide that I work with. We all have desks in there. [Lines 17-19]

- Focus Group 3, Participant H- (21st century design):

  Focused collaboration, the grade level does meet. We meet in our hub area, so we're all spaced out. You know there are quite a bit of us. Four of us, and then a specialist. Our music specials teacher comes, and he sits in every morning with us for focused collaboration, so he gives us input as well. Our Special ed teachers that are assigned to the grade level also attend and gives us input. [Lines 101-102]

- Focus Group 4, Participant K- (21st century design):

We have a collab room where the six teachers get together, and we meet for PLC and planning and all of that. [Line 27]

- Focus Group 2, Participant E- (21st/ traditional physical design):

  In our 21st century part of our building has the open classroom with the one wall that's made of glass but has been open all year. For this covid thing to keep distance and whatnot. I see some of that collaboration happening, not just in the classroom but in that hub area or common area, whichever you call it outside the room, so that people can so that teachers can share students. [Lines 50-53]

Proximity of Colleagues. Accessibility of colleagues in the physical design of the school was another sub theme of supportive conditions-structural. Participants in the study discussed the benefits of having colleagues nearby. The following statements describe the benefits of proximity to colleagues:

- Focus Group 1, Participant A- (21st century design):

  I would say the benefits certainly include that and meet that immediate collaboration. You're not having to travel to be in and amongst your colleagues. [Lines 40-41]

- Focus Group 2, Participant C- (21st century design):

  If we need to change something because something's not working, I can say hey you know what the students really are struggling with this, I need to spend a little bit more time and we can easily communicate because it's just popping in my head out there you are same thing with collaboration in the morning it's just, you're all right there. [Lines 69-70]

- Focus Group 2, Participant E- (21st century design):

  Something that I feel is really positive with this open environment is that the teacher is able to collaborate very easily like you said with our teammates. And if things are not

working, we can make adjustments and it works very well. I've been in this building now; this is what our fifth year? And I have been blessed with having great teammates and so that close proximity and having great teammates, I say that's a lot of positives for me. [Lines 78-80]

Additionally, participant E added that proximity is beneficial, saying:

If they're having problems or they are having technology issues or they're not sure what to do whatever the case may be, we are right there, we can jump in so, we can get right to those hiccups easy peasy. [Lines 81-82]

If there's behaviors, we can jump right in. You know we're not leaving students because we're such an open space, so the collaboration with my teammates is definitely a plus. [Lines 84-85]

- Focus Group 4, Participant I- (traditional design):

As far as the structure the design of the building and we are connected to like a neighbor teacher, so you know, even if you're not actively and purposely observing the other teacher, you know the doors are open between the rooms, you can kind of get some ideas or see what they're doing and it kind of gives you that opportunity, and while you still have your own space. [Lines 144-145]

Collaboration Structures. During each focus group interview, participants mentioned the structure of collaboration that the organization has implemented when collaborating with colleagues. Participants discussed having norms during their collaboration time, use of an agenda, critical questions, stages, and designated roles. Example statements of collaboration structures are as follows:

- Focus group 1, Participant B- (21st century design), described the agenda thus:

Collaborative tool that we have to fill out and kind of guides us. We have the stages that we have to look at and you have to know where you're at in the stage. And what question, like some of the questions are, what do you want your students know and be able to do, what are you going to do for students don't know it, so we look at all these questions and then we formulate what we're going to talk about like the day prior or the week prior. And we have a plan before we go into these collaborative sessions and we don't just go in there and just do them, you have to have a plan and we fill out the collaborative tool prior. [Lines 137-139]

- Focus Group 2, Participant C- 21st century design elaborated on the agenda tool by saying:

  One of the things I guess what I found is it is like we have the agendas that are set. I think when it first came out like as we were starting them there were some unknowns and people maybe didn't know how to make them work. But this is where I think in the 21st century schools, they become much more authentic for us. Because we're constantly in collaboration of some kind, even you know, like going back and adding things to our PDCA. You know because, like oh hey we have some stuff that we need to get done. We completed that so go ahead and put that in there and we're adding that agenda throughout the week, [Lines 179-182]

- Focus Group 2, Participant D- (traditional design):

  So, um what you probably will see is that we'll have a timekeeper, will have a note taker will have a facilitator. [Line 210]

- Focus Group 2, Participant E- (21st century design):

Whoever's the facilitator generally I'm a math facilitator on, so I do the math and then my teammate we switch roles for the Thursday for literacy. And we will read the norms, we will have we will talk about who has each role, we will review our past PDCA. That's the things that we talked about in the past: task we completed and the task we need to complete. [Lines 218-220]

- Focus Group 3, Participant C- (21st century design):

  I've been facilitator for both at different times, note taker for both at different times, and the PDCA scribe depending on what it is. And so, we kind of rotate that so that everyone has a chance to I guess make sure that it's fair. [Lines 238-240]

- Focus Group 3, Participant F- (21st century/traditional design):

  I think that teachers have done that for a while, without calling it focus collaboration. Now we just have a time set aside for it and an agenda. [Line 64]

- Focus Group 3, Participant G- (traditional design):

  For me I'm very lucky that I have a colleague that I work well with; and we often meet every day, and so, when it's time for a focus collaboration. You will hear us quickly discuss agenda item or an indicator, so that it does not look like we have skipped indicators. So, we will quickly discuss what we just you know we did off the agenda just to make sure that we are following the steps and then. We are really following the agenda and the indicators to a TEE; and I am the chair for focus collaboration and PLC, so I make sure that we do as we're supposed to. [Lines 88-91]

- Focus Group 3, Participant H- (21st century design):

  And we really go by that journey of excellence, making sure that we're going through those indicators and stages of PLC, and just you know, even when we're setting the

agenda for the next agenda we go back to make sure that we're going in order to make sure that you know it does become that cyclical process that you know everyone is saying that works well in the organization. [Lines 122-123]

- Focus Group 4, Participant I- (traditional design):

  We do have a set agenda, we have a place to house the agendas, we have like allocated days for certain things, but they are somewhat flexible. [Line 124]

Collaboration via Technology. Some participants mentioned that due to the Covid 19 pandemic, most of their collaboration with colleagues has been through technology platforms such as Microsoft Teams or Google Meet. The following quotations provide examples of supportive conditions- structural through technology:

- Focus Group 2, Participant C- (21st century design):

  Right now, we have somebody who is quarantined at home and so we're still able to meet because we meet via Google. [Lines 19-20]

- Focus Group 3, Participant E- (21st century design)

  We have an office with the other teachers. So, we share that office space, but also because COVID we're not in there anymore. We work through our meetings we actually set up for Google meets. [Lines 24-25]

- Focus Group 1, Participant A- (21st century design:

  Now, during covid this year has been different, a lot of times we started out in zoom sessions spread out in our own studios. [Line 54]

- Focus Group 3, Participant F- (21st/traditional design):

  Because we have been back and forth between remote and in school and uh because of Covid mitigation strategies we're not supposed to be in the same kind of space with other

people, we have started and continued mostly to the year all year of having our PLCs meet via Microsoft teams. [Lines 81-84]

Shared Personal Practice. The next theme that was identified as a facilitator of collaboration in the two physical design types was shared personal practice. Shared personal practice is the fourth dimension of PLCs identified in the literature. Some participants discussed having opportunities to observe instructional practices, mentor new faculty members, and reflect on instructional practices.

Observe and Mentor Colleagues. Examples of shared personal practice relating to the subtheme observe and mentor colleagues were the following:

- Focus Group 1, Participant A- (21st century design):

  And another benefit, I would say is that when there is a need for example as a special education teacher if I need a general education team member. And if the student's assigned teacher is not available, one of the other grade level teachers can be called in, and they are also familiar with that child they've taught the child, or they've been in proximity to that child and that's the benefit as well. [Lines 45-47]

- Focus Group 3, Participant F- (21st century/traditional design):

  Before the pandemic our principal allowed, encouraged, groups of teachers to go in and observe other groups of teachers and then discuss what they saw, and he got subs for that I remember that happening. [Line 142]

- Focus Group 3, Participant H- (21st century design):

  And can I just add that we have in second grade just had a colleague to join us in I think she may come in, maybe March or April. And coming in our admin had it where she was able to come in and just observe, you know guided reading or going in and observe, you

know math workshops and that type of thing, so it was kind of to introduce her to the workspace and to what the expectations were. [Lines 144-145]

- Focus Group 2, Participant E- (21st century design):

  In our 21st century school that's something that's very nice as a positive when you have a new teacher whether, if it's a brand-new teacher or just a new teacher to the school system you're right there and you can be a buddy and you know, being in that one studio. Big studios open I can be right there and the other two teammates when we had four teachers, you were right there so that's the easy, very fluid moving in. [Lines 329-331]

- Focus Group 2, Participant D- (traditional design):

  And the Aspen program that manages our student data we know IEPs and things like that that's how we kind of and, of course, during a PLC that's an opportunity to teach and to mentor as well, so um I know I probably didn't answer your question appropriately, but I don't really know how. [Line 322]

- Focus Group 2, Participant B- (21st century design):

  But you can kind of mentor each other in the PLC. This is something I do with students who are struggling or have ideas that maybe have this as fluency. And so, you can kind of mentor that way in the sense that you're sharing things that've worked. How you've done it. Sometimes we even brought during our PLC you might say, hey, this is what I was going to start the lesson. You guys have any ideas and then everybody will kind of maybe you know kind of Oh, I think you should do this way or whatever. This year is unique in the sense that we had a teacher who had not taught fourth grade math for five years, and so, because of that. We did level our classes. [Lines 337-341]

- Focus Group 4, Participant I- (traditional design):

I have had conversations with the administrator at the school asking if it was okay if, like people could see like how my workstations or things like that were set up, and if that was something that I was okay with. [Line 140]

Collective Learning and Application. A fourth theme that emerged during analysis was collective learning application. This theme is one of the dimensions of PLCs identified in the literature. In this dimension, educators work together to ensure that the needs of students are met. To ensure that the needs of students are met, focus group participants discussed co-teaching with colleagues, analyzing data, and differentiating their construction.

Study and Work Collaboratively. Substantiating focus group statements to support this sub theme included:

- Referring to analyzing data: Focus Group 1, Participant A- (21st century design):

  They're breaking numbers down, maybe on their individual computers and then contributing to the discussion that's on the big whiteboard. [Line 188]

- Referring to analyzing data: Focus Group 1, Participant B (21st century design):

  We're talking about the percentages where we're at on a certain unit, and we look at certain math items we didn't think were, you know phrased correctly for a first grader on a math test and fill out feedback forms there's m-any things that we talked about a lot of times we talk about kids. And what interventions we're doing, we have charts we fill out to identify those students that need re- teaching, or they need intervention and where they're at what tier they land in based on the data. [Line 146-147]

- Referring to analyzing data: Focus Group 2, Participant D- (Traditional design):

  But one of the things when I was the CSC chair, was I tried to find a way that we could seamlessly track our students in terms of you know the kind of support that they need.

