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The Diffusion of Innovation in a Math Professional Learning Community

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Abstract

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Daphne Kahn-Wiley

MLA, Texas Christian University, 1990

BS, Howard University, 1987

Project Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

In a southern U.S. suburban middle school, officials required the implementation of professional learning communities (PLCs) to improve student achievement in math. Despite PLC implementation, math student achievement did not improve over 4 years since implementation in the fall of 2014. The problem was that middle school math teachers and educational personnel struggled to implement the innovation of a PLC at the target school. The purpose of this exploratory case study was to examine teachers' and school officials' perceptions of the math PLC process using Rogers's diffusion of innovation (DOI) framework and archival documents to determine reasons for the challenges with PLC implementation. The research questions focused on PLC teachers' and school officials' perceptions of the relative advantage, compatibility, complexity, trialability, and observability of the math PLC as well as analysis of archived documents. Using exploratory case study design, data were collected through semistructured interviews with eight educators who met the criteria of being a current or previous math teacher or school official involved in PLC training and implementation. Inductive and thematic analysis yielded emergent themes: (a) relative advantage of the PLC as an innovation, (b) compatibility, (c) cohesive understanding, (d) time and complexity, (e) positive effects of trialability, (f) influence on instructional practices, and (g) collaboration. Findings indicated educators would benefit from a deeper understanding of PLC implementation using the DOI framework. The 3-day professional development project may strengthen the implementation of PLCs and may promote social change by serving as a model to other districts working to increase student achievement and informing leaders of any organization of the importance of considering DOI perceptions.

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Dedication

I dedicate this project study to my family. First, to my husband Shaun Wiley, who supported me throughout this process, thank you for keeping me focused and reminding me of how proud you are of me. Thank you for sacrificing your schedule so that I could continue my educational journey. You will never know how much I am appreciative of you, and I am glad you are my husband. To my son, Ian, thank you for being the greatest son ever. As you get older, I hope that you are proud of the contribution your mother has given to field of education.

To my mother, Daisy Kahn, I dedicate this study because without you, I would have never had a career in education. You are the best mother a daughter could have. Thank you for blazing the trail of education for me. To my sisters, Denise Kahn and Danielle Kahn, we are all on this online journey to higher education. I thank you for being models of continued growth and exploration. No person has better sisters than I do.

Finally, I would like to dedicate this project study to my father, the late Dennis C. Kahn. You supported me at the beginning of my educational career, and I believe that you are still with me as my journey continues.

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I would like to acknowledge all the professors and advisors at Walden University, including Dr. Shelly Arneson, for all of their support. I would like to give a special acknowledgment to my chair, Dr. Cathryn White, whose patience and help on this project study were invaluable and immeasurable. You will never know how much you have influenced me. Thank you so much for helping me achieve my dream.

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Section 1: The Problem

The Local Problem

In a southern U.S. suburban middle school, school officials required the implementation of professional learning communities (PLCs) to improve student achievement in math by teachers and educational personnel at the campus; despite the PLC implementation, student achievement in math had not improved during the 4 years since initial PLC implementation in the 2014-2015 school year. Therefore, the problem addressed by the current study was that middle school math teachers and educational personnel struggled to implement the innovation of a PLC at the target school, Campus A. The gap in practice is that it was not known why teachers and educational personnel were struggling with the PLC implementation to close the gap on student math performance.

Problem in the Larger Educational Situation

Since the 1980s, researchers and several professional associations have documented the importance of implementing PLCs to focus on student needs (DuFour & Reeves, 2016). A PLC is not a standard meeting but rather an innovative and continuous process characterized by educator collaboration, shared inquiry, and problem solving (DuFour & Reeves, 2016). An educator PLC is typically focused on increasing student achievement (DuFour & Reeves, 2016). Teachers participating in PLCs work in collaboration instead of working in isolation. This collaboration is essential for creating a positive environment, professional learning, and the opportunity for improvements in

student learning and achievement (Serviss, 2020). Another feature of PLCs is teacher reflection, which varies according to teachers' level of experience. Researchers reported that when teachers experience collaboration, teachers begin to assess, evaluate, and more deeply reflect on their own individual instructional practices (Burns et al., 2019; Darling-Hammond et al., 2019).

Effective PLC teams use processes that engage the team in deep, complex learning, including sharing student data and strategies for student improvement (Basileo, 2016). Through this intense focus on student learning and collaborative partnerships, the probability of increasing student achievement improves (Basileo, 2016). DuFour (2014) identified three primary concepts that characterize the guiding principles for PLCs: (a) focusing on student learning as opposed to teaching students, (b) collaborating among teachers leading to student achievement for all, and (c) designing interventions and instruction based on evidence of student results. PLCs thereby support student learning and performance, provided that members of the PLC demonstrate evident dedication and collaboration (Schaap & de Bruijn, 2018). With various models and structures, PLCs serve as an effective innovation for improving teacher approaches.

In the current study, the implementation of the PLC was investigated using the diffusion of innovation (DOI) theory. Rogers (2003) described the DOI theory as a process in which innovation occurs among members of a social system: "An innovation is an idea, practice, or project that is perceived as new by an individual or other unit of adoption" (p. 12). In the current study, the notion of PLCs as an educational innovation

represents an idea and practice perceived as something new by the math PLC members at the target school investigated, identified as Campus A. According to Rogers's DOI theory, the four elements that influence innovation are (a) the new idea or innovation, (b) communication channels, (c) time, and (d) social system.

In the following section, I discuss the rationale for the study including justification and supporting data from the local setting. The purpose, definition of terms, significance of the study, and research questions are also reviewed, followed by an in-depth discussion of the framework, a critical analysis of the literature, and implications for potential projects based on findings from the data collection and analysis. The section concludes with a summary.

Rationale

The rationale for this study is supported by evidence of the local problem as indicated by student math scores on STAAR lower than the state average and concerns from district and campus officials regarding the implementation of the math PLC innovation, an initiative to address achievement on state assessments. After initial implementation of the math PLC at the school and continued training, the percentage of students in Grades 7 and 8 scoring at grade-level proficiency on the STAAR math test continued to be below the state average (Table 1). Additionally, the percentage of Grade 8 students who did not pass STAAR and were required to participate in the SSI remained above the state average (Table 2).

Table 1

Percentage of Students Meeting Proficiency or Better on the Grade 7 STAAR Mathematics Test

Year	Grade 7 math		Grade 8 math	
	Campus A	State average	Campus A	State average
2019	18	43	35	57
2018	10	40	27	51
2017	11	40	22	45

Note. STAAR = State of Texas Assessments of Academic Readiness. Data from Texas Education Agency Texas Academic Performance Reports, 2016-2017, 2017-2018, and 2018-2019, from https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/texas-academic-performance-reports

Table 2

Percentage of Students Requiring School Success Initiative Participation in Grade 8 Mathematics

Year	Campus A	State average
2019	31	18
2018	39	20
2017	47	25

Note. School Success Initiative is an indicator of continued scoring below proficiency on the state achievement test. Data from Texas Education Agency Texas Academic Performance Reports, 2016-2017, 2017-2018, and 2018-2019, from https://tea.texas.gov/texas-schools/accountability/academic-accountability/performance-reporting/texas-academic-performance-reports

Campus A school officials' expectation for implementing a PLC aligned with that of district school officials, who recommended all schools implement PLCs to support student learning and math achievement, as expressed in the District Improvement Plans for 2017, 2018, and 2019. In alignment with the Campus Improvement Plans for 2017,

2018, and 2019, the goal was to support student learning through collaboration by educators in PLCs regarding instructional strategies for math to address student deficits based on analysis of state assessment data.

Various presenters, such as campus school officials, district school officials, professional development companies, and experts in the field of PLCs, conducted PLC training annually for all of the district campuses, including Campus A (Campus A school official, personal communication, March 2017; school officials, district meeting communication, August 2019). In terms of expectations of math PLCs at Campus A, teachers were required to meet weekly during their common conference period to review student achievement data and collaboratively plan instruction based on PLC student data analysis (Campus A school official, personal communication, March 2017; school officials, district meeting communication, August 2019). Despite yearly PLC training and math PLC time for collaboration built into the weekly schedule, the math PLC teachers and school officials were challenged to implement the math PLC. Concurrently, student achievement scores remained below the state average on the state accountability assessments.

Researchers have cited that PLCs are linked to student achievement by enhancing teacher reflection and instructional practices, resulting in increased student outcomes (Burns et al., 2019; Serviss, 2020). Moreover, PLCs can provide a process for educators to collaborate in cycles using collective inquiry and research to meet academic achievement goals (Miller, 2020) for the students they serve.

With regard to the PLC innovation improving achievement, Campus A officials voiced concern over the implementation of the math PLC. In a discussion, one Campus A school official reported concerns over the Campus A math PLC meetings such as absenteeism from both teachers and school officials, math PLC members not implementing meetings per PLC training, and challenges for the team working with deficient data (school official, personal communication, March 2017). Further, at a district meeting, Campus A school officials stated their PLCs, including the math PLC, had challenges conducting PLC meetings (school officials, district meeting communication, August 2019). Therefore, by collecting information to more deeply understand the implementation process of the PLC as an innovation within the DOI framework, educators at the target Campus A could strengthen PLC implementation.

Consequently, the leadership team at Campus A addressed this concern in the goals and performance objectives of the Campus Improvement Plan. School leaders encouraged a PLC innovation supported by research (DuFour, 2014) stating educators working in PLCs should collaborate and learn from each other because a collaborative environment develops into structural improvement and teacher empowerment, which is connected to student achievement. Therefore, in the Campus Improvement Plans for 2017-2020, the math intervention expectation was that 100% of core content teachers would participate in a PLC once a week to focus on student data analysis, instructional planning, and strategies to address student learning needs.

Math PLC retraining took place using PLC resources based on the DuFour model posted on the faculty portal via a curriculum link. Materials used for the training included a DuFour (2014) journal article outlining PLC tenets and framework. In addition, PLC tools (e.g., the guidebook and process forms from Solution Tree, a subsidiary of DuFour's AllThingsPLC website at http://www.allthingsplc.info/) were uploaded for teacher use, and the administrator discussed how to use the PLC resources (PLC training administrator, personal communication, March 2017). Even so, the math PLC continued to face challenges with implementation and meeting as a team.

Collaborative culture is a cornerstone of the PLC (DuFour et al., 2013). Collaborative culture implemented through the PLC has been viewed as an innovation (DuFour et al., 2013; Schaap & de Bruijn, 2018). In this collaborative environment, PLC team members meet in the PLC to analyze student data and design instruction to remediate identified areas of needed growth for the students. The beginning of the PLC process requires that teachers and other administrators build a clear connection to what researchers have reported about the power of collaborative teaming via PLCs, which can result in collaborative practices (Darling-Hammond et al., 2019; Schaap & de Bruijn, 2018). The shift to a collaborative team culture requires the participants to change practices, think differently, and work together rather than independently (Darling-Hammond et al., 2019). For PLCs to function effectively, all participants must clearly understand the responsibilities, norms, and procedures to use during PLC meetings. Therefore, teachers must work collaboratively in PLCs learning how to share ideas and

agree or disagree effectively, skills that are essential among members for the PLC to operate according to the design of the innovation (Schaap & de Bruijn, 2018). Thus, the PLC often has been characterized as a school- or district-wide reform effort, which is a complex process (Eaker & Marzano, 2020).

The math PLC was viewed as a new innovation because relative advantage also measures how improved an innovation is over the earlier generation of a product (Schaap & de Bruijn, 2018). Despite retraining of the PLC and implementation changes, school staff continued to voice concerns over some PLC members not participating in meetings and grade levels not collaborating. Butkevica and Zobena (2017) supported that teachers must understand an innovation to lessen apprehension. Advantages and disadvantages about the innovation should be discussed with the teachers implementing the innovation to allay fear or confusion surrounding implementation (Butkevica & Zobena, 2017). The problem addressed by the current study was that middle school math teachers and educational personnel struggled to implement the innovation of a PLC at the target school, Campus A. The gap in practice is that it was not known why teachers and educational personnel were struggling with the PLC implementation to close the gap on student math performance. The purpose of this exploratory case study was to examine teachers' and school officials' perceptions of the math PLC process using the DOI framework and archival documents to determine reasons for the challenges with PLC implementation. The following section is a review of the terms used in this study.

Definition of Terms

Campus Improvement Plan: The Campus Improvement Plan, which is required by Texas law under Texas Education Code (1995/2017) § 11.253, serves as the blueprint for how a campus will address the needs identified during the process known as the campus needs assessment. Updated annually, the Campus Improvement Plan includes improvement goals; action plans; and decisions on curriculum, budget, staff development, staffing patterns, and school organizations.

Diffusion of innovation (DOI): DOI is a central theory, conceived by Rogers (2003). Rogers used the theory of DOI to describe the pace and path of acceptance of new ideas and innovations. DOI refers to the systematic spreading out of innovation by which, through certain channels, novelty includes communication among a social system's members over time (Rogers, 2003). In the diffusion process, innovations with the following five aspects tend to result in successful implementation: high relative advantage, trialability, observability, and compatibility as well as low complexity.

Professional development: The professional development or training of educators is part of the lifelong education process, including how teachers learn and how they apply that learning in classroom practice (Hauge & Wan, 2019). This development includes activities and processes that enable teachers to improve their students' skills, attitudes, and knowledge (Yurdakul et al., 2014).

Professional learning community (PLC): A PLC is a group of people who share a vision for learning. Members of a PLC aim to create continued improvement and meet

learner needs (Darling-Hammond et al., 2019). Teachers in PLCs reflect on their practices and learn enhanced learning methods (Burns et al., 2019; Darling-Hammond et al., 2019). According to DuFour et al. (2013), a PLC includes results orientation, a focus on learning, collective inquiry, a collaborative culture, action orientation, and commitment to continuous improvement.

State of Texas Assessments of Academic Readiness (STAAR): STAAR is an annual assessment for Grades 3–8, which was first implemented in spring of 2012 (TEA, 2020a). The STAAR tests measure student knowledge of the Texas Essential Knowledge and Skills (TEKS) standards.

Texas Essential Knowledge and Skills (TEKS): TEKS is the state standard of what students must know and can do (TEA, 2020a). TEKS standards are incorporated into the curriculum, and student learning is measured by scores on the STAAR.

Significance of the Study

This study is significant because I explored the implementation of the PLC as an innovation by examining the perceptions of the math PLC teachers and school officials with respect to the five characteristics of an innovation based on the DOI framework. Specifically, I sought to understand teachers' and school officials' perceptions related to the communication regarding the innovation of the PLC and the key qualities that facilitate the adoption and successful implementation the PLC. Findings may provide insights to district and campus stakeholders to review the process used for the PLC implementation and may lead to a refined implementation of the PLC as an innovation by

gleaning individual educators' perceptions of the DOI. In the case of this project study, Campus A and other educators may benefit from more deeply understanding how to adopt, implement, monitor, and reflect on the innovation process of the PLC, thus increasing student achievement on math assessments.

Locally, this study could influence the adoption rate and practices for other departmentalized PLCs at Campus A by considering the five characteristics of the DOI. Beyond Campus A, this study may influence district leaders' understanding of how to increase adoption rates for other district-wide initiatives. Specifically, this study supports a change in thinking from providing information as a method of training to adding systems for considering five characteristics of the DOI as part of systemic professional development plans for participants.

Research Questions

To examine how teachers and school officials perceive the implementation of the math PLC, I used two central research questions directly related to the five characteristics necessary for successful adoption of an innovation, according to Rogers (2003). Rogers's DOI theory was the framework that guided the research questions regarding teachers' and school officials' perceptions of the implementation of the PLC as an innovation to support student math achievement. Two research questions were used to explore the problem and gap in practice:

1. How do math teachers and school officials perceive the (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability of the math PLC program?
2. What is recorded in archived documents to reflect the PLC innovation implementation?

Review of the Literature

Researchers have indicated that when innovations are implemented using a specific model or framework, the likelihood of the innovation being implemented successfully improves (Barbour & Schuessler, 2019; Rogers, 2003). Furthermore, the implementation of PLCs requires high levels of communication regarding the expectations for implementation and support for the skills needed to execute the innovation of a PLC. Skills such as being a good communicator and being open-minded are important in PLCs (DuFour, 2014). PLCs are considered an innovation among the math PLC at Campus A because, although math teachers said they were familiar with the concept of PLCs, they also stated they were unfamiliar with the PLC process, as shown in the target school's PLC meeting minutes from February 2016. In terms of qualifying the math PLC practice as an innovation in this study, the introduction of new PLC processes is considered a type of innovation called a process innovation because there was a disruption and a redefinition (Walker, 2016) of the way the math PLCs functioned. Unlike an improvement process, which focuses on improving an existing procedure, a process innovation is a new solution to fundamentally change what currently exists

(Walker, 2016). With regard to this study, one school official introduced a new PLC process to math teachers, and the following year, another school official introduced the PLC process to new math teachers on Campus A (personal communication, March 17, 2017).

Conceptual Framework

The purpose of this study was to examine teachers' and school officials' perceptions of the math PLC process using the DOI framework and archival documents to determine reasons for the challenges with PLC implementation. To begin, the primary theory chosen to guide this project study regarding how organizations and individuals respond to innovation was Rogers's (2003) DOI theory. Rogers defined diffusion as the change process of a social system's function and structure, including alterations in ideas and their associated consequences. Rogers used the DOI theory to describe a process in which innovation occurs among members of a social system. First, an innovation is an idea, device, or method that is new to an individual or group of individuals (Rogers, 2003). According to the DOI theory, four elements influence diffusion in a social system: innovation, communication channels, time, and the social system (Rogers, 2003). The chosen framework for this study is rooted in the element of innovation, the first element listed in Rogers's DOI theory. The element of innovation focuses on perceptions that further align with the five factors identified by Rogers that influence the adoption of an innovation (LaMorte, 2019): relative advantage, compatibility, complexity, trialability, and observability. School officials and teachers may use the findings to ensure that the

PLCs are working within the parameters of a research-based PLC model adopted by the local campus or district. Specifically, in this study I examined team perceptions of the relative advantage, compatibility, complexity, trialability, and observability of the math PLC and ways in which they influenced the rate of adoption of the innovation, which would affect the likelihood of successful implementation (see Bernadine, 2019; Webster et al., 2020).

Supported by the DOI theory (Rogers, 2003), the research questions align with the element of innovation by exploring the areas of relative advantage, compatibility, complexity, trialability, and observability. Relative advantage refers to the extent in which adopters view the innovation as better than the previous idea (Rogers, 2003; Webster et al., 2020). Compatibility refers to extent of compatibility between the innovation and the standards, experiences, and needs of the adopters (Rogers, 2003; Webster et al., 2020). I explored the degree to which the math PLC processes aligned with Campus A teachers' and officials' values and norms. Complexity is the extent to which the innovation is easy to comprehend or use (Rogers, 2003; Webster et al., 2020). This characteristic relates to the degree Campus A educators understood PLC processes and were able to implement them.

Trialability refers to the extent to which the innovation can be tried before the decision to adopt is made (Rogers, 2003; Webster et al., 2020). This study explored the degree to which Campus A educators viewed what PLCs can do and participated in a trial run before committing to adoption. During this period, reinvention may occur; the

innovation may be changed or modified by the potential adopter (Dryden-Palmer et al., 2020). Also, during the trial period, adopters can experience the characteristic difference in the innovation (Henderson, 2018). Observability refers to the extent to which the results or benefits of the innovation are visible to potential adopters (Rogers, 2003; Webster et al., 2020). This project study examined the degree in which Campus A educators saw the benefits of math PLC implementation related to student achievement.

To examine reasons for the lack of implementation of the math PLC at Campus A, educator perceptions served as a consideration. The DOI theory served as the means and the framework for exploring perceptions. The five characteristics that influence the rate of adoption served as the basis for questions to shed light on educator perceptions. In addition, the four elements of DOI theory (Rogers, 2003) are the innovation, communication channels, time, and the social system. These elements are detailed in the following sections.

DOI Element: The Innovation

In reflecting on the math PLCs implementation of an innovation, selecting Rogers's (2003) element of innovation as a foundation piece was key because of concerns over the math PLC implementation process. Hence, to put an innovation into implementation or practice, individuals (e.g., teachers) first must decide to adopt the innovation, in this case, PLC practices (Butkevica & Zobena, 2017; Wilcox & Lawson, 2018).

The five characteristics of innovation are based on degrees of perception that determine the rate in which a social system adopts an innovation. Rogers (2003) found that innovations are more likely to be adopted if they have the following five characteristics: high relative advantage, high compatibility, low complexity, high observability, and high trialability. The first characteristic, relative advantage, describes the extent to which potential adopters perceive an innovation as superior to previous or existing ideas or methods. Next, compatibility is the degree to which participants perceive that the innovation falls in line with their experiences, needs, and values. The third characteristic, complexity, refers to the difficulty of understanding the innovation, as perceived by the potential adopter. The fourth characteristic, trialability, refers to a limited trial of the innovation prior to full implementation. Finally, observability is the degree the advantages of the innovation are visible in terms of benefits or outcomes (Rogers, 2003). Regarding researchers recommending an innovation, such as a PLC on a school campus, Cadarette et al. (2017) suggested not only evaluating the innovation but also considering the five characteristics of an innovation to incorporate the innovation into practice.

DOI Element: Communication Channels

In DOI theory, communication is characterized by conversation, with participants encoding and sharing information until reaching shared understanding (Dolezel & McLeod, 2019; Rogers, 2003). Communication channels occur in two forms: mass media and interpersonal. Mass media channels, which include television, radio, and newspaper,

more effectively create innovation knowledge. Conversely, interpersonal communication forms and changes individuals' attitudes toward a new idea, influencing the decision to adopt or reject a new idea (Rogers, 2003). PLCs rely on interpersonal communication to collaborate and reflect on practices. In describing the interpersonal communication process, Rogers (2003) cited the ideas of heterophily and homophily. Homophily is the extent to which individuals interact with those with similar characteristics (Ramazi et al., 2018). Conversely, heterophily refers to the degree that individuals interrelate with others with different characteristics (Ramazi et al., 2018). DOI may not occur when individuals have similar skill levels or a high degree of homophily because no differential information exists to exchange between them (Ramazi et al., 2018). However, communication may be less effective among heterogenous individuals (Yu & Gibbs, 2018).

DOI Element: Time

Time influences diffusion in three ways: innovation process, innovativeness, and the rate of adoption (Rogers, 2003). First, the time that is involved in the decision to adopt an innovation goes through a five-step process: knowledge, persuasion, decision, implementation, and confirmation. The process goes from knowledge, or awareness of the innovation, through persuasion, forming an attitude toward the innovation in innovation, to decision, being involved in activities to reject or adopt the innovation. As the individual works through activities, the person puts the innovation into use implementation. Through confirmation, the last step of the innovation process, the

individual assesses the results of an already-made innovation-decision. At the stage of confirmation, the individual seeks support for their decision and may change their mind (Qazi et al., 2018). Studying the innovation process would provide insight in the study of the challenges with implementation of the math PLC.

The second facet of Rogers's (2003) time dimension is innovativeness, or the characteristics of individuals exposed to the innovation. This term refers to Rogers's outline of the degrees of responsiveness to an innovation. Rogers stated that five distinct personalities tend to divide a population as related to their inclination to accept an innovation: laggards, the late majority, the early majority, early adopters, and innovators. Innovators who start the adoption process typically represent 2.5% of the population. They are pioneers and risk-takers. Early adopters, which consist of the subsequent 13.5% of individuals adopting an innovation, are strategic thinkers who seek advice from the innovators and thus lead all others to change. The next group is the early majority, representing the next 34% of a social group. Those in the early majority tend to follow the mainstream, are opposed to taking risks, and choose not to act until they see others' success with the innovation. The next 34% is the late majority, who are not risk takers and are uncomfortable with innovations, even though the early adopters and early majority have adopted the innovations (Rogers, 2003). The late majority eventually will consent, although cautiously. The final 16% are the laggards. The laggard is conservative and cut off from the social system. In the presence of the innovation, the laggard will not consent (Lien & Jiang, 2017).

The math PLC at Campus A consists of 10 math teachers. Using the percentages for the degree of responsiveness among the math teachers could provide insight on the effect of laggards on implementation. The third aspect of time dimension in the element of innovation is the rate of adoption, which refers to the speed that the members of a social system adopt an innovation. The rate indicates the amount of system members who adopt the innovation in a certain period (Rogers, 2003). A few innovators adopt the innovation in each period. Eventually, the diffusion curve climbs, and more individuals adopt the innovation until the diffusion process is finished (Rogers, 2003). The rate of adoption is of note in this study because rates of adoption can vary by a month or years, which would affect PLC implementation and ultimately student learning.

DOI Element: The Social System

The math teachers at Campus A comprise the fourth element of DOI theory: a social system. Rogers (2003) cited that a social system describes a group of interconnected individuals who participate in shared problem solving to realize a mutual goal. These units include organizations, groups, and individuals. Diffusion happens within the framework of a social system and is influenced by group configuration, systems of behavior, and communication (Gaftoneanu, 2016). The social system of the math PLC at Campus A is important to consider because sources have noted the math PLC's lack of meeting and collaborating as a group (school officials, personal communication, January 29, 2016; school official, personal communication, March

2017), which could result in an inability to solve a common goal (Schaap & de Bruijn, 2019).

Review of the Broader Problem

Throughout my search for current, peer-reviewed sources, I read and annotated three types of literature sources relevant to the study: published books, peer-reviewed journal articles, and reputable scholarly web publications. This project study reached saturation with sources from peer-reviewed journals, dissertations, and books found in the following databases: Educational Resource Information Center (ERIC), ProQuest, and Google Scholar. I searched the following terms and concepts: *PLC, innovation, diffusion, professional development, adult learning, evaluation,* and *assessment*.

The literature review centers on the element of innovation, the first element in the diffusion process of Rogers's (2003) DOI theory. Rogers's conceptualization of the DOI theory supports individuals seeking to understand how perceptions within a social system influence the rate of adoption of an innovation; how the adoption is perceived and adopted influences the implementation of the innovation. Other theories in this review involved various aspects of PLCs, such as foundational knowledge, implementation, leadership, and assessment of PLCs.

With the focus of this study on the implementation of PLC processes by math teachers, the theory of diffusion highlights the role of participants in establishing successful adoption and implementation (Dryden-Palmer et al., 2020). Within the DOI theory, Rogers (2003) defined five qualities as determining an innovation's success:

relative advantage, compatibility, complexity, observability, and trialability. Rogers explained that the diffusion process is influenced by social systems, time, communication channels, and the nature of the innovation. The element of innovation, including the five qualities for success of an innovation, is discussed in the literature review.

In this literature review, I make connections between aspects of the DOI theory and elements of innovation related to the implementation and operation of the math PLC. I offer detailed information on innovation theory and the elements related to infusing an innovation such as a PLC into an educational setting. The expectations of PLC implementation and the recommended processes used to implement an effective PLC are described. The notion of change and human behavior related to innovation are also included in the following critical review of the broad problem.

Defining PLCs

PLCs are based on various theories of collaboration, social learning, and learning organizations. According to the foundational work of Hord (1997), the innovative theory of a learning organization, which led to a shift in how organizations achieve results, was presented in Senge's (1990) book, *The Fifth Principle.* According to Senge, in a learning organization, "people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (p. 3). This concept caught the attention of educational researchers and moved into the

education world (Hord, 1997). As Senge's ideas became explored in education journals, these groups became known as learning communities (Hord, 1997).

Over time, other experts in education expanded on the definition of learning communities, which became referred to as PLCs. DuFour et al. (2013) cited that a PLC is an ongoing process of collaborative work in recurring cycles of action research and collective inquiry, with the end goal of higher student achievement. According to DuFour et al., the PLC process includes elements such as results orientation, a focus on learning, collective inquiry, a collaborative culture, action orientation, and commitment to continuous improvement.

Hord (1997), an educator whose research teams identified the attributes of effective learning teams, based PLC attributes on constructivism (Vygotsky, 1962, 1978). Hord (2007) outlined the six dimensions of PLCs: (a) supportive structural conditions, including resources, time, and place; (b) leadership that is supportive; (c) supportive relative conditions; (d) "shared beliefs, values, and vision" (para. 3); (e) collective learning within the PLC team; and (f) peers sharing their practice to gain feedback. Similar attributes occur between the Hord model, which can provide a framework for an effective PLC; however, I focused on the DuFour (2014) model because Campus A's school district posted on the district website PLC resources based on the DuFour (2014) model.

Models of PLCs

Researchers have provided no single, set definition of a PLC; however, in literature the most common description of a learning community in terms of relationships and functions is a team whose members have (a) feelings of belonging, (b) reliance between members, (c) trust between each other, and (d) shared purpose. In addition, members are functional and work to achieve a goal (West & Williams, 2018). Yet, in the study of PLCs, researchers have used different frameworks describing the collaborative practices that school leaders should consider when designing how PLCs will be organized. Specifically, two prominent researchers emerged in the field of PLCs. DuFour (2007) and Hord (1997) constructed similar PLC models yet emphasized different features of PLCs (Dogan et al., 2017). Hord (2007) described five dimensions outlining what PLCs should resemble: (b) shared vision and values, (b) "shared and supportive leadership" (para. 5), (c) collective learning with practical classroom applications, (d) shared personal practices, and (e) supportive conditions both in physical and structural environment and work relationships. DuFour (2014) structured three big ideas regarding PLCs: (a) focus on learning, (b) build a collaborative culture, and (c) focus on results. Both models have a focus on learning and collaboration; however, Hord (2007) highlighted the importance of the school principals' roles in sharing tasks and responsibilities with teachers to lead to success of the PLC. When trying to understand the math PLC, knowledge of various models and the role of administrative staff can serve

to guide research questions and thus shed light on possible inconsistencies in the perception among the members.

PLCs: Implementation Fidelity

Many school educators claim to embrace the PLC process, yet for many schools, a more accurate description of the process should be called PLC lite (DuFour & Reeves, 2016). Often, educators rename their department meeting or faculty meetings as PLCs, but these meetings do not function in a manner that would positively affect students' achievement. In a rare examination of a failed PLC, Sims and Penny (2015) showed that the teachers' view of team meetings were that they were concerned only with data and did not allow time for teachers to collaborate; further, teachers did not have a common conference period, and principals appeared detached and unhelpful. Activities that do not fall in line with the principles of the PLC process likely will not lead to higher levels of learning for students or adults (DuFour & Reeves, 2016). However, schools implementing the central tenets of PLCs can improve teaching and learning. Teachers who are working in a true PLC recognize that they must collaborate instead of work in isolation, establish a guaranteed and viable curriculum, use assessments based on the curriculum, use assessments to identify students in need of intervention and areas of need, and create a system of intervention for students (DuFour & Reeves, 2016).

DuFour and Reeves (2016) further delineated between PLC and PLC lite concepts with four questions, which drive PLCs:

1. What are students intended to learn?

2. How do teachers determine whether students have learned it?
3. What do the teachers do if students have not learned the material?
4. How will teachers "provide extended learning opportunities for students who have mastered the content" (DuFour & Reevese, 2016, para. 14)?

This literature is essential for this project study by providing insight on participants' perceptions and the reality of who they are as a team.

PLCs: Challenges With Implementation

Researchers found evidence that PLCs increase teacher collaboration, emphasis on student learning, instructional decision-making from teachers, and creation of standards for continuous learning (Darling-Hammond et al., 2019). Furthermore, researchers cited that teams working in collaboration to improve teaching and learning yield an increase in student, campus, and system performance (Darling-Hammond et al., 2019; DuFour & Reeves, 2016; Schaap & de Bruijn, 2018). However, despite favorable responses from educators, implementation of PLCs can be challenging. Wilson (2016) cited various barriers that can result in a failed PLC, such as lack of time, lack of buy-in, and lack of shared leadership.