Our special education students that we serve and then put them into groups, you know, like I'm in an emerging group. You know, working towards standard and those who are at standard, and you know, like map it out somehow visually and then track them as they move from one group to another. [Lines 209-213]

- Referring to Co-teaching: Focus Group 1, Participant B- (21st century design):
  Well, we have a gifted teacher who comes in, and she pushes in more than she pulls out. So, you know she helps us a lot with our stem and PBL activities, so you know she has more time and hands on to prepare for those gifted kids sometimes. Because we're doing more of the trying to get them to read and you know how to do the foundational fluency skills and math skills and lots of interventions and first grade so she's really good about pushing in and teaching us things. That we are not able to spend a lot of time on. We learn a lot from her. And we also have our speech teacher who will push in, and she will you know sit with us because she's right there in the neighborhood and we're able to identify student needs and things like accommodations we might need to provide that we don't know that we're not providing so you're able to vertically collaborate within your neighborhood with these people pushing in. [Lines 218-224]
- Referring to Co-teaching: Focus Group 2, Participant C- (21st century design):
  Eleven of my students happened to be in her classroom. So, I'm just naturally going to be co-teaching with her. So, for the first two weeks I taught all the math, or the IS Math teacher was teaching. And then she took over and started to teach the lessons and we would talk about what she was doing, how she would do it and even now like yesterday, was kind of, I guess her last official lesson, because today with the assessment and she did the first word problem and then she put up the second one, and she just looked over

at me and she said, Ms. T (pseudonym) *what do you think we should do with this one and I knew exactly what it was, it was? Just worded differently, kind of funny so I, but the kids were used to it so because of how it is, I could pop right in.* [Lines 342-346]

- Referring to Co-teaching: Focus Group 3, Participant G- *(traditional design)*:

  So, before the pandemic, we did a lot of co teaching together, and now that the pandemic it's in place, the best way we have found is using teams. Open it up in our classroom that way. Now I have been able to still co-teach with the ET who comes in and does Wixie lessons and Seesaw we co teach that together, and then our math coach we have co - teach math lessons together. [Lines 146-147]

- Referring to Co-teaching: Focus Group 3, Participant F- (21st century/traditional design):
  I do co teach a lot with the teachers. Where sometimes I model doing something or sometimes, we work together. [Line 141]
- Referring to Co-teaching: Focus Group 4, Participant J (traditional):
  And when I was in first grade this year, I had the ESL cluster um so the ESL teacher would come in and she would kind of co teach we would go over like I would let her know what we were doing what we're working on what they have worked with me and that would give her the opportunity. [Lines 143-144]
- Referring to Vertical Collaboration: Focus Group 1, Participant B (21st century design):
  First grade is one of those core years and we often get kids that come from kindergarten that don't know all their sight words. It's always good to have that vertical collaboration to talk about you know. [Line 113-114]
- Referring to Vertical Collaboration: Focus Group 2, Participant E (21st century design):
  Also, a positive being next to fourth grade is easy for me for as a team if we need to

collaborate with fourth grade you know if we need to know some things that are going on, so that close proximity is definitely a positive for collaborating and doing what's best for our kids. [Line 92]

Two participants shared an overall benefit of collective learning and application: teachers studying and working collaboratively to improve teaching and learning based on the PLC framework in their design type as:

- Focus Group 3, Participant H (21st century*)*:

  I think the planning portion of the plc is where you get to really talk about what you could do, individually or as co- teaching or even as a team. And as far as people being able to go in and actually teach together that's when those open classrooms come into play. Where it's you know the flexibility of being able, before a covid. You know where someone could have said, well you know, let's meet in the hub and we'll do this lesson or do this read aloud and do this activity afterwards. [Line 131-133]

- Focus Group 1, Participant B- (21st century)-

  And that's probably my favorite part of collaboration and I see the most benefit in that, and then talking about students as well you know where they are in the SST to process or CSC process. [Line171]

Barriers of PLCs. On the other hand, focus group participants identified barriers of collaboration within their physical design type. Two themes submerged from coding connected to the conceptual framework of the study. Those themes were: supportive conditions-structural and supportive conditions-relational.

Supportive Conditions: Structural. The open coding approach revealed supportive conditions-structural as a barrier for collaboration within the two design types. This theme is one

of the dimensions of a professional learning community. Characteristics of this dimension consist of time, communication, procedures, size of the school, proximity of teacher, and staff development processes. Example statements below provide insight into the challenges of the spaces that educators occupy.

- Referring to proximity to colleagues: Focus Group 1, Participant B (21st century design): *Also, vertical collaboration it's really hard like, if you want to vertical collaborate with fourth grade you actually have to walk downstairs in my building to go and collaborate with fourth grade, I only see kindergarten and Pre-K upstairs. And I feel like we're more isolated in that manner as compared to a traditional classroom. You see other people from other grade levels more often. Which is still very important. I feel like we spend more time with our neighborhood teams. And that is a challenge to be getting that time and I think our administration does a really good job of trying to provide that time for the vertical collaboration, because it is, it is very important, especially now, at the end of the year*. [Lines 79-82]
- Referring to the layout of the school: Focus Group 2, Participant D (traditional design): *Participants C and Participants E (pseudonyms) have said, you know by us being closed off and separated, you know no ease to leave to assist another teacher due to the design of the school. We may have to let you know we've got to walk out the door, and you know walk a couple of doors down the hall.* [Lines 97-98]
- Referring to the layout of the school: Focus Group 2, Participant E (21st century design): *Also, something as a teacher is I don't have any space to just shut down. If I need to make a personal phone call, I don't have personal space. My office is shared with my*

teammates. Sometimes you just need quiet, and you don't have that with that open space. I don't have a door; I can just close my door for a moment. [Lines 110-111]

- Referring to layout of the school: Focus Group 3, Participant F (21st/traditional design): *The new 21st century building wasn't built large enough, so we keep some of the legacy buildings; where they have a bunch of this where our middle school is kept, which is fine, because they're all in one place. But where we have a bunch of specials, the students have to come from one building and make this scorious loop to come to the other building to do work. And that also sort of isolates those of us in the new building or in the old building from those in the new building because you go from one to the other, you have to plan that. You know you don't just happen by somebody else so that as apart as building layout goes are challenges.* [Lines 31-35]
- Referring to the layout of the school: Focus Group 3, Participant G (traditional): *For me, I feel like even before the pandemic just to team teach or to have our students work together the other fifth grade teacher is two doors down. So, even if we wanted to work together, we would lose time traveling and just to co- teach is a problem, because our classrooms are so small, so I feel like those things are challenges."* [Lines 36-38] Additionally, Participant G added the following statement relating to the layout of the school: *"One thing I did not mention before, is that, like to the specials happen in our classrooms which I think takes away a little bit, so I think that's a disadvantage that I forgot to mention from small space.* [Line 58]
- Referring to flexibility of space: Focus Group 2, Participant E (21st century design): *Moving into the building it wasn't what we thought it would be. I was very fortunate to be able to back in 2012, sit with my administrator and the engineers; and they listened to*

our ideas and what we wanted. They had this plan and how we could close and have that space when we need it and open it. When we got into the classroom, it wasn't what we thought we did not, we were not able to close off that big studio. [Lines 104-106]

Supportive Conditions: Collegial/Relational. The literature describes this theme as educators having positive attitudes, respect, and trust for colleagues. Respect and trust yield caring relationships and a desire for continuous critical inquiry and improvement in the learning community (Hord, 1997). Example statements of the challenges of this theme are below:

- Referring to personalities of teammates: Focus Group 2, Participant E (21st century design):

  Another thing that when you have a general classroom, that's your classroom. This is how "you do" things, but when you're in an open space with a team it's what "we do." That again there's things you have to give up of how I'll say like a control this is how I would do. With a lesson, this is how I would address something, and you have to listen to your teammates and to their ideas. Also, it doesn't have to always be your idea. So, that was a lot of transformation just over the past years of just giving that up so that control part. Another thing that's kind of difficult is working with so many different personalities. That can also be a challenge when you're working. If you don't get along or anything like that, that access is sometimes too much access. [Lines 114-118]

- Referring to the cohesiveness of teammates: Focus Group 2, Participant C (21st century):

  The strength of the team is typically positive because you can draw on each other's strengths. But that goes back to also you're only as strong as your weakest link and if your team is not cohesive. Because I have been with multiple teams. I've kind of moved a

different route in different areas. I started out with some really strong teams and sometimes one person will move in or move out and that team is no longer as cohesive as it used to be because of that again. You have to remember that we're all individuals and so as much as it can be great, and it can be a great strength. It also depends on your purpose, your motivation for teaching why you are there. Like different personalities might not mesh well, some people need that break. They don't have that break. [Lines 120-125]

- Relating to the cohesiveness of the teammates: Focus Group 3, Participant G (traditional):

  Like a little bit more stressful. Especially if you don't have teachers. It's kind of like the 21st century school if you don't have those personalities, or those teachers that are all giving the same 100%. Then you have one person that's preparing for the meeting that's making sure the agenda is ready and doing everything. It's like you can't put these people together to work in 21st century school, just like you can't force people to focus on collaboration. [Lines 71-73]

- Relating to teacher buy-in: Focus Group 4, Participant I (traditional):

  So, when you have teams, they're not necessarily together for like the long haul you don't have those teams that have been together for years and years and years so everybody's at a different place. And so, what immediately comes to my mind, could be somewhat like frustration, because we're all in different places. So, I was placed in my school on temporary assignment. And so, I came from somewhere that was like it technically leaps and bounds ahead. Like so it's where we're going and then sometimes like it's hard to be in that space when knowing that some individuals aren't necessarily seeing the value in

it, and I see that it's very valuable. But knowing that some people don't see it yet or can't see the value of it, yet it's kind of frustrating. [Lines 99-102]

- Relating to teacher buy-in: Focus Group 4, Participant K (21st century design):

  There's teachers that are totally against it, like fighting it. And I'm like guys, this is to benefit us. This is our time to work together to look at data and to improve our instruction. That's us, working together to figure out what the needs of the students are going to guide our instruction. So, I mean I think lots of benefits from it, but there is a lot of pushbacks in our school as well from about probably two thirds of the staff. [Line 106-109].

- Relating to teacher buy-in: Focus Group 4, Participant J (traditional):

  Yeah, and I've kind of noticed the same thing. I'm in the grade levels with one that I worked with; you know first grade; now I'm their scribe for this semester. And I just noticed that with everyone being at a different level like sometimes sadly one or two people on the team are taking the load of the work. And kind of carrying the group, and so I would want to see more like personal accountability. And I know we have roles and that kind of thing, but you know, sometimes when certain people are in certain roles, we spend 15-20 minutes trying to figure out what stage we're on and it's not really valuable time. [Lines 110-113]

Teacher buy-in is an important component in sustaining a high functioning professional learning community. This coincides with educators believing in the values and vision of the school and bringing their collective knowledge together in the learning community to make the vision a reality.