Levine (2019) discussed barriers to success of establishing PLCs, including inadequate time, difficulties collaborating, and a lack of commitment to change the organization's culture. Similarly, DuFour (2015) stated, "The primary challenge in the PLC process is changing, and not merely tweaking, the existing culture" (p. 100). Concerns over the lack of implementation of PLC processes for math at Campus A must

be answered to effect change. The reasons, outlined in this literature review, provide research-based factors that should to be considered.

Factors Influencing Effective Implementation. Collaboration is the foundation of PLCs, so for educators to learn collaboratively, members should have support; monetary resources; time to learn; and participation from educators who have expertise, information, and motivational capabilities (Affandi et al., 2019). Furthermore, principals play a key role in successful implementation of the PLC. Brown (2016) suggested school leaders can attain success in implementing their PLCs by utilizing a system based on a theoretical framework that promotes shared expectations for instruction and learning in the classroom.

Critical Questions for PLCs. Effective PLC teams base their inquiry and action on four key questions and responses, as listed earlier. The questions PLC teams should ask themselves in relationship to the learning content delivered through instruction are (a) what students should learn, (b) how teachers will know if the students learned the content, (c) how teachers will respond if the students do not learn, and (d) how teachers will respond if the students already know the material (DuFour & Reeves, 2016). Effective PLCs address these questions by determining the essential standard, developing a common assessment, providing interventions, and extending learning, respectively (DuFour et al., 2013). When determining the essential standard, teams should consider the long-term value of the standard, whether or not it will bring value to other disciplines, and whether the standard will provide the knowledge and skills needed to master the next

level (DuFour & Reeves, 2016). Strong PLCs uphold that teachers should check student understanding consistently and provide opportunities for students to self-assess their knowledge (DuFour & Reeves, 2016). In addition, formative assessments should be developed by the PLC and directly related to the instruction (DuFour & Reeves, 2016). PLC members should not plan to repeat strategies of unsuccessful teaching as an intervention, in the event that students do not master the essential standard. Rather, PLCs should plan ahead for intensive and immediate intervention that results in improvement (DuFour & Reeves, 2016). Finally, effective PLCs should collaborate on adding activities that extend the learning of students who have mastered the essential standard.

Evaluating PLCs. To gain insight into the effectiveness of a program, such as a PLC, the program should go through a systematic evaluation. In theory, PLCs expose teachers to new ideas and practices that can improve their pedagogy (Hord, 1997), which can improve teaching practices and ultimately increase student achievement (Blitz & Schulman, 2016). Researchers (Domingo-Segovia et al., 2020; Jones & Thessin, 2017) cited that to resolve issues related to creating PLCs, such as working with diverse experiences or working in various stages of PLC development, dependable instruments are needed to evaluate the extent of PLC development and the frameworks from which the PLC is modeled. Domingo-Segovia et al. (2020) asserted that the most known PLC evaluative instrument is the PLC Assessment–Revised (PLCA-R). The PLCA-R is a diagnostic tool created by Olivier et al. (2003) and in 2010 revised to a shorter version by Olivier and Hipp (2010). The PLCA-R measures perceptions about a campus's principal,

faculty, and community members regarding PLC practices (Domingo-Segovia et al., 2020; Hipp & Huffman, 2007), including the strengths and weakness of the PLC. In addition, the purpose of the PLCA-R is to promote continuous improvement in the PLC process (Domingo-Segovia et al., 2020). When considering the gap in implementation of the math PLC at Campus A, I concluded a clear need existed to assess PLC programs and provide measurement tools to evaluate specific aspects of a PLC.

Twelve Principles of Change

Although the math PLC plan at Campus A was a requirement, the plan was not fully implemented, as administrators did not report PLC processes in meeting minutes and notes from 2016. Based on PLC meeting minutes from 2016, after discerning some of the factors that helped school officials and teachers better understand the lack of PLC implementation, such as time and training, administrators deemed implementation of the processes of a PLC necessary through effectively training staff. However, the process of change is complicated; therefore, researchers have requested a more thorough understanding of change theory and its implications to sustain the process (Reinholz & Andrews, 2020).

Understanding the principles of change and how change affects team members provided insight as to why the math PLC did not adopt and implement the PLC processes. In the late 1960s, a research group from the University of Texas in Austin collaborated to identify the principles of change in educational systems (Hall & Hord, 2014). Khandaghi and Baraei (2017) confirmed and extended the list containing the 12

principles of change. Additional researchers from several countries, such as the United States, Belgium, Holland, Australia, Canada, Taiwan, and Hong Kong, collaborated with the researchers from Austin for assistance and confirmation (Hall & Hord, 2014). Together, the group developed 12 main principles of curriculum change (Hall & Hord, 2014):

1. "Change is learning" (Hall & Hord, p. 9).
2. Change refers to a process, not a one-time occurrence.
3. The school is the main component for change.
4. Establishments adopt change yet also implement change.
5. Interventions are a necessity to attaining change.
6. Appropriate interventions lessen challenge to change.
7. District and campus leadership is essential for long-term change.
8. Establishing change requires the effort of the team.
9. Directives from leadership make change.
10. Viewing of internal and external factors is needed for change.
11. The change process goes through a process of adoption, implementation, and sustainability.
12. Be focused.

Shared Leadership and PLCs

One essential factor that campus principals should consider in ensuring that their PLCs are sustainable is the leadership of the PLC and how leadership is distributed.

Although principal support and leadership is necessary to the function of a PLC, the distributed leadership model shares responsibility across the school, rather than concentrating responsibility on the principal (Hamzah & Jamil, 2019; Joo, 2020). Researchers suggested that teacher empowerment results in increased teacher success, which in turn affects student academic performance (Wilson, 2016). However, when campuses are ruled by an autocratic leadership style instead of one of shared leadership, the culture of the campus becomes stifled, which suppresses teacher leadership. Subsequently, the principal establishes the school's culture, thereby influencing the competency of PLCs and teacher leaders (Wilson, 2016). For these reasons, principals should accept distributed leadership structures and thereby empower teachers to establish effective PLCs (Hamzah & Jamil, 2019). Moreover, the presence of shared leadership may help sustain PLCs through administrator succession (Peters-Hawkins et al., 2017). Shared leadership is a relevant concept when considering the math PLC's inability to function to the point of adoption and implementation.

Roles and Responsibilities of PLC Members

Collaborative teams function within the framework of shared learning that results in the same goal. Therefore, all team members are responsible for the success of the PLC team. Team members must work to achieve their goals, but everyone's official role describes how the participating individuals contribute and relate to the overall team (Broward County School Board, 2019). Roles such as a facilitator, a timekeeper, and a notetaker are essential regardless of the size of the team, and members need to

periodically rotate roles so that every member has the opportunity to hone their skills in collaboration (Causton & MacLeod, 2016). Specifically, members should rotate the role of facilitator throughout the year to lessen the amount of authority one person has, because the power of the group is contingent on each member being a leader and feeling empowerment (Sacks, 2017). In contemplating combining shared leadership with team roles, math PLC members can consider sharing roles on a rotating basis.

Implications

In the literature review, I discussed various features and historical references related to PLCs and aspects of the DOI theory with a focus on the five characteristics that influence the successful adoption of an innovation (see Rogers, 2003). A challenge for the math PLC at Campus A is the inability to implement the PLC process with fidelity possibly due to a lack of adoption. After a review of literature covering PLC features, pointing to challenges and barriers to implementation of PLCs, I focused on the broader issue of perceptions on the characteristics of an innovation as outlined by the DOI as a consideration for the problems of implementation. Through this theory, I gained an understanding that an innovation, such as a PLC, can have all the necessary components to function, but to ensure adoption of an innovation, participants must positively experience the five characteristics of the DOI (Rogers, 2003).

Examining the perceptions of the math PLC and school officials related to the five characteristics of the DOI would shed light on the challenges of implementing PLC process. Moreover, data might prove to be useful for the planning, monitoring, and

reflecting on PLC processes for other core subject PLCs or school-wide PLCs. Specifically, during the planning phase, school officials may ensure that teachers see the relative advantage of the PLC process as opposed to working in isolation and set up training to include a trial period and observation of the results from other PLCs. The math PLC and school officials can monitor the complexity or simplicity of the process. Finally, all educators may reflect and consistently communicate whether the PLC process is in alignment with school values and norms.

Summary

PLCs provide a useful strategy to improve teacher and student performance (Basileo, 2016; Burns et al., 2019; Darling-Hammond et al., 2019; DuFour & Reeves, 2016; Schaap & de Bruijn, 2018). School-based PLCs can be implemented differently. Some teachers experience challenges in implementation of PLCs. Challenges include insufficient access to timely data used for instruction, poor infrastructure (lack of scheduled time or inefficient use of limited time), lack of teacher buy-in based on teacher perception that PLCs are imposed on them, lack of shared leadership, and difficulty collaborating (Bates & Morgan, 2018; Levine, 2019; Wilson, 2016). Additional key barriers are a lack of understanding of what a PLC is and a lack of commitment to change school culture (Darling-Hammond et al., 2019; Levine, 2019).

I explored educators' perceptions of the PLC process based on the five characteristics of an innovation using Rogers's (2003) DOI conceptual framework. Data from interviews and archived data in the form of PLC meeting minutes might highlight

reasons school officials and teachers of the math PLC continue to struggle in implementing PLC processes. The study findings might offer information and encouragement to promote professional development for teachers specific to PLCs.

One potential project resulting from the study might be 3-day professional development on how to support PLCs, including both teachers and school officials, thereby resulting in a more effective math PLC at Campus A. Another possible process could involve professional development on how to support PLCs, including both teachers and school officials, resulting in more effective PLCs district wide. The math PLC, having gone through the process of planning, monitoring, and reflecting on DOI characteristics leading to full adoption of the PLC as an innovation, eventually could serve as a district model, specifically with regard to the characteristic of observability. PLCs working toward successful adoption could observe the math PLC at Campus A and examine the PLC from the relative advantage, complexity, and compatibility with school values and norms as suggested in the DOI theory. The project will be presented in Appendix A.

Furthermore, this project study may have implications at the district level as information is shared with district leaders to promote more widespread social change. A white paper or professional development workshop could be a potential outcome to provide campus and district leadership recommendations based on the findings from this study, including recommendations for professional development. This project study could

be meaningful in promoting social change by informing district and campus leaders to better understand how teachers and other educators perceive the PLC innovation.

Beyond PLCs, as school district leaders continue to initiate new innovations, they can shift from providing information and professional development to schools to adding a system for considering the five characteristics for successful adoption of the innovation to professional development strategies and follow-along processes. This system may in turn increase the effective implementation of the PLC, thus meeting the overarching goal of the project to strengthen the PLC implementation using the DOI framework, providing more support for teachers and students in supporting student learning in math.

Section 2 includes a discussion of the specific methodology and study design chosen to address the research questions focused on a struggling PLC. Section 2 of this study also includes the research design and approach, the criteria for selecting participants, justification of the number of participants, discussion on the depth of inquiry, the setting, sample, instrumentation and materials, data collection, and the data analysis process. Results of the data analysis are provided by research question.

Section 2: The Methodology

The purpose of this study was to examine teachers' and school officials' perceptions of the math PLC process using the DOI framework and archival documents to determine reasons for the challenges with PLC implementation. The leadership of the math PLC in the target school, Campus A, struggled with implementing the PLC processes. During the 2016-2017 academic year, the struggle continued, despite professional development efforts from the new school officials (school official, personal communication, 2017). In the current qualitative exploratory case study, I investigated the reasons for the math PLC's lack of successful implementation. The problem addressed by the study was that middle school math teachers at the target school, Campus A, struggled to implement the innovation of a PLC even though the teachers had participated in PLC training. The lack of implementation of the innovative PLC could be contributing to students' low scores on local and state standardized math assessments. I used Rogers's (2003) DOI theory to guide the current study based on the aspects of the theory that focus on adopting a new innovation. I posed two primary research questions :

1. How do math teachers and school officials perceive the (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability of the math PLC program?
2. What is recorded in archived documents to reflect the PLC innovation implementation?

Section 2 is organized to include discussions of the methods chosen to address the study problem and purpose. Information is first presented on the study method and design. A discussion of study participants follows and includes information on the sampling strategy used, steps taken for the protection of participants, and the informed consent process. I then describe the steps involved with data collection, including the instruments involved and the procedures used. Data analysis methods are then discussed, including information on the quality aspects of the study. Then, I present the data analysis results based on the data collected and organized by research question.

Research Design and Approach

Common research methods include quantitative, qualitative, and mixed methods that employ both quantitative and qualitative strategies (R. K. Yin, 2017). Researchers who use a quantitative method focus on understanding the data collected in terms of measurement, such as how much or how many of aspects or variables related to the study (Creswell, 2018). Researchers who employ a qualitative methodology are interested in answering research questions founded in understanding the how or why of the research problem (Creswell, 2018).

Qualitative research allows for a variety of methods to gather data. Data collection techniques allow for systematic collection of information about the study, such as people, objects, and phenomena, and about the settings in which they occur (Clark & Vealé, 2018). As the focus of the current study was on a phenomenon that cannot be counted or measured quantitatively, specifically involving the how or why related to the

struggles experienced by teachers of the math PLC at the target school, the qualitative method was the appropriate research method. Moreover, considering the type of data to be collected, the data collection methods planned included document reviews and individual interviews. Also, my goal was to gain insight into people's feelings and thoughts, making the qualitative research design the most appropriate choice.

Justification of Design

Qualitative research can be conducted using different approaches based on the data collection methods planned, the population to be studied, and goals of the researcher. Five primary approaches within the qualitative study methodology are phenomenology, narrative, ethnography, case study, and grounded theory (Creswell & Poth, 2018). To determine whether an exploratory case study design was best suited for this research study, I considered other qualitative designs as well.

A phenomenological study focuses on the lived experiences of the individuals (Creswell & Poth, 2018). In the current study, the focus was not on specific lived experiences but on a holistic description of the situation. An ethnography study involves immersion into a specific population, group, or culture (Creswell & Poth, 2018). Conducting an ethnography study was not consistent with the goals of the current study, as this study was not focused on a specific culture or group. A grounded theory research design aims to develop a theory within the construct of the research (Creswell & Poth, 2018), which was not the intent with the current project study. A narrative approach involves collecting stories about a person's life and culture (Creswell & Poth, 2018;

Patton, 2002), thus focusing on a single source for data. The narrative approach did not align with the current research study of the math PLC.

According to R. K. Yin (2017), using a case study approach is appropriate when the researcher intends to explore a central issue using different sources of data. Collecting different types of data from evaluations, interviews, and document reviews can result in an in-depth understanding of different viewpoints within the case. Researchers apply the case study design to review multiple data types to explore real-life circumstances (R. K. Yin, 2017). As the data collection process included multiple resources to explore the experiences and perspectives of the study participants, a case study design was an appropriate choice for the current project study. Merriam and Tisdell (2016) noted the strengths of using a case study design, such as using a variety of research collection tools, establishing rapport with research participants, and gathering data to gain in-depth insight into the problem—in this instance, a gap in practice regarding the implementation of PLCs at Campus A. After considering the study problem, purpose, and other study designs, I chose the case study design as the most appropriate research design because case studies provide an intensive, holistic description and analysis of a single, bounded unit situated in a specific context (Merriam & Tisdell, 2016). This method provides insight into real-life situations (Merriam & Tisdell, 2016; R. K. Yin, 2017).

Exploratory Case Studies

Case studies can be used in different modes, such as exploratory, descriptive, explanatory, and evaluative modes (R. K. Yin, 2017). An exploratory case study serves to

collect data that might be useful for further investigation and further study (R. K. Yin, 2017). The exploratory design can be used to investigate a problem in a manner that determines the need for further study, such as stand-alone qualitative studies (Sutton & Austin, 2015). However, the exploratory case study design follows accepted methods of organization and allows for findings and conclusions without requiring additional study or methods (R. K. Yin, 2017). In the exploratory design, a researcher focuses on finding answers to questions from different people and other sources in an attempt to collect rich data on the phenomenon (R. K. Yin, 2017). Researchers use the exploratory design to explore the circumstances of a real-life problem in a contemporary setting (Creswell & Poth, 2018). In this case study, the specific problem related to the math PLC of Campus A.

An exploratory case study design with a focus on extrapolating information from sources as a single unit of evidence was appropriate for the study (see Stake, 1995; R. K. Yin, 2017). In this qualitative, exploratory case study, I used data collection methods that included individual interviews, specifically involving teachers and school officials, and a review of archived documents, PLC meeting minutes. The information included the quality and rate of adoption of the math PLC. My goals in this study were to understand teachers' and school officials' thoughts and perceptions of PLCs and ease the implementation of the innovation (see Rogers, 2003) of the math PLC. I also hoped to aid this process so that the benefits of implementing the math PLC and the benefits of PLC training at Campus A could be experienced at the study site. I used evaluative processes

to explore Campus A teachers' and school officials' beliefs, perceptions, understandings, and ideas on the PLC process at Campus A.

Process Evaluation

I used an exploratory case study method referred to as process evaluation. The process evaluation was the chosen evaluation method because the goal of the process evaluation involves understanding how an intervention functions by considering the unique characteristics of a particular group, the implementation of the intervention, and its effect (Limbani et al., 2019). Process evaluation is particularly useful with complex interventions (Limbani et al., 2019). Another result of process evaluation involves providing feedback to the public, program sponsors, and managers, as well as insight into program outcomes (Desveaux et al., 2016; U.S. Government Accountability Office, 2012). Process evaluations are essential for researchers to discover interventions that are useful and effective and to understand how to improve interventions that are not (Limbani et al., 2019). This type of evaluation was the most appropriate because process evaluation addresses inquiries regarding the extent to which the implemented activities are appropriate for the problem or population (Desveaux et al., 2016; U.S. Government Accountability Office, 2012). Implementation fidelity can be measured through process evaluation (Bragstad et al., 2019). Consequently, I evaluated challenges of the implementation of Campus A's math PLC processes by discovering educators' and school officials' perceptions of five DOI characteristics needed for successful adoption.

An exploratory case study is a valuable tool to improve features of program implementation, such as fidelity and effectiveness (Smith & Ory, 2014). The process of an exploratory case study design aided in more deeply understanding the phenomenon of the PLC implementation related to the five DOI components. I used an exploratory case study design and process evaluation strategies within a single middle school to explore math PLC teachers' and school officials' perceptions regarding the five elements that determine the quality and rate in which the social system adopts an innovation (Rogers, 2003). I examined the math teachers' and school officials' experiences and perceptions in an educational setting that might provide useful data for other educational administrators in various educational settings (see Stake, 1995). In the next section, I describe participant selection, access procedures, and participant protections implemented prior to data collection.

Participants

The setting for this study was a public school district in North Central Texas. The district consists of 15 elementary schools, four middle schools, two ninth-grade campuses, two high schools, and two special-program schools. During the 2019-2020 school year, the district student enrollment was approximately 16,000 students with approximately 2,000 employees. The target school for the study is a middle school identified as Campus A. The 2020 state report on schools was unavailable due to the COVID-19 pandemic. The most current state report, from the 2018-2019 academic year, listed Campus A with an enrollment of 1,064. Data on enrollment described the student

population as 46% African American or Black, 29.1% Hispanic, 21% White, 3.5% Asian, 3.4% multiracial, and 0.1% Pacific Islander. Additionally, as of the 2018-2019 school year, 73.9% of the total student body was coded as economically disadvantaged, and 49.7% was coded as academically at risk (TEA, 2020c).

Criteria for Participant Selection

This study included teachers and school officials at Campus A and other teachers and school officials who were previous members of the PLC at Campus A. The primary criteria for selecting the teacher participants were the following: (a) current or previous math teacher in the PLC at Campus A, (b) math PLC participation at Campus A, and (c) trained in PLC processes. The primary criteria for the school officials were the following: (a) current or previous school official at Campus A, (b) supported math PLC implementation at Campus A, and (c) trained in PLC processes.

The population meeting the criteria included eight teachers, six school officials, two previous teachers, and two previous school officials, a total of 18. Eight participants comprised the final sample: five teachers and three school officials at Campus A. Three participants were former staff at Campus A: two teachers and one school official. The study obtained a 44.4% response rate. Table 3 provides a summary of the participants who returned the consent forms and volunteered to participate in the study.

Table 3

Participant Characteristics

Participant (P)	Job classification	Trained on professional learning communities
P1	Teacher: Grade 8	Yes
P2	Teacher: Grade 7	Yes
P3	Teacher: Grade 7	Yes
P4	School official	Yes
P5	Teacher: Grade 8	Yes
P6	Teacher: Grade 8	Yes
P7	School official	Yes
P8	School official	Yes

The sample size can be determined by the size of the study and the method of data collection (Braun & Clarke, 2013). The type of sample obtained is important in addition to the sample size to obtain a sample adequate to answer research questions in qualitative research (Vasileiou et al., 2018). Qualitative research sample sizes are not clear cut, with no consistent recommendations across experts (Vasileiou et al., 2018). Braun and Clarke (2013) suggested six to 10 interviews or two to four focus groups as sufficient for small projects. A medium project would involve 10 to 20 interviews, whereas a large interactive qualitative study would involve over 20 interviews or over 10 focus groups (Braun & Clarke, 2013). Vasileiou et al. (2018) noted a sample size was adequate when interviews began to provide redundant data, called data saturation.

Justification and Type of Sampling

A purposeful, or purposive, sampling strategy provides a means to ensure that study participants meet the criteria identified by the researcher for the study sample. Purposive sampling is used by researchers exploring and understanding phenomenon through a focus on the specific characteristics of the population, as aligned with the needs of the study (Etikan et al., 2016). As qualitative research often involves small sample sizes, the use of purposive sampling allows the researcher to seek out individuals with the knowledge and experience needed to aid in examining the phenomenon under study (Etikan et al., 2016).

Through the process of purposeful sampling, I invited members of the target population, which consisted of eight teachers, six school officials, two previous teachers, and two previous school officials, to participate in the study. The purposeful sampling strategy is heterogeneous in nature and allows for variability in perspectives regarding the studied phenomenon. To gain insight into the perceptions of the math PLC teachers and school officials, all participants needed to have experience working within the math PLC at Campus A. One of the main assertions supporting the purposeful sampling methodology is that researchers are not looking for one correct answer; instead, the researcher seeks to examine different perceptions (Benoot et al., 2016). Conducting research with a heterogeneous sample allows the researcher to compare perceptions and gain a deeper understanding of how varying perceptions from different stakeholders, such

as teachers and school officials, might affect the implementation of an innovation. Specific protocols were adhered to for gaining access to the participants.

Access to Participants

To gain approval for data collection within the district specific to the study project, I sent a Letter of Cooperation requesting permission to conduct research to the school district's deputy superintendent, the district gatekeeper. The Letter of Cooperation included a description of the problem to be studied, the study purpose, and the research questions. I received contingent approval from the deputy superintendent in September 2019. Following directions of the deputy superintendent, I obtained advance approval from the two campus principals prior to obtaining approval from Walden University's Institutional Review Board (IRB). After the deputy superintendent received the agreement of the principal at Campus A and the principal who had previously served at Campus A, the district gatekeeper provided a signed copy of the Letter of Cooperation that signified permission to conduct research on the designated campus site. The next step for access involved securing Walden IRB approval.

Upon receiving approval of the study proposal from the doctoral committee signified by passing the proposal stage, I obtained approval to conduct research through Walden University's IRB. The IRB approved the study and assigned the approval number of 01-15-20-0166115. Upon receiving the approval to conduct research through Walden IRB, I shared the IRB approval document and number with the district deputy superintendent and moved forward with reaching out to potential participants.

The Letter of Invitation was sent to teachers and school officials at Campus A and to other teachers and school officials who were previous members of the PLC at Campus A. Invited teachers met the teachers' criteria of the following: (a) current or previous math teacher in the PLC at Campus A, (b) math PLC participation at Campus A, and (c) participated in PLC training. The school officials' primary criteria were the following: (a) current or previous school official at Campus A, (b) supported math PLC implementation at Campus A, and (c) participated in PLC training.

The Letter of Invitation in the study included information about the purpose of the study, activities of participants, and confidentiality. The Letter of Invitation included a link identified as "Notice of Consent Form" that individuals selected if interested in participating in the study. The Notice of Consent form contained information about the project, participants' activities, sample questions, and information on potential risks related to participation. After the participant read the Notice of Consent, they were asked to complete the Demographic Survey. Participants returned the Notice of Consent and Demographic Survey if interested in participating in the study. Participants were notified in the Notice of Consent prior to clicking the link that submission of the Notice of Consent and the Demographic Survey served as agreement to participate in the research study.

To recruit the desired number of participants, I sent a reminder email 7 days after the delivery date of the initial Letter of Invitation reminding the potential participants of the opportunity to participate. I sent a second reminder 7 days after the first reminder.

After sending the Letter of Invitation twice, eight participants had responded by returning the Notice of Consent and Demographic Survey. Next, I focused on building and maintaining a researcher–participant relationship while conducting the research study.

Researcher–Participant Relationship

I developed a researcher–participant relationship with teachers and school officials to understand their perceptions related to the DOI of a math PLC at the target middle school. I worked to develop a researcher–participant relationship that was transparent and trustworthy so that individuals felt comfortable sharing their perceptions, viewpoints, and documents prior, during, and after the data collection process. The researcher plays an essential role in developing researcher–participant relationships by building rapport and fully notifying participants of their roles and all aspects of the research with an open and using participant-friendly language (McGrath et al., 2018). I shared sample interview questions with the participants and made clear the requests for documents such as PLC meeting minutes in advance. As I was responsible for all data collection, it was incumbent on me to establish a trustworthy relationship with the participants, which is central to qualitative case study research (Merriam & Tisdell, 2016). I assigned numeric pseudonyms to each participant to promote confidentiality and explained these pseudonyms to the participants. Participants were aware of the protection of their privacy and the measures taken to ensure confidentiality at all times.

Protection of Participants

Protocols were adhered to as outlined in Walden University's IRB Ethical Standards in Research to protect the rights and welfare of all participants. Planning to protect research participants was a necessary ethical practice because "respecting human dignity is the cardinal ethical principle underlying research ethics and is intended to protect the interests and the physical, psychological or cultural integrity of the individual" (Research and Enterprise Development Centre, 2014, p. 20). As confirmation that I understood the ethical practices and the protection of research participants, I attained a certificate from the National Institutes of Health Office of Extramural Research.

The initial invitation letter and the Notice of Consent Form provided useful and detailed information about the study to potential participants. To protect participants, the Notice of Consent provided information about the study including (a) background information, (b) participants' activities, (c) sample questions, (d) the voluntary nature of the study, (e) potential risks and benefits, (f) compensation policies, (g) privacy statement, and (h) contact information. I discussed the voluntary nature of participation and reminded participants that they could decline participation at any stage if desired. In addition, I ensured that each participant was able to communicate with me through phone calls and emails prior to the interview with questions or concerns.

At the beginning of each interview, I read an approved statement regarding participant anonymity, confidentiality, voluntary status, and the ability to withdraw from

the study at any time. I asked each participant if there were any questions and answered them as needed.

Protecting the confidentiality of the study participants is essential to the study process (Silverman, 2016). Confidentiality involves protecting the participant's identify and information by avoiding revealing participant information in any discussions or communications with others; further, the data collection procedures and study results are presented in a manner that prevents the identification of the participants (Roth & von Unger, 2018).

The confidentiality of participants was further protected as all electronic data will be stored in a secure manner on a single, password-protected home computer used and accessed by me only. Documents and paper records will be securely stored in a locked filing cabinet in my private home office. No copies will be made other than those needed for data analysis, and no documents will be shared with other individuals not associated with the research process. All records will be stored for 5 years. After 5 years, the electronic data will be permanently deleted and all paper records and documents will be shredded per Walden University protocol.

The process of anonymity has been used to protect the school district and the target school. The process includes the use of descriptors, specifically Campus A, throughout the study and study findings. Actual school district and school names are not used to protect institutional identities when reporting the findings of this project study.

Data Collection

In qualitative research, researchers collect data to obtain information about the participants' lived experiences of the phenomenon (Creswell & Poth, 2018). The most common techniques for data collection are survey questionnaires, document reviews, observations, face-to-face interviews, and focus group discussions. To address the gap in practice in the math PLC implementation, I collected data from semistructured interviews, archival documents in the form of meeting minutes from PLC meetings, and field notes to answer the two research questions in this study.

Data Collection Instruments

The instruments used for data collection included researcher-created materials. The instruments used included a demographic survey, interview protocol used during the semistructured interviews, and field notes that included my observations during the face-to-face interviews. Documents reviewed included archived PLC meeting minutes created and stored in the school and school district records. I conducted face-to-face interviews with teachers and school officials using the interview protocols. I used the semistructured interviews to answer Research Question 1 and to supplement answering Research Question 2.

I collected the documents in the form of PLC minutes to triangulate the information obtained from the interviews and to gather information to answer Research Question 2. To secure data from teacher participants, I collected PLC meeting minutes

from school officials prior to the interviews. I needed these documents to answer Research Question 2 regarding the DOI of the PLC.

Demographic Survey

Prior to the semistructured interview and review of PLC meeting minutes, participants were asked to answer a researcher-generated demographic survey from a link embedded in the emailed initial Letter of Invitation. The purpose of the Demographic Survey was to confirm that participants met the participant criteria for the study. Questions gathered participant contact information, job title, whether they were current or former employees of the school, and the grade level taught. The survey asked questions confirming study criteria: participation in math instruction at the school and PLC training. The participants who consented varied in job classification and grade level taught or supervised, but all participants had firsthand knowledge of the PLC process at the target site PLC, as presented in Table 3. After receiving consent forms and demographic surveys, I used interview protocols to conduct face-to-face individual interviews with teachers and school officials.

Interview Protocols

According to R. K. Yin (2017), interviewing is a primary data source when using a case study design, as it centers directly on the research question by way of the participants' perspectives. The advantage of using a semistructured, more flexible version than the structured interview is the flowing, conversation style of the interview, allowing for in-depth descriptions of the participant's experiences using the participant's own

terms (Evans, 2018). I developed open-ended interview protocols and probe questions in consultation with my doctoral committee at Walden University. From the feedback given, I evaluated, amended, and added interview questions (see Castillo-Montoya, 2016) to maintain clarity and significance of the project study. The interview questions and probe questions were designed to provide extensive information about the participants' awareness and perceptions related to the specific phenomenon (Christenbery, 2017), specifically the math PLC at Campus A.

I aligned the participant responses with the research questions. I developed interview questions specific to the participants' roles and that were understandable and articulated in everyday language (see Kvale & Brinkmann, 2015). I created a protocol checklist with interview questions for each interview to ensure consistency in the interview process. The interview protocol was comprised of 12 open-ended questions and accompanying probes. Probes are recommended in the event the participant needs to elaborate or clarify their response (DeJonckheere & Vaughn, 2019). The questions were formulated to be organized and standardized, providing complete coverage of the phenomenon to address the purpose of this research, while remaining open ended (Creswell & Poth, 2018; Patton, 2002). The interview protocol is presented in Appendix B.

Prior to interviews, I obtained permission from the eight participants to audio record the sessions. Consenting participants were three Campus A math teachers, two previous Campus A math teachers, two school officials, and one previous school official.

Participants were asked via a standardized email to schedule their interview at a mutually agreed-upon place and time, outside of the hours of instruction. Participants selected interview times for before and after school hours. Participants selected interview locations from a list of options including on-campus and off-campus locations. Each interview was scheduled as an individual, one-on-one interview and lasted approximately 40 min.

Establishing rapport with a participant is important before the interview process begins, and such rapport should be maintained during the interview process. A researcher may establish rapport quickly by listening, using a conversational tone, explaining the reason for conducting research, and informing the participants that their part in the study is meaningful (DeJonckheere & Vaughn, 2019). Accordingly, I explained the background of the study and reiterated to the participants that their participation was voluntary and that they could withdraw from the study at any time without consequences. Additionally, I reviewed the process of confidentiality of the interview data with each participant. I explained to each participant that a numeric pseudonym of Participant (P) 1–8 would be assigned to ensure the participants' anonymity and that I would be the only individual who would know the identities of the participants. Finally, I asked each participant if they had any questions and answered any questions prior to the interview. The interviews were audio recorded, with permission from the participant, and labeled by the numeric pseudonym assigned to each participant. After I completed asking interview questions using probes, I informed the participants that the interview was completed and read the

Statement of Appreciation and Final Statement. Deggs and Hernandez (2018) recommend that the researcher take notes on the interview protocol form to make meaningful and more robust interview data. Therefore, I took field notes during the interview process.

Field Notes and Observations

To ensure accuracy and meaning, I took field notes during the audio-recorded interview. Field notes include researcher insight and observations during the interview and add to the information collected based on the interview questions. Field notes serve many purposes, such as providing thick, rich descriptions of the study and other facets of the data collection such as contextual data. Field notes complement the audio-taped interview to enhance insight into the data collected (R. K. Yin, 2017). In addition, the researcher uses field notes to help in analyzing and interpreting data (Phillippi & Lauderdale, 2018).

Archived Campus Documents

I also collected and analyzed PLC meeting minutes. The choice of these archived documents aligns with recommendations by Owen (2014) and Caulley (1983), who suggested that researchers use prior records of the program to be evaluated to determine origin and history together with information on implementation and the effect of the program. Such documents can include minutes of meetings and staff reports (Caulley, 1983).

The use of multiple methods of data collection allows for triangulation, which supports increased reliability of data and stronger validation of constructs (Moon, 2019). Moreover, data collection that goes further than the usual observation and interview can depict valuable information not found in observations and interviews (Creswell & Poth, 2018). Archival data may include meeting minutes (Creswell & Poth, 2018). Archival documents permit the researcher to experience the language of the participants; researchers can evaluate the data at a convenient time (Creswell & Poth, 2018). A primary concern is that old archival data may not be relevant to the current investigation (Brough, 2019). However, I received minutes from PLC meetings that occurred 4 months prior to interviews. Prior to my request for minutes, protocols were developed appropriate to reviewing the archived PLC meeting minutes. The PLC minutes were used to triangulate the interview responses of the teacher and school officials and to answer Research Question 2.

Sufficiency of Data Collection Instruments to Answer Research Questions

The instruments used for data collection included demographic data to confirm participants met study criteria, audio-taped face-to-face interviews guided by interview protocols, field notes, and a review of PLC minutes. R. K. Yin (2017) argued that a study finding is "likely to be more convincing and accurate if it is based on several different sources of information" (p. 116), because multiple sources of evidence enable the development of convergent lines of inquiry for data triangulation (also see Baškarada, 2014). The protocol guides included a list of the interview questions and probes that

provided extensive information about the participants' awareness and perceptions related to a specific phenomenon: the implementation of the PLC as an innovation per the DOI framework. Interview questions pertaining to the research questions were based on the five characteristics of Rogers's (2003) DOI theory: relative advantage, compatibility, complexity, trialability, and observability. Archival documents, the PLC meeting minutes, were used for triangulation and to observe any records related to the use of elements of the DOI framework. PLC meeting minutes were obtained as archival data, and a protocol for review of the PLC meeting minutes was used to address Research Question 2. The information from the interviews and documents allowed me to complete the protocols designed to determine the implementation of the PLC as an innovation per the DOI framework. Through the use of the Interview Protocol (see Appendix B) and a protocol for PLC meeting minutes, I was able to obtain the information needed to answer Research Questions 1 and 2. Data were organized and managed throughout the data collection and analysis process.

Tracking Collected Data

To keep track of data and emerging understandings, I kept a reflective journal to promote critical thinking and analysis. In addition, Wahyuni (2012) recommended keeping a hard copy folder of data in the form of research memos, transcription of interviews, archived data, and coded interview notes. All data were scanned as an electronic file on my password-protected computer, in my home office, and the hard copies were placed in a locked filing cabinet in my home office as well. My system for

keeping track of data included uploading the recorded interview to my computer and saving with the assigned participant number. Field notes were titled with the assigned participant number as well, placed in a file, and secured in a filing system in my home. Codes from analysis software were assigned by participant and printed so that I could have a hard copy backup. Additionally, I kept a reflective journal to reveal relevant data, make meaning, and construct connections. This journal was also secured in my home.

Gaining Access to Participants

Full procedures for access to participants are described in the Access to Participants section earlier. In summary, to gain access to participants, I contacted the principal of Campus A and the principal of another campus that employed two previous teachers of the math PLC at Campus A. I sent an email introducing myself, the purpose of my study, background information, and permission to conduct research. Upon receiving consent from the principals, I forwarded the consents to the deputy superintendent of the district. After approval from the IRB, I emailed a Letter of Invitation to potential participants explaining details of the study as well as confidentiality. The invitation contained a link to the Notice of Consent Form, which also contained a link to a Demographic Survey. Participants were notified in the Notice of Consent prior to clicking the link that submission of the Notice of Consent and the Demographic Survey served as agreement to participate in the research study. The Demographic Survey contained questions confirming individuals met study criteria related to participation in the math PLC at the study site and in PLC training. After two

email reminders, each a week apart, I had gained participation of eight individuals meeting study criteria. I then scheduled face-to-face interviews as described in the Participants section.

Role of the Researcher

In this qualitative exploratory case study, my primary role involved data collection by conducting interviews and reviewing archived data from PLC meeting minutes. I have 30 years of experience as an educator working at elementary, middle, and high school levels. I served as an administrator at the elementary, middle, and high school levels for 21 years in various school districts. At the time of data collection, I served in the study district as an elementary school administrator. I previously served as a middle school administrator at Campus A (the location of the current study) prior to the data collection. Although I was a previous administrator at Campus A, I was not in any supervisory capacity at the time of the data collection for the participants in the study, and I had not had any direct contact with any of the participants. However, because of my previous position at Campus A, I considered that some teachers would remember me and might have perceived me in some supervisory capacity. Therefore, I ensured that protocols were in place to assure math teachers' understanding of the confidentiality of the interview process and that they could withdraw at any time from the study with no penalty for not participating.

I minimized bias by furnishing interview questions to each participant prior to interview, which helped make the participants more comfortable during the interview

process. Deliligka et al. (2017) recommended using appropriate measures to help make participants comfortable prior to interviews. Allowing interview participants to review the interview questions prior to the interview provided more time for the participants to reflect on the phenomenon being explored, the DOI of the math PLC, and to reflect on their experiences (see Corbin & Strauss, 2015). Following the interview with each participant, I reviewed and reflected on my field notes. I examined my interview protocol for any biases that I might have inserted into the interview process.

Being aware of physical body language and facial expressions during the interview process was important as well (see Merriam & Tisdell, 2016). Following an interview protocol helped systematize how questions were asked and helped me ask questions in the same way (see Merriam & Tisdell, 2016). To support the credibility of the study findings, I followed consistent data collection procedures, which contributed to the procedure flow and accuracy of the data collection process and thus the data analysis.

Data Analysis Methods

Analyzing data is a multistep process with the goal of uncovering valuable information. Miles et al. (2019) defined qualitative data analysis as the process of gathering data, reviewing and reading data, assigning codes and categories that emerge into the themes, arranging the data for analysis, and writing up the findings in a final report. Therefore, the process for data analysis began after audio recording was completed for each participant interview. Upon completion of the interview, I labeled each transcription with a numeric pseudonym assigned to each respondent. I uploaded the

audio recording to a transcription service. To maintain confidentiality, I requested and received a signed confidentiality agreement form the transcription service. Upon receiving the returned transcriptions, I listened to the audio recordings and followed along with the transcript to ensure that all words, phrases, and expressions were recorded and transcribed correctly.

Finally, I used a qualitative coding software to organize, filter, and assist with coding the data. Utilizing the coding software, Dedoose, I adhered to the process for data analysis steps suggested by Gläser and Laudel (2013). The steps were the following:

1. I created descriptors with demographic information.
2. I uploaded transcripts by participant demographic.
3. I read each transcript in its entirety.
4. Electronically highlighted excerpts of responses were placed in data filters to create filtered data.
5. I read the excerpts to find similar patterns and added more relevant excerpts as warranted.
6. I developed codes based on the five components of the DOI and questions over archival document reflections.
7. I reviewed math PLC minutes and used the same coding process.
8. I uploaded patterns into codes and then printed all reports by code.

9. I read the transcripts and PLC minutes reports several times and hand-highlighted relevant information to classify codes to categories and then into potential themes.
10. I created themes and added new themes as they emerged.
11. I underlined direct quotes to support the themes that emerged.
12. Finally, I reviewed math PLC minutes and compared them with the direct quotes from the interviews.

Knowing of the possibility of discrepant cases, I searched for information that consistently deviated from the others' perceptions (see Creswell, 2018). The data from interviews had similarities, and any variances in answers were explained as participants were describing specific different experiences to explain the same perspective. The gathering of pertinent data and reaching data saturation provided the foundation needed to analyze the findings in an objective manner (Creswell, 2018; Vasileiou et al., 2018).

Prior to analysis, I learned that mistakes can occur due to several factors, such as fatigue or bias. Therefore, preserving the quality of the process and trustworthiness of results was essential by ensuring validity and reliability of the data collected (Bengtsson, 2016). I initiated a qualitative comparative analysis of previous studies based on the presence or absence of characteristics for the purpose of constructing meaning (Allen, 2017). By following the steps described in reviewing the data collected, establishing a comparative analysis of the data, and attending to factors that might contribute to errors in analysis, the data analysis maintained integrity. However, eliminating all biases in

qualitative research is impossible because the researcher is a key component of the data collection process serving to interpret the information collected (Creswell, 2018).

Data Analysis Results

This section contains the results of the data analysis. As an overview, I generated the following seven themes as a result of qualitative data analysis: (a) relative advantage of the math PLC as a positive innovation; (b) compatibility of PLC collaboration; (c) lack of a cohesive understanding of member responsibilities, reflecting complexity; (d) lack of adequate time, reflecting complexity; (e) trialability improved climate, culture, and member accountability; (f) observability of influence on instructional practices for PLC members; and (g) lack of evidence of collaboration or instructional practices. The themes were developed to address the problem of middle school math teachers' struggling to implement the innovation of a PLC at the selected school, Campus A, despite PLC training.

The target school district and campus officials worked to increase the performance of math students on local and state assessments through weekly implementation of a math PLC at the study site. However, some school officials observed that the math PLC was not functioning or was not implemented with fidelity. Therefore, the purpose of this study was to examine teachers' and school officials' perceptions of the math PLC process using the DOI framework and archival documents to determine reasons for the challenges with PLC implementation. Rogers's (2003) DOI theory

provided the framework for the study. I used the following research questions to guide the study:

1. How do math teachers and school officials perceive the (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability of the math PLC program?
2. What is recorded in archived documents to reflect the PLC innovation implementation?

Proper channels were followed to obtain permission to conduct the study. Once university permission was obtained and the school district and target school agreed to participate, 18 target potential participants were identified using a purposive sampling strategy and invited to participate. The final sample included eight individuals from the participant population contacted who signed the consent and participated in the study. Data collection methods included eight face-to-face individual semistructured audio-taped interviews guided by interview protocols, as well as field notes and a review of archived documents consisting of minutes from PLC meetings from the previous 4 months.

The interviews were transcribed and then reviewed with the audio file for accuracy. Following confirmation, the audio recordings were destroyed. I diligently and repeatedly reviewed the final transcriptions for emerging themes. A qualitative coding software, Dedoose, was used to organize, filter, and aid in pattern identification, coding, and highlighting the data. The math PLC meeting minutes were reviewed and compared

with direct quotes from the participant interviews that involved document reflections. Table 4 details the codes that were developed along with themes that emerged from each set of codes. The themes were aligned with the research questions posed for the study, as shown in Figure 1.

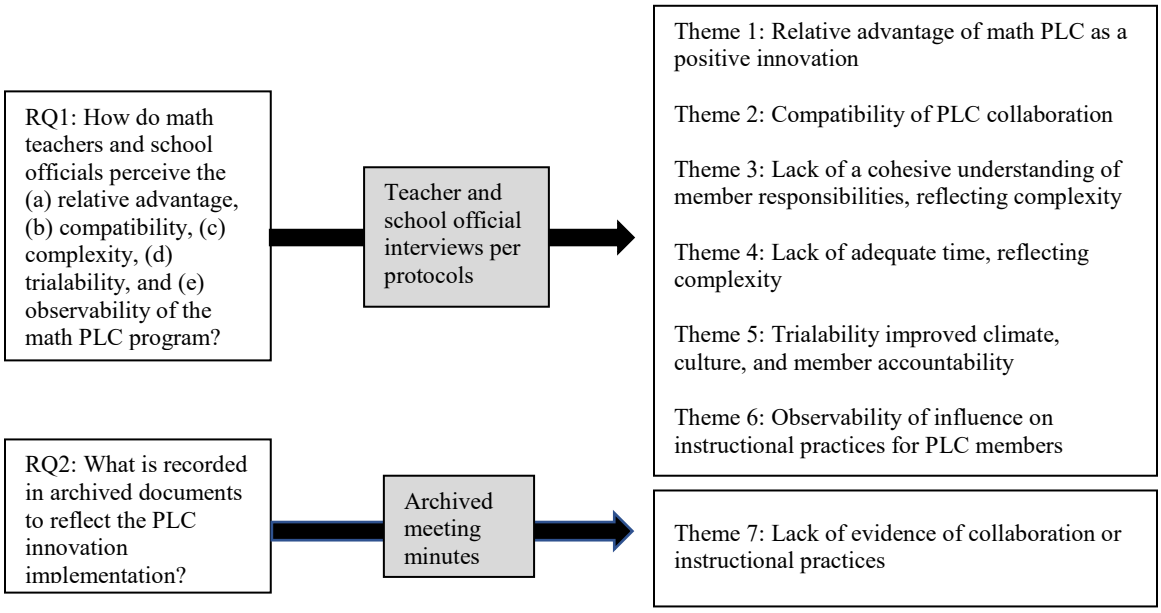
Table 4

Themes Developed From Codes

Themes	Codes
Theme 1: Relative advantage of math professional learning community (PLC) as a positive innovation	1. PLC improvement 2. Isolation 3. Prior PLC implementation
Theme 2: Compatibility of PLC collaboration	4. Collaboration 5. Different perspectives
Theme 3: Lack of a cohesive understanding of member responsibilities, reflecting complexity	6. PLC questions 7. Lesson planning 8. Collaboration 9. Data
Theme 4: Lack of adequate time, reflecting complexity	10. Limited PLC time
Theme 5: Trialability improved climate, culture, and member accountability	11. Personality conflicts 12. Lack of collaboration 13. Climate improvement
Theme 6: Observability of influence on instructional practices for PLC members	14. Demonstration 15. Observation 16. Learning

Figure 1

Themes Aligned With Research Questions



Note. RQ = research question; PLC = professional learning community.

The findings reflect the perceptions of participants from face-to-face interviews regarding the PLC and the review of archival PLC meeting minutes. After reviewing and analyzing the data, the themes that emerged related to Research Question 1 were related to the five aspects of DOI (Rogers, 2003). Participants perceived relative advantage using the math PLC. Compatibility was demonstrated through collaboration facilitated by PLCs. Complexity related to a lack of cohesive understanding of member responsibilities and a lack of adequate time. Trialability improved PLC climate and culture. Observability influenced instructional practices for PLC members. One theme emerged related to Research Question 2 pertaining to the document analysis and confirmed by interview

data: a lack of evidence of collaboration and instructional practices. Figure 1 depicts the research questions and themes that emerged.

The themes that emerged are discussed in the following sections, by research question. The first part of the discussion describes themes, including details of participant responses from interviews, aligned with Research Question 1. The themes aligned with Research Question 2 follow, based on PLC meeting minutes as well as participant interview reflection on those meetings.

Results for Research Question 1

Research Question 1 addressed math teachers' and school officials' perceptions of the five components of Rogers's (2003) DOI as it related to the math PLC innovation. During the interviews, teachers and school officials were asked to describe their perceptions of the implementation of the math PLC based on the five components needed for adoption of an innovation: (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability. All teachers were read a description of each component to provide clarity and consistency in understanding the terms and aiding in the participants' reflection and prior experiences regarding each set of questions asked. After coding and categorizing, six themes emerged, as presented in Figure 1.

Theme 1: Relative Advantage of Math PLC as a Positive Innovation

The first theme consisted of participant perceptions that the math PLC is a positive innovation for increasing student achievement. The first set of questions asked of participants related to the first DOI component, relative advantage. Relative advantage

measures the advantage an innovation has over other innovations or previous models of the innovation. Users may personally perceive the advantage as an improvement in many ways such as empowerment to the user or increased productivity (Yocco, 2015). With other district innovations as well as modifications added to the initial DuFour (2014) PLC model, I asked about participants' perceptions of the math PLC process related to relative advantage.

The first theme revealed that all teachers and school officials perceived the math PLC as a positive innovation for increasing student achievement and described advantages of the PLC by comparing it to another way of working in school or the previous model of the math PLC. P3 stated, "I would rate it much above working in isolation." P3 further described the advantage of the PLC in comparison to the previous model of the math PLC:

> I've seen it change a lot over the years from being like a department meeting where we're going to do this, this, and this, and you have one person saying what everyone's going to do. What I'm experiencing now in the math PLCs, it's much more collaborative. They may bring up things, but everybody contributes. It's not just sitting there getting a bunch of information dumped on me. But it's taken several years to get to that point.

P6 stated, "I was able to have a support group." P8 articulated, "I appreciate the transition to the PLC format because every second of the PLC meeting now feels highly data driven

and intentional, whereas department meetings were not as structured and not always as effective." P5, who worked at Campus A during the initial start of the PLC, said,

> I would say that a PLC was much better than previous ones [initiatives] because the PLCs were specific to what we were supposed to do with that meeting, the questions that we had, each person a specific job to do by the end of the meeting. So, when we had our next meeting, we were all on the same page.

Overall, participants perceived that the use of a math PLC in Campus A was a relative advantage in that the current implementation was more effective when compared to the previous models of the math PLC, other innovations, or working in isolation. Hence, Theme 1 is aligned with Rogers's (2003) DOI element of relative advantage of an innovation, the attribute with the highest association with successful adoption. The higher perceived extent of relative advantage, the faster the adoption. Therefore, the relative advantage component may not be a factor in the challenges of the math PLC implementation. The next theme of perceptions of compatibility may shed light on the gap in practice of the math PLC.

Theme 2: Compatibility of PLC Collaboration

The next set of interview questions focused on gaining insight into the second DOI characteristic, compatibility, through the values and expectations of the innovation. A second theme emerged that aligned with Research Question 1 from participants' responses, as all participants perceived that the math PLC facilitated consistent collaboration, which was compatible with their values. According to district documents,

teams are expected to collaborate during PLC meetings. As an example of participants' views, P3 expressed,

> We're able to discuss ideas on how to teach something to the students. We're able to look at data and say, "Okay, here's a place where all of our students are having an issue; what can we do to address that?"

Similarly, P1 noted, "We were able to spend a lot of time planning together." P6 elaborated, "My colleagues, they're not as familiar with technology. So, I've been able to help them, so that they can use it in their classroom." P8 explained, "There is a huge emphasis on the collaboration piece through PLC and making sure that it is following a consistent format from department to department, grade level through grade level." P7 recalled, "Anytime they would do any sort of review or they had a big intervention component, they worked well together in delegating those duties." Perceptions varied on the types of collaboration, from collaborative learning to collaborative teaching. Nevertheless, all participants perceived the PLC innovation as one of collaboration, a characteristic compatible with their values.

The information gathered from the participant interviews on collaboration is an essential part of a successful PLC and is useful in understanding the challenges with implementation of the PLC innovation at the target campus. Whereas the participants described different types of collaboration, noteworthy is that all participants recognized the importance of collaboration is some form. Identified as part of the initial study problem, school officials had observed problems with implementing the PLC; therefore,

data collection through interviews helped in clarifying areas that contributed to the struggling PLC.

Theme 3: Lack of a Cohesive Understanding of Member Responsibilities, Reflecting Complexity

Teachers and school officials were asked interview questions to gain knowledge on the level of complexity, a DOI characteristic, in understanding and implementing the PLC innovation. To discover perceptions of complexity with the PLC innovation, I asked participants what they understood about the PLC process. Participants gave a variety of answers. For example, P4 stated,

> PLCs are designed to answer the four questions of (a) what do you want our students to know, (b) how do we know if they know it, (c) what do we do if they don't know it, and (d) what do we do if they already know it?

Furthermore, P1 remarked, "We consider it a success if we've answered all four of those questions."

P3 asserted that the PLC "should be a time of collaboration between teachers to discuss where we've been." P6 shared that PLCs were "supposed to be structured, ... not a time to get off topic and gossip. It's supposed to benefit students at all times." P7 stated that the purpose of the PLC process "was to get teachers in the room to collaborate and have conversations about student learning." P2 recalled that the purpose of PLCs was to "get together and lesson plan." P2 also commented on the meeting content, described as "constantly, data, data, data" and "just swapping ideas." P5 relayed that PLCs were "a better way for teachers to collaborate when it came to lesson planning."

As a result, responses indicated that, although each participant touched on different parts of the PLC definition, they lacked a cohesive understanding of a PLC innovation. Therefore, the third theme was a lack of cohesive or comprehensive understanding of the PLC innovation. The participant responses to questions about the purpose of the PLC indicated a disjointed perspective. Each participant shared their understanding of the reason for the PLC innovation, and each description lacked evidence of clarity of the group in understanding the full purpose, and therefore the usefulness, of establishing the PLC. This theme provides helpful information in addressing the study problem specific to the gap in implementing the innovation and contributing information that might be related to the continued evidence of poor student achievement identified by local and state testing.

Theme 4: Lack of Adequate Time, Reflecting Complexity

A pattern emerged as I asked teachers and school officials interview questions to examine perceptions of complexity. Participants expressed consistent concerns about lack of time as a barrier to implementing the PLC process. Questions over time were not a part of the interview protocol, yet six of the eight participants made references to having a limited amount of time to work in PLC meetings. P1 shared, “The biggest resource we’ve ever received was the additional time that we used to have, but now we don’t have.” Additionally, P8 elaborated on issues involving limited time to implement PLCs and properly analyze student data:

> It feels that we are rushed, that there's not enough time to sometimes really dig deeper into everything that needs to be covered with the data. We had to make some changes in our master schedule, which then limited the amount of time that the math department was spending in PLC. And so, because of that, there were limitations because we still have the same goals that we have to accomplish, but in less amount of time.

In terms of being able to address needs, P6 expressed, "There's not really a whole lot of time for us to go over things that we need. So only going to 1 day of PLC is kind of a challenge as well." Furthermore, regarding limited time, P3 explained that the PLC met 45 min a week:

> [The] district expects us to meet at least once a week for 45–60 min. We meet once a week for an entire class period. So, it's approximately, by the time we all get there, I'd say about 45 min.

Data from interviews revealed that lack of time in implementing PLCs was an issue in past years. Previous teacher P2 revealed, "We didn't have a lot of time, so it was very limited of our collaborating." Another previous teacher, P5, discussed the conflicting various events the team had to perform during their planning period, including the PLC meeting. Complexity, when perceived as a barrier, can result in a failure of the innovation to diffuse.

Data collected and included in this theme provided significant information regarding the gap in successful implementation of the math PLC. Even though the

interview did not focus on questions related to time, the interview format provided participants with the ability to expand on topics discussed, leading to identifying this theme. This information is useful as the participants' discussions identified a potential barrier that contributed to the struggles associated with implementation of the PLC and resulting poor student achievement.

Theme 5: Trialability Improved PLC Climate, Culture, and Member Accountability

Teachers and school officials were asked interview question regarding the DOI characteristic, trialability. To understand if the math PLC had gone through a trial period, or a period of modification to their practices, I asked teachers and school officials questions regarding making modifications and monitoring processes. Through questioning, I learned that at the beginning of the school year, the PLC transformed from one multilevel math PLC to two distinct PLCs: one seventh grade and the other eighth grade. In the interviews, I learned about a concern expressed by one grade-level math PLC member regarding the PLC's climate and culture and the effects on the PLC team's productivity. As an example of the discussion surrounding the concern, P3 became aware of the situation with the math PLC the previous year, and stated,

> There were issues with getting everybody on the same page. There were modifications made to the PLC last year because of things that were being observed and some personality conflicts. It was really derailing the whole idea of collaboration.

In addition, P1 stated, “In the previous year, one of the teams had a lot of disagreement within the PLC. It came down to competing visions about what the time was supposed to be used for and difficulty with staff.” Furthermore, P4 expressed, “There were personality issues that make it difficult. I think specifically on culture and collaboration.”

These discussions gave insight pertaining to trialability that resulted in the fifth theme of this study. The theme that emerged was that participants perceived the climate and culture of the PLC improved after looking at members’ level of accountability to the PLC process. P3 explained the modifications made to the PLC:

> There were modifications made to the PLC last year because of things that were being observed and some personality conflicts and, and so they did do some modifications to make it easier for that group to work together collaboratively. So one person was excused from attending the PLCs and would receive the information outside of them so that the school, because it was really derailing the whole idea of collaboration and it would just turn into this very much, we’re not going to do it because you’re the one that suggested it. So, so that’s how they modified it.

P3 elaborated, “Haven’t seen the necessity for those modifications on our PLC this year.” Further, P4 expressed, “I'm not sure that they [advantages] are all realized at that campus, although they have improved this year. Last year was a lot worse.” P1 noted, “It got settled last year.” Interviews indicated that the PLC did go through a trial period, by addressing the negative climate and culture through altering duty expectations. As a

result, members of the math PLC perceived the climate and culture of the math PLC had improved.

The aspects identified in this theme overlap with the essential need for members of a PLC to work collaboratively with the focus on student achievement. Identification of this theme contributed to understanding the struggles experienced in establishing the PLC successfully at the target school. Examining the perceptions of math PLC members as described in the study purpose led to recognition of PLC climate, culture, and member accountability as significant factors in implementing the PLC to operate effectively.

Theme 6: Observability in Instructional Practices for PLC Members

The sixth theme that emerged from Research Question 1 came from interview questions related to observability, the last characteristic of the DOI theory. The construct of the theme involved the perceptions of participants that observing other members in PLC meetings resulted in developing positive instructional practices. I asked participants what they observed in PLC meetings that led to positive outcomes. P8 explained, "I see how excited the teachers are when they bring a lesson plan or an idea to the table and then the staff agrees to try it, even if it's out of their comfort zone." Similarly, P6 stated,

> I feel like I'm really good at using technology whereas some of my colleagues are not. They're not as familiar with technology as I am. So, I've been able to help them, so that they can use it in their classroom.

In addition, P3 gave an account about learning from other members: "People bringing things that they've done in their classroom or describing activities that they've done. I

can take and modify to use in my own classroom." P4 said of the department head, "It's been a huge change for the positive. I have witnessed somebody saying something about how they taught or something and the teacher is like, 'Oh, I'm going to try that tomorrow.'"

Looking at the Campus A math PLC, the team historically has observed positive instructional outcomes from others. P5 recounted,

> If there was a question on the assignment or tests that was confusing to teachers, if one teacher understood it, knows how to do it, we would have a discussion amongst all of the teachers on how to solve it and if [whether] it was worded correctly for a student to be able to understand it. So, I remember being in PLCs and discussing what's the best way to rework the question so that the kids would understand it and it would be easier for the teacher to explain it in a way that made sense to the children.

Additionally, P2 stated,

> So some of those lesson ideas and activities that they would share that helped them in their classroom. That [sharing lesson ideas and activities] would help results, data in my classroom if I were to implement correctly the way that they did theirs.

Participant responses indicated that the math PLC at Campus A typically has observed positive instructional and student outcomes from observing each other. Understanding the strengths and overall aspects that worked well in the math PLC at

Campus A is useful in determining the answers to the research questions and addressing the study problem. Identifying positive aspects of the PLC aids in recognizing other aspects that lack evidence of positive influences and strengths, thereby contributing to the struggles experienced by the PLC participants. In the next section, the theme emerging from Research Question 2 is discussed.

Results for Research Question 2

Research Question 2 asked the following: What is recorded in archived documents to reflect the PLC innovation implementation? The purpose of Research Question 2 was to provide for reliability and validity through triangulation. As a researcher who also participates in analysis, I reviewed and reflected on what was written in the two seventh-grade PLC meeting minutes. Eighth-grade PLC minutes were not available. Upon review, one theme emerged, as presented in Figure 1. The theme was corroborated by additional interview data.

Theme 7: Lack of Evidence of Collaboration or Instructional Practices

To gain an in-depth analysis of the math PLC implementation reflecting elements of the DOI, I requested and received archival documents in the form of math PLC meeting minutes to triangulate teachers' and school officials' perceptions of the PLC meetings with what was recorded in the minutes. During interviews, participants reflected on the minutes, so that I could ensure I had an accurate understanding of the agenda items and the verbiage used to address each item.

Upon reviewing the meeting minutes, I found the four critical questions that should drive the PLC meeting were not answered in sum, but rather through one-word answers or two-word concepts such as “QC” (with no explanation of the abbreviation), “reteaching,” “Data Wall,” or “data folders.” Additionally, the meaning of agenda items such as “Data Wall!!” or “TEKS, Tier 1” was unclear because the notes and follow-up sections were blank or incomplete and lacked in-depth information and direction. Finally, I found noninstructional agenda items such as “pod keys” and “extra scanner/printer,” which did not correlate to direct instruction. Based on the meeting minute template, personal perceptions of what is an advantage or complex, or descriptions of changes through trial could not be seen.

Based on my analysis of the documents, I determined the PLC meeting minutes gave no indication of collaboration because PLCs are to partner in answering the four critical questions. To review, the four PLC questions are the following (DuFour & Reeves, 2016):

1. What are students intended to learn?
2. How do teachers determine if students have learned it?
3. What do the teachers do if they have not learned it?
4. How will teachers provide extended learning opportunities for students who have mastered the content?

As stated, the answers to the questions were either left blank or had incomplete answers. Similarly, I concluded the meeting minutes gave no suggestion of learning from

each other and seeing benefits from what was learned. I do not propose that no collaboration or observability occurred, but I conclude that the complexity of implementing a PLC might have something do to with the incomplete meeting minutes. Specifically, not having a cohesive understanding of member responsibilities (Theme 3) and being hindered by lack of adequate time (Theme 4) might have affected the validity of the minutes.