Document Analysis. Some focus group participants discussed that during focused collaboration (professional learning community), they have an agenda, each member has a role, norms are identified, and minutes documented. Participants also discussed the actions taken in collaboration such as analyzing data, creating flexible groups, and sharing best practices with colleagues. To examine, the actions taken during collaboration as well as corroborate some of the information shared during focus group interview, documents such as collaboration agendas and minutes were analyzed. This study consisted of eight elementary schools. Six of the eight schools provided examples of their focused collaboration agendas, schedules, and minutes. Two of the schools did not share examples citing confidentially as the reasoning. Upon examination of the documents, I noticed that the agenda/ minutes document for each school was the same. The document consisted of the following items:

- Richard DuFour's Four Critical Questions
- Stages for Collaboration
- Materials needed for the meeting
- Educators in attendance
- Date
- Amount of time spent on each item
- SMART goal
- Location of meeting (Google Meet, Teams, or in person)
- Items discussed:

a. Interventions

b. Data analysis

c. Assessment Feedback

- Some agendas were separated by subject area (literacy or math)

Analysis of documents served as triangulation of information learned from focus group interviews. Participants mentioned the collaborative structures that were in place in the two design types. Those structures consisted of an agenda, stages, data, and meeting days and times just to name a few. Based on the information retrieved from focus group interviews and the analysis of documents, it can be concluded that these documents are indeed a part of the collaborative structures described by participants.

Summary of Findings

This chapter provided the results to each of the research questions. Research question one sought to determine if a relationship existed between the independent variable school type (21st or traditional) and dependent variable (supportive conditions-structural). Multivariate Analysis of Variance (MANOVA) was conducted for the independent variable school type and combined dependent variables, six dimensions of a professional learning community. The results indicated no significant differences between school type and supportive conditions-structural. Research question two sought to identify if there were differences between the dimensions of a professional learning community (shared and supportive leadership, shared values and vision, collective learning, and application, shared personal practice, supportive conditions-relationships, and supportive conditions-structural). The results indicated no statistically significant difference between the subscales.

The purpose of research question three was to identify facilitators and barriers to the professional learning community in 21st century and traditional layouts. The initial data analysis identified five themes that addressed the facilitation and barriers of collaboration in 21st century and traditional schools. The first theme, supportive conditions- structural included the

subcategories collaborative space, proximity to colleagues, collaboration structures, and collaboration via technology as facilitators of collaboration within the two design types. Next, the second theme, shared personal practice included the subtheme observe and mentor colleagues. Theme three was collective learning and application. This theme included the subtheme study and work collaboratively.

Themes relating to barriers of collaboration were supportive conditions-structural and supportive conditions-relational. Participants identified the layout of the building as a barrier of collaboration within the two design types. They cited the size, proximity to colleagues, and flexibility of space as examples of those barriers. Lastly supportive conditions-relational was identified as a barrier in the two design types. Some participants described teacher buy-in and different team members to a grade level each year as a challenge. Because of this, the capacity of the professional learning community fluctuates, and this can be a barrier to collaboration. Chapter five will interpret the findings and provide recommendations to school districts and suggest future research opportunities.

Chapter 5: Discussion

The purpose of this research study was to broaden awareness of collaboration using the professional learning community framework in schools whose physical designs/floor plans were 21st century or traditional. Additionally, this study sought to identify if there was a relationship between the physical design/floor plan of the school and the sixth dimension of professional learning communities, supportive conditions-structural as well as identify differences between the dimensions in the two design types based on the anonymous questionnaire, the *Professional Learning Community Assessment-Revised.* Furthermore, the study sought to get further explanations to the results of phase one, quantitative, by having elementary educators identify facilitators and barriers of collaboration in 21st century and traditional schools through focus group interviews. By giving elementary educators an opportunity to reflect on collaboration based on the professional learning community framework in their assigned workspace, information gathered will assist school districts, administrators, and teachers in understanding the physical and collaborative structures needed for effective continuous improvement.

Physical Design Layout

The physical design/floor plan can be described as the overall design and layout of the learning environment. Physical design is an important part of education because it is the space where teachers and students learn and work collaboratively. The physical aspects of the learning environment consist of color schemes, lighting (natural and light bulbs), social (opportunities for teachers and students to interact), and furniture (desks, chairs, flexible seating options, etc.). Physical design/floor plans of schools differ around the world. For example, some learning environments are in pods. Schools with a pod layout have approximately five or more pods and in each pod, and there are five to six classrooms. These facilities sometimes have a multi-

purpose room, media center, music, and art room just to name a few. Another type of physical design/floor plan is 21st century layout. This layout consists of a neighborhood with a central hub that has approximately four to five learning studios, a teacher collaboration area, and small group/one-to-one learning rooms. Lastly, traditional classrooms are learning environments that are self-contained. This type of physical design has a classroom across the hallway from them and rooms on the left and right. Some traditional learning environments have an adjoining room that leads to another classroom but is separated by a door. Also, the facilities have a multipurpose room, media center, and special area rooms (art, music, and P.E.).

Although the physical design/floor plan of the schools throughout the United States may look different, one commonality is each environment is organized by teachers to promote 21st century skills such as collaboration, critical thinking, creativity, and communication for students and colleagues.

Professional Learning Communities

A continuous push for teachers to collaborate with other colleagues on instructional practices has become the norm in the educational realm. This has led to school districts identifying an effective way for teachers to interact and share ideas in a formal setting. Because of this, school districts have implemented professional learning communities as a structured process for educators to process new knowledge and have a collective responsibility for supporting and helping others improve their instructional practices (Wennergren & Blossing, 2017).

Professional learning communities are professionals who come together and share a common purpose that will lead to conversations regarding data and best practices. The PLC framework consists of six dimensions that initiates and sustains a successful community of

learners. Those dimensions are shared values and vision, shared and supportive leadership, collective learning and application, shared personal practice, supportive conditions-collegial/relational, and supportive conditions-structural.

First, shared values and vision consists of educators sharing the same purpose that will guide the actions taken in the learning community. In this dimension educators collaborate and grow professionally as a community of learners. The next dimension is shared and supportive leadership. School leaders are at the forefront of implementing change. To get faculty and staff buy-in, administrators must share power and decision making when necessary. This creates a positive culture and climate among the learning community because it builds teacher leaders and provides an opportunity for faculty and staff to take ownership and provide feedback on new initiatives.

Another dimension of the learning community is collective learning and application. This is when educators seek new knowledge, skills, and strategies from members of the learning community while working collaboratively to plan, solve problems, and improve instruction and student learning opportunities. Then, the fourth dimension of PLCs, shared personal practice, gives members an opportunity to observe colleagues informally to offer positive feedback, gain new knowledge, and share information. Some learning environments have opportunities for teachers to participate in instructional rounds or learning walkthrough cohorts to see the various instructional strategies being implemented within the school. This dimension requires school leaders to be intentional in creating a learning community that is built on trust and respect so that educators feel comfortable with colleagues visiting the learning community to gain new knowledge or share feedback that could improve practice.

Dimensions five and six are supportive conditions-structural and supportive conditions-relationships. Supportive conditions-structural identifies when and where the learning community will meet and establishes the communication systems needed to convey information to members in a timely manner. Also, this dimension gives members an opportunity to identify resources needed for the work of the learning community such as instructional support from math or literacy coaches or finances for materials needed for instruction.

Moreover, another aspect of supportive conditions is relationships. To sustain a successful professional learning community, positive relationships built on trust and respect must be established. Building trust and respect in the community requires leaders to model for PLC members good intentions, expression of appreciation for others, honesty, acceptance of responsibility, opening communication, consistency, and engaging in problem solving. Establishing trust is built over time, and it is important for school leaders to provide meaningful opportunities for members to interact formally and informally.

The dimensions of professional learning communities serve as the foundation for establishing a sustainable community whose goal is to provide support and resources to teachers as they work collaboratively to analyze data and share instructional practices that will enhance each tier of instruction.

Professional Learning Community Assessment-Revised

The *Professional Learning Community Assessment-Revised* was the anonymous electronic survey used to gain insight into the learning communities of this study. The 52-item assessment asks questions relating daily classroom and school practices as it relates to the PLC dimensions (Olivier et al., 2003). Participants were able to rate items using a five-point scale (strongly disagree to strongly agree). Item statements used in the assessment align to the large

body of literature on PLCs. Results from the *PLCA-R* provide schools with valuable data relating to the PLC dimensions that can be used to reflect on current practices and identify strategies needed to improve dimensions with low responses. Information collected from the questionnaire will assist in strengthening and sustaining the professional learning community.

Research Questions:

1. What is the relationship between the physical design/floor plan (21st century and traditional) elementary schools and supportive conditions- structural dimension of the professional learning community?

2. What differences exist between supportive conditions-structural dimension and the other dimensions of the professional learning community (a. shared values and vision; b. shared and supportive leadership; c. collective learning and application; d. supportive conditions-collegial/relational; and e. shared personal practice) in 21st century and traditional elementary schools?

3. What do teachers perceive as factors that facilitate or present barriers to the professional learning community in 21st century and traditional schools?

Evaluation and Discussion of Research Questions 1 and 2

Research question one focused on identifying if there was a relationship between the school type, 21st century or traditional, and supportive conditions-structural dimension of the professional learning community as assessed by the *Professional Learning Community Assessment-Revised (PLCA-R).*This question focused on the dimension supportive conditions-structural in the two design types because a characteristic of this dimension is proximity to colleagues (Hord, 1997; Hord & Sommers, 2012; Hord & Tobia, 2012). Spillane and colleagues (2017) found that the proximity of colleagues to one another predicts work-related interactions.

Based on the literature, I hypothesized that there was a relationship between school type and supportive conditions-structural. Additionally, research question two, gave me an opportunity to explore the other dimensions of the professional learning community (shared and supportive leadership, shared values and vision, collective learning, and application, shared personal practice, and supportive conditions-relationships) to see if any differences existed. Research questions one and two were answered using MANOVA in SPSS (v.28.0).

Descriptive statistics from the analysis revealed that mean differences between the six dimensions in each design type was minimal. The lowest mean difference was .01, shared values and vision, and the highest mean difference was .09, shared and supportive leadership. Collective learning and application were the highest mean of all the dimensions (traditional layout: 3.12(*SD*=.4755) and 21st century layout: 3.13(*SD*=.52875*)*. Since this dimension had the highest mean, some focus group interview questions were constructed relating to this theme based on the characteristics identified when reviewing the literature. Also, the standard deviation band for each dimension was small ranging from 0.47-0.64. Creators of the Professional Learning Community Assessment-Revised (PLCA-R) identified that small standard deviations indicate greater agreement from respondents relating to the six dimensions. Because the standard deviation band was small in this study, I can conclude that respondents agreed with the statements of the dimensions as it relates to their physical design type.