Interview Data Triangulating Theme 7: Lack of Evidence of Collaboration or Instructional Practices

The participant interviews revealed that participants did not see evidence of collaboration or instructional practices from the math PLC meeting minutes. The seventh theme, lack of evidence of collaboration or instructional practices, was corroborated by triangulating interview data with the document analysis. I asked the participants to discuss any information recorded in the minutes that reflected collaborative planning. Upon viewing the minutes, participants indicated they saw no evidence of collaboration. For example, P1 stated, “I mean, this is supposed to be the collaborative part. But right now, there’s nowhere where it’s recorded.” Also, P3 expressed, “It’s hard to tell from the agenda specifically what the collaboration was that particular day. This wasn’t exactly collaborative planning.” P6 explained, “We did our colors on our data wall, but I wouldn’t consider that to be really collaborative. It’s more independent.” P4 responded, “Don’t see it.” Only participant, P8, the outlier in the data, perceived collaborative planning in the minutes. According to P8, “Well one thing that I am seeing over and over again in both of the meeting minutes is data.”

Next, I asked participants to discuss what information in the minutes reflected instructional practices. Responses indicated that nothing in the minutes indicated instructional practices. P6 answered, “Pretty much everything is a reflection and not really is instructional practice.” In addition, P1 said, “This is just housekeeping. This is compliance based. There’s nowhere it’s recorded.” P3 also confirmed, “I don’t really see anything.”

Again, an outlier among the participants was P8, who observed use of data and “the important time incorporating griddables” of tested subjects. Further, P8 explained seeing “Tier 1 instruction, how we can drive our kids that are already on grade level from meets to masters.” Other than this outlier, data collected from teacher and school official responses indicated perceptions that what was recorded in meeting minutes was not consistent with perceived experiences of the math PLC meetings.

Following all interviews, I concluded that the archival meeting minutes did not reflect collaborative planning or instructional practices. In terms of collaborative planning, the agenda minutes recorded noninstructional related terms, such as “pod keys” and “extra scanner/printer.” The instructional activities did not provide specifics needed to reflect collaborative planning, but were directives such as “Everyone plan1 lesson” or “place students on a tabby.” However, one data-related agenda item was recorded as “analyze data wall by meets, masters, and approaches,” referring to levels of student proficiency. Without details, I was unable to determine if this recorded sentence was a collaborative action, leading collaborative planning.

Also, upon reflection, the meeting minutes did not reflect instructional practices because the math PLC's four critical questions were not answered specifically, or left blank. The questions were (a) what do you want students to learn, (b) how will you know when they have learned it, (c) what will you do if they do not, and (d) what will you do if they already know it? In the meeting minutes that addressed the four questions, two of the four answers were one-word responses. For example, to the question, "How will you know when they have learned it?" the written response was "QC." P8, in reflecting on the meeting minutes, referred to "QC" as "quick check data." However, in the meeting minutes the team did not expound on "QC" in terms of what would be tested of what would be the passing rate. Similarly, the written response to the question, "What will you do if they don't learn it?" was simply "reteaching." Again, the team did not expound on the specifics of what they would reteach, or which instructional strategies would be used to reteach equations, inequalities, and angles, the instructional focus. In terms of the question, "What will you do if they already know it?" the written responses lacked the detail to reflect instructional practices. A list of topics and general activities was recorded as "create hands-on activities, continue on TEKS (state curriculum), data folders, incorporating griddables." Without detailed information on which hands-on activities should be created, which TEKS should be addressed, what the students will do with the data folders, and how best way to incorporate griddables activities, I was unable to see evidence of instructional practices in the minutes for the seventh-grade PLC meetings. As mentioned earlier, participants were unable to access eighth-grade PLC meeting minutes.

In conclusion, lack of evidence of collaboration and instructional practices was the seventh theme to emerge from this project study. Four of the five participants eligible to reflect on the archival documents (current math teachers and school officials) concluded that the meeting minutes did not reflect collaborative planning or instructional practices. This conclusion did not align with participant perception of the PLC as it relates to the DOI theory. Specifically, analysis concluded that all teachers and school officials of the math PLC perceived that they experienced compatibility with the values and expectations of the organization and district through consistent collaboration; however, the meeting minutes showed no evidence of collaboration. In addition, participants perceived through the characteristic of observability that observing other teachers in PLC meetings resulted in positive instructional practices. Again, however, no evidence of instructional practices was recorded in the meeting minutes.

In the final analysis of archival documents, I affirmed participants' perceptions and concluded that recording minutes with accuracy, detail, and completion was not viewed as a requirement. The complexity of implementing a PLC might have related to the incomplete meeting minutes. The lack of archival documents to answer Research Question 2 was a limitation of the study. PLC meetings occur weekly, yet only two documents of PLC meeting minutes were retrieved. Additionally, the documents only reflected seventh grade; no PLC meeting minutes were obtained for the eighth-grade PLC meetings. The school official in charge of math gave me the two documents and then took medical leave. I looked on the district Google Drive, but the math PLC minutes

were not archived there. Teachers could not find the eighth-grade PLC minutes. Keeping minutes of the math PLC meetings may not be a regular occurrence. A discussion of the methods used for accuracy and validity starts with a description of checking for discrepant cases.

Discrepant Cases

Finding discrepant cases involves searching for data that contradict prevailing perceptions (Collins & Stockton, 2018). During the process of analysis, I looked for responses that diverged from those of the other participants. Identifying and underscoring discrepant data emphasizes the importance of data collection methodology and qualitative research (Ruark & Fielding-Miller, 2016). By presenting both the predominant and contradictory responses, I would increase the validity of this study (Rose & Johnson, 2020).

In the real world, people have various perspectives that do not always align with each other. Similarly, in qualitative studies, participants may communicate discrepant information that contradicts themes which may enhance the credibility of the study (Creswell, 2015). Researchers can present a more trustworthy study by building a theme based on evidence, but also presenting contradictory evidence (Creswell, 2015). During analysis, I found that most participants reported comparable perceptions for questions under Research Question 1. However, as I looked for a discrepant case I identified one related to interpretation of the PLC meeting minutes, for Research Question 2. When looking at archival documents, one participant, a school official, reported a perception of

what was reflected in the meeting minutes that conflicted with the perceptions of the other participants.

Evidence of Quality

According to Creswell (2015), researchers should use multiple procedures to enhance the accuracy and increase the validity of a study. Such procedures include the use of triangulation, member checking, and searching for discrepant information, to name a few. Through the use of field notes, interview transcripts, and archival documents, I was able to check for accuracy by (a) checking and rechecking data, (b) conducting member checking, (c) searching for discrepant cases, and (d) triangulating data.

Checking and Rechecking Data

After I completed each interview, I sent the audio recording to the selected transcription service. Upon receiving each transcribed interview, I listened to the recording and simultaneously read through the accompanying transcript to check for accuracy in words and sounds. I corrected errors in spelling to reflect the accurate meaning of the participant. In addition, during the interviews I took field notes on key points made by each participant and observations as warranted. I checked my notes to confirm that what was recorded and transcribed captured the essence of what the participant shared with me during the actual interview process. I checked and rechecked the data for accuracy using the sources of data collection used for the study, as recommended by Creswell (2018).

Member Checking

Member checking is the process whereby the researcher asks study participants to check the accuracy of their responses by returning related findings back to the participant, along with a request for feedback in writing or by interview (Candela, 2019). Prior to asking the first interview question, each participant was given a participant numeric pseudonym. The audio recording of the interview and transcripts were labeled with the corresponding participant number.

Birt et al. (2016) recommended several forms of member checking, from having the participant review a transcript of the interview, to more involvement in results and analysis. The practice of member checking confirms interviewer understanding of the data collected during the interviews and enhances the study findings by contributing authenticity and accuracy of the data collected and analyzed (Marshall & Rossman, 2015). After completing the preliminary findings, I sent each participant a copy of the findings and asked each to read the draft of the findings, check for accuracy, and make needed corrections. I provided my contact information with the email communication and informed participants they could schedule an appointment or phone conference to review the draft findings. My objective was to ascertain that the draft findings were clear, accurately represented the participants' perspectives, and were not my own personal reflections (see Candela, 2019). The findings could be confirmed by the participants for correction, elaboration, and fine-tuning using the described member-checking process

(Candela, 2019). The participants did not respond with any feedback regarding the draft findings of the study.

Triangulation

To ensure accuracy, I triangulated the interview data including reflections of archival documents (see Moon, 2019). The premise is that, through addressing a phenomenon in multiple ways, researchers can view the phenomenon more accurately (Rose & Johnson, 2020). During analysis, I reviewed teacher and school official interview responses regarding collaborative planning and instructional practices with archival meeting minutes for a more precise picture of the phenomenon being studied. I then analyzed both documents to find what was recorded in archived documents to reflect the PLC innovation implementation. Interviews and my reflection revealed an inconsistency between perceptions of collaborative planning and instructional practices and written documentation in the meeting minutes.

Summary of Findings

This qualitative project study focused on examining teachers' and school officials' perceptions of the math PLC process using the DOI framework to determine reasons for the gap in PLC implementation. Five years prior, the school district began requiring all schools to collaborate through PLCs to address student achievement. Campus A, the target school, worked to increase student scores on local and state assessments in math through weekly PLC meetings by department. As Campus A worked to increase math scores through PLCs, various administrators observed that the math PLC

was not functioning with fidelity. I confirmed that members of the math PLC received yearly training based on the DuFour (2014) model or were presented with district expectations for the PLC. Using Rogers's (2003) DOI theory as the framework for research questions, I collected data by conducting semistructured interviews with eight participants, current and previous teachers and school officials.

I used an exploratory case study approach focusing on interviews and reflections on archival documents with teachers and school officials who were part of the math PLC at Campus A. Through interviews, I determined how teachers and school officials perceived the implementation of the PLC process. By employing an exploratory case study process-evaluation approach, I obtained rich and detailed data of the experiences of math teachers and school officials on Campus A.

During interviews, I discovered at the beginning of the 2019-2020 school year, the math PLC was divided into a seventh-grade PLC and an eighth-grade PLC. However, school officials attended both PLCs. For purposes of analysis and findings, I referred to both PLCs as one math PLC because of the similarity in district expectations, assessment data concerns, and school experiences. One difference occurred as one of the math PLCs went through a period of trialability, and changes were made to address the climate and culture. In addition, I collected data from archival documents in the form of PLC meeting minutes. I found seven emerging themes to consider when looking the gap in practice in implementation of the PLC process: (a) relative advantage of the math PLC as a positive innovation; (b) compatibility of PLC collaboration; (c) lack of a cohesive understanding

of member responsibilities, reflecting complexity; (d) lack of adequate time, reflecting complexity; (e) trialability improved climate, culture, and member accountability; (f) observability of influence on instructional practices for PLC members; and (g) lack of evidence of collaboration or instructional practices..

Summary of Findings for Research Question 1

How do math teachers and school officials perceive the (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability of the math PLC program? Educators in PLCs are typically focused on increasing student achievement (DuFour & Reeves, 2016). Shifting to a PLC is a process innovation for teachers (Walker, 2016). I examined team perceptions of the relative advantage, compatibility, complexity, trialability, and observability of the math PLC and ways in which they influenced the rate of adoption of the innovation, which would affect the likelihood of successful implementation (see Bernadine, 2019; Webster et al., 2020). For an innovation to be implemented, individuals should perceive the five characteristics of the innovation for diffusion or adoption: (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability (Rogers, 2003). Previous teachers of the math PLC were included in this study representing the historical context of practices implemented over time to explore a potential link between the phenomenon being explored and the conceptual framework used as the lens to interpret the information gleaned from the interviews. The math PLC was formerly one multilevel team, but at the time of this study had changed to two distinct PLCs by grade level. Nevertheless, all teachers and school

officials saw the math PLC innovation as a benefit over other innovations they used, including working in isolation as opposed to a team. Therefore, all perceived the PLC had a relative advantage. Perceiving the relative advantage of an innovation leads to its adoption (Rogers, 2003).

All teachers and school officials also perceived the PLC was compatible with the values of the organization with regard to collaboration. Compatibility of an innovation with the individual or organization leads to adoption of the innovation (Rogers, 2003). However, the complexity of the PLC innovation created issues because participants had a fragmented understanding of what a PLC was and how it supposed to function in terms of the guiding principles and three big questions of (a) focus on learning, (b) build a collaborative culture, and (c) focus on results (DuFour, 2014)). Perceived complexity of an innovation hinders or slows adoption of the innovation (Rogers, 2003). Complexity was a problem, related to a lack of cohesive understanding of member responsibilities and a lack of adequate time. Butkevica and Zobena (2017) supported that teachers must understand an innovation to lessen apprehension. Another factor related to complexity was a reported lack of time to learn about and implement the PLC. In terms of trialability, Rogers's (2003) fourth characteristic impacting adoption of an innovation, the math PLC had not gone through a period of reinvention or change until the year prior to the study, when changes were made related to the teacher accountability to provide a positive climate and culture. Recognizing an intransigent member of the PLC and making accommodations for that individual to be involved less resulted in improved PLC climate

and culture. Finally, all teachers and school officials perceived observability, Rogers's fifth characteristic impacting DOI, by recalling observing and learning instructional practices.

By examining the perceptions of the study participants regarding the difficulty with implementing the innovative math PLC at Campus A, the data collected and analyzed provided useful insights into the reasons for the gap in the implementation. Insights gained provided firsthand knowledge and understanding of the difficulties faced by the PLC teachers. The shared perceptions revealed that the math PLC addressed the difficulties in creating a successful PLC, established consistent collaboration, and positively influenced the instructional practices of PLC teachers. Potential gaps in practice included understanding of the complex aspect of a PLC, including a lack of time to implement such a complex innovation. Hord (1997) noted time was an aspect of the supportive structural conditions of an effective PLC.

Summary of Findings for Research Question 2

What is recorded in archived documents to reflect the PLC innovation implementation? Regarding the reflection of archival documents, current teachers and school officials at the school reviewed archival documents in the form of PLC meeting minutes from the previous 4 months. Based on patterns of analysis of the interview on archival data, four of the five eligible (current) participants reported seeing no evidence of collaboration or instructional planning. One outlier, a school official, gave an account of the archival documents that was inconsistent with the others and perceived

collaboration through data and incorporating strategies and Tier 1 instruction for instructional practices. P8's perceptions focused on possible outcomes as a result of what was written in the minutes, which might explain the difference in perception. My own analysis of the archival documents similarly revealed that teachers' and school officials' perceptions of collaboration and instructional strategies were not reflected in the math PLC meeting minutes. According to DuFour and Reeves (2016), PLCs should develop formative assessments and directly relate results to instruction. The theme related to Research Question 2 was a lack of evidence of collaboration and instructional practices. A primary principle of PLCs is a collaborative culture among teachers leading to student achievement for all (DuFour, 2014; DuFour et al., 2013). PLCs thereby support student learning and performance, if members of the PLC demonstrate evident dedication and collaboration (Schaap & de Bruijn, 2018). The shift to a collaborative team culture requires the participants to change practices, think differently, and work together rather than independently (Darling-Hammond et al., 2019).

Conclusion

Based on the analysis of participant perceptions and responses using DOI theory, I discovered that the math PLC continued to struggle slightly in implementing the PLC innovation because they experienced a level of complexity affecting the ability of all of the team to adopt the innovation. Failure of innovation to diffuse can be result of factors such as the characteristics of the innovation (Dearing & Cox, 2018). In this case, the actions that brought about perceptions of complexity might have affected the diffusion of

the math PLC innovation. Through the DOI characteristic of trialability, modifications were made to the math PLC, allowing less participation of one member in PLC meetings to address the problematic member, who was perceived to be affecting the desired implementation of the PLC. The changes related to the division of the PLC into two PLCs resulted in a perceived increase in adoption and implementation of the PLC.

The five characteristics of DOI affect the rate or speed of adoption of the innovation. Rogers (2003) stated, "Individuals' perceptions of the five attributes of the DOI predict how fast the innovation will be adopted" (p. 219). Evidence from the interviews of math PLC participants suggested that historically, getting 100% adoption of the math PLC innovation was a problem due to complexity. Without these issues being addressed, the rate of adoption will be slow and impede the goal of full implementation. Therefore, based on Rogers's DOI theory, school leaders could address math PLC members' inability to adopt the math PLC program at 100% by providing professional development on an overview of PLC, norms, meeting coordination, professional dialogue, process-monitoring methods, and documentation approaches. In addition, the math PLC would benefit from adding additional time to collaborate, as the team revealed in interviews. In the next section I will discuss the project developed based on these findings.

Project Deliverable

Section 3 is a description of the project study project and a review of literature aligned with the findings of this research to support the implementation of the math PLC

at Campus A. The 3-day professional development project also may benefit other PLCs throughout the school district. Based on findings, Campus A PLC members would benefit from additional professional development and additional time to collaborate on student achievement. In addition, a protocol for process monitoring of the PLC actions and behaviors would benefit PLCs and the administrators in assessing implementation and continued effectiveness of the PLC. In terms of staff training, all staff are given an overview of PLC expectations such as weekly attendance, collaborative planning, and lesson planning. PLC professional development strategies should address areas of need based on themes that emerged from the information collected to support the findings of this study. I will develop a 3-day professional development project focused on PLC modules such as (a) leadership styles, (b) basic DOI components, (c) process-monitoring methods, (d) professional dialogue, (e) meeting coordination, (f) PLC norms, and (g) documentation approaches.

Interviewed PLC participants indicated a desire for more collaboration time. Therefore, school officials at Campus A could increase PLC time by transforming the weekly, all-level, math department meeting to a PLC. According to P3, this time "is more a department meeting than a PLC." The principal of Campus A will receive a copy of the final draft of this project study, which will include recommendations for PLCs.

With regard to process the monitoring of PLCs, the district Curriculum and Instruction Department has a protocol for process monitoring to be used by school officials weekly. However, when asked during the interview process about process

monitoring, school officials were unaware of any systematic process monitoring. To benefit the math PLC, a protocol, such as the PLCA-R, could be used by all members of the PLC. The PLCA-R is an internationally recognized tool to assess professional learning and collegiality in elementary and secondary schools (Domingo-Segovia et al., 2020).

Additionally, I will create an assessment of the perceptions of the PLC focusing on the five characteristics of an innovation, based on Rogers (2003). This assessment will be a shortened version of the interview protocol I created for this study. The purpose of the assessment will be to ensure the professional development meets participants' needs. In Section 3, I introduce the 3-day professional development project, provide a related literature review, and recommend a solution that aligns with data findings.

Section 3: The Project

The purpose of this qualitative case study was to examine teachers' and school officials' perceptions of the math PLC process using the DOI framework and archival documents to determine reasons for the challenges with PLC implementation. District officials required PLC implementation for all campuses, including the target site, Campus A, to increase student achievement. Math assessment results showed Campus A consistently scored below the state average, despite efforts to implement the PLC process. I gathered interview and archival document data from teachers and school officials from Campus A. Seven themes emerged from the data analysis. Based on the themes, I concluded that adoption of the math PLC innovation was a challenge due to the complexity of the PLC process, including a lack of time to understand and implement the complex innovation, thus affecting the ability of the math PLC participants to implement the PLC as intended. District officials, school officials, and PLC lead teachers need formal professional development in the PLC process to support teachers in effectively implementing PLC meetings because supportive leadership can provide the structure for developing and sustaining a PLC (Dehdary, 2017). Therefore, I selected a 3-day professional development project as the project genre.

Brief Description of the Project

As a result of research outcomes, I designed a 3-day professional development workshop on effectively implementing a PLC. The purpose of the professional development is to build capacity in district officials, school officials, and PLC lead

teachers to equip them with tools to develop a systemic professional development program with monitoring systems and measures of diffusion to increase fidelity of the PLC process. The learning outcomes will be understanding the critical components of a PLC and improvement of implementation. The target audience is district and school staff and PLC lead teachers. Materials, implementation, and the evaluation plan are described in this section; details are in Appendix A. In this section I detail a potential professional development with eight modules leading to effective implementation: (a) leadership styles, (b) basic DOI components, (c) process-monitoring methods, (d) professional dialogue, (e) meeting coordination, (f) PLC norms, and (g) documentation approaches. Furthermore, Section 3 includes a literature review highlighting the path-goal theory of leadership for leaders helping implementors to attain goals pertaining to system-wide change. The goal upon successful completion of the professional development modules is to equip district officials, school officials, and PLC teacher leaders with tools to develop a systemic professional development program with monitoring systems and measures of diffusion to increase fidelity of the PLC process.

Project Goals

Based on findings of the study from the DOI theory, the PLC innovation failed to diffuse because of the DOI component of complexity. Teachers and school officials had a fragmented understanding of the PLC process. Additionally, lack of time to implement and incomplete meeting minutes reflected complexity in the adoption and subsequently in the implementation of the math PLC innovation. By designing professional development,

my goal is to build capacity in district officials, school officials, and PLC lead teachers to equip them with tools to develop a systemic professional development program with monitoring systems and measures of diffusion to increase fidelity of the PLC process. In doing so, I also designed the professional development as a means for the target campus educators to understand the innovation and the critical components of the PLC. The goals of the professional development project are as follows:

- Goal 1: District and school officials and PLC lead teachers will develop an understanding of leadership styles that support teacher growth during a change process or when implementing an innovation.
- Goal 2: District and school officials and PLC lead teachers will demonstrate an understanding of DOI components through data analysis and the creation of a DOI action plan to attain adoption and effective implementation of the PLC innovation.
- Goal 3: District and school officials and PLC lead teachers will apply PLC process monitoring tools such as an assessment, an inventory, a survey, and a set of reflections.
- Goal 4: District and school officials and PLC lead teachers will demonstrate an understanding of reflective dialogue through application of principles that promote teacher and student learning.

- Goal 5: District and school officials and PLC lead teachers will demonstrate an understanding of PLC requirements with respect to sufficient meeting time, the use of PLC minutes, PLC agendas, and assignment of PLC roles.
- Goal 6: District and school officials and PLC lead teachers will develop an understanding of PLC norms.
- Goal 7: District and school officials and PLC lead teachers will practice expectations for creating adequate and accurate PLC meeting documentation.
- Goal 8: District and school officials and PLC lead teachers will create an action plan based on DOI theory to address PLC implementation.

I designed a 3-day professional development project titled, "PLC Leadership: Transforming Your Teams." The training is tentatively set for July 2021, 1 month prior to the start of the fall semester of the school year, contingent upon the approval of district officials. The target audience will include all district officials, school officials, and PLC lead teachers. The professional development will include presentations, discussion, role play, document design, surveys, and reflection.

Rationale

Upon examining and analyzing the data in Section 2 of this project study, in collaboration with my committee, I established a 3-day professional development project on implementing PLCs with fidelity to facilitate adoption and proper implementation of the PLC innovation. I concluded that the target audience was appropriate given that researchers have asserted policy makers and campus administrators should work to

provide considerable support to educators implementing the innovation to promote positive transformation (Song & Choi, 2017). For instance, school officials should enhance the PLC by providing administrative approaches to PLCs such as expertise, support, leadership, collegiality, and collaborative networks (Boonpradab et al., 2019). Further, as Peters et al. (2018) explained, school officials should build and maintain the "vision, direction, and focus" (p. 33) for student learning along with inspiring an environment of "participation, responsibility, and ownership" (p. 33). PLC lead teachers, who will be included in the target audience, are educators who regularly demonstrate and encourage professional growth in PLC meetings (Peters et al., 2018).

Overall, my findings showed that although school officials made changes in the teacher composition of the math PLC to improve the climate of the team, the math PLC also would benefit from school officials and PLC lead teachers who have been trained to support the implementation of a PLC, particularly to (a) increase the PLC meeting time, (b) ensure PLC members understand processes and norms through process monitoring, and (c) advocate for the importance of thorough and accurate documentation of meeting minutes. Therefore, by completing the 3-day professional development, district officials, school officials, and PLC lead teachers should have a comprehensive understanding of the PLC process and knowledge of the DOI components needed to ensure adoption of the PLC, leading to implementation with fidelity.

Review of the Literature

This literature review includes an explanation of the professional development program as the genre for my project study. Additionally, the literature review includes the criteria I used in the search for literature related to my Section 3 conceptual framework and key terms. Finally, the components of the professional development project are supported by literature specific to the topics. To provide a foundation for the 3-day professional development project and goals, I reviewed literature on the following: (a) andragogy theory, (b) leadership styles, (c) professional development, (d) learning styles, and (e) reflective dialogue.

Project Genre

From the findings of my research, I designed a 3-day professional development project based on the foundations of the PLC process and effective leadership practices to strengthen PLC effectiveness and implementation. In the conceptual framework found in Section 1, I based my research study on the DOI theory. The DOI theory (Rogers, 2003) outlined factors affecting the adoption of an innovation in a social system, including the communication process and the factors impacting the rate of adoption. In DOI theory, Rogers (2003) also addressed the primary implementation of an innovation, the central phenomenon of my study. The findings of this study demonstrated that the barriers in adopting an innovation, as established in the DOI theory, can hinder the effective implementation of the innovation, and as such should be considered before, during, and after the implementation stage of an innovation (Scott & McGuire, 2017).

Literature Search

For the literature review, I examined peer-reviewed articles either published within the last 5 years or original published research that served as a conceptual framework. I retrieved the articles from the following Walden University Library databases: Education Research Complete and SAGE Journals. In addition, I used Google Scholar to retrieve articles referenced in this section. Search terms included *andragogy, leadership styles*, *path-goal theory, learning styles, effective professional development,* and *reflective dialogue.*

Andragogy

One primary theory of adult learning, or andragogy, has its roots in a book by Alexander Kapp published in 1833 (as cited in Veiga-Branco, 2018) but was revived and further developed by the 20th-century theorist most associated with andragogy, Malcolm Knowles (1975). The main concept of andragogical theory is that adults learn differently from children. Adults learn through self-direction, through examination of their own experiences, to address a perceived need, and to apply knowledge immediately in practice (Knowles, 1975). Knowles eventually advanced his theory to include six assumptions that assist in understanding adult learning and can serve as a resource for leaders developing programs (Greenhaw & Denny, 2020): the need to know, self-concept, prior experience, readiness to learn, orientation to learning, and internal motivation. Various researchers have redefined Knowles's

(1975) six assumptions; however, the following are the most agreed-upon definitions:

- Adults learn based on the need to know. Typically, the adult learner will apply knowledge to their professional or personal life (Ferreira et al., 2018).
- In terms of self-concept, as a person matures, the learner moves from being a dependent learner to a self-directed learner (Aderinoye, 2020).
- Prior experience is accessed by adult learners. As a person matures, the adult accrues experiences that serve as a resource for learning (Abdullah et al., 2021).
- Adult readiness to learn is based on developmental tasks and social roles (Hidayat, 2018).
- Orientation to learning shifts as a person matures. The adult's perspective of learning shifts from delayed application knowledge to immediate application (Veiga-Branco, 2018).
- Motivation shifts as the person matures, from external to internal (Mews, 2020).

When designing the professional development, I chose the andragogy theory as a framework because researchers have shown using the andragogical model supports active participation in learning, allowing adult learners to take responsibility for their learning (Cochran & Brown, 2016). Moreover, when developing professional development, I considered learning approaches and materials that could increase

motivation in learners. With regard to Knowles's (1975) six assumptions, researchers (e.g., Hidayat, 2018; Veiga-Branco, 2018) have suggested implications to consider for learning opportunities.

In terms of adult learners' self-concept, learning materials should allow for adult learners' sense of independence and self-direction (Hidayat, 2018). Next, to strengthen learning through prior experiences, educators of adults should create groups of learners with similar experience levels and provide opportunities for discussion and sharing of ideas (Veiga-Branco, 2018). Also, from the perspective of adult readiness, learning materials should be gathered or designed for adult learners based on their roles such as administrator or teacher (Hidayat, 2018). Further, when considering learning materials from the perspective of orientation to learning, materials should be designed for immediate use and applicable to everyday experiences (Hidayat, 2018). Finally, to support adult learner motivation, learning materials should be stimulating and challenging (Veiga-Branco, 2018). In addition to principles of andragogy, motivation can be provided by leaders, such as teacher leaders or administrators in the current case. The following section describes the path-goal theory of leadership and its relevance to adults' professional development.

Path-Goal Theory of Leadership

School leaders are essential for conveying the goal and vision of an institution through strong leadership, collaboration, and involvement (Lynch, 2016). Researchers have produced many theories and frameworks to assist in identifying and understanding

various leadership styles and behaviors (Al Khajeh, 2018; Cherry, 2019; Gardner, 1999; House & Mitchell, 1975; Sujana, 2019). The importance of school leadership and styles of leadership is addressed in the 3-day professional development project so district officials, school officials, and PLC teacher leaders can be mindful of the most congruent styles of leadership to support the PLC process and implementation. Researchers have indicated that different leadership styles can be expressed by the same leader depending on the situation (House & Mitchell, 1975).

House (1971) conceived the path-goal theory of leadership, which consists of four types of leader behavior. In path-goal theory, House suggested that the leader's strategic approach with the four types of leader behavior will increase staff motivation and job satisfaction (House & Mitchell, 1975). The four types of leader behavior in the path-goal theory are (a) directive leadership, (b) supportive leadership, (c) participative leadership, and (d) achievement-oriented leadership (House, 1971; House & Mitchell, 1975). With directive leadership, the leader informs staff of what is expected, gives procedures and timelines, and requires staff to follow policies and standards (House & Mitchell, 1975). The supportive leadership style is characterized by a leader who is friendly and exhibits concern about the welfare of the staff by making the environment more pleasant and treating leaders and staff as equals (House & Mitchell, 1975). The participative leader consults with staff and asks for recommendations before making decisions. An achievement-oriented leader sets high standards for performance and excellence. Also, the achievement-oriented leader exhibits confidence that the staff will perform at high

levels and assume responsibility for meeting challenging goals (House, 1971; House & Mitchell, 1975).

Based on the path-goal theory, leaders' actions should be based on the needs of staff and conditions of the environment to motivate others in achieving their goals (Abdulrasheed et al., 2019, Sujana, 2019). Further, researchers of path-goal theory (e.g., Abdulrasheed et al., 2019; Sujana, 2019) have provided leaders with specific leadership approaches to use based on characteristics of the staff and the work condition or situation (Table 5). Moreover, leaders not only should be aware of leadership styles to influence staff, but also should be able to respond immediately to staff expectations, requirements, and wishes (Abdulrasheed et al., 2019). Table 5 presents examples of the path-goal leadership styles described by Sujana (2019).

Table 5

Path-Goal Leadership Style

Leadership style	Leader actions	Condition
1. Directive	Give rules. Set schedules. Set policies and procedures.	Apply when staff feel a sense of uncertainty about their work or environment.
2. Supportive	Build relationships with staff. Pay attention to staff's needs. Be friendly	Apply when work environment is difficult or challenging.
3. Participative	Allow staff to participate in decision-making.	Apply when staff members have excellent work skills and are actively engaged in their work.
4. Achievement oriented	Set challenging goals. Expect high performance.	Apply in work environments that are technical, scientific, and related to sales.

Note. Adapted using data from *Contractor Project Manager Leadership Style Based on Path Goal Theory to Support Construction Sustainability* [Paper presentation], by C. M. Sujana, 2019, The 3rd International Conference on Eco Engineering Development, Solo, Indonesia.

In leadership studies using surveys or assessments, researchers have reported insight on leadership styles and the influence styles have in an organization (Al Khajeh, 2018). In this context of the path-goal theory, the Path-Goal Leadership Questionnaire adapted by Northouse (2017) from Indvik (1985) provides leaders with knowledge of their predominate leadership style and the leadership style used the least. In context to this project study, knowledge of leadership styles may be appropriately applied to situations to prevent barriers in the innovation diffusion process. Specifically, school

officials and PLC lead teachers may learn to adjust their leadership styles to address the factors that caused the math PLC to experience complexity in the PLC process.