A limitation of this phase of the study was the small sample size. There were 111 elementary educators who were members of a professional learning community and whose workspaces were traditional (*n*=28) and 21st century (*n*=83) that responded to the questionnaire. The number of traditional school respondents makes up less than half of the respondents. Having a small sample size limits generalizability of findings. Observed power which was found in the

multivariate table indicated there was a 17.7% chance of having significant difference between school types, 21st century and traditional layout. The low observed power in this study could be because there were more respondents from the 21st century than traditional or just the presence of a small sample size in general. Information from the observed power coincided with the findings that there was no statistical significance between school type and the six dimensions. Although results from MANOVA did not yield any statistically significant results, responses of participants revealed that the schools in this study exhibit characteristics of the dimensions of the PLC based on the literature. Results from phase one helped in the construction of focus group interview questions that relate to the design type and six dimensions of the PLC.

Evaluation and Discussion of Research Question 3

To gain a deeper understanding of the professional learning community dimensions in the 21st century and traditional schools from elementary educators through focus group interviews. The purpose of the focus group interviews was to get a description of the spaces that teachers occupy, identify facilitators and barriers of the professional learning community based on the physical design/floor plan of the school. Focus group interview questions were created based on data from phases that revealed each dimension's closely related dimensions of the professional learning community and literature on school building design.

Facilitators of PLCs

Coding from focus group interviews revealed three themes and six sub themes of PLCs in the two design types. Those themes and subthemes were supportive conditions-structural (collaborative space, proximity to colleagues, collaboration structures, collaboration via technology); shared personal practice (observe and mentor colleagues); collective learning and application (study and work collaboratively).

Theme: Supportive Conditions: Structural

Sub theme 1: Collaborative Space. The first facilitator of professional learning communities identified by focus group participants was supportive conditions-structural. Review of the literature relating to this theme identified space as a characteristic of the learning community because it answers "where" members will meet to problem solve, reflect, learn, and inquire (Hord & Sommer, 2008; Hord & Tobia, 2012).

Participants in 21st century learning environments agreed that having a designated collaborative space such as their collaboration room or grade level office was beneficial. The collaborative space housed desks, SMART Boards to project information to share with the whole group, materials such as manuals, data notebooks, etc. were housed in a central location. Educators in traditional schools discussed how they collaborate in classrooms of their grade level colleagues to share information. Like 21st century participants, those in traditional layouts mentioned that they bring required materials to collaboration and can project information on the board for everyone to see. Though the design of the spaces for collaboration are different in the two design types, a commonality that members share is that they have a place to collaborate and possess the materials needed for discussion in those spaces. Having a designated space to collaborate builds a sense of community and sets the tone that everyone is valuable. These spaces create the mindset that this is a workspace and has all the human and tangible resources needed for the successful work of the professional learning community.

Sub theme 2: Proximity to Colleagues. The second sub theme identified by participants was proximity to colleagues. Educators in 21st century schools mentioned that grade level teams are divided into neighborhoods. The neighborhoods consist of 4 to 6 learning studios. Participants described that some learning studios are paired and have an operable partition

between the adjacent studios. Some studios do not have an operable partition because the studio is like a classroom in a traditional school. There are also small group rooms for special education and interventionists to use when working with small groups of students. Participants from 21st century schools liked having small group rooms within the neighborhood because it decreased travel time of support teachers and students so that service time is not decreased.

Similarly, some participants in traditional schools mentioned that although their building design is not set-up like a 21st century layout, they are still near colleagues. In years when class size ratio is 1:18, grade level teams can be in the same hallway and are able to support one another as needed formally or informally. Another participant from a traditional school mentioned that there is an adjoining door between her classroom and a colleague's. If they have questions and need immediate response or support, they can quickly go through that door and get support. Educators shared that a benefit of proximity to colleagues gave them the opportunity to discuss immediate instructional changes as well as support another colleague or substitute teacher. Proximity to colleagues provides educators with an opportunity to informally collaborate to provide feedback and support to colleagues.

Sub theme 3: Collaboration Structures. Furthermore, focus group participants identified collaboration structures as another sub theme. PLC members mentioned that they have designated days and times to collaborate with colleagues. For example, Tuesdays at 10:00 am are math collaboration days. Kilbane (2009) identified collaborative structures such as common time to collaborate as a factor of sustaining a PLC which is like what participants identified as the structure of their community.

When the professional learning community meets, members have identified roles such as timekeeper, facilitator, and scribe. These roles assist in ensuring everyone participates in the

learning community. Participants also shared that the roles change weekly or monthly based on the type of meeting (literacy or math) so that everyone gets experience in each role. Additionally, participants discussed that they have an agenda that is followed. The agenda/minutes (one document) identifies the purpose of the meeting, materials needed, critical questions being addressed (DuFour's 4 Critical Questions), stage (school district has stages for collaboration- stage 4: planning for standards-based instruction and common assessments), and items discussed. The minutes and agenda provide members with a uniformed practice throughout the school creating less of a learning curve if a member changes grade level teams. Based on the experiences shared by educators, whether the workspace is 21st century or traditional, the collaborative structures that the school district has in place such as identified time, space, and resources supports the importance of collaboration as a school improvement strategy that can improve teaching and student outcomes.

Sub theme 4: Collaboration via Technology. The fourth sub theme was collaboration through technology. Participants discussed that the nationwide COVID-19 pandemic has changed the space in which they collaborate. Before the pandemic, participants met in collaboration offices or a grade level colleague's classroom. Since the pandemic, however, members have been meeting online through Microsoft Teams or Google Meet. Collaboration via technology was considered a facilitator of the professional learning community because colleagues who were in quarantine were still able to participate in the rich discussions during collaboration although they were not physically within the learning community. Technology platforms as a collaborative space allow for the work of the learning community to continue no matter the layout of the school building or outside factors that influence face-to-face interactions.

Gaining new knowledge does not have to be confined to the learning environments that teachers occupy but can be extended outside of the physical building. Collaboration via technology serves as a resource for educators to connect with other teachers within and outside their schools no matter the design type. This gives educators an opportunity to create a community that supports each other and has purposeful discourse regarding instructional practices for improved student outcomes.

Theme 2: Shared Personal Practice

Sub theme 1: Observe and Mentor Colleagues. The next facilitator of the professional learning community identified by participants was shared personal practice. In this dimension, educators can give and receive feedback that helps them grow individually and collectively to enhance the learning community (Hord & Sommers, 2008). A subtheme that derived from the focus group discussion was observing colleagues. Some participants from the 21st century layout discussed that their principal encouraged small groups of educators to observe colleagues and discuss what they saw in the learning environment. The principal provided substitute teachers for those who were interested in observing colleagues. Another participant from a 21st century school mentioned that when a new second grade teacher joined the team in the middle of the school year, the teacher was able to shadow the long-term substitute in the classroom for a few days as well as observe grade level colleagues.

Moreover, a traditional school participant discussed that the principal observed guided reading instructional practices and asked if colleagues could observe. The participant mentioned there were discussions about providing substitutes for those who would like to observe. Another example that was shared about observing and mentoring colleagues was during collaboration

time. Members can model how they taught a skill, use of technology tools, and other best practices for instruction.

Teachers having an opportunity to visit the workspaces of their colleagues inside and outside of the building can be a valuable experience. These experiences can give some educators the courage to step out of their comfort zones and try new instructional practices such as guided math, guided reading, project-based learning, number talks, collaborative groups, etc. Instead of teachers solely hearing about the practice, they can see the procedures and ask questions. Instructional leaders can no longer expect educators to implement new initiatives without visually seeing how it works. Building a community of educators that are comfortable allowing colleagues to come into their workspaces is key in changing an isolated mindset to an open mindset that welcomes colleagues and accepts constructive feedback.

Theme 3: Collective Learning and Application

Sub theme 1: Study and Work Collaboratively. The last theme identified as a facilitator of the professional learning community in the two design types was collective learning and application. Results in phase one indicated that collective learning and application was the highest mean compared to the other dimensions in 21st century schools. Collective learning and application are when members of the community identify what they need to learn and how they will learn it to support the needs of students.

Participants from both design types mentioned that during collaboration, they analyze student data, create flexible groups, and identify intervention and enrichment activities. During collaboration, they invite interventionists, special education collaborators, or special area teachers to support the work of the learning community. Support from members outside of the grade level team helps educators hear different points of view, identify ways that the skill can be

addressed across disciplines (art, music, or P.E.), plan co-teaching opportunities with gifted teachers, special education collaborators, or other educators, which addresses the differentiated learning needs of all students. Experiences shared by educators shows that not only are they learning from one another improve practice, but they are growing personally and professionally which will positively impact student outcomes.

Research question one was my confirmatory question that sought to determine if there was a relationship between the dimension, supportive conditions-structural and the two design types. Although there was no statistical significance, the information gained from focus group interviews discussed above solidifies the importance of supportive conditions-structural in 21st century and traditional layout. The designs of the buildings are different based on the descriptions provided by participants, however, the structures in place such as designated meeting days and times, agendas, and collaboration via technology support the work of the learning community no matter the design type. Based on the structures in place, members can share their practices and study and work collaboratively to provide high quality teaching and learning.

Barriers of PLCs

Research question three not only sought to identify facilitators of the professional learning community but also sought to identify barriers. One theme that emerged as a barrier that was previously identified as a facilitator was supportive conditions-structural.

Theme 1: Supportive Conditions: Structural

Focus groups participants in 21st century schools identified the layout of the building as a barrier. For example, participants find it challenging to vertically collaborate because grade levels are divided into neighborhoods, and some are on different floors. Because of this, some

21st century participants shared that they do not know some of the teachers in the various grade levels, which creates a sense of isolation.

Furthermore, participants in traditional schools shared that the layout of the building is a barrier. An example that was shared was a grade level colleague being two doors away making it challenging for students from each class to collaborate on projects due to loss of instructional time because of travel. A 21st Century educator mentioned that because of an increased number of first grade students, a fifth teacher was added, and the class had to be housed upstairs in the third-grade neighborhood versus with the other first grade teachers. Being separated from a grade level team can make a teacher feel isolated if structures are not in place to ensure this does not happen. Also, the size of traditional classrooms can serve barriers for co-teaching due to lack of room for flexible spaces. An educator whose building design is 21st century and traditional discussed that the new part of the building (21st century layout) is not big enough. As a result of the building not being big enough, middle school students remained housed in the traditional building. Also, classes must travel from 21st century layout to the traditional layout for specials, and time is lost due to travel.

A facilitator of collaboration that was mentioned in this study was collaborative structures such as when and where PLC teams meet, and the resources needed for the meeting. Collaborative structures can serve as a facilitator for teams to vertically collaborate. School leaders can designate one collaborative meeting for vertical collaboration or give members the autonomy to decide when their team needs to vertically collaborate. Either option will give educators an opportunity to meet with colleagues outside of their grade level to discuss teaching and learning.

To address the layout of the school to support collaborative interactions between students, educators can have students collaborate via technology on certain projects. Educators in this study mentioned that because of the COVID-19 pandemic, they have collaborated with colleagues through technology platforms such as Microsoft TEAMS or Google Meet. Collaboration via technology would be a beneficial strategy for upper elementary students periodically to provide rich discussions with peers from other classrooms. An example of this would be if students are researching an African American for Black History Month, they could be paired with a student in another class that chose the same person. Students can use Google Docs to provide feedback to one another on the project. They could also use Google Meet or any other approved software with supervision to collaborate on the project during an identified time. Another barrier mentioned in this section was flexible space and the building layout not being big enough to accommodate all students. Although the physical design of the building cannot be changed unless a new building is being constructed, there are ways for educators to revamp the layout of their workspaces. In the review of the literature, it was discussed that the physical design of a classroom consists of the arrangement of furniture. The way educators have furniture pieces arranged can be a challenge in the learning environment. For example, too many furniture pieces can make it difficult for teachers and students to walk around in the classroom because the space is tight. To provide flexible space in the learning environment, educators should evaluate the furniture they have in their classroom and identify the purpose the items have to support teaching and learning. Any item that does not benefit the learning environment can be removed. Also, teachers can visit other classrooms to see the set-up of the workspace to get ideas on how to arrange their spaces. Learning environments that are equipped with furniture that could be

moved and manipulated creates flexible space, provides a variety of seating options for all that occupy the workspace, and facilitates collaborative work among students.

Theme 2: Supportive Conditions: Collegial/Relational

Another barrier of the professional learning community identified in the two design types was supportive conditions-collegial/relational. Participants mentioned cohesiveness of teams as a barrier. The high mobility of teachers or teachers being reassigned to different grade levels can affect how teams positively interact. Beginning each school year with different teammates can affect the culture, climate, and morale of the team and school because members of the learning community are unable to build trust, relationships, or capacity of colleagues. Because of this, the professional learning community can become unstable, and the important actions needed for high quality teaching and learning are no longer at the forefront.

The next barrier related to supportive conditions-collegial/relational in the two design types was teacher buy-in. Participants mentioned that some members of the professional learning community do not see the value of collaborating and that can lead to frustration. Also, some participants in both design types mentioned that the personalities of members can be a challenge because everyone does not get along which can cause tension in the learning community. A participant from a traditional school shared that if personalities are not meshing and people do not see the value, then it leads to one person doing all the work in the learning community, and it becomes draining because you cannot force someone to work well with others. Relationships are the heart of the learning community because each member is responsible for teaching and learning.

Administrators contribute to the attitudes and relationships of the learning community by nurturing the human capacities needed for PLCs (Hord & Sommers, 2008). Providing

opportunities for educators to get to know one another through ice breakers, problem-solving challenges, escape rooms, and staff luncheons gives staff an opportunity to socialize and learn more about their colleagues which creates a caring environment.

Study Limitations

The present study was limited by the two following factors: the Covid-19 pandemic and the sample size. First, the study took place during the 2020-2021 school year, which was the peak of the nationwide pandemic. During this time, educators in the school district where the study took place were rotating between in-person and remote learning. The unknowns of education during this time added challenges to educators and coincides with the next limitation of the study, sample size.

Sample size for this study was small and was a limitation because it limited generalizability of findings and statistical power. There were nineteen schools that were invited to participate in the study, and only eight schools accepted the invitation. Some of the schools who declined to participate cited the pandemic as a determining factor because teachers were already facing challenges, and the study could have been an added stressor.

Additionally, the sampling method for both phases of the study was nonprobability purposive sampling. As mentioned in chapter three, this type of sampling involves a deliberate choice of participants based on the qualities they possess. The qualities that participants in the present study had to possess were elementary educators in either a traditional or 21st century layout and members of a professional learning community. Limiting the study to just elementary schools decreased the chances of having a larger sample size.

Another limitation of the study was the unequal sample size across groups. This limitation was seen early in the study because there were more 21st century school layouts (n=5)

that agreed to participate in the study than traditional school layouts (*n*=3). Also, the equal size of groups can be seen further in each phase of the study. In phase one, quantitative, there were 111 participants. Of those 111 participants, (*n*=83), 21st century layout and (*n*=28), traditional layout. Like phase one, the second phase, qualitative, consisted of more 21st century participants (*n*=7) than traditional participants (*n*=4). Having an unequal sample size reduced the chances of correctly predicting an effect. To mediate these limitations, multiple data sources were used, such as an electronic questionnaire, focus group interviews, and document analysis so that information could be triangulated.

Although there were limitations to the study, the information gathered from participants provides insight into the structures of collaboration and the role of the physical layout as it relates to collaboration.

Implications for Action

This study provided insight into professional learning communities in 21st century and traditional schools. The insight gained from quantitative and qualitative results revealed that members of professional learning communities in either design have collaborative structures such as space, time, and technology that support opportunities for them to come together and learn. For the sustainability of the professional learning community within the two design types, school leaders should provide professional learning to new faculty and staff so they understand the purpose of PLCs which will build the capacity of new members and aid in cohesiveness of the community.

Furthermore, members of the learning community should have opportunities to reflect on PLC practices, so they can provide feedback that will assist with the continuous improvement of

the school. Reflecting on current practices and adjusting as needed is vital to the sustainability of a successful professional learning community.

Moreover, educators need opportunities to observe colleagues since we are all accountable for teaching and learning. Educators first identify the practice they wish to improve. School leaders, instructional coaches, or other colleagues can then identify teachers who are experts in the area. Next, the administrator can provide coverage for the teacher to observe practice and gain knowledge that will enhance teaching and learning. For example, a teacher might identify that they want to implement math centers. School leadership would provide coverage for the teacher to visit learning communities in the building who are implementing math centers. This gives the teacher an opportunity to see the practice in action, gain new knowledge, and provide an opportunity to ask clarifying questions. Also, the teachers being observed could gain valuable feedback from the observer that could strengthen their instructional practice.

Additionally, as new constructions are built or remodeled it is important that the spaces support the work of teachers and students by being flexible. As mentioned in prior chapters, teachers and students are expected to collaborate on a regular basis. To do this, the spaces they occupy must provide flexibility for furniture to move with ease to support face-to-face collaborative conversations. Buildings must have enough space to accommodate growing school population so that educators of the same grade level are near one another, and teachers and students can visit various learning communities within the building to collaborate, think critically, create, and communicate. If there are situations such as a pandemic or the space does not support face-to-face collaborative conversations, then schools should have the technological resources available to support collaboration via technology. Collaboration via technology can

build community amongst educators as they discuss teaching and learning no matter their physical design type.

Recommendations for Future Research

Limited research has been conducted one the role that the physical layout of schools plays in collaboration. The present study provided some insight into the phenomena and revealed that collaborative structures is a factor in implementing and sustaining successful learning communities no matter the design type. Future research opportunities discussed below are based on participants responses and the limitations of the study.

First, this study can be replicated in a different school district that has the same physical design types (21st century and traditional) and has implemented professional learning communities to determine if there is a relationship between design type and supportive conditions-structural, assess if differences exist between the dimensions of a professional learning community and the two design types, and identify facilitators and barriers to the professional learning community based on the design type.

Also, researchers could replicate this study in elementary, middle, and high schools to increase sample size and to gain further insight into collaboration in different design types and academic levels and assess if differences exist in collaboration between academic levels.

Moreover, one of the themes identified in phase two, qualitative of the present study was supportive conditions-structural (sub theme: collaborative structures). As mentioned in chapter four, collaborative structures are the expectations for collaboration such as when and where members meet, agenda, minutes, and roles of members (facilitator, note taker, and timekeeper, etc.). Since the findings in this study revealed that no matter the physical layout of the school, educators were still able to collaborate based on the structures in place this concept should be

explored further. Therefore, researchers should examine the collaborative structures in place within different design types to determine if structures support collaboration within any design type.

Another future research recommendation is examining collaboration via technology. Researchers could look at the technology platforms used for collaboration, examine who participants collaborate with (colleagues in the building or outside the building), and determine the actions taken during collaboration. This research opportunity could provide insight into how a technology platform serves as a space for collaboration.

Lastly, future research could be conducted using social network analysis to examine collaboration in different physical design types. As mentioned in the review of the literature, Spillane et al., (2017) examined how proximity to colleagues contributed to the social interactions of educators; however, the study did not examine different physical design layouts like the present study. A social network analysis can therefore be conducted in different physical design types to identify which educators are in proximity with each other and with whom they formally and informally collaborate (instructional practices or seeking support and advice). This recommendation will provide insight into whether the building design is a factor of collaboration.

Summary

This chapter discussed and interpreted key findings and implications for educators and identified recommendations for future research. Results from this study revealed that no matter the design type, the collaborative structures in place can facilitate or present a barrier to collaboration. In an era of education where collaboration has become the norm to reduce teacher isolation, improve instructional practices, and student learning, and school buildings are

undergoing facelifts or new buildings are being constructed, it is important to examine the structures in place for successful collaboration in assigned workspaces. This study sought to bring awareness of the role the physical design/floor plan of schools can have on collaboration based on the dimensions of a professional learning community (shared values and vision; shared and supportive leadership; collective learning and application; shared personal practice; supportive conditions-structural; supportive conditions-collegial/relational).

Understanding the collaborative experiences of educators in different design types can assist instructional leaders in implementing a sustainable professional learning community based on the literature provided in this study. Also, this study provided detailed accounts on the actions taken in the learning community to improve teaching and learning as well as facilitators and barriers of workspace. As school districts meet with architects to design new buildings, this research will be beneficial in constructing flexible workspaces that allow for the formal and informal collaboration of teachers and students.

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APPENDIX A

Office of Research Compliance
540 Devall Drive
Auburn, AL 36832

AUBURN UNIVERSITY

February 15, 2022

MEMORANDUM TO:	Ms. Brandi Howard Department: Education Foundations, Leadership, and Technology
PROTOCOL TITLE:	"An Examination of Professional Learning Communities in Elementary Schools with Different Physical Design Layouts"
IRB FILE NO.:	20-602 EX 2102
APPROVAL:	June 4, 2021
EXPIRATION:	No Continuing Review

Your request for modification was approved as "Exempt" under 45 CFR 46. Please reference the IRB authorization number in any correspondence regarding your project.

Please Note:

1. CONSENT FORM AND/OR INFORMATION LETTERS: Only use documents that have been approved by the IRB and included the AU IRB approval stamp.
2. RECORDS: Keep this and all protocol approval documents in your files. Reference the complete protocol number in all correspondence.
3. MODIFICATIONS: Request IRB approval of any changes to an approved protocol prior to implementation. Some changes may affect the assigned review category.
4. FINAL REPORT: When the study is complete, notify the Office of Research Compliance at irbsubmit@auburn.edu.

If you have any questions, contact the Office of Research Compliance at irbsubmit@auburn.edu.