Evaluating Professional Development

Although development of effective professional development is challenging, researchers and educators have supported the essential role of professional development in increasing teachers' knowledge and improving practice (Meng & Ye, 2020). Any professional development program should be evaluated to determine the value of the program and potential changes to improve future professional development (Alzahrani & Althaqafi, 2020). Specifically, evaluation allows the developer or trainer to determine what has been achieved and what needs to be corrected to increase the effectiveness of the professional development (Nordengren & Guskey, 2020).

Nevertheless, Guskey (2002), a foundational researcher in the field of teacher professional development, argued that educators pay little attention to evaluating professional development due to the perception that evaluations are expensive and time consuming, leaving minimal time to focus on "planning, implementation, and follow-up" (p. 46). Effective evaluations need not be complicated. Leaders merely need to know how to (a) plan carefully, (b) question effectively, and (c) acquire valid feedback from professional development participants (Guskey, 2002). Therefore, Guskey developed a model for evaluation of professional development.

Guskey (2002) developed five critical levels of professional development evaluation. According to Guskey, the process of collecting evaluation data becomes more

complex with each succeeding level, as the process builds on the preceding level. Therefore, the success of each level is dependent on success of the previous level. Evaluation typically occurs at the end of the professional development; however, evaluating the effectiveness during the professional development delivers information on whether the program is progressing as planned (Kartal et al., 2019). Professional development developers and leaders who aim for real-time evaluation data may consider Guskey's five-level evaluation model, as presented in Table 6.

Table 6

Five Critical Levels of Evaluation

Level	Purpose	Data collection
1. Participants' reaction	Determine participants' reactions to the professional development, such as whether participants liked the activities, the helpfulness of the presenter, and the setting and temperature.	Online or paper surveys after the professional development event.
2. Participants' learning	Assess the level of new knowledge and skills acquired by participants.	Paper or online assessments of participant knowledge.
3. Organizational support and change	Show the alignment with and level of support from the organization. How does the professional development affect the organization?	Surveys, interviews, and participant portfolios
4. Participants' use of new knowledge and skills	Measure the degree to which the new knowledge and skills have been implemented and whether the implementation yielded positive results over time.	Observations, questionnaires, interviews with participants and school leaders, reflections, examinations of journals or portfolios
5. Student learning outcomes	Determine the benefit of the professional development on student learning.	Assessments, achievement tests, standardized tests, grades. Data must match the correct aspect of professional development.

Note. Data from "Using Multi-Level Evaluation Model in Continuing Professional Development, by S. E. Acar and F. Erozan, 2021, *Revista Argentina de Clínica Psicológica*, *30*(1), 101–113; and "Professional Development and Teacher Change, by T. R. Guskey, 2002, *Teachers and Teaching: Theory and Practice, 8*(3), 381–391.

The 3-day professional development is designed to focus on Level 1, by requesting that leaders participate in an electronic survey to gauge participant reaction.

Additionally, the nature of activities will allow me to examine Level 2, the participants' learning, through observation of presentations, quick check assessments, and exit ticket activities.

In addition to understanding leadership styles and evaluating the professional development to determine its effectiveness, professional development creators may consider participants' learning styles when designing or modifying professional development programs. Theories about different learning styles have informed professional development research, as I will describe in the next section.

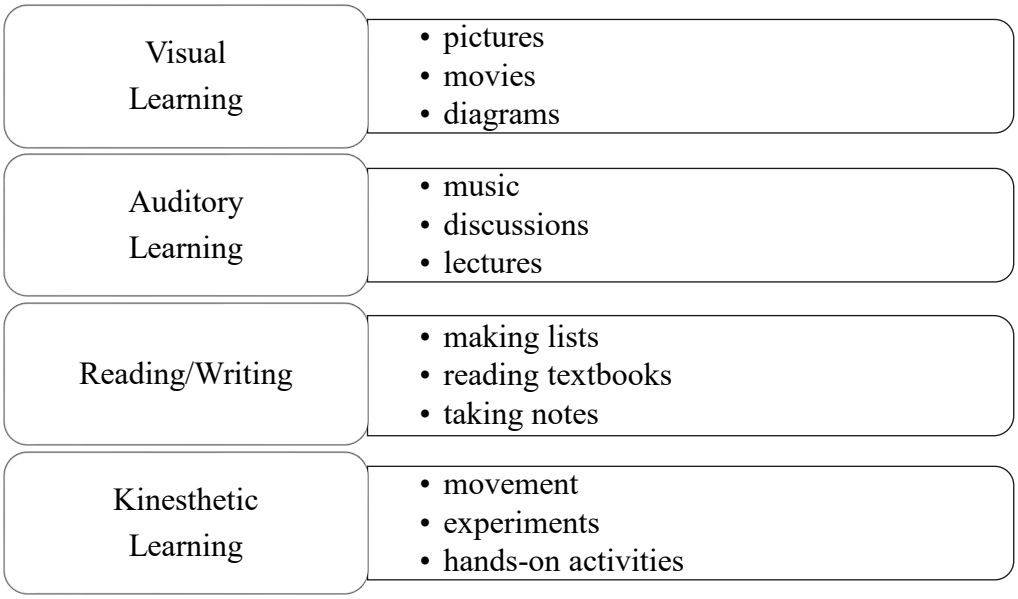
A New Approach to Learning Styles

In the 1980s and 1990s, educators explored various learning style concepts to explain one's preferential way of learning. Theories on learning styles include Gardner's (1999) multiple intelligences and Dunn and Dunn's (1999) 21 learning styles. Dunn and Dunn proposed 21 learning style elements divided into five dimensions. For environment, elements include sound, light, temperature, and seating design. For the emotional dimension, elements are motivational support, persistence, individual responsibility, and structure. The sociological dimension includes the elements of individual, pair or team, adult, and varied. For the physiological dimension, elements are perceptual (auditory, visual, tactual, or kinesthetic), intake time, and mobility. Finally, in the psychological dimension, Dunn and Dunn identified the elements of global, analytical, impulsive, and reflective, based on how students address problems.

However, Neil Fleming's model of visual, aural, reading and writing, and kinesthetic (VARK) learning is one of the most prevalent models (Cherry, 2019). Introduced in 1987, the VARK inventory was conceived to help learners and educators discover their learning preferences (Cherry, 2019). The current version of the VARK Questionnaire is available online (VARK, 2021). Questions ask whether learners would prefer receiving feedback via graphs, a written description, examples from the learner's work, or through dialogue (VARK, 2021). Questions determine whether individuals prefer diagrams, written text, audio feedback via conversations, or more hands-on models. VARK, a trademarked term, represents a process or preference for learning (Fleming & Baume, 2006). One purpose of the VARK model is to allow instructional designers to design lessons based on the learning style of the learner. According to the VARK model, approaches to learning include activities such as those outlined in Figure 2 (Cherry, 2019).

Figure 2

VARK Activities by Learning Style



Note. VARK is a trademarked acronym for visual, auditory, reading/writing, and kinesthetic. Data source: *Overview of VARK Learning Styles*, by K. Cherry, 2019, https://www.verywellmind.com/vark-learning-styles-2795156

From the trend of learning styles in the 1980s and 1990s, to the present, researchers have shown that most learning style models are not based on scientific data, and when learning style inventories are taken on more than one occasion, they have low test–retest reliability by not matching the previous inventory (Kirschner, 2017). Additionally, learning style inventory results can be influenced by the participants' work experience (Barry & Egan, 2018). With regard to VARK, Khazan (2018) argued that a great deal of evidence has shown although the questionnaire results may indicate a person is a particular type of learner, in reality people are multimodal learners. However, researchers have suggested presenting information in various ways to increase memory

retention. Achievement is not attained by matching one particular learning style with instruction but by utilizing multiple means (An & Carr, 2017). This new approach to learning styles is significant in that it supports the rationale for implementing multiple types of learning activities and modes in the professional development project. In the next section, I will describe effective professional development attributes.

Effective Professional Development

The purpose of professional development in schools is to improve content knowledge and performance in teachers to increase student achievement; effective teaching transforms teaching competencies and student learning (Aldahmash et al., 2019). Moreover, professional development that is properly designed and implemented effectively can yield positive changes in teaching methods and student learning (Darling-Hammond et al., 2017). However, many professional development programs have not been successful in improving student learning (Bates & Morgan, 2018). Therefore, researchers such as Darling-Hammond et al. (2017) have identified features of effective professional development for teachers.

Effective professional development, according to Darling-Hammond et al. (2017), has seven characteristics: (a) is content focused, (b) integrates active learning, (c) supports collaboration, (d) models effective practice, (e) provides for coaching support, (f) allows for feedback and reflection, and (g) is of sustained duration. Darling-Hammond et al. (2017) identified the characteristics specifically for working with teachers. The

following descriptions provide a guide for effective professional development with teachers.

Content-focused professional development addresses the subject taught, such as mathematics, science, or reading. Active learning is a contrast from the lecture model, engaging teachers in activities directly connected to their classrooms and students. Collaboration offers many variations such as one-on-one communication, small-group exchanges, schoolwide teaming, or interactions with professionals outside of the school (Darling-Hammond et al., 2017). Modeling practice involves the process of helping teachers in their practice by modeling instruction or providing a model of effective instruction. Examples include video lessons, demonstration lessons, and observations of colleagues. Coaching is built around supportive discussion, analysis of student output, and sharing of expertise on instructional best practices. Reflection requires teachers to think about their practices and make changes based on feedback or what was learned or seen in the professional development session. Finally, professional development must be of sustained duration, designed with sufficient time to learn, apply, and contemplate new knowledge. Professional development must shift from a one-time event to multiple opportunities to learn and improve their instructional practices (Darling-Hammond et al., 2017).

Traditionally, campus and district professional development is presented in a lecture format, with participants passively receiving the information. However, educators want to be actively engaged in practicing strategies that they have learned (Matherson &

Windle, 2017). To increase engagement, educators should be given the opportunity to (a) review and use the materials to be implemented, (b) participate in model activities, and (c) lead in instructing lessons (Bates & Morgan, 2018). Although portions of the 3-day professional development are lecture style, I designed the program to address the three engagement strategies. Finally, to ensure educator engagement, collaboration should be a part of the professional development; regardless of whether it is face-to-face or virtual, so educators have time to share ideas and work through concerns (Saaris, 2017). Several of the effective professional development practices listed by Darling-Hammond et al. (2017) relate to dialogue among teachers, including collaboration, coaching, and reflection. In the next section, I review literature related to reflective dialogue.

Reflective Dialogue

PLC members can enhance their collaborative skills through the process of reflective dialogue. Reflective dialogue, a strategic kind of discourse, strengthens communities, enhances the ability to listen, and nurtures self-reflection (Voelker, 2017). Dialogue between teachers as a form of communication can be as effective as teachers' professional development (Dogan et al., 2018). From a sociocultural perspective, dialogue is essential for reflection leading a change in thinking (Mynard et al., 2018). From a study of school-based professional communities, Kruse and Seashore Louis (1993) asserted that when teachers collaborate through dialogue, the outcome is a deeper understanding of teaching and learning. Reflective dialogue among members of the PLC

forms a common understanding of students, learning, and pedagogy. Further, teachers reflect on their own classroom practices during reflective dialogue (Chien, 2020).

Reflective dialogue supports professional learning, yet barriers can exist. For instance, meetings may be inundated with talks over noninstructional topics; therefore, leaders need to provide enough time for reflective dialogue if the expectation is school achievement (Dogan et al., 2018). With challenges in maintaining favorable outcomes in the PLC, principals should ensure that the atmosphere is safe for teachers to express their opinions, discuss conflicts, and model deep reflective thinking (H. Yin & Zheng, 2018). Based on my research findings, I found that reflective dialogue should be a part of the 3-day professional development project for the math PLC at Campus A to prevent concerns with relationships between educators on the PLC team and to provide a means to address issues of collegiality.

Use of a facilitator can help prevent barriers to reflective dialogue. The facilitator of reflective dialogue practices should be chosen carefully, as the behavior of the facilitator has an effect on the degree of reflection and the atmosphere during the reflection (Foong et al., 2018). School officials should take time to support departmental leadership, specifically department heads, in facilitating team processes and encouraging collaborative practices such as reflective dialogue to improve teaching and learning (Vanblaere & Devos, 2018). Further, the facilitator's role in reflective dialogue must be to facilitate in a way that ensures all participants have the opportunity to share their ideas and views, keeps the conversation on topic, and emphasizes listening to others when

discussing difficult matters (Voelker, 2017). This research on the importance of selecting department heads to lead aligns with the decision to include PLC lead teachers in the project study professional development. The following section provides a description of the project, based on this literature review and the findings of the study.

Project Description

Based on findings from interviews in this study, reflections from archival documents, and the subsequent literature review, I designed a 3-day professional development program for district officials, school officials, and PLC lead teachers. The purpose of the professional development is to build capacity in district officials, school officials, and PLC lead teachers to equip them with tools to develop a systemic professional development program with monitoring systems and measures of diffusion to increase fidelity of the PLC process.

Leaders initially will reflect on their own predominant and secondary leadership styles and also determine the type of leadership behaviors and supports PLCs will need based on the circumstance (see Abdulrasheed et al., 2019; Sujana, 2019). The professional development project is designed as the following eight modules: (a) leadership styles, (b) basic DOI components, (c) process-monitoring methods, (d) professional dialogue, (e) meeting coordination, (f) PLC norms, and (g) documentation approaches. A 3-day project is appropriate for the breadth of material presented, as a half-day or full-day professional development would offer an overload of information and would not be an effective way to ensure implementation of new knowledge (Rucker,

2018). Further, professional development should be rigorous, and rigor takes an extended amount of time (Rucker, 2018). In terms of the professional development audience, district officials, school officials, and PLC lead teachers are the appropriate target audience for this professional development project. School management and leadership need the skills and knowledge to support the initial and continuous support of teachers involved in the PLC (see Egboka, 2018). The 3-day professional development, entitled "PLC Leadership: Transforming Your Teams," will include (a) lecture-style presentations, (b) discussions in various breakout groups, (c) role play by practicing leadership responsibilities, (d) practice designing documents to reflect elements of the PLC process and norms, (e) surveys to gain insight and collect data, and (f) reflection exercises for next steps. In the next section I describe resources and supports for the professional development.

Resources and Existing Supports

To meet the needs of appropriate district officials, school officials, and PLC lead teachers in the district, the primary resource needed is a large meeting room that holds approximately 200 people. In the room, 30 round tables, for approximately eight people per table, and 200 chairs will be necessary. I will include handouts, pens, markers, sticky notes, note pads, and sensory fidget toys on each round table daily. Six additional long tables will be needed and used as follows: two for beverages and snacks; two for presenter materials; and two for sign-in sheets, name tags, and professional development packets. Technology needs include a laptop, projector, projector screen, internet,

microphone, and speakers. Evaluation sheets will not be needed as evaluations in the district, including evaluations of this professional development, will be completed online. Finally, participants will be responsible for their own breakfast and lunch. With regard to existing support, technical employees are available upon request for district meetings for set up and troubleshooting. In addition, all district professional employees are given a laptop. Therefore, all participants will be required to bring their district laptop to participate in many of the activities. Upon district approval of the professional development, and in accordance with the purchasing procedures from the district, requisition forms must be submitted to the Purchasing Department for approval of a purchase order. Food and nonfood items will be coded to the appropriate account. The Purchasing Department will give final authorization of the purchase order.

Potential Barriers and Solutions

Two potential barriers may occur. First, depending on the state's COVID-19 stay-at-home order, the professional development may have to take place virtually through the current online meeting platform. Current district guidelines during the pandemic require all meetings and professional development to be conducted virtually. This circumstance will not be a barrier, as virtual learning is the current mode of delivery. In addition, I have designed the eight modules to be compatible with virtual learning. Instead of round tables set by the school or department, the district's virtual learning platform gives the presenter the ability to set up schools in virtual breakout rooms. In addition, the technical

employees mentioned in the resources section can check in on breakout rooms and give each group hosting capabilities to type and view documents.

The second barrier, common during professional development in the district, is inadequate time for lunch. Many nearby districts have summer learning in July and August, which produces traffic and competition for space in nearby restaurants. The result is that many participants return late for the afternoon session and fail to receive pertinent information. Through past experiences, I have learned to structure lunch time 15 minutes earlier than the specified time so that participants will be less likely to encounter issues that would prevent them from starting the afternoon session on time.

Implementation and Timetable

Following dissertation approval, in the summer of 2021, I will meet with leadership at the district site to present an overview of the proposed PLC leadership professional development along with the findings of my research, the rationale for my project, and goals of the professional development. In addition, I will recommend to district leadership that professional development participants play a continuing leadership role in the process of ensuring the five components of DOI to ensure fidelity of PLC processes districtwide. Planning the professional development presentation, securing a facility, obtaining assistants, and getting approval for purchase orders for supplies likely will take 2 months. Next, 2 days prior to the professional development start date in late summer 2021, arrangements for the room set-up, technology, and sound will be made.

Lastly, Table 7 includes a detailed timeline outlining stages leading to implementation of the 3-day professional development project.

Table 7

Timeline for Professional Development Implementation

Timeline stage	Activities
Summer 2021	• Meet with professional development director and selected district officials to present professional development proposal. • Request professional development director send summer professional development information and instructions to district officials and principals. • Email registration information to selected participants.
Late summer 2021	• Email registration information reminders to selected participants. • Secure room set up, technology resources, presentation materials, refreshments.
Professional development Day 1	• Review professional learning community (PLC) literature, processes, norms, and documentation. • Demonstrate understanding of leadership styles. • Participate in leadership style activities for teacher support based on condition. • Demonstrate understanding of diffusion of innovation (DOI) theory • Participate in activities reflecting on DOI components relative advantage and compatibility.
Day 2	• Participate in activities reflecting on DOI components complexity, trialability, and observability. • Evaluate innovations with DOI components. • Design DOI survey and action plans for PLC scenarios.
Day 3	• Demonstrate an understanding of an apply reflective dialogue. • Demonstrate implementation of the Professional Learning Community Assessment–Revised questionnaire. • Design campus PLC quick guide based on district PLC expectations and DOI components. • Conduct consensus meetings on district-wide DOI survey and PLC quick guide.

Roles and Responsibilities

Upon approval of this professional development project for implementation, I recommend that district officials, school officials, and PLC lead teachers be responsible for the implementation and continuous support of PLCs to maintain fidelity of the PLC process districtwide. Whereas district officials support campuses, and PLC lead teachers lead in implementing the PLC process, the school officials' responsibility is to ensure staff are working effectively (Sterrett et al., 2018). Specifically, the principal or school official who supervises the math PLC at Campus A should be responsible for understanding their leadership role and how that role interplays with monitoring and securing the DOI to achieve adoption and implementation.

Project Evaluation Plan

The plan for evaluating the professional development project includes formative and summative evaluations. In the educational setting, formative evaluations occur throughout the course of the program to determine whether the information is understood by participants, and whether the material needs to be retaught. Summative evaluations are used infrequently to establish whether the program met its goal as intended (Joyce, 2019). In this section I outline the goals of the evaluation and identify key stakeholders.

Formative and Summative Evaluations

Using Guskey's (2002) five-level evaluation model as a framework for evaluation, I determined the appropriate course to assess the professional development project will be to implement the Level 1 (participants' reaction) and Level 2

(participants' learning) evaluations. As referenced previously in the literature review, with Level 2, most evaluations occur at the end of the professional development; however, assessing professional development in real time provides pertinent information to the trainer as to the progress of the project (Kartal et al., 2019). Each day during the professional development, I will conduct a formative evaluation in the form of an exit ticket. An exit ticket is a method of assessment typically given at the end of instruction to review concepts that were learned, and the trainer can use the results for planning the next lesson (Akhtar & Saeed, 2020). In addition, I will conduct a Level 1 summative evaluation at the end of the professional development by asking participants to complete an anonymous electronic survey covering topics ranging from questions about the setting, to the usefulness of the information presented and activities, to suggestions for the professional development.

Evaluation Goals

An evaluation is a mechanism for establishing whether the program is being delivered as designed (Phillips, 2018). In this project study, the Math PLC members at Campus A struggled to adopt and implement the PLC process with fidelity due to challenges with the DOI component of complexity, including a lack of time to understand and implement the complex innovation. The primary goal of the formative evaluation taken during the professional development will be to determine whether leaders on all campuses have learned (a) the components of DOI, (b) how to monitor their PLCs with regard to processes and DOI perceptions, and (c) how to address negative perceptions of

DOI components to assist in making modifications for successful diffusion and ultimately adoption and implementation.

Key Stakeholders

The key stakeholder groups for this 3-day professional development project are internal stakeholders, meaning they have a direct affiliation with the organization (Leonard, 2018). These include district officials, school officials, and PLC lead teachers. District officials are the administrators and coordinators who work in the district building. They support the expectation of meeting as PLCs or may check in on campus PLC meetings. In addition, school officials include the principal, assistant principals, and support specialists who work directly with campus PLCs. Further, school officials should have the ability to be consistent and committed to the management of the PLC process (Vajarintarangoon et al., 2019). Finally, the PLC lead teacher facilitates the PLC process. All stakeholders will be asked to participate in the formative and summative evaluations of the professional development, and the results of the summative evaluation will be shared with district stakeholders.

Project Implications

Social Change Implications

This project study was developed based on findings from Section 2 that the PLC innovation failed to diffuse among members of the math PLC at Campus A because of the complexity component in the PLC process. As a result, there was a barrier to adoption leading to the lack of fidelity of implementation of the PLC process. To effectively

implement the PLC process, teachers needed support from district officials, school officials, and PLC lead teachers. I designed a professional development project to (a) help leaders understand how to support teacher growth through the understanding of leadership styles; (b) help leaders understand DOI and how to create action plans based on DOI components to attain adoption and implementation of the PCL innovation; (c) ensure that leaders understand how to use various tools to monitor the PLC process; (d) help leaders apply the principles of reflective dialogue to promote teacher and student learning; (e) increase leaders' ability to coordinate meetings through the creation of scheduling, duties, and PLC agenda documents; (f) increase leaders' understanding of PLC norms; (g) provide leaders practice in writing adequate and accurate meeting documentation; and (h) help create a leadership guide focusing on the DOI theory. In terms of social change, the overarching goal for this project study is to increase student achievement. Professional development in the area of DOI may build capacity in leaders to guide teachers in adopting and implementing the PLC process with fidelity.

Findings from this study on addressing PLC implementation at one school through the DOI theory could promote social change by informing leaders in the target district with information that could be used to strengthen PLC implementation by having PLC members use the PLC to review student data and design interventions to support student learning. Also, PLCs, when properly implemented, serve to support the development of teacher skills and knowledge to more effectively serve students. Social change may result from the strengthening of PLC implementation as a vehicle to support

teachers in serving students and meeting their needs. Better serving students' academic needs in mathematics could improve student achievement. Other middle schools in the district could benefit from the possible actions by district stakeholders to strengthen PLC implementation. Additionally, leaders of any organization would benefit from this study by learning how to consider DOI perceptions to increase the effectiveness of an innovation. Improving administrators' capacity to implement systemic changes, such as PLCs, could result in social change through effective PLC implementation, serving to support the development of teachers' skills and knowledge. Effective implementation of PLCs could help the PLC team to evolve and could improve the use of research-based practices in mathematics and decrease the number of students who are not performing proficiently on the state mathematics assessment. As an early basis for PLCs, Senge (1990) described a learning organization as allowing members to build their capacity and collaborate. Another implication for social change exists in that the DOI theory (Rogers, 2003) is applicable for implementing other innovations and initiatives.

Local and Larger Context

The math PLC members at Campus A experienced barriers in the adoption and implementation of the PLC process due to difficulties indicated as complexity, based on the DOI theory (Rogers, 2003). The districtwide professional development project, which will include leaders at Campus A, may be an effective approach in providing teachers with the support needed to implement the math PLC process with fidelity. In the larger

context, the outcome of this project may increase teacher growth, and ultimately, student achievement in math.

Summary

In Section 3 I described the design of a 3-day professional development project based on my research findings. I outlined a professional development project including project goals, the rationale, a program description, and an evaluation plan. I completed Section 3 with implications of this professional development for social change at the district level as well as the target campus level. In Section 4, I will present the project strengths and limitations; recommendations for alternative approaches; and considerations on scholarship, project development, and leadership and change. Section 4 will conclude with reflections on the importance of work; implications, applications, and directions for future research; and finally, the conclusion.

Section 4: Project Strengths and Limitations

This section focuses on the strengths and limitations of the project related to addressing the gap in practice. The primary strength of this project is the unintended awareness that leadership concepts should be featured in the professional development program. Initially, I planned for leaders to be trained primarily on the DOI theory and PLC norms, and referenced the importance of such support in my literature review. However, during the designing planning phase, I realized that not only should teachers make changes in the implementation of the PLC, but also leaders must change their behaviors to meet the needs of teachers. Specifically, the more school principals demonstrate leadership qualities involving soft skills such as decision-making abilities and empathy, the greater the likelihood of teachers completing their tasks (Özgenel et al., 2020). I later returned to the literature review and made additions to address leadership styles to prepare for activities in the professional development.

Another strength of this project is the inclusion of formative evaluations throughout the course of the day. Formative evaluations were designed to monitor the level of participant understanding and to provide the presenter with the data needed to make learning adjustments. A final strength of this project is the ease in which all aspects of this project can be adapted to a virtual meeting format. Participants can receive hard and electronic copies of all documents, and virtual breakout rooms can be used for discussion. In terms of the limitations of this project, I noticed the number of activities

and evaluations to complete may leave participants with minimal down time. Although all of the information and activities are relevant, times can be adjusted as needed.

Recommendations for Alternative Approaches

The purpose of this study was to examine teachers' and school officials' perceptions of the math PLC process using the DOI framework and archival documents to determine reasons for the challenges with PLC implementation. Findings from analysis of data uncovered the members of the math PLC struggled slightly in implementing the PLC innovation because they experienced a level of complexity, which affected their ability to adopt the innovation. Recommendations for the math PLC include (a) increasing the PLC meeting time, (b) ensuring PLC members understand processes and norms through process monitoring, and (c) advocating for the importance of thorough and accurate documentation of meeting minutes. As a result, I recommended a 3-day professional development for district, school, and campus leaders to build their capacity in supporting teachers to effectively implement the PLC process with fidelity. Alternatively, another approach I considered to address findings was designing a curriculum plan. The curriculum plan would have addressed many of the topics included in the 3-day professional development and would have addressed the barriers of COVID-19 outlined in Section 3. The curriculum plan, as with all other plans in the district, would have been in an online format and could be used with time constraints.

In addition, I considered various alternative solutions for addressing the local problem of Campus A math scores that are lower than the state average. With regard to

PLC professional development, the first alternative approach could be an afterschool professional development for teachers and school officials that is presented monthly, as opposed to professional development for district, school, and PLC teacher leaders prior to the beginning of school. With this approach, teachers learn best practices firsthand and have the opportunity to build upon learning from the previous month. Next, the second approach to PLC professional development could be monthly online professional development to be completed individually, with follow-up discussions to be completed at a specified professional development meeting. Individual online training is an alternative for learners who want to learn at their own pace, yet questions can be addressed with a specified trainer and through collaboration with the team at a PLC meeting. Finally, an alternative solution to addressing low math scores could be a middle school intervention manual addressing strategies for teaching students who struggle. Again, professional development for use of the manual would be recommended.

Scholarship, Project Development, and Leadership and Change

Throughout this educational journey, I have had time to reflect on my hard skills as well as my soft skills. The hard skills of writing in a scholarly tone proved to be a challenge for me, as I am not accustomed to this style of writing. I learned that although my writing skills are appropriate for most aspects of my job, learning how to write in a scholarly tone was beneficial for writing documents that needed a more formal tenor. In addition, the hard skill of delving deeply into research became a necessary albeit time-consuming skill that I needed to address issues in a precise and research-based way.

Finally, in terms of hard skills, analyzing qualitative data was an experience I previously believed to be easier than analyzing quantitative data. I was mistaken. Through analyzing qualitative data, I learned the challenge of interpreting words, tone, and nonverbal communication to make meaning for research findings. However, because of the soft skills I possess—perseverance, stress management, and discernment—I was able to continue on my educational journey. Overall, I gained respect for researchers and the research process. I now know that conducting research can be arduous work, yet the outcome can change society by answering questions, revealing new ideas, changing beliefs, and enlightening the intellect. For those reasons, my educational journey will continue.

Reflection on Importance of the Work

As I reflect on the importance of the work, I have learned never to discount the importance of the individual to the success of any innovation. Although creating innovation to address a need is important, equally important is considering the experiences and perceptions of those who will use the innovation, because perceptions can drive or block forward movement. As an educator who occasionally provides professional development, I have been fortunate to apply my research on the DOI to promote the innovations I am presenting to staff. I see merit in what I do. Specifically, I presented a professional development on the DOI theory at the district level, and I was pleased with the interest. Particularly, one administrator wanted more information and training to use the knowledge with the teachers on her campus. By continuing to keep the

DOI theory in the forefront of presenting innovations, I am living my research, not just writing about it.

Implications, Applications, and Directions for Future Research

The PLC innovation is a requirement in campuses in the target district to address student achievement on the state accountability assessment. This project study served to address the gap in practice of the implementation of the math PLC at Campus A as a result of low math test scores on the state assessment. Based on discussion and observation, administrators had determined that the math PLC struggled to implement the PLC innovation with fidelity. This belief was supported by research conducted with members of the Campus A math PLC using the DOI theory. Consequently, I created a 3-day professional development program for district leaders, school leaders, and PLC lead teachers to build their leadership capacity in supporting PLCs and implementing the PLC process with fidelity by considering DOI theory.

This project study has potential impact for positive social change through positive implications for organizations, individuals, and society. Organizations that push for innovation, such as the school district, may bring forth positive social change by leading campuses in addressing the lack of implementation of the PLC, as well as other innovations. Next, PLC members at the campus level may produce a positive social change by using new PLC best practices to help to increase student achievement on state assessments. Findings of this study could serve as a model to other school districts to increase student achievement through effective PLC implementation. Additionally,

leaders of any organization can use these findings to learn the importance of and methods to explore perceptions of DOI in an organization when implementing an innovation. Future research could include the strategies educators use to support pedagogical shifts in thinking, such as shifting from working individually to working with a team in the PLC environment. This study focused on the implementation of the PLC as an innovation and used DOI as a lens to view the implementation and perceived change. Further research could explore administrators' perspectives regarding how to create, design, and implement changes that require educators to shift or alter their thinking. Teachers' perspectives regarding the most effective strategies to support changes in practice and thought processes related to how teams of educators work with children also could be explored.

Findings that support a 3-day professional development program may have challenging implications for the following year. For example, additional innovations may become more prominent, thus lessening the importance of PLC innovation. In addition, attrition among school administrators and PLC lead teachers is possible. Next, PLCs may suffer from "DOI fatigue," as process monitoring can be a lengthy process. Recommendations to address possible implications include (a) offering a 1-day refresher course either face-to-face or in an online platform at the beginning of the year, (b) continuing the 3-day professional development program for new leaders, and (c) placing the dates for DOI process monitoring on the calendar in advance so PLCs can prepare. Beyond the PLC innovation, the DOI theory can serve as a process-monitoring tool for

other innovations in the future. School districts are ever changing, and with increasing change comes innovation, whether for the purposes of meeting academic, student management, or professional development needs. My recommendation is that considering the DOI theory for monitoring user perception be the standard for all campus or district innovations.