Bernie R. Olin, Pharm.D.
Chair of the Institutional Review Board #2
for the Use of Human Subjects in Research

cc: file

APPENDIX B

AUBURN UNIVERSITY

COLLEGE OF EDUCATION

EDUCATIONAL FOUNDATIONS, LEADERSHIP AND TECHNOLOGY

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

(ELECTRONIC SURVEY) INFORMATION LETTER
for a Research Study entitled

"An Examination of Professional Learning Communities in Elementary Schools with Different Physical Design Layouts"

Dear Prospective Participant,

You are invited to participate in a research study to examine your collaboration experiences based on the Professional Learning Community model in your school's building design. The study is being conducted by Brandi S. Howard, under the direction of Dr. Ellen Hahn, Professor in the Auburn University Department of Educational Foundations, Leadership and Technology. You are invited to participate because you are an elementary teacher in a 21st century or traditional school, member of a professional learning community, and are age 19 or older. The internal control number for this study is DoDEA (S) 1000-013.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete an electronic survey titled "PLCs in Elementary Schools" that will be sent to you via Qualtrics to your email address. The electronic survey can be completed using a computer or mobile device. Your total time commitment for the electronic survey will be approximately fifteen minutes.

Are there any risks or discomforts? The risks associated with participating in this study are possible indirect identification when combining information items such as (e.g., name of school, gender, and grade taught).

Are there any benefits to yourself or others? If you participate in this study, there will be no personal benefits to participants in this evaluation.

Will you receive compensation for participating? There will be no compensation offered for your participation.

The Auburn University Institutional Review Board has approved this Document for use from 06/04/2021 to ---------- Protocol # 20-602 EX 2102

4036 Haley Center, Auburn, AL 36849-5221; Telephone: 334-844-4460: Fax: 334-844-3072

Are there any costs? If you decide to participate, there is no associated cost.
If you change your mind about participating, you can withdraw at any time during the study by closing your browser window. Your participation is completely voluntary. Once you have submitted the anonymous survey, it cannot be withdrawn since it will be unidentifiable. Your decision whether to participate or to stop participating will not jeopardize your future relations with Auburn University or the Department of Educational, Foundations, Leadership, and Technology.

Any information obtained in connection with this study will remain anonymous. There will be no identification tags associated with any participant. Completing the electronic survey through Qualtrics does not present any greater risk than daily use of the internet. Information obtained through your participation may be used to fulfill educational requirements, published in a professional journal, or presented at professional meetings. By agreeing to participate in this study you give the researcher permission to maintain data indefinitely for future research opportunities stated above.

If you have questions about this study, please contact Brandi Howard at bsh0023@auburn.edu or Dr. Ellen Hahn at reamseh@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844- 5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH PROJECT. IF YOU DECIDE TO PARTIICPATE, THE DATA YOU PROVIDE WILL SERVE AS YOUR AGREEMENT TO DO SO. THIS LETTER IS YOURS TO KEEP.

_____
Investigator's signature Date

_____
Print Name

The Auburn University Institutional Review Board has approved this Document for use from
06/04/2021 to ----------
Protocol # 20-602 EX 2102

2

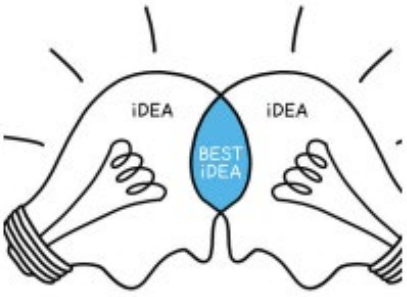
APPENDIX C

APPENDIX C

AN EXAMINATION OF PROFESSSIONAL LEARNING COMMUNITIES WITH DIFFERENT PHYSICAL DESIGN LAYOUTS

INTERNAL CONTROL NUMBER: DODEA (S)1000-013

PRINCIPAL INVESTIGATOR:
BRANDI S. HOWARD



GET IN TOUCH

For more information about this study, please contact:
Brandi S. Howard- Doctoral Candidate
Auburn University
at:
bsh0023@auburn.edu

The Auburn University Institutional Review Board has approved this Document for use from 06/04/2021 to ----------
Protocol # 20-602 EX 2102

Purpose

The purpose of this study is to:

- Investigate the relationship between the physical design/floor plans of 21st century and traditional schools and the Dimensions of Professional Learning Community; and
- Identify factors that facilitate or present barriers to the professional learning community within the two physical design types.

Participation in this study is completely voluntary.

To participate in this research study you must:

- Be a member of a professional learning community
- Be a certified elementary educator in a 21st century or traditional school in the school district

Participation in this study involves:

- A time commitment of approximately 15 minutes to complete PLCs in Elementary Schools Questionnaire

LINK TO QUESTIONNAIRE:

HTTPS://AUB.IE/GKU6CF

OR

USE YOUR CELLPHONE TO SCAN THE CODE BELOW:

APPENDIX D

Follow-up Email for Questionnaire

An Examination of Professional Learning Communities in Elementary Schools with Different Physical Design Layouts

Internal Control Number: DoDEA (S) 1000-013

(Follow-up email to send to prospective participants regarding questionnaire)

Date:

Dear Prospective Participant,

One week ago, a questionnaire seeking your experiences in a Professional Learning Community within a 21st century or traditional elementary school was emailed to you. If you have already completed and submitted the questionnaire, please accept my sincere thanks. If not, please do so today.

I know that your time is valuable and sometimes limited as an educator. However, I would greatly appreciate it if you took a few minutes to complete the PLCs in Elementary Schools questionnaire. The link to the questionnaire is https://aub.ie/GKU6cF.

If you have any questions or concerns, please feel free to contact me at bsh0023@auburn.edu.

Thank you for your time and attention to this survey.

Much appreciation,

Brandi S. Howard
Doctoral Candidate
Auburn University
Department of Educational Foundations, Leadership, and Technology

APPENDIX E

June 13, 2020

Brandi Howard
Auburn, AL
Doctoral Candidate
Auburn University

Dear Brandi Howard:

This correspondence is to grant permission for the utilization of the *Professional Learning Community Assessment-Revised* (PLCA-R) for your doctoral research at Auburn University. I am pleased you are interested in using the PLCA-R measure to *examine teachers and school leaders' perceptions of professional learning communities in elementary schools in relation to different physical design layouts.* This study's findings will contribute to the PLC literature with focus on supportive conditions and collegial/relational dimensions.

This permission letter allows use of the PLCA-R to be administered through Qualtrics, a district supported platform, to multiple schools within the district. While this letter provides permission to use the measure in your study, authorship of the measure will remain as Olivier, Hipp, and Huffman, 2010 (exact citation on the following page). This permission does not allow renaming the measure or claiming authorship.

Upon completion of your study, our research team would be interested in learning about your findings and would welcome the opportunity to receive an electronic version of your study outcomes. Thank you for your interest in our research and measure for assessing professional learning community attributes within schools. Should you require any additional information, please feel free to contact me.

Sincerely,

Dianne F. Olivier

Dianne F. Olivier, Ph. D.
Professor and Coordinator of the Doctoral Program
Joan D. and Alexander S. Haig/BORSF Professor
Department of Educational Foundations and Leadership
College of Education, University of Louisiana at Lafayette
P.O. Box 43091, Lafayette, LA 70504-3091
(337) 482-6408 (Office)
dianne.olivier@louisiana.edu
http://www.plcassociates.org

cc: Dr. Jane Huffman
Dr. D'Ette Cowan

Reference Citation for Professional Learning Community Assessment-Revised measure:

Olivier, D. F., Hipp, K. K., & Huffman, J. B. (2010). Assessing and analyzing schools. In K. K. Hipp & J. B. Huffman (Eds.). *Demystifying professional learning communities: School leadership at its Best.* Lanham, MD: Rowman & Littlefield

APPENDIX F

PLC's in Elementary Schools

Internal Control Number: DoDEA (S) 1000-013

Start of Block: Default Question Block

This is a copy of the informational letter you received in the notification email for the questionnaire. It is included here for your review.

(Electronic Questionnaire) Informational Letter for a Research Study entitled "Examining Professional Learning Communities in Different Physical Design Layouts"

You are invited to participate in a research study to examine your collaboration experiences based on the Professional Learning Community model in your school's building design. The study is being conducted by Brandi S. Howard, under the direction of Dr. Ellen Hahn, Professor in the Auburn University Department of Educational Foundations, Leadership and Technology. You are invited to participate because you are an elementary teacher in a 21st century or traditional school, member of a professional learning community, and are age 19 or older. The internal control number for this study is DoDEA (S) 1000-013.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete an electronic survey titled "PLCs in Elementary Schools" that will be sent to you via Qualtrics to your email address. The electronic survey can be completed using a computer or mobile device. Your total time commitment for the electronic survey will be approximately fifteen minutes.

Are there any risks or discomforts? The risks associated with participating in this study are possible indirect identification when combining information items such as (e.g., name of school, gender, and grade taught).

Are there any benefits to yourself or others? If you participate in this study, there will be no personal benefits to participants in this evaluation.

Will you receive compensation for participating? There will be no compensation offered for your participation.

Are there any costs? If you decide to participate, there is no associated cost.

If you change your mind about participating, you can withdraw at any time during the study by closing your browser window. Your participation is completely voluntary. Once you have

submitted the anonymous survey, it cannot be withdrawn since it will be unidentifiable. Your decision whether to participate or to stop participating will not jeopardize your future relations with Auburn University or the Department of Educational, Foundations, Leadership, and Technology.

Any information obtained in connection with this study will remain anonymous. There will be no identification tags associated with any participant. Completing the electronic survey through Qualtrics does not present any greater risk than daily use of the internet. Information obtained through your participation may be used to fulfill educational requirements, published in a professional journal, or presented at professional meetings. By agreeing to participate in this study you give the researcher permission to maintain data indefinitely for future research opportunities stated above.

If you have questions about this study, please contact Brandi Howard at bsh0023@auburn.edu or Dr. Ellen Hahn at reamseh@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

Click the arrow below to begin the survey.

The Auburn University Institutional Review Board has approved this Document for use from 06/04/2021 to ----------
Protocol # 20-602 EX 2102

Professional Learning Communities Assessment – Revised

Directions:

This questionnaire assesses your perceptions about your principal, staff, and stakeholders based on the dimensions of a professional learning community (PLC) and related attributes. This questionnaire contains a number of statements about practices which occur in some schools. Read each statement and then use the scale below to select the scale point that best reflects your personal degree of agreement with the statement. Select the appropriate oval provided to the right of each statement. Be certain to select only one response for each statement. Comments after each dimension section are optional.

Key Terms: Principal = Principal, not Associate or Assistant Principal Staff/Staff Members = All adult staff directly associated with curriculum, instruction, and assessment of students Stakeholders = Parents and community members

Scale:

1 = Strongly Disagree (SD)
2 = Disagree (D)
3 = Agree (A)
4 = Strongly Agree (SA)

Q1 **STATEMENTS: Supportive Conditions-Structures**	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
Time is provided to facilitate collaborative work. (1)	○	○	○	○
The school schedule promotes collective learning and shared practice. (2)	○	○	○	○
Fiscal resources are available for professional development. (3)	○	○	○	○
Appropriate technology and instructional materials are available to staff. (4)	○	○	○	○
Resource people provide expertise and support for continuous learning. (5)	○	○	○	○
he school facility is clean, attractive and inviting. (6)	○	○	○	○
The proximity of grade level and department personnel allows for ease in collaborating with colleagues. (7)	○	○	○	○

Communication systems promote a flow of information among staff members. (8)	○	○	○	○
Communication systems promote a flow of information across the entire school community including: central office personnel, parents, and community members. (9)	○	○	○	○
Data are organized and made available to provide easy access to staff members. (10)	○	○	○	○

COMMENTS:

_____

Page Break

Q2

STATEMENTS:

Supportive Conditions- Relationships

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
Caring relationships exist among staff and students that are built on trust and respect. (1)	○	○	○	○
A culture of trust and respect exists for taking risks. (2)	○	○	○	○
Outstanding achievement is recognized and celebrated regularly in our school. (3)	○	○	○	○
School staff and stakeholders exhibit a sustained and unified effort to embed change into the culture of the school. (4)	○	○	○	○
Relationships among staff members support honest and respectful examination of data to enhance teaching and learning. (5)	○	○	○	○

COMMENTS:

_____

Q3

STATEMENTS

Collective Learning and Application

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
Staff members work together to seek knowledge, skills and strategies and apply this new learning to their work. (1)	○	○	○	○
Collegial relationships exist among staff members that reflect commitment to school improvement efforts. (2)	○	○	○	○
Staff members plan and work together to search for solutions to address diverse student needs. (3)	○	○	○	○
A variety of opportunities and structures exist for collective learning through open dialogue. (4)	○	○	○	○
Staff members engage in dialogue that reflects a respect for diverse ideas that lead to continued inquiry. (5)	○	○	○	○

Professional development focuses on teaching and learning. (6)	○	○	○	○
School staff members and stakeholders learn together and apply new knowledge to solve problems. (7)	○	○	○	○
School staff members are committed to programs that enhance learning. (8)	○	○	○	○
Staff members collaboratively analyze multiple sources of data to assess the effectiveness of instructional practices. (9)	○	○	○	○
Staff members collaboratively analyze student work to improve teaching and learning. (10)	○	○	○	○

COMMENTS:

_____

Page Break

Q4
Statements
Shared and Supportive Leadership

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
Staff members are consistently involved in discussing and making decisions about most school issues. (1)	○	○	○	○
The principal incorporates advice from staff members to make decisions. (2)	○	○	○	○
Staff members have accessibility to key information. (3)	○	○	○	○
The principal is proactive and addresses areas where support is needed. (4)	○	○	○	○
Opportunities are provided for staff members to initiate change. (5)	○	○	○	○
The principal shares responsibility and rewards for innovative actions. (6)	○	○	○	○
The principal participates democratically with staff sharing power and authority. (7)	○	○	○	○

Leadership is promoted and nurtured among staff members. (8)	○	○	○	○
Decision-making takes place through committees and communication across grade and subject areas. (9)	○	○	○	○
Stakeholders assume shared responsibility and accountability for student learning without evidence of imposed power and authority. (10)	○	○	○	○
Staff members use multiple sources of data to make decisions about teaching and learning. (11)	○	○	○	○

COMMENTS:

_____

Page Break

Q5

STATEMENTS

Shared Values and Vision

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
A collaborative process exists for developing a shared sense of values among staff. (1)	○	○	○	○
Shared values support norms of behavior that guide decisions about teaching and learning. (2)	○	○	○	○
Staff members share visions for school improvement that have an undeviating focus on student learning. (3)	○	○	○	○
Decisions are made in alignment with the school's values and vision. (4)	○	○	○	○
A collaborative process exists for developing a shared vision among staff. (5)	○	○	○	○
School goals focus on student learning beyond test scores and grades. (6)	○	○	○	○
Policies and programs are aligned to the school's vision. (7)	○	○	○	○

Stakeholders are actively involved in creating high expectations that serve to increase student achievement. (8)	○	○	○	○
Data are used to prioritize actions to reach a shared vision. (9)	○	○	○	○

COMMENTS:

Page Break

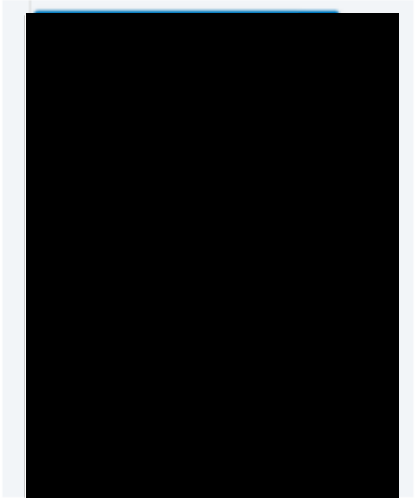
Q6 **STATEMENTS Shared Personal Practice**

	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
Opportunities exist for staff members to observe peers and offer encouragement. (1)	○	○	○	○
Staff members provide feedback to peers related to instructional practices. (2)	○	○	○	○
Staff members informally share ideas and suggestions for improving student learning. (3)	○	○	○	○
Staff members collaboratively review student work to share and improve instructional practices. (4)	○	○	○	○
Opportunities exist for coaching and mentoring. (5)	○	○	○	○
Individuals and teams have the opportunity to apply learning and share the results of their practices. (6)	○	○	○	○
Staff members regularly share student work to guide overall school improvement. (7)	○	○	○	○

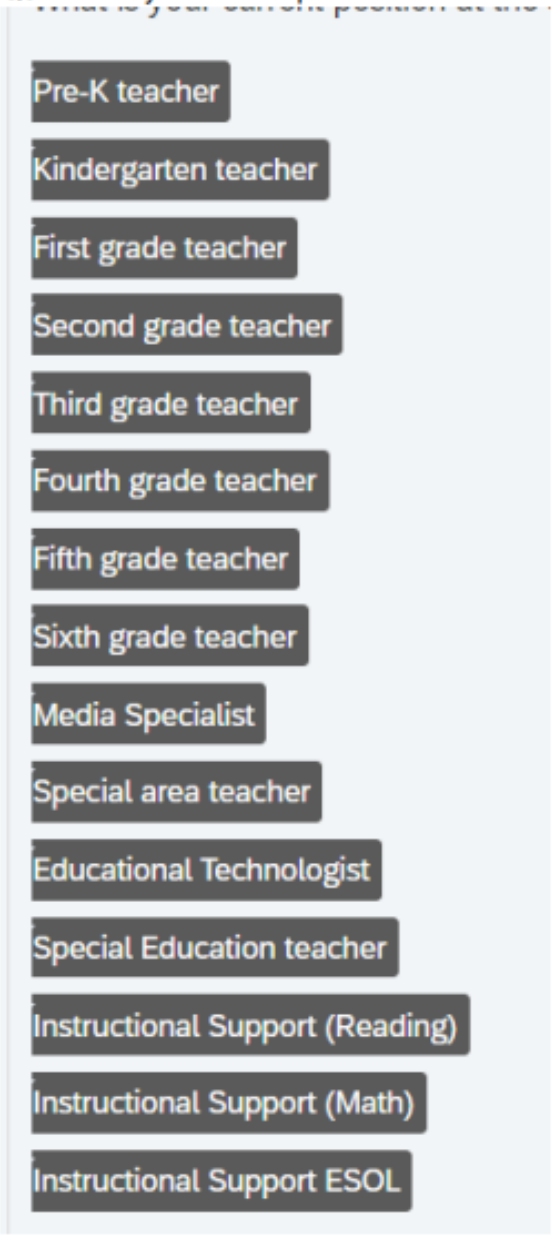
COMMENTS:

Page Break

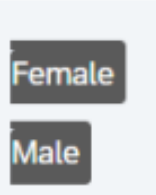
Q7 What school are you apart of?



Q8 What is your current position at the school (i.e. third grade teacher, media specialist, etc.)?



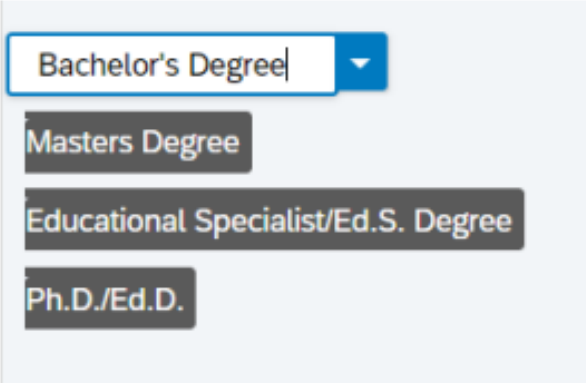
Q9 What is your gender?



Q10 How many years of experience do you have as an educator?

Q11 How many years of experience do you have at your current school?

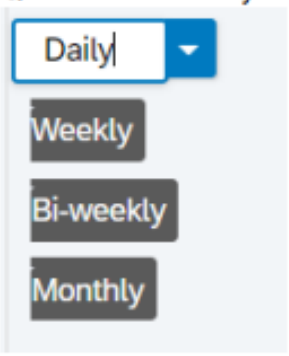
Q12 What is the highest degree you have received?



Q13 Who do you collaborate with during focused collaboration (professional learning community)? Select all that apply.

- [ ] Grade level team (1)
- [ ] Instructional support (2)
- [ ] Special area teacher(s) (3)
- [ ] Special Education teacher(s) (4)
- [ ] Media Specialist (5)
- [ ] Educational Technologist (6)
- [ ] School Administrator(s) (7)
- [ ] Speech Pathologist (8)
- [ ] Occupational Therapist or Physical Therapist (9)
- [ ] Assessor (10)

Q 14 How often do you collaborate with colleagues?



Q15 Where do you collaborate with colleagues? Select all that apply.

- [ ] Classroom (8)
- [ ] Grade level office (9)
- [ ] Conference room (11)
- [ ] Multi-purpose room (12)
- [ ] Other (13)

End of Block: Default Question Block

Start of Block: Block 1

APPENDIX G

Introduction of Principal Investigator:

Hello, I am Brandi Howard a graduate student in the Department of Educational Foundations, Leadership, and Technology at Auburn University. Thank you for agreeing to be a part of my research study and talking to me today. I will be using the recording feature in Zoom to record the interview with your permission to ensure that I recount information shared accurately. This information is in the informed consent. Is that still okay?

As a reminder, taking part in this interview is voluntary. At any time if you change your mind about participating or being recorded, please let me know and we will stop the interview and recording immediately.

Confidentiality Statement:

To maintain confidentiality, I will use pseudonyms for your name and the school district's name in my dissertation. Recordings will be deleted once I complete transcription. This information can be found in the informed consent. As a participant in the focus group, you are not permitted to share the identity of participants or any information that was shared by other focus group participants. This information can be found in the informed consent. Do you have any questions regarding this process?

Introduction of Interviewee:

Please introduce yourself (name, current position, years teaching, the physical design layout of your school-i.e., 21st century or traditional).

Interview Questions:

1. Describe for me the workspace that you are assigned to at your school?
    - If the interviewee is not a classroom teacher, ask: Describe the physical design layout of your school?)
2. What are some of the benefits of your assigned workspace?
    - If the interviewee is not a classroom teacher, ask: What are some of the benefits of your school's physical design layout?
3. What are some challenges of your assigned workspace?
    - If the interviewee is not a classroom teacher, ask: What are some of the challenges of your school's physical design layout?
4. When you hear the word, professional learning community (i.e., focused collaboration), what comes to mind?
5. Describe your professional learning community experiences as it relates to collaborating with your colleagues?