The process of change is complicated; therefore, researchers such as Reinhoilz and Andrews (2020) have requested a more thorough understanding of change theory and its implications to sustain the process. Change theory is a mechanism to describe the reasons and the means by which a program works by uncovering relationships between the program actions and the change or results (Burbaugh et al., 2017). DOI theory is one of many change models (Barrow et al., 2017). Innovation implementation is not confined to education; change models, such as the DOI theory, have been documented to be applicable to a variety of disciplines (Scott & McGuire, 2017). Future directions for research could include exploring various change models, including the DOI theory, to determine how the change process has a direct effect on innovation implementation.

Conclusion

Throughout the process of my research, I learned that knowing the consumer is just as important as knowing the product, followed by making needed adjustments for adoption and implementation. Any product—in this case, the PLC innovation—should begin with sound instruction; however, consumers, or teachers, should not be left without strong leadership to support the process of learning. In this project study, findings

showed that teachers struggled slightly to implement the PLC process. In addition, this study supports the DOI theory (Rogers, 2003) that the PLC innovation failed to diffuse among members of the math PLC at Campus A due to perceived complexity of the innovation. I found from research that leaders are an essential factor in ensuring educator success; therefore, my 3-day professional development program is leadership training geared toward empowering teachers.

My project study is complete. Looking back over the last few years, I have gone from proposal, to continuous revisions, to endless research for sources, to praying for participants interested in being interviewed, to learning how to write a scholarly analysis. This has been a long journey, but I learned something about myself. I am persistent. I will take that persistence with me throughout the rest of my educational journey. As I move forward, I continue to look for opportunities for growth in my field. I will always look for solutions until I find the answers, much like the problem in this study that I to wanted address years ago. My hope is that the readers of my work will be able to use this information to strengthen their innovations for student success.

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Appendix A: The Project

PLC Leadership: Transforming Your Teams

Program Goals

- Goal 1: District and school officials and professional learning community (PLC) lead teachers will develop an understanding of leadership styles that support teacher growth during a change process when instituting of an innovation.
- Goal 2: District and school officials and PLC lead teachers will demonstrate an understanding of diffusion of innovation (DOI) components through data analysis and the creation of a DOI action plan to adopt and effectively implement of the PLC innovation.
- Goal 3: District and school officials and PLC lead teachers will apply use of PLC process monitoring tools such as: an assessment, an inventory, a survey, and a set of reflections.
- Goal 4: District and school officials and PLC lead teachers will demonstrate an understanding use of reflective dialogue through application of principles that promote teacher and student learning.
- Goal 5: District and school officials and PLC lead teachers will demonstrate an understanding of PLC requirements with respect to sufficient meeting time, the use of PLC minutes, PLC agendas, and assignment of PLC roles.
- Goal 6: District and school officials and PLC lead teachers will demonstrate an understanding of PLC norms.
- Goal 7: District and school officials and PLC lead teachers will demonstrate an understanding of how to maintain accurate PLC meeting documentation.
- Goal 8: District and school officials and PLC lead teachers will create an action plan for based on DOI theory to address PLC implementation.

Day 1: Professional Development: PLC Leadership: Transforming Your Teams

Purpose: The purpose of this 3-day professional development is to build capacity in district and campus leaders with the strategies to strengthen the effectiveness of PLC teams and support teachers in effectively implementing the PLC process with fidelity.

Location: Large Meeting Room /Medium Meeting Room (Virtual if necessary)

Date: July 2021(Tentative)

Target Audience: District Administrators, Principals, Assistant Principals, Instructional Specialists, PLC Lead Teachers (Math and ELAR)

Sessions	Learning Outcomes	Supplies	Room Set Up
Morning Session 8:30 a.m.-11:30a.m. Large Conference Room All District Leaders **Break** 10:00 a.m.-10:15 p.m. ***Lunch on your own 11:30 a.m.-1:00 p.m.*** *Coffee/Water Muffins/Crackers Available	Leaders will participate in activities as a review of PLC processes, norms, and documentation. Leaders will learn about leadership styles and how to support teachers based on conditions.	Sign-in Sheet Name Tags Laptops (participants bring district laptop) Internet	**Large Conference Room** 28 round tables 6 long tables Table signs Screen/Projector Microphone Laptop Internet
Afternoon Session 1:00-4:00 Large Conference Room Elem./ District Leaders Small Conference Room Secondary Leaders **Break** 2:30 p.m.-2:45 p.m. *Tea/Lemonade Assorted Cookies Available	Leaders will learn components of DOI theory. Learners will learn the DOI theory as it relates to the adoption and implementation of PLCs. Leaders will participate in activities reflecting DOI components relative advantage and compatibility.	handout packet pens markers sticky notes easel pads note pads sensory fidget toys.	**Small Conference Room** 8 tables for 10 2 long tables Table signs Screen/Projector Microphone Laptop Internet

Day 1 Goals – Leaders will develop an understanding of leadership style sand DOI concepts to strengthen their ability to support teacher growth and implementation in the PLC process.

Day 1 Activities

Activity	Time
• Welcome PD purpose • Icebreaker- "Would You Rather…?" • Test your knowledge of PLCs with Kahoot! (video learning platform) • PLC Review- Purpose, DuFour Model, Process, Norms, Documentation, District PLC documents • Review 4 profiles PLC	8:30-10:00 a.m.
Break	10:00-1015 a.m.
• Creating Norms • Leadership Style Self-Inventory • Presentation on Path Goal Leadership Styles • Video Clip from "Sister Act" • Path Goal Leadership Activity • **Evaluation:** Self-Reflection Exit Ticket	10:15-11:30 a.m.
Lunch on Your Own	11:30-1:00 p.m.
• Leadership Responsibilities in the PLC Discussion • The Diffusion of Innovation (DOI) Presentation • Nostalgic Commercials and DOI • Five components of DOI overview	1:00-2:30 p.m.
Break	2:30-2:45 p.m.
• Overview of Relative Advantage • Overview of Compatibility • **Evaluation:** Relative Advantage and Compatibility Exit Ticket	2:45-4:00 p.m.

Day 2: Professional Development: PLC Leadership: Transforming Your Teams

Purpose: The purpose of this 3-day professional development is to build capacity in district and campus leaders with the strategies to strengthen the effectiveness of PLC teams and support teachers in effectively implementing the PLC process with fidelity.

Location: Large Meeting Room /Medium Meeting Room (Virtual if necessary)

Date: July 2021(Tentative)

Target Audience: District Administrators, Principals, Assistant Principals, Instructional Specialists, PLC Lead Teachers (Math and ELAR)

Sessions	Learning Outcomes	Supplies	Room Set Up
Morning Session 8:30 a.m.-11:30a.m. Large Conference Room All District Leaders **Break** 10:00 a.m.-10:15 p.m. ***Lunch on your own 11:30 a.m.-1:00 p.m.*** *Coffee/Water Muffins/Crackers Available	Leaders will participate in activities reflecting DOI components complexity, trialability, and observability. Leaders will apply knowledge of DOI components through reinforcement/refinement forms 4 profile PLCs.	Sign-in Sheet Name Tags Laptops (participants bring district laptop) Internet	**Large Conference Room** 28 round tables 6 long tables Table signs Screen/Projector Microphone Laptop Internet
Afternoon Session 1:00-4:00 Large Conference Room Group A Elementary Leaders / District Leaders Meeting Room Group B Elementary Leaders Small Conference Room Secondary Leaders **Break*** 2:30 p.m.-2:45 p.m. *Tea/Lemonade Assorted Cookies Available	Leaders will create action plans for two profile PLCs. Leaders will share and receive feedback from profile PLC action plans.	Easel pads Handout packet pens markers sticky notes note pads sensory fidget toys.	**Small Conference Room** 8 tables for 10 2 long tables Table signs Screen/Projector Microphone Laptop Internet **Meeting Room** 8 tables for 10 2 long tables Table signs Screen/Projector Microphone Laptop Internet

Day 2 Goals – Leaders will demonstrate an understanding and their role in ensuring the adoption and implementation of the PLC process through knowledge of the components of DOI.

Day 2 Activities

Activity	Time
• Welcome/Overview of Day 2 • Review based on Day 1 Evaluations • Post questions electronically through Padlet • Overview of Compatibility • Overview of Trialability • Overview of Observability • Nostalgic Commercials and DOI • Compatibility, Trialability, and Observability Exit Ticket	8:30-10:00 a.m.
Break	10:00-1015 a.m.
• Respond to Padlet questions • DOI Components and Profile PLCs Activity • PLC team presentation of findings (selected at random)	10:15-11:30 a.m.
Lunch on Your Own	11:30-1:00 p.m.
• Participants go to assigned breakout rooms • DOI Action Plans for Profile PLCs Activity	1:00-2:30 p.m.
Break	2:30-2:45 p.m.
• PLC Teams present one action plan (selected at random) • Review information based on Day 2 Quick Check Evaluation	2:45-4:00 p.m.

Day 3: Professional Development: PLC Leadership: Transforming Your Teams

Purpose: The purpose of this 3-day professional development is to build capacity in district and campus leaders with the strategies to strengthen the effectiveness of PLC teams and support teachers in effectively implementing the PLC process with fidelity.

Location: Large Meeting Room /Medium Meeting Room (Virtual if necessary)

Date: July 2021(Tentative)

Target Audience: District Administrators, Principals, Assistant Principals, Instructional Specialists, PLC Lead Teachers (Math and ELAR)

Sessions	Learning Outcomes	Supplies	Room Set Up
Morning Session 8:30 a.m.-11:30a.m. Large Conference Room All District Leaders **Break** 10:00 a.m.-10:15 p.m. ***Lunch on your own 11:30 a.m.-1:00 p.m.***	Learners will apply knowledge of process monitoring tools to campus PLCs.	Sign-in Sheet Name Tags Laptops (participants bring district laptop) Internet	**Large Conference Room** 28 round tables 6 long tables Table signs Screen/Projector Microphone Laptop Internet
Afternoon Session 1:00-2:30 Large Conference Room *Elem./ District Leaders* Small Conference Room *Secondary Leaders* **Break*** 2:30 p.m.-2:45 p.m. *Tea/Lemonade Assorted Cookies Available **Ending Session** 2:45-4:00 Return to Large Conf.	Leaders will practice principles of reflective dialogue. **Evaluation**-Campus leaders will create a campus specific draft of a PLC Leadership Guide.	Easel pad handout packet pens markers sticky notes note pads sensory fidget toys.	**Small Conference Room** 8 tables for 10 2 long tables Table signs Screen/Projector Microphone Laptop Internet

Day 3 Goals - Leaders will demonstrate knowledge of PLC process monitoring assessments and reflective dialogue among PLC members.

Day 3 Activities

Activity	Time
• Welcome and Overview of the Day • Icebreaker- "Musical Stops and Greetings" • Review based on Day 2 Evaluations • Post questions electronically through Padlet • Overview of Process Monitoring Tools-DOI Inventory, PLCA-R, and Critical Issues Survey, and PLC Reflection Questions • Complete the DOI Inventory (PLC Reflections if time permits)	8:30-10:00 a.m.
Break	10:00-1015 a.m.
• Discussion on process monitoring results • Introduction to Reflective Dialogue	10:15-11:30 a.m.
Lunch on Your Own	11:30-1:00 p.m.
• Return for instructions on Reflective Dialogue Simulation activity • Campus PLC teams go to assigned rooms/District leaders go to assigned campus PLC teams • Principles of Reflective Dialogue • Reflective Dialogue Simulation Activity • **Evaluation**-Quick Check on Reflective Dialogue	1:00-2:30 p.m.
Break	2:30-2:45 p.m.
• All Participants return to large conference room • Q&A Segment • Final Project: Create electronic draft of Campus PLC Leaders' Guide (with template). Submit in your campus folder in Google Drive. • Acknowledgements, contact information, closing • **Evaluation**-Survey over Professional Development	2:45-4:00 p.m.

EVALUATION
Day 1: Evaluation 1

Self-Reflection Exit Ticket
(To be submitted in your campus team box and picked up the next day)

Name_____

School_____

What is your Path Goal Leadership Style?

Briefly describe yourself as a leader, and how your actions or traits align with your Path Goal Leadership Style.

Review Profile PLC #3. Which leadership style is appropriate for this PLC? Discuss specifically what actions would you take (based on the Path Goal Leadership Style) to address the condition of Profile PLC #3.

EVALUATION
Day 1: Evaluation 2

Relative Advantage and Compatibility Exit Ticket
(To be submitted in your campus team box and picked up the next day)

Name_____

School_____

What is the definition of Relative Advantage in your own words?

What is the definition of Compatibility in your own words?

Think about and select in your mind a grade level or departmental PLC on your campus. In terms of the DOI component compatibility, describe in detail how the actions of that PLC **are** or **are not** compatible with the norms, expectations, or values of your district or campus.

Review Profile PLC #3. Which leadership style is appropriate for this PLC? Discuss specifically what actions you would take (based on the Path Goal Leadership Style) to address the condition of Profile PLC #3.

EVALUATION
Day 2: Evaluation 1

Compatibility, Trialability, and Observability Exit Ticket

Google Survey Link

Name_____

School_____

Match the sentence with the DOI Component, then hit submit at the of end the screen.

	Complexity	Trialability	Observability
Making modifications and monitoring before deciding to adopt an innovation.	_____	_____	_____
Not understanding how to use an innovation is a problem of_____	_____	_____	_____
Seeing that the innovation works.	_____	_____	_____

EVALUATION
Day 2: Evaluation 2

Summative Evaluation on Professional Development and Campus PLC Leaders' Guide

Google Survey Link

1. Select your current position

District Admin./Coordinator Campus Admin. Instructional Specialist Teacher

2. The setting for this training was appropriate comfortable.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

3. The room temperature for this professional development (PD) training was comfortable.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

4. The presenter was knowledgeable and well-prepared.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

5. The topics covered in this PD program were relevant to the duties of my current position.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

6. The activities were appropriate in helping me to understand the goals of the PD program.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

7. I gained knowledge and strategies that I can immediately implement with PLCs.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

8. The handouts and materials were understandable and useful.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

9. I gained knowledge and strategies that I can immediately implement with PLCs.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

10. The handouts and materials were understandable and useful.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

11. The setting for this training was appropriate comfortable.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

12. The room temperature for this PD training was comfortable.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

13. I understand the concepts of the five components of the DOI.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

14. I understand how to assess and evaluate perceptions of the five components of the DOI with our PLCs.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

15. I understand how to address negative perceptions of a PLC.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

16. I understand my predominate leadership style.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

17. I understand how to adjust leadership styles to support PLCs.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

18. I understand how to facilitate reflective dialogue in a PLC.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

19. I understand how to accurately document PLC meetings.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

20. On my campus, PLCs have sufficient time to implement PLCs on a weekly basis.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

21. I understand most sections of the draft of the Campus PLC Leaders' Guide.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

22. I have many questions regarding how to implement the Campus PLC Leaders' Guide.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

23. Our team needs additional assistance in creating the Campus PLC Leaders' Guide.

Strongly Agree *Agree* *Neutral* *Disagree* *Strongly Disagree*

Comments (Optional)

If you have any additional comments or feedback that would be helpful for me to consider, please share your thoughts.

Campus PLC Leaders' Guide Checklist

District leaders will gain knowledge of PLC leadership through a process of observing assigned teams during their creation of the Campus PLC Leaders' Guide. Using this checklist, district leaders can assist teams in areas that need to be addressed. When the team completes their draft of the guide, the district leader will evaluate the draft to check for (a) adherence to the concepts learned and (b)completion of the assignment.

Campus_____

Evaluator_____

Leader and PLC Information	**Yes**	**No**	**Suggestions**
All responses are complete.			

Path Goal Leadership Styles	**Yes**	**No**	**Suggestions**
All responses correctly adhere to the Path Goal Leadership Style.			
All responses are written clearly and precisely.			
All responses are complete.			

DOI Components	Yes	No	Suggestions
All responses correctly adhere to the DOI Theory.			
All responses are written clearly and precisely.			
All responses are complete.			

Comments:

Creating Norms Activity

You will be assigned a PLC profile at random. Select a facilitator. As a team discuss establish norms for your group. Post on your easel pad.

Name_____

School_____

District Profile

The ABC School District has outlined expectations for PLCs in the Curriculum and Instruction Handbook. All teachers shall complete the prescribed training at their home campus. An excerpt from the handbook states,

> To increase student achievement the ABC district supports the necessity of weekly PLC meetings to collaborate in data analysis, addressing the four critical PLC questions, sharing or observe best practices, and professional development. It is an expectation that PLCs submit weekly minutes that address these expectations through the appropriate district Google Docs folder. It is highly recommended that PLC teams monitor their processes periodically, and make modifications as needed to strengthen PLC implementation. [fictitious statement]

Profile PLC #1 High School-Algebra Department PLC

PLC #1 is composed of 6 algebra teachers. Typically, teachers arrive to the PLC 10 minutes into their conference period, which leaves them 40 minutes to meet once a week. The duties assigned are facilitator, recorder, timekeeper, and data manager. Typically, meetings begin with announcements and special dates, followed by strengths and weaknesses in instruction. Teachers share tips on successful instructional strategies. The assistant principal listens to this discussion until time is completed, and reminds everyone to sign in for attendance on the meeting minutes form.

Profile PLC #2 Elementary- 3rd Grade PLC

PLC #2 is composed of four 3rd grade teachers. Typically, teachers arrive to the PLC 5 minutes into their conference period, which leaves them 40 minutes to meet once a week. The duty assigned is a rotating recorder. The principal facilitates the meeting. The teachers don't perceive PLC meetings are the best way to address student achievement. They prefer the Parent Learning Nights as the main vehicle for addressing student achievement. Typically, the PLC reviews the weeks data and plans instruction based on answering the 4 PLC questions. The team does not really understand how to read or analyze the data, and relies on the principal to help. The teachers are concerned because one of the teacher's data is consistently lower than the others. The minutes are usually incomplete.

Profile PLC #3 Middle School-English Department PLC

PLC #3 is composed of eight 7th -8th grade English teachers. Typically, teachers arrive to the PLC 10 minutes into their conference period, however two PLC members often arrive 20 minutes late, and one reports they need to catch up on their work, often missing the meeting. The duties assigned are facilitator, recorder, timekeeper, and data manager. Typically, meetings begin with social time for snack and beverages, followed by announcements and deadlines. The lead PLC teacher wants the members to follow

norms and focus on data and planning, but members have different ideas as to what is supposed to going on in the PLC meeting and occasionally non-professional disagreements. At times there are minutes, and at times there are not. He will ask the principal to help make program modifications.

Profile PLC #4 District Science Coordinators

PLC #4 is composed of 3 science coordinators for the district. Typically, coordinators arrive by the specified time and meet once a week. The duties assigned are lead facilitator, recorder, and data manager. The coordinators believe that PLC meetings are better than previous PLCs since they monitored and redesigned process after additional training. Typically, meetings begin with an overview of data. Each coordinator discusses the critical questions from the perspective of their assigned schools' local assessments. At times, each coordinator struggles to answer the questions due to lack of ideas. Minutes always reflect the discussion. The Director for Teaching and Learning directs the team to contact the Social Studies Coordinator PLC meetings.

When Establishing Norms, Consider:	Proposed Norm
Time ■ When do we meet? ■ Will we set a beginning and ending time? ■ Will we start and end on time?	
Listening ■ How will we encourage listening? ■ How will we discourage interrupting?	
Confidentiality ■ Will the meetings be open? ■ Will what we say in the meeting be held in confidence? ■ What can be said after the meeting?	
Decision Making ■ How will we make decisions? ■ Are we an advisory or a decision-making body? ■ Will we reach decisions by consensus? ■ How will we deal with conflicts?	
Participation ■ How will we encourage everyone's participation? ■ Will we have an attendance policy?	
Expectations ■ What do we expect from members? ■ Are there requirements for participation?	

Path Goal Leadership Approach Activity

Name_____

School_____

As a group, go over each profile PLC, and using the Leadership Approach Activity sheet found in your packet, determine which leadership style is described. Then determine which leadership style is needed to address the condition.

District Profile

The ABC School District has outlined expectations for PLCs in the Curriculum and Instruction Handbook. All teachers shall complete the prescribed training at their home campus. An excerpt from the handbook states,

"… to increase student achievement the ABC district supports the necessity of weekly PLC meetings to collaborate in data analysis, addressing the four critical PLC questions, sharing or observe best practices, and professional development. It is an expectation that PLCs submit weekly minutes that address these expectations through the appropriate district Google Docs folder. It is highly recommended that PLC teams monitor their processes periodically, and make modifications as needed to strengthen PLC implementation." [fictitious statement]

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Path Goal Leadership Styles and Descriptions (House, 1971), (Sujana, 2020)

- **Directive –** The leader sets rules and expectations.
- **Supportive –** The leader builds relationships with teachers.
- **Participative –** Leaders consult with teachers and includes them in the decision-making process.
- **Action-Oriented –** The leader sets high expectations for challenging goals and expects high performance**.**

DOI Components and Profile PLCs Activity

Name_____

School_____

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After reading district expectations and the profile PLCs, as a group, use your notes, discuss, and complete the following questions:

Relative Advantage

Which profile(s) PLCs describe a team that perceives the PLC innovation as a relative advantage. Please give a detailed explanation.

Compatibility

Which profile(s) PLCs describe a team that perceives the PLC innovation as compatible with the values and norms of the district. Please give a detailed explanation.

Complexity

Which profile(s) PLCs describe a team that perceives (or demonstrates) the PLC innovation as to complex to understand, implement effectively. Please give a detailed explanation.

Trialability

Which profile(s) PLCs describe a team went through a period of modification, or looked at the tentative direction of the PLC innovation. Please give a detailed explanation.

Observability

Which profile(s) PLCs describe a team that demonstrates teachers observing other teachers in PLC meetings showing effective instructional practices.

Day 2: Activity 2

DOI Action Plans for Profile PLCs Activity

As a team, use your notes to create an action plan for the leader of each profile PLC that will address promotion of the innovation and increase fidelity of implementation of the PLC. The action plan will focus how to (a)promote relative advantage, (b) connect actions that show compatibility with the organization, (c) decrease the complexity of the PLC process, (d) create a trial period, and (e) facilitate staff observing practices of other staff.

Profile PLC #1

Profile PLC #2

Profile PLC #3

Profile PLC #4

Day 3: Activity 1

Process Monitoring Tools-DOI Inventory

The members will look for patterns in responses to gain insight on the status of the PLC. The following questions will be answered independently and will be used as a guide by the facilitator to elicit responses..

1. How would rate PLC meetings in comparison to other academic initiatives you have done?

2. Are there any advantages to working as a PLC on your campus? Please explain.

3. Are there any disadvantages to working as a PLC on your campus? Please explain.

4. Please describe the benefits of your PLC meetings. Consider instructional planning, instructional practices, and student learning.

5. Please describe how what collaboration looks like in your PLC meetings.

6. Please describe what you know about district expectations for PLC meetings.

7. What are the norms of your PLC?

8. Is there anything about the PLC process that is difficult to understand?

9. Are there any modifications or follow-up plans needed to implement to improve your PLC meetings?

10. Can you describe the effect PLC meetings have had on your instructional practices?

11. Can you describe the effect PLC meetings have had on student achievement?

Process Monitoring-DOI Inventory Directions

This DOI inventory is a qualitative inventory. Findings regarding a campus PLC are to emerge from discussion, and reflection. Findings will be based on the majority perception, and but in no way negates the perception of the minority. Decisions will not be made at this time, as the PLC members are not in attendance. *This evaluation activity is for practice only.*

The presenter will lead participants step-by-step in the process of analysis. PD assistants will monitor and be available for assistance.

Selected PLC

PLC Lead teachers will decide which one of ***their*** PLCs will be selected for DOI process monitoring.

Supplies and Materials

Teams will need to spread out, taking their chairs with them to various points in the room near a wall. Supplies needed are easel notepads, markers, PLC packet, and notes.

Duties

The PLC Lead teachers will serve as facilitators. The facilitator(s) will read each question, facilitate discussion among team members, and verbally interpret findings.

A volunteer will serve as the recorder. The recorder will record and read comments at the end of questioning.

Team members will look for similarities, and differences in perceptions and note if there is a majority in perception

DOI Questions

DOI questions can be found in your packet and titled "*Process Monitoring Tools-DOI Inventory".*

Question Alignment for Analysis

Questions 1-4	Relative Advantage
Questions 5-6	Compatibility
Questions 7-8	Complexity
Question 9	Trialability
Questions 10-11	Observability

The assessment shown is a sample of the PLCA-R. The complete online or paper version is available for request and purchase at www.plcassociates.org

Professional Learning Communities Assessment – Revised

Sample Items

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. Shade 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)

STATEMENTS		SCALE			
	Shared and Supportive Leadership	**SD**	**D**	**A**	**SA**
1.	Staff members are consistently involved in discussing and making decisions about most school issues.	0	0	0	0
10.	Stakeholders assume shared responsibility and accountability for student learning without evidence of imposed power and authority.	0	0	0	0
COMMENTS:					
	Shared Values and Vision	**SD**	**D**	**A**	**SA**
13.	Shared values support norms of behavior that guide decisions about teaching and learning.	0	0	0	0
18.	Policies and programs are aligned to the school's vision.	0	0	0	0
COMMENTS:					
	Collective Learning and Application	**SD**	**D**	**A**	**SA**
21.	Staff members work together to seek knowledge, skills and strategies and apply this new learning to their work.	0	0	0	0
29.	Staff members collaboratively analyze multiple sources of data to assess the effectiveness of instructional practices.	0	0	0	0
COMMENTS:					

	Shared Personal Practice	**SD**	**D**	**A**	**SA**
32.	Staff members provide feedback to peers related to instructional practices.	0	0	0	0
37.	Staff members regularly share student work to guide overall school improvement.	0	0	0	0
COMMENTS:					
	Supportive Conditions - Relationships	**SD**	**D**	**A**	**SA**
38.	Caring relationships exist among staff and students that are built on trust and respect.	0	0	0	0
COMMENTS:					
	Supportive Conditions - Structures	**SD**	**D**	**A**	**SA**
52.	Data are organized and made available to provide easy access to staff members.	0	0	0	0
COMMENTS:					

Source: 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.

REPRODUCIBLE

Critical Issues for Team Consideration

Team Name: _____

Team Members: _____

Use the scale below to indicate the extent to which each of the following statements is true of your team.

1 2 3 4 5 6 7 8 9 10
Not True of Our Team — Our Team Is Addressing — True of Our Team

1. ___ We have identified team norms and protocols to guide us in working together.
2. ___ We have analyzed student achievement data and have established SMART goals that we are working interdependently to achieve.
3. ___ Each member of our team is clear on the essential learnings of our course in general as well as the essential learnings of each unit.
4. ___ We have aligned the essential learnings with state and district standards and the high-stakes exams required of our students.
5. ___ We have identified course content and/or topics that can be eliminated so we can devote more time to essential curriculum.
6. ___ We have agreed on how to best sequence the content of the course and have established pacing guides to help students achieve the intended essential learnings.
7. ___ We have identified the prerequisite knowledge and skills students need in order to master the essential learnings of our course and each unit of this course.
8. ___ We have identified strategies and created instruments to assess whether students have the prerequisite knowledge and skills.
9. ___ We have developed strategies and systems to assist students in acquiring prerequisite knowledge and skills when they are lacking in those areas.
10. ___ We have developed frequent common formative assessments that help us to determine each student's mastery of essential learnings.
11. ___ We have established the proficiency standard we want each student to achieve on each skill and concept examined with our common assessments.
12. ___ We have developed common summative assessments that help us assess the strengths and weaknesses of our program.
13. ___ We have established the proficiency standard we want each student to achieve on each skill and concept examined with our summative assessments.
14. ___ We have agreed on the criteria we will use in judging the quality of student work related to the essential learnings of our course, and we practice applying those criteria to ensure consistency.
15. ___ We have taught students the criteria we will use in judging the quality of their work and have provided them with examples.
16. ___ We evaluate our adherence to and the effectiveness of our team norms at least twice each year.
17. ___ We use the results of our common assessments to assist each other in building on strengths and addressing weaknesses as part of a process of continuous improvement designed to help students achieve at higher levels.
18. ___ We use the results of our common assessments to identify students who need additional time and support to master essential learnings, and we work within the systems and processes of the school to ensure they receive that support.

The evaluator(s) will look for patterns in responses to gain insight on the status of the PLC. The following questions can be answered independently and given to the evaluator, or can be used as a guide by the leader for reflective dialogue.

PLC Reflection Questions
Keep in the mind the following....

1. How are you sitting?
2. Are the norms being followed?
3. Are the individual roles being followed?
4. Have you taken the time to understand the responsibilities of each role?
5. Is there a structure to the meeting – or is it just a free open discussion of whatever comes to mind?
6. How much time is spent talking about students versus how much time is taken by planning what topic is being covered for the upcoming week?
7. How much time is taken up by discussing the following:
    a. How are we differentiating this lesson?
    b. What kinds of higher order questions can we ask during this lesson?
    c. How are we assessing during the lesson?
8. How often is data (by student/by teacher) brought to PLC's (a copy for each) and discussed?
9. What happens when someone doesn't bring their data (ie. didn't have time to grade it yet)?
10. How often do you visit your PLC's norms or have those "heart to heart" conversations to become better?

Used with permission by Solution Tree

Day 3 – Activity 3

Reflective Dialogue Simulation Activity

General Principles for Participating in Reflective Discussion

by David J. Voelker

1. Listen carefully and use what you hear to help you reflect—rather than focusing on defending your preexisting assumptions.

2. If you have a natural tendency to "go on" in discussions, challenge yourself to listen rather than speak and try to be very selective about what you say.

3. If you have a natural tendency to be reserved and quiet in discussions, challenge yourself to share your thoughts with the group.

4. Keep in mind that the main goals of a reflective discussion are: 1) individual reflection and clarification (of assumptions, habitual thought processes, values, feelings, etc.), and 2) community building (building trust and capacity to listen)— not consensus building, problem solving, or decision making (though the practice of reflective discussion may enhance these processes at a future time).

5. Avoid the temptation to offer easy solutions to problems. A reflective discussion is not the appropriate place to give advice to anyone about how to solve their problems.

6. Feel free to ask questions of other participants, but make an effort to keep these questions open-ended, rather than "leading." Strive to ask what Parker J. Palmer calls "honest, open questions."

7. Attempt to understand the views of other members of the group—while accepting that they may differ from your own views. You should share your own views without arguing for them with the intention of persuading or instructing others.

8. As David Bohm says of authentic dialogue: "We are not playing a game against each other, but with each other. In a dialogue, everybody wins" (p. 7). Everybody wins because everyone walks away with a deeper understanding of themselves and others, and the group is stronger from having shared a common experience of thinking together.

Acknowledgements: Thanks to Kelli Covey, who helped me develop my understanding of reflective discussion.

http://davidjvoelker.com/reflective-discussion/
2016-05-26

Campus PLC Leaders' Guide Final Project Draft

The purpose of this Leaders' Guide is to build capacity in district and campus leaders to strengthen the effectiveness of campus PLC teams with practices to implement the PLC process with fidelity. As a campus team, this last activity is to the complete the draft. An assigned district leader will monitor and evaluate a team using the Campus PLC Leaders' Guide Checklist. No later than one week from Day 3 of this PD, submit the final draft in Google Drive>PLC files>your campus folder.

Campus_____

Leader Name	Title

Leaders' Responsibilities

- Monitor PLC process through DOI and other measures and make needed adjustments
- Apply the appropriate leadership skills
- Develop sound PLCs based on research and norms
- Attend PLC meetings

Insert the appropriate leader name.