Guiding questions if needed:

- Describe the space for professional learning communities to meet (focused collaboration)- (type of room, tables, chairs, etc.).
- Who do you meet with (grade level team, across grade levels, instructional support, etc)?
- Describe for me a plc meeting (what are you doing).

6. What structures in your building support shared personal practice (observe colleagues teaching and or mentoring)?
7. Is there anything else you would like to share about your experience with plcs within your building design?

Closing: Wrap up/Summarize
Thank you so much for taking the time to share your professional learning community experience with me in your workspace. If you think of anything else that you would like to share or have any questions, please feel free to contact me.

***If after 30 minutes and all questions have not been asked say:**
Our time is up. Thank you for your time. I want to respect your time. I am willing to stay if you would like to share further.

APPENDIX H

"An Examination of Professional Learning Communities in Elementary Schools with Different Physical Design Layouts"

Focus Group Recruitment

Principal Investigator: Brandi S. Howard
Internal Control #: DoDEA(S) 1000-013

Purpose of the Study:

- Investigate the relationship between the physical design/floor plans of 21st century and traditional schools and the Dimensions of Professional Learning Community.
- Identify factors that facilitate or present barriers to the professional learning community within the two physical design types.

PARTICIPATION IN THIS STUDY IS VOLUNTARY

- As a participant, you will be asked to participate in a focus group interview.
- The interview will ask you to discuss your professional learning community experiences in your physical design layout and will take approximately **30 minutes**.
- Interviews will take place through a teleconferencing platform ZOOM.
- Audio of interviews will be recorded to ensure that I accurately capture the information discussed.
- As a participant you have the right to decline audio recording.

If you are interested in participating in the focus group please email me at:
bsh0023@auburn.edu

APPENDIX I

AUBURN UNIVERSITY

COLLEGE OF EDUCATION

EDUCATIONAL FOUNDATIONS, LEADERSHIP AND TECHNOLOGY

(NOTE: DO NOT SIGN THIS DOCUMENT UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

(FOCUS GROUP INTERVIEW) PARTICIPANT INFORMED CONSENT

for a Research Study entitled

An Examination of Professional Learning Communities in Elementary Schools with Different Physical Design Layouts

You are invited to participate in a research study to examine your collaboration experiences based on the Professional Learning Community model in your school's building design. The study is being conducted by Brandi S. Howard, under the direction of Dr. Ellen Hahn in the Auburn University Department of Educational Foundations, Leadership and Technology. You were selected as a possible participant because you are an elementary teacher and are age 19 or older. The internal control number for this study is DoDEA (S) 1000-013.

What this study is about: The purpose of this study is to investigate the relationship between the physical design/floor plans of 21st century and traditional schools based on Shirley M. Hord's Dimensions of PLCs (a. shared values and vision; b. shared and supportive leadership; c. intentional collective learning; d. shared personal practice; e. supportive conditions-collegial/relational; and f. supportive conditions-structural). This study will specifically examine: (a) supportive conditions-structural because an attribute of this dimension is the physical proximity of grade level teams to each other for ease of collaboration; (b) examine if differences exist between supportive conditions-structural dimension and the other dimensions of PLCs in 21st century and traditional schools; and (c) identify factors that facilitate or present barriers to the professional learning community within the two physical design types.

What I will ask you to do: If you decide to participate in this research study, you will participate in a focus group interview with a maximum of eight elementary teachers. The interview will involve questions about your Professional Learning Community experiences in your school's building design layout. I will conduct the interviews at a time that is convenient for you outside of your duty day. I will audiotape and take notes during the interviews. Interviews will be conducted through teleconferencing using ZOOM. The interview will only be audio recorded. Recording of the interview is needed to ensure that I accurately record the information provided. Recordings will be used for transcription purposes only. The recording will be heard only by the principal investigator and the transcriber. Your total time commitment is approximately thirty minutes.

4036 Haley Center, Auburn, AL 36849-5221; Telephone: 334-844-4460: Fax: 334-844-3072

www.auburn.edu

Taking part is voluntary: If during the interview you begin to feel uncomfortable, I can turn off the recording at your request. Also, if you do not wish to continue being a part of the interview, you can stop the interview at any time. Your participation is completely voluntary. Your decision whether to participate or to stop participating will not jeopardize your future relations with Auburn University or the Department of Educational Foundations, Leadership and Technology.

Confidentiality: As a participant in the focus group, you are not permitted to share the identity of participants or any information that was shared by other focus group participants. Any information obtained in connection with this study will remain confidential. There will be no identification tags associated with any participant. Data will be stored using BOX, Auburn University's cloud storage. BOX is secured on a password-protected computer. Audio recordings will be deleted after transcriptions. In addition to the data being kept confidential by the researcher, as a participant in this study you must agree not to speak of any information attained in this study. Information obtained through your participation may be used to fulfill educational requirements, published in a professional journal, or presented at professional meetings. By agreeing to participate in this study you give the researcher permission to maintain transcripts indefinitely for future research opportunities stated above

Risks and discomforts: Breach of confidentiality is a risk associated with participating in this study due to the identifiable data. The use of electronic data presents no greater risk than everyday use of the Internet. To minimize this risk, pseudonyms will be used in the interview transcription and analysis. Data files will be saved using Auburn's cloud storage, BOX on a secure, password-protected computer. The findings will be used to fulfill an educational requirement for a dissertation and may also be used to create presentations or publication.

Benefits: No personal benefits will be provided to participants in this evaluation. However, participation in this study will give you the opportunity to reflect on your collaborative experiences which may lead to your growth as a teacher leader and provide a deeper understanding regarding the physical design of the workspace that you occupy daily. Compensation for your participation: There will be no compensation offered for your participation.

Cost involved: If you decide to participate, there is no associated cost.

Audio/Video Recording: An audio recording device is needed to record the interview transcription. Interviews will be conducted through teleconferencing via ZOOM. Only the audio features will be used. Any audio recordings and transcriptions will be deleted by the completion immediately after transcriptions are complete.

- o I do not want to have the interview recorded.
- o I am willing to have the interview recorded.

Please sign below if you are willing to have this interview audio recorded if conducted via ZOOM is selected, only the audio recording feature will be used. Any audio recordings and transcriptions will be deleted by the completion immediately after transcriptions are complete. If you have questions about this study, please contact Brandi Howard at bsh0023@auburn.edu or Dr. Ellen Hahn at reamseh@auburn.edu.

If you have questions about your rights as a research participant, you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

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

_____ _____

Participant's signature Date

_____

Participant's printed name

_____ _____

Investigator obtaining consent Date

_____

Investigator's printed name

The Auburn University Institutional Review Board has approved this Document for use from 06/04/2021 to ----------
Protocol # 20-602 EX 2102

APPENDIX J

FOCUS Group Interview Email to Schedule Interview

An Examination of Professional Learning Communities in Elementary Schools with Different Physical Design Layouts

Internal Control Number: DoDEA (S) 1000-013

(Email to send to participants after receiving signed informed for focus group interview)

Date: _____

Dear _____,

Thank you for agreeing to participate in my research study titled "An Examination of Professional Learning Communities in Elementary Schools with Different Physical Design Layouts." You are receiving this email because I have received your signed consent form indicating your willingness to participate. A goal of this research is the perceptions of teachers who are members of a professional learning community (PLC) and teach in workspaces that are 21st century and traditional. The researcher's intent is to identify the relationship between the building design and collaboration as well as identify factors that facilitate or present barriers to the professional learning community within the two physical design types.

A focus group interview will consist of a maximum of eight participants and should take approximately thirty minutes to complete. Please click on the link below to select the best days and times that you are available for the interview.

Focus Group Interview Scheduler

Remember your participation is voluntary and that as a participant in the focus group, you are not permitted to share the identity of participants or any information shared by other focus group participants.

If you have any questions or concerns, please feel free to contact me at bsh0023@auburn.edu.

Thank you for your support in my research study.

Much appreciation,

Brandi S. Howard
Doctoral Candidate
Auburn University
Department of Educational Foundations, Leadership, and Technology

APPENDIX K

Zoom link for Focus Group Interview

An Examination of Professional Learning Communities in Elementary Schools with Different Physical Design Layouts

Internal Control Number: DoDEA (S) 1000-013

(Follow-up email to send to focus group interview participants with Zoom link)

Date:

Dear _____,

Thank you for agreeing to participate in the focus group interview. Your focus group interview is scheduled for (Date and time). Please use the link below to access the link to the meeting room.

Link to focus group (link will be pasted here)

I value your time and ask that you please be on time for the interview. If you experience technical difficulties, please feel free to contact me at (205) 470-7944.

If you have any questions or concerns, please feel free to contact me at bsh0023@auburn.edu.

Thank you for your support in my research study.

Much appreciation,

Brandi S. Howard
Doctoral Candidate
Auburn University
Department of Educational Foundations, Leadership, and Technology

APPENDIX L

Request for Professional Learning Community Documents

(Email that will be sent to principals requesting professional learning community schedules, agendas, and minutes)

An Examination of Professional Learning Communities in Elementary Schools with Different Physical Design Layouts

Internal Control Number: DoDEA (S) 1000-013

Date: _____

Dear (Principal's name),

My name is Brandi S. Howard, a doctoral candidate from the College of Education at Auburn University. I am examining Professional Learning Communities in 21st century and traditional elementary schools. Part of the data collection in this study will examine Focused Collaboration schedules, agendas, and minutes for the 2019-2020 school year. I am requesting that agendas an minutes represent the various grade levels within your school. Please send these documents electronically to bsh0023@auburn.edu by (provide date 5 days from the day email is sent).

If you have any questions or concerns, please feel free to contact me at bsh0023@auburn.edu o (205) 470-7944.

Thank you for your support of my research study.

Sincerely,

Brandi S. Howard
Doctoral Candidate
Auburn University
Department of Educational Foundations, Leadership, and Technology

APPENDIX M

Lynn Irwin
Mon 10/28/2019 7:40 PM

To: Brandi Howard

Brandi,
It's so good to hear from you and I'm so excited that you are getting into the dissertation process. You may absolutely use the figure that I included in my dissertation. Congratulations on your hard work and if I can help in any way please don't hesitate to contact me.

Best of wishes,
Lynn

Sent from my iPad

On Oct 20, 2019, at 8:28 PM, Brandi Howard <bsh0023@auburn.edu> wrote:

Dr. Irwin,
Currently I am writing my literature review for my dissertation. My topic is Teacher Perceptions of the Relationship between the Physical Learning Environment and Teacher Collaboration. In your dissertation you created a figure that connects Hord's Five Attributes and the Six Principles of PLCs. I am asking for permission to use the figure in my dissertation. Please let me know if I have your permission to use the figure in my literature review.
Thanks,

Brandi S. Howard
PhD Student
Department of Educational Foundations, Leadership, and Technology