PLC Grade/ Subject	Campus Admin Leader(s)	Instructional Specialist Leader(s)	PLC Lead Teacher	District Coordinator Leader

Insert the appropriate information.

PLC Grade/ Subject	Location	Day(s)	Time (From-To)

Considering the Path Goal Leadership styles, propose and write your campus/district leadership actions by condition.

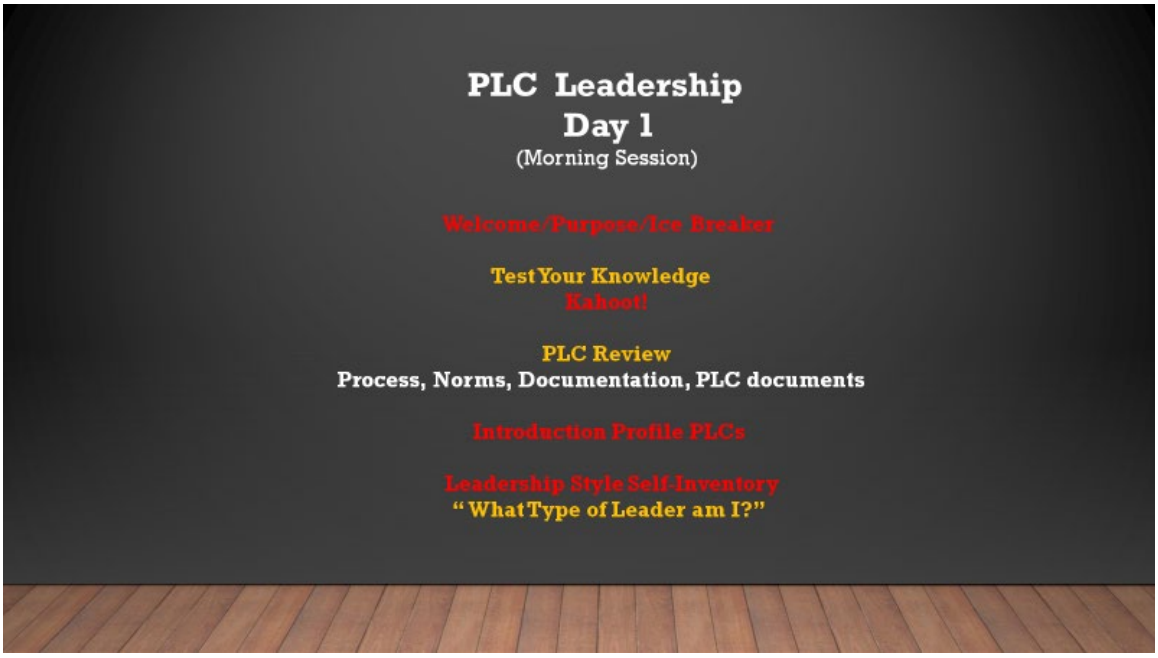
Leadership Style	Condition	Proposed Leader Actions
Directive	If the PLC is not sure or knowledgeable about an aspect of the job	
Supportive	If the PLC needs support during challenging aspects of the job	
Participative	If the PLC and has high-quality work skills and can be included in the decision-making process	
Achievement Oriented	If the PLC needs to perform at maximum level to achieve a challenging goal.	

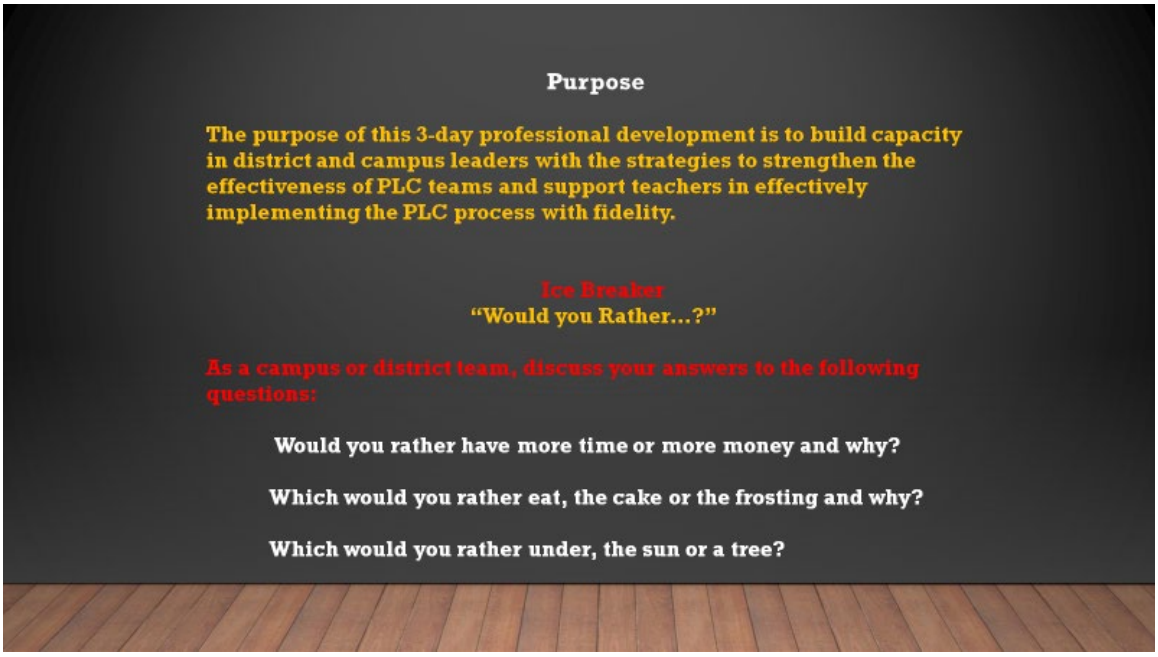
Utilizing the components of Diffusion of Innovation (DOI) addresses promotion of the PLC innovation and increases the fidelity of implementation. Additionally, DOI reflections can be a tool to monitor the PLC process. Propose and write actions that campus/district leaders will execute to strengthen, correct or initiate each DOI component.

DOI Component	Proposed Leader Actions
Relative Advantage	
Compatibility	
Complexity	
Trialability	
Observability	

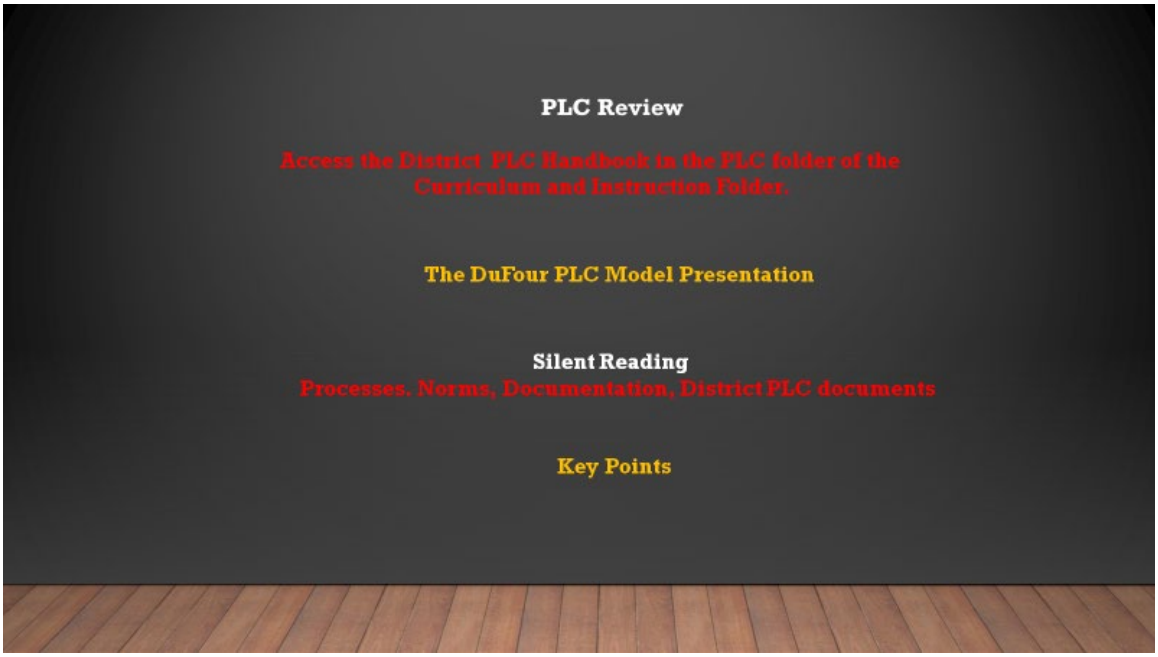

PLC Leadership:
Transforming Your Teams
Daphne Kahn-Wiley

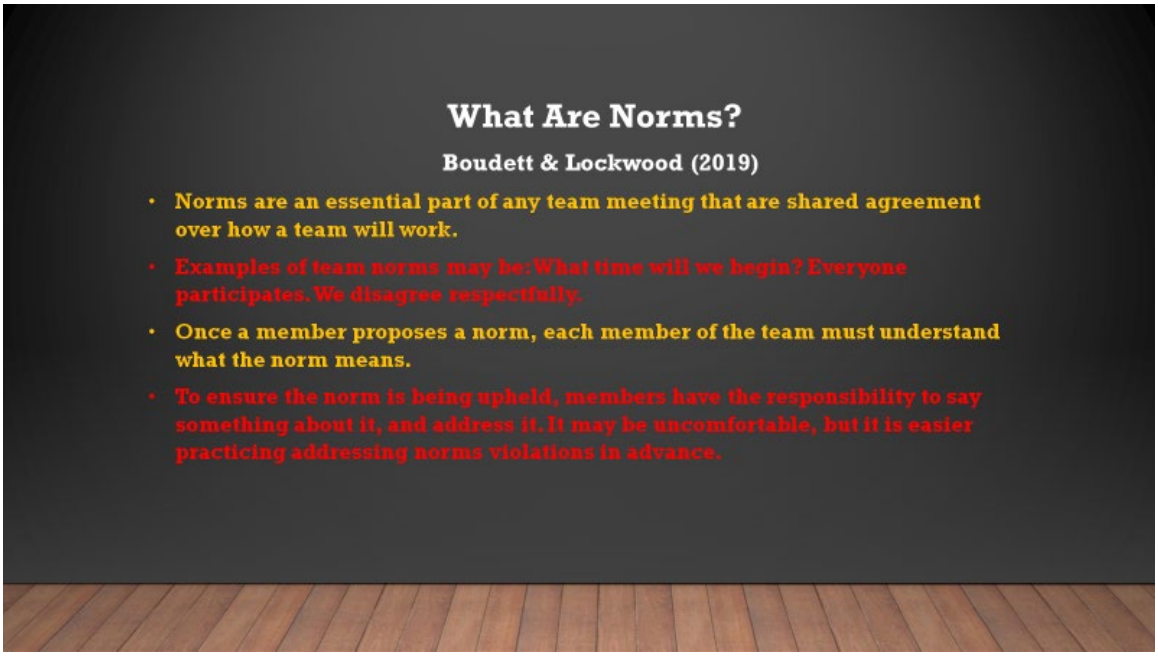

Leaders become great not because of their power but, because of their ability to empower others.
John Maxwell

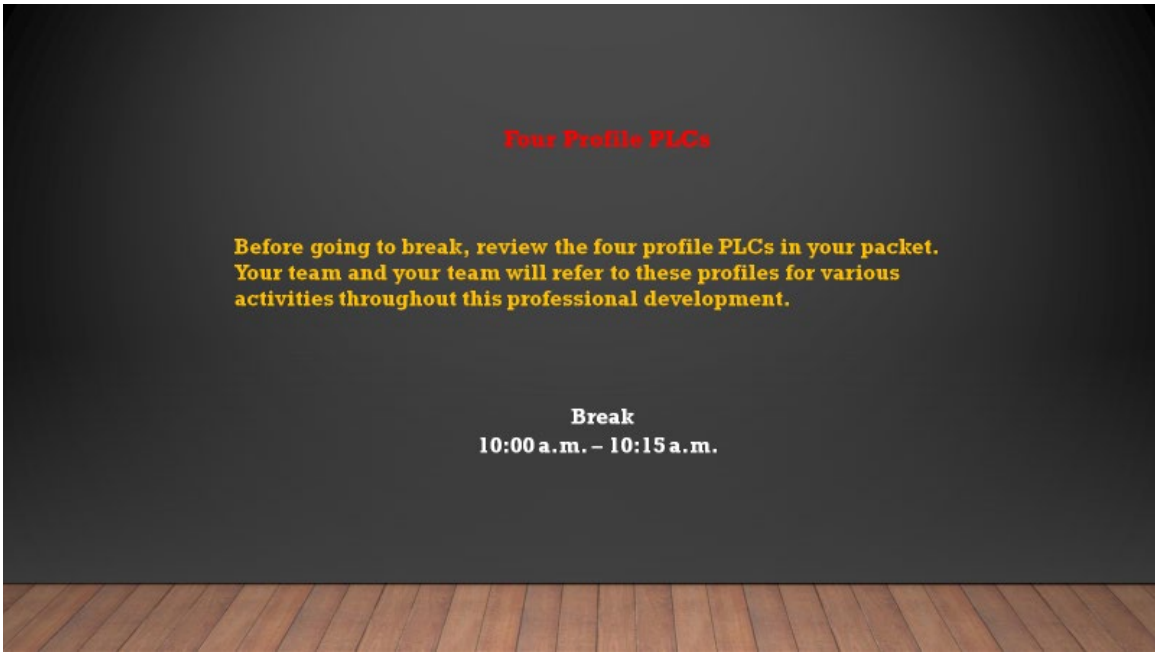

PLC Leadership
Day 1
(Morning Session)
Welcome/Purpose/Ice Breaker
Test Your Knowledge
Kahoot!
PLC Review
Process, Norms, Documentation, PLC documents
Introduction Profile PLCs
Leadership Style Self-Inventory
"What Type of Leader am I?"

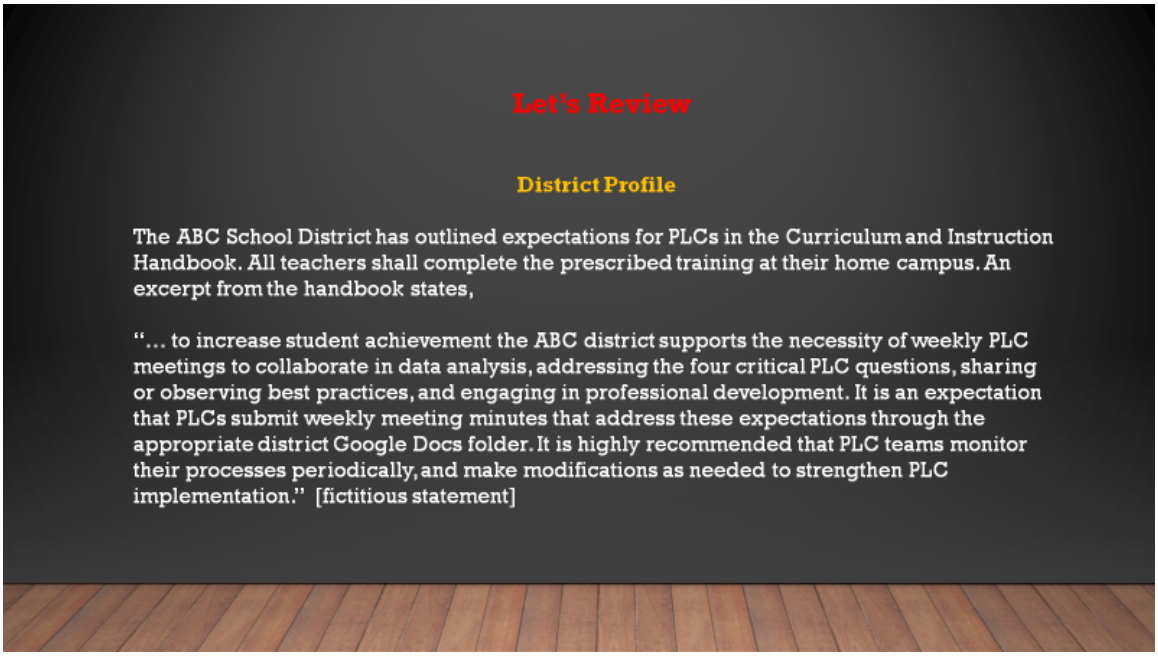

Purpose
The purpose of this 3-day professional development is to build capacity in district and campus leaders with the strategies to strengthen the effectiveness of PLC teams and support teachers in effectively implementing the PLC process with fidelity.
Ice Breaker
"Would you Rather…?"
As a campus or district team, discuss your answers to the following questions:
Would you rather have more time or more money and why?
Which would you rather eat, the cake or the frosting and why?
Which would you rather under, the sun or a tree?


Test Your Knowledge
Follow the Kahoot! link on your phone or laptop.
After the question, select the correct answer.
Kahoot! Link _____
Kahoot!


PLC Review
Access the District PLC Handbook in the PLC folder of the Curriculum and Instruction Folder.
The DuFour PLC Model Presentation
Silent Reading
Processes. Norms, Documentation, District PLC documents
Key Points


What Are Norms?
Boudett & Lockwood (2019)
• Norms are an essential part of any team meeting that are shared agreement over how a team will work.
• Examples of team norms may be: What time will we begin? Everyone participates. We disagree respectfully.
• Once a member proposes a norm, each member of the team must understand what the norm means.
• To ensure the norm is being upheld, members have the responsibility to say something about it, and address it. It may be uncomfortable, but it is easier practicing addressing norms violations in advance.


Four Profile PLCs
Before going to break, review the four profile PLCs in your packet. Your team and your team will refer to these profiles for various activities throughout this professional development.
Break
10:00 a.m. – 10:15 a.m.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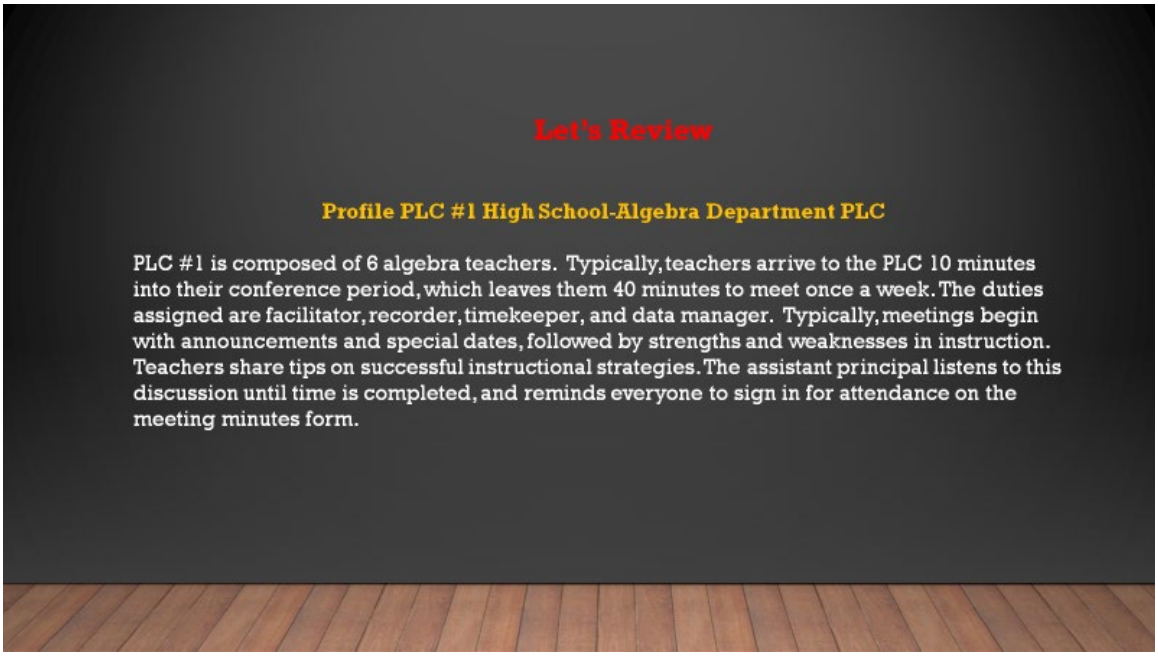
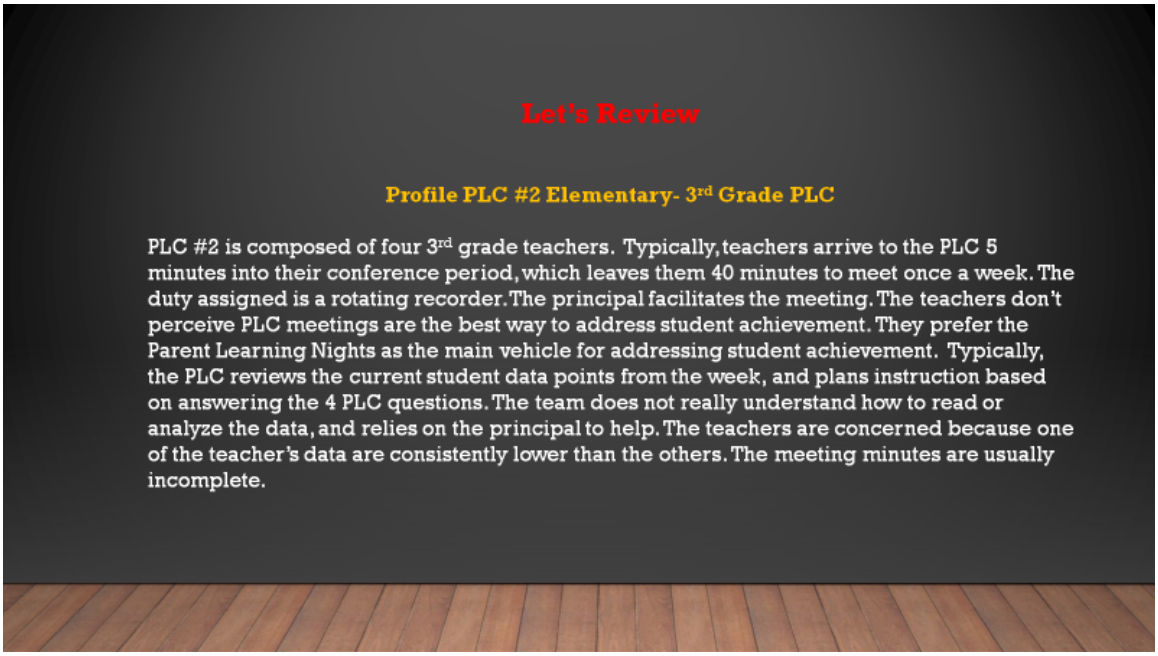
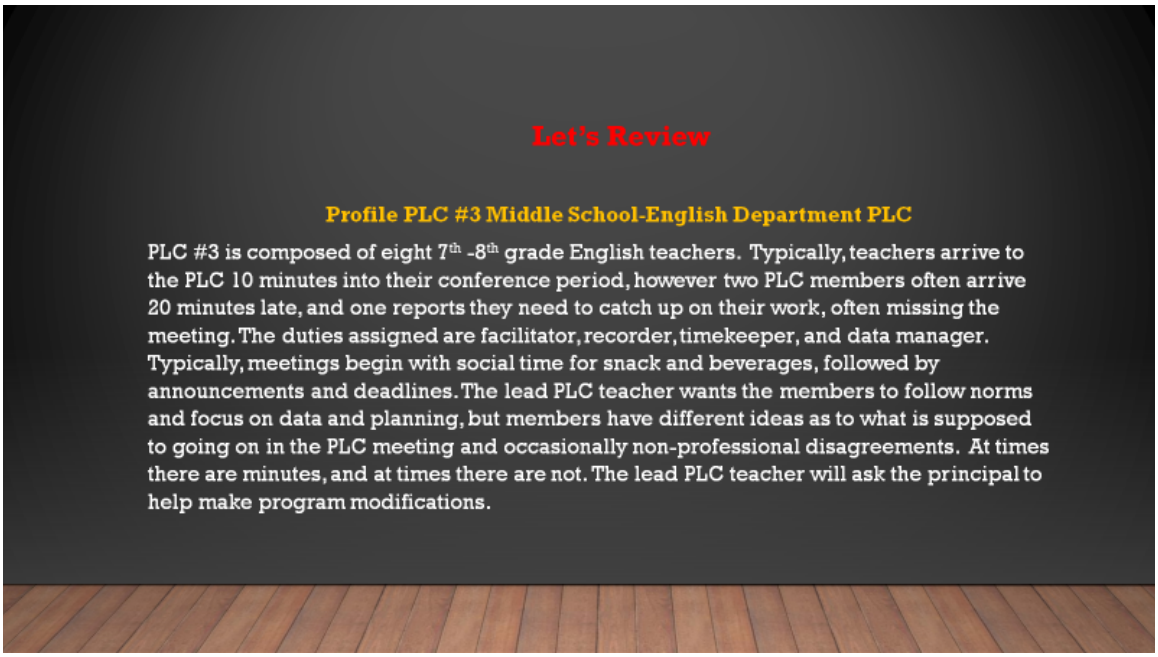
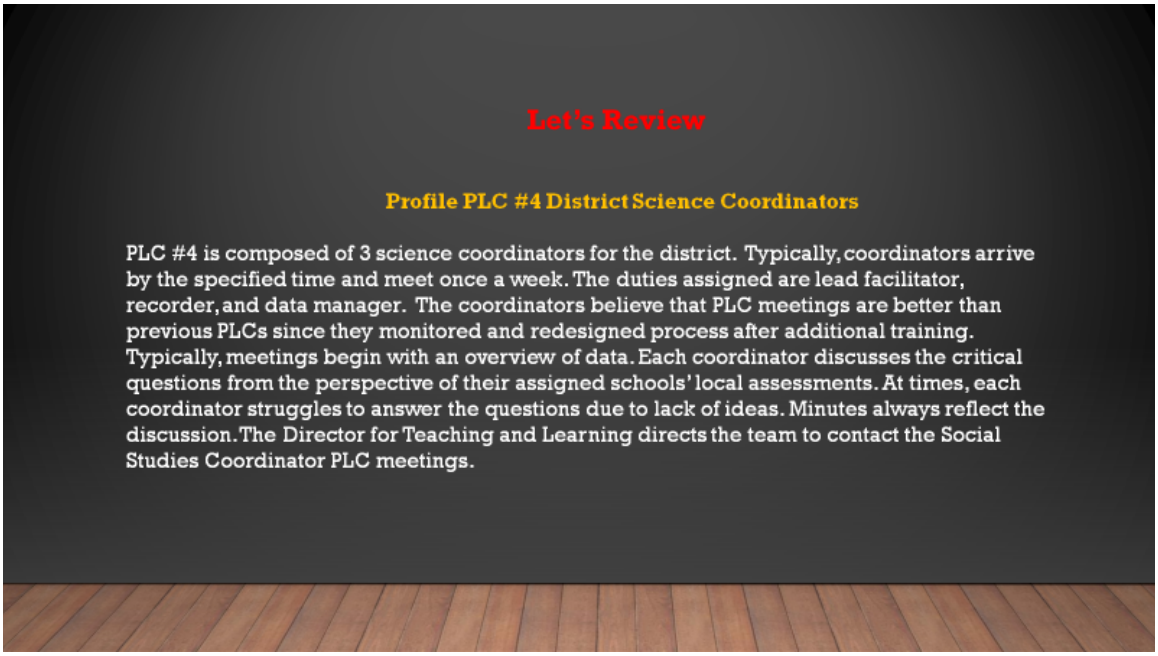
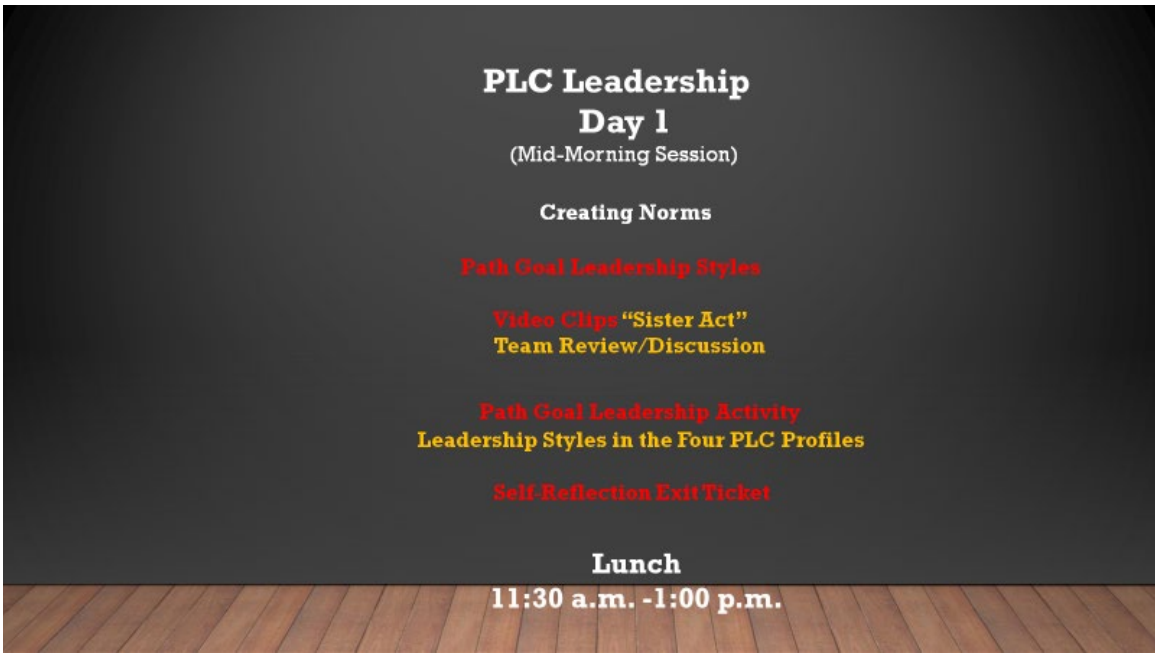
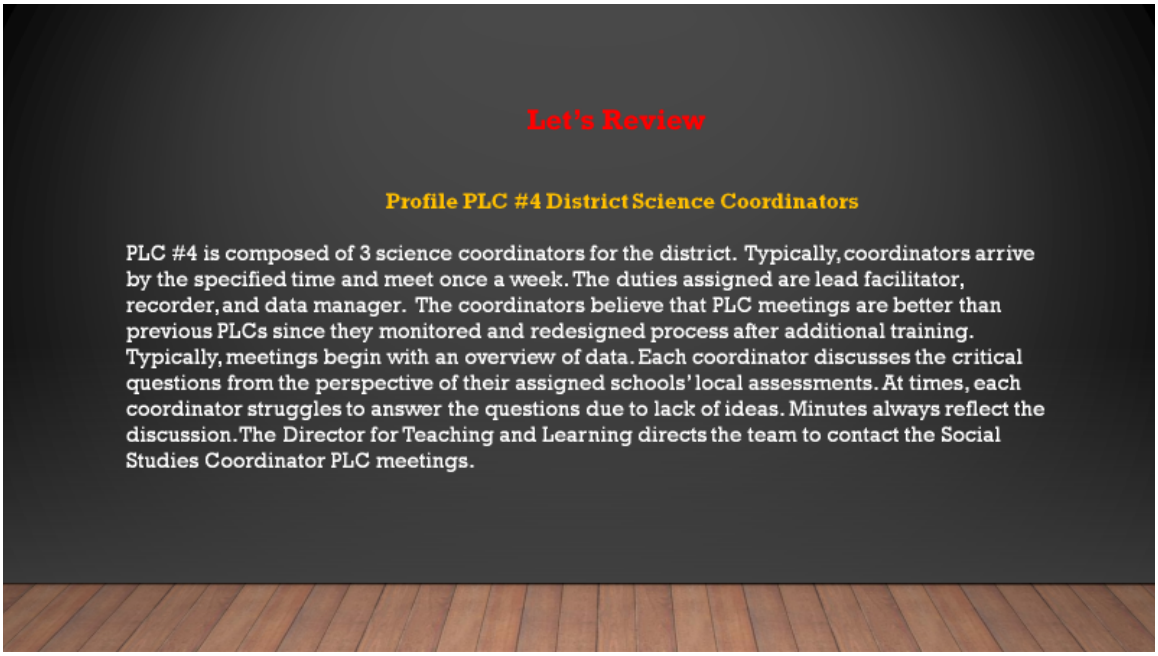

Let's Review
Profile PLC #1 High School-Algebra Department PLC
PLC #1 is composed of 6 algebra teachers. Typically, teachers arrive to the PLC 10 minutes into their conference period, which leaves them 40 minutes to meet once a week. The duties assigned are facilitator, recorder, timekeeper, and data manager. Typically, meetings begin with announcements and special dates, followed by strengths and weaknesses in instruction. Teachers share tips on successful instructional strategies. The assistant principal listens to this discussion until time is completed, and reminds everyone to sign in for attendance on the meeting minutes form.


Let's Review
Profile PLC #2 Elementary- 3rd Grade PLC
PLC #2 is composed of four 3rd grade teachers. Typically, teachers arrive to the PLC 5 minutes into their conference period, which leaves them 40 minutes to meet once a week. The duty assigned is a rotating recorder. The principal facilitates the meeting. The teachers don't perceive PLC meetings are the best way to address student achievement. They prefer the Parent Learning Nights as the main vehicle for addressing student achievement. Typically, the PLC reviews the current student data points from the week, and plans instruction based on answering the 4 PLC questions. The team does not really understand how to read or analyze the data, and relies on the principal to help. The teachers are concerned because one of the teacher's data are consistently lower than the others. The meeting minutes are usually incomplete.


Let's Review
Profile PLC #3 Middle School-English Department PLC
PLC #3 is composed of eight 7th -8th grade English teachers. Typically, teachers arrive to the PLC 10 minutes into their conference period, however two PLC members often arrive 20 minutes late, and one reports they need to catch up on their work, often missing the meeting. The duties assigned are facilitator, recorder, timekeeper, and data manager. Typically, meetings begin with social time for snack and beverages, followed by announcements and deadlines. The lead PLC teacher wants the members to follow norms and focus on data and planning, but members have different ideas as to what is supposed to going on in the PLC meeting and occasionally non-professional disagreements. At times there are minutes, and at times there are not. The lead PLC teacher will ask the principal to help make program modifications.


Let's Review
Profile PLC #4 District Science Coordinators
PLC #4 is composed of 3 science coordinators for the district. Typically, coordinators arrive by the specified time and meet once a week. The duties assigned are lead facilitator, recorder, and data manager. The coordinators believe that PLC meetings are better than previous PLCs since they monitored and redesigned process after additional training. Typically, meetings begin with an overview of data. Each coordinator discusses the critical questions from the perspective of their assigned schools' local assessments. At times, each coordinator struggles to answer the questions due to lack of ideas. Minutes always reflect the discussion. The Director for Teaching and Learning directs the team to contact the Social Studies Coordinator PLC meetings.


PLC Leadership
Day 1
(Mid-Morning Session)
Creating Norms
Path Goal Leadership Styles
Video Clips "Sister Act"
Team Review/Discussion
Path Goal Leadership Activity
Leadership Styles in the Four PLC Profiles
Self-Reflection Exit Ticket
Lunch
11:30 a.m. -1:00 p.m.


Let's Review
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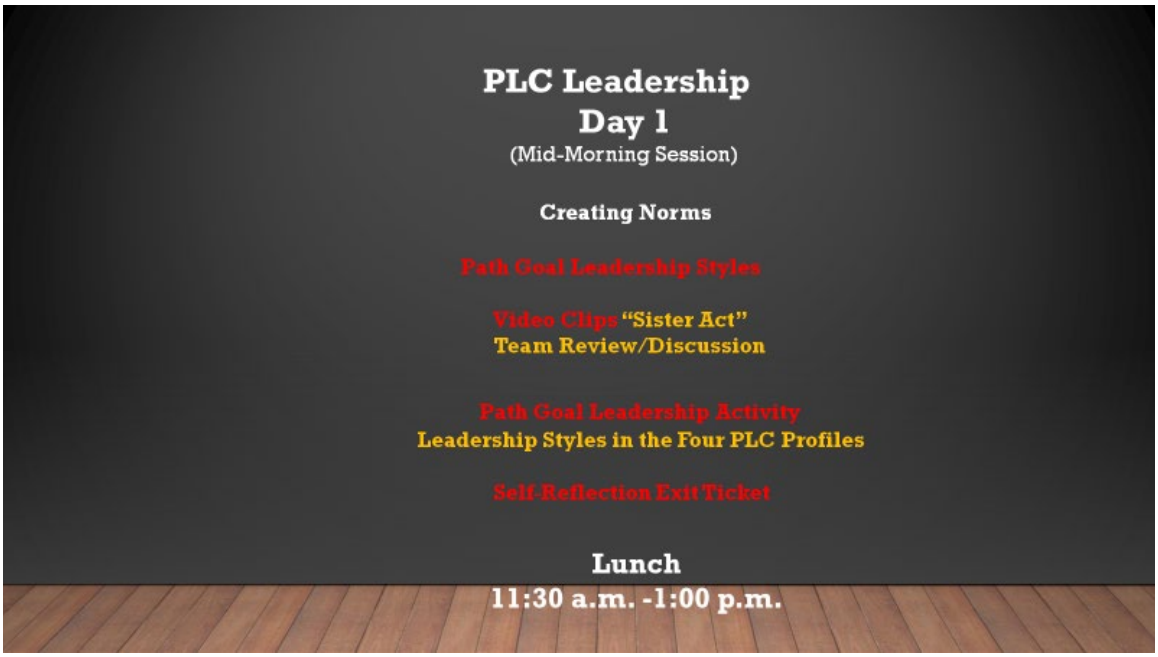
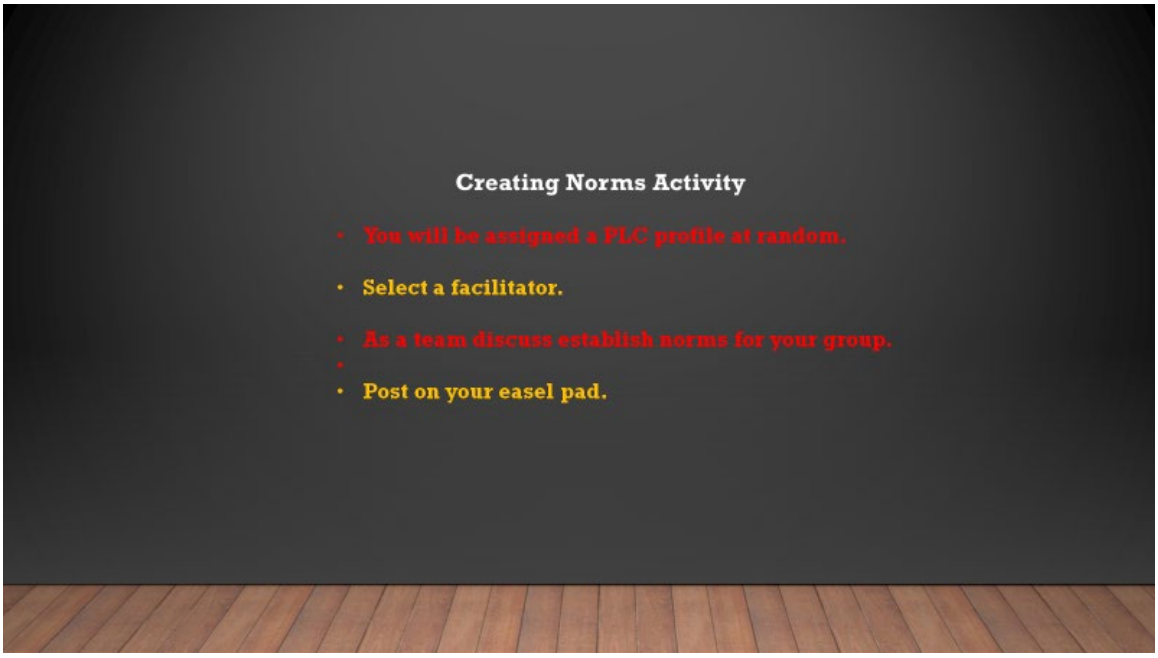
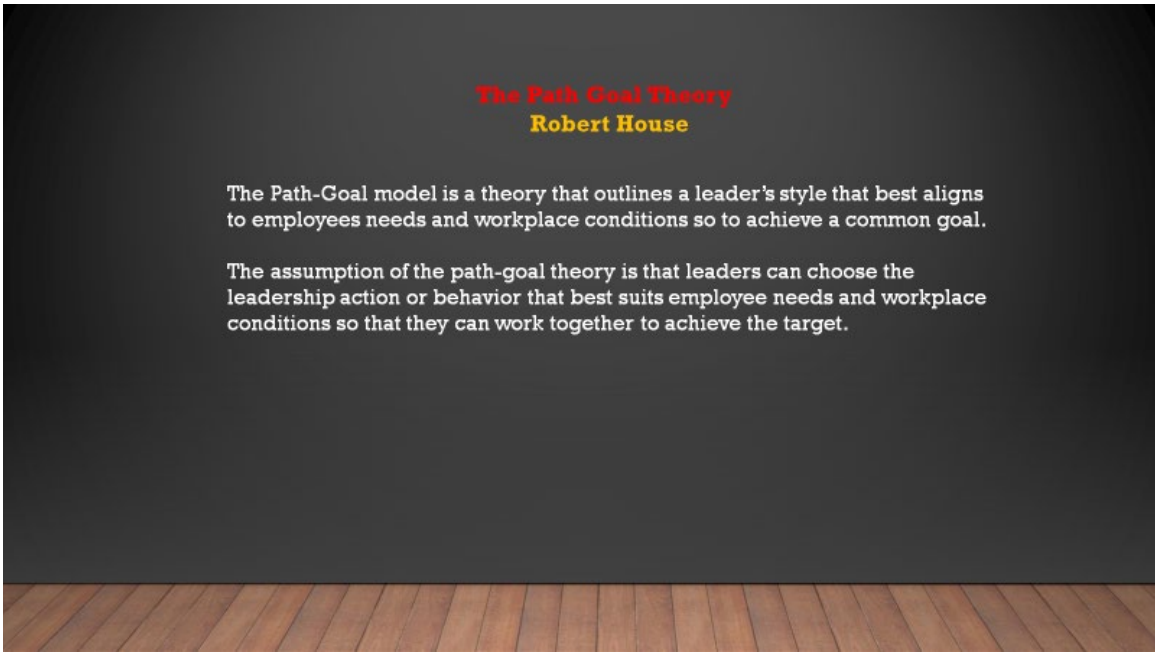
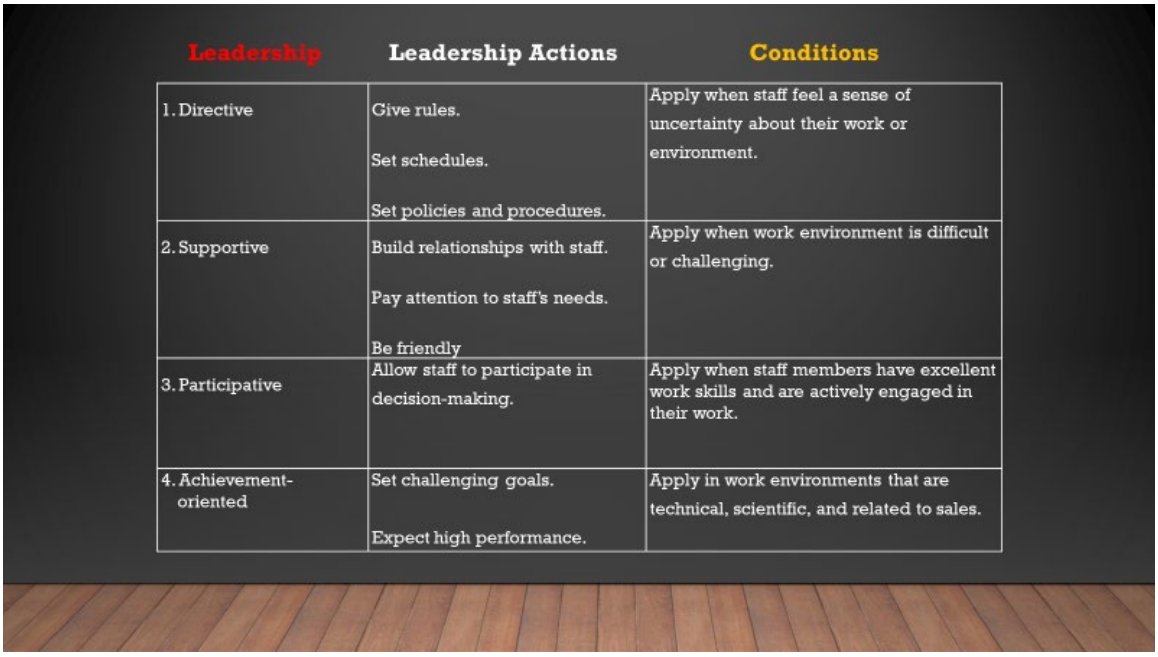

PLC Leadership
Day 1
(Mid-Morning Session)
Creating Norms
Path Goal Leadership Styles
Video Clips "Sister Act"
Team Review/Discussion
Path Goal Leadership Activity
Leadership Styles in the Four PLC Profiles
Self-Reflection Exit Ticket
Lunch
11:30 a.m. -1:00 p.m.


Creating Norms Activity
You will be assigned a PLC profile at random.
Select a facilitator.
As a team discuss establish norms for your group.
Post on your easel pad.

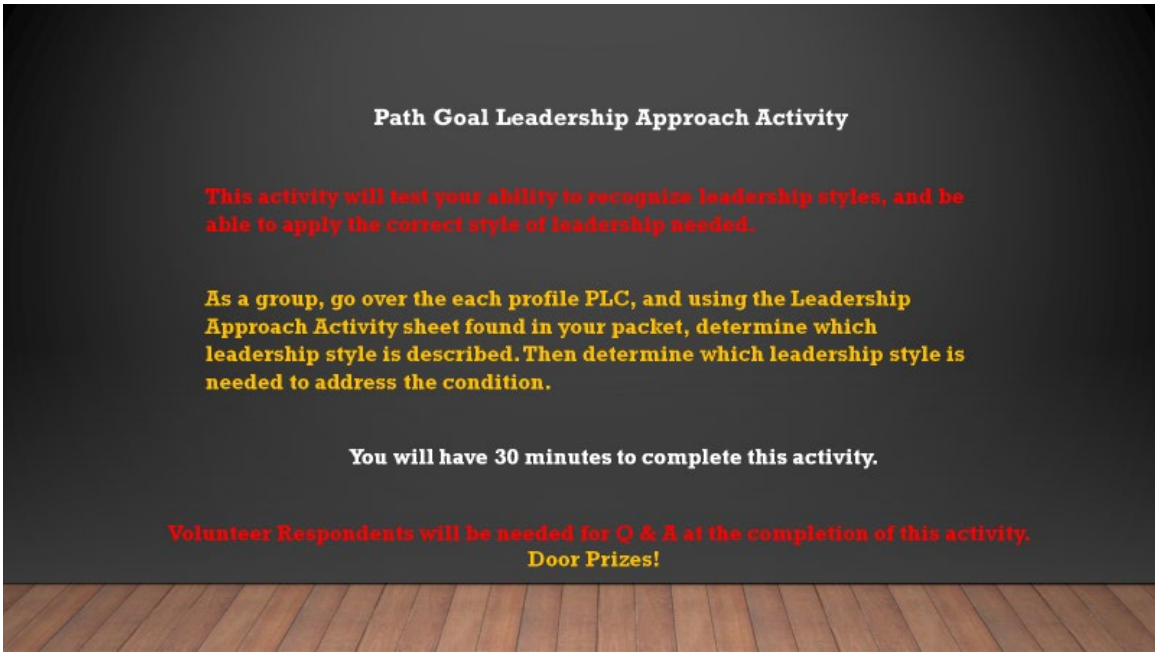

What is your Leadership Style?
Leadership Style Questionnaire
(In packet)
Discussion

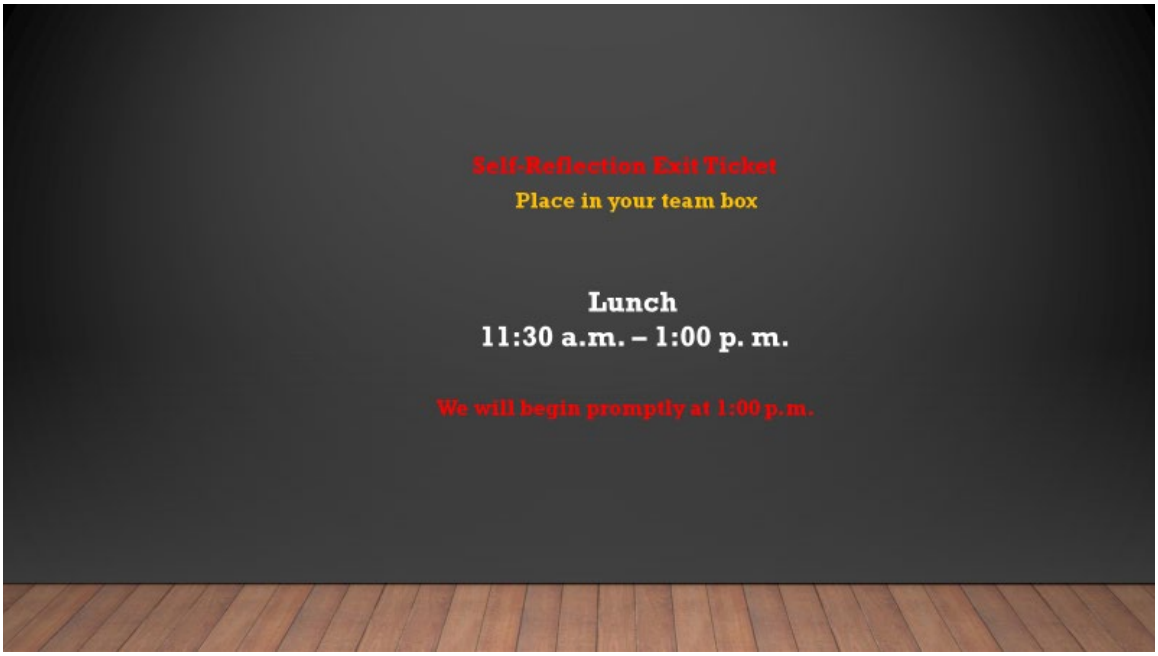


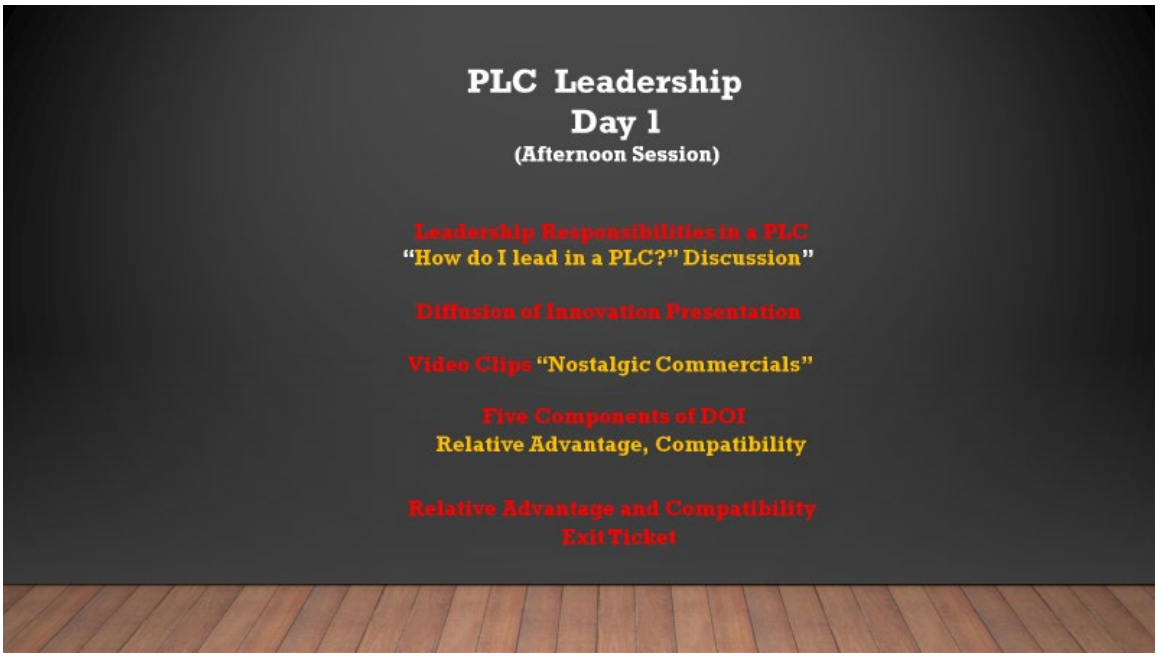


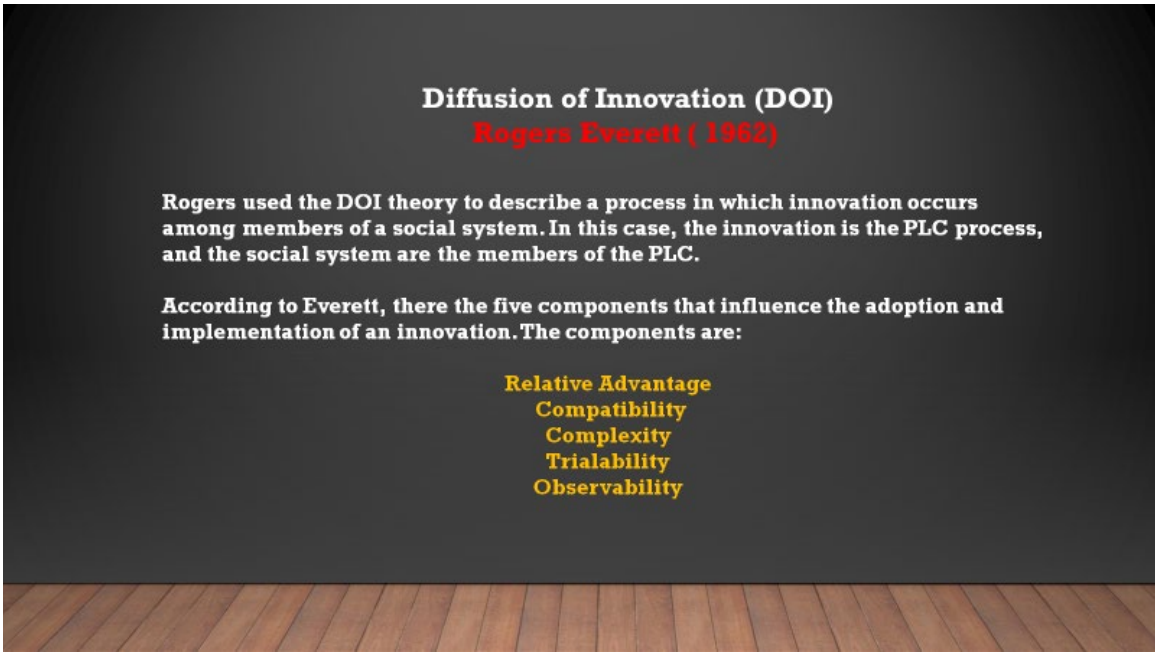
Leadership	Leadership Actions	Conditions
1. Directive	Give rules. Set schedules. Set policies and procedures.	Apply when staff feel a sense of uncertainty about their work or environment.
2. Supportive	Build relationships with staff. Pay attention to staff's needs. Be friendly	Apply when work environment is difficult or challenging.
3. Participative	Allow staff to participate in decision-making.	Apply when staff members have excellent work skills and are actively engaged in their work.
4. Achievement-oriented	Set challenging goals. Expect high performance.	Apply in work environments that are technical, scientific, and related to sales.

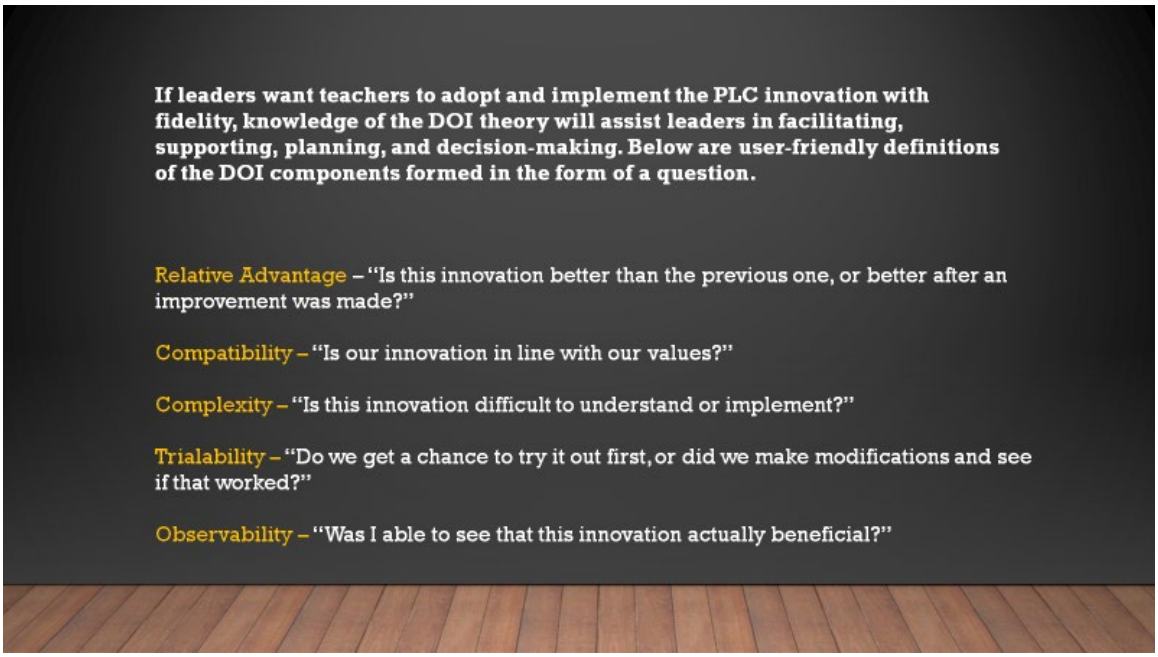

SISTER
ACT
Can you spot the four leadership styles?


Path Goal Leadership Approach Activity
This activity will test your ability to recognize leadership styles, and be able to apply the correct style of leadership needed.
As a group, go over the each profile PLC, and using the Leadership Approach Activity sheet found in your packet, determine which leadership style is described. Then determine which leadership style is needed to address the condition.
You will have 30 minutes to complete this activity.
Volunteer Respondents will be needed for Q & A at the completion of this activity.
Door Prizes!


Self-Reflection Exit Ticket
Place in your team box
Lunch
11:30 a.m. – 1:00 p. m.
We will begin promptly at 1:00 p.m.

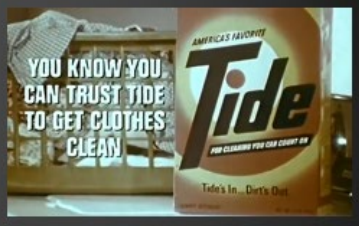

PLC Leadership
Day 1
(Afternoon Session)
Leadership Responsibilities in a PLC
"How do I lead in a PLC?" Discussion"
Diffusion of Innovation Presentation
Video Clips "Nostalgic Commercials"
Five Components of DOI
Relative Advantage, Compatibility
Relative Advantage and Compatibility
Exit Ticket


Diffusion of Innovation (DOI)
Rogers Everett (1962)
Rogers used the DOI theory to describe a process in which innovation occurs among members of a social system. In this case, the innovation is the PLC process, and the social system are the members of the PLC.
According to Everett, there the five components that influence the adoption and implementation of an innovation. The components are:
Relative Advantage
Compatibility
Complexity
Trialability
Observability


If leaders want teachers to adopt and implement the PLC innovation with fidelity, knowledge of the DOI theory will assist leaders in facilitating, supporting, planning, and decision-making. Below are user-friendly definitions of the DOI components formed in the form of a question.
Relative Advantage – "Is this innovation better than the previous one, or better after an improvement was made?"
Compatibility – "Is our innovation in line with our values?"
Complexity – "Is this innovation difficult to understand or implement?"
Trialability – "Do we get a chance to try it out first, or did we make modifications and see if that worked?"
Observability – "Was I able to see that this innovation actually beneficial?"

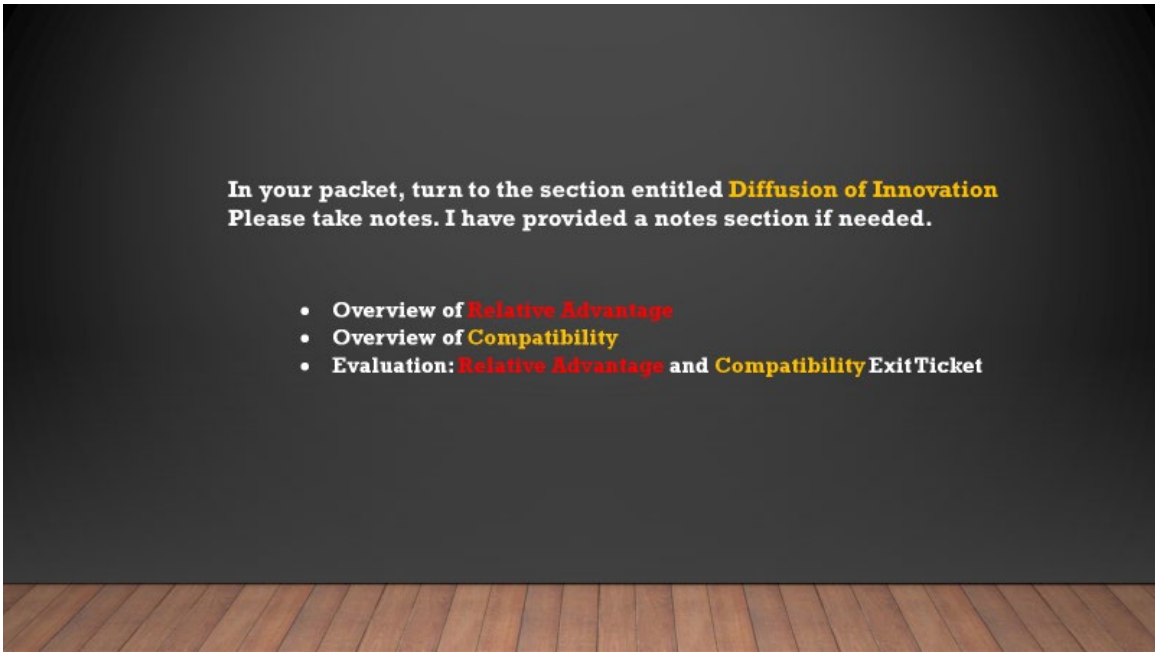
Diffusion of Innovation in 1960's Marketing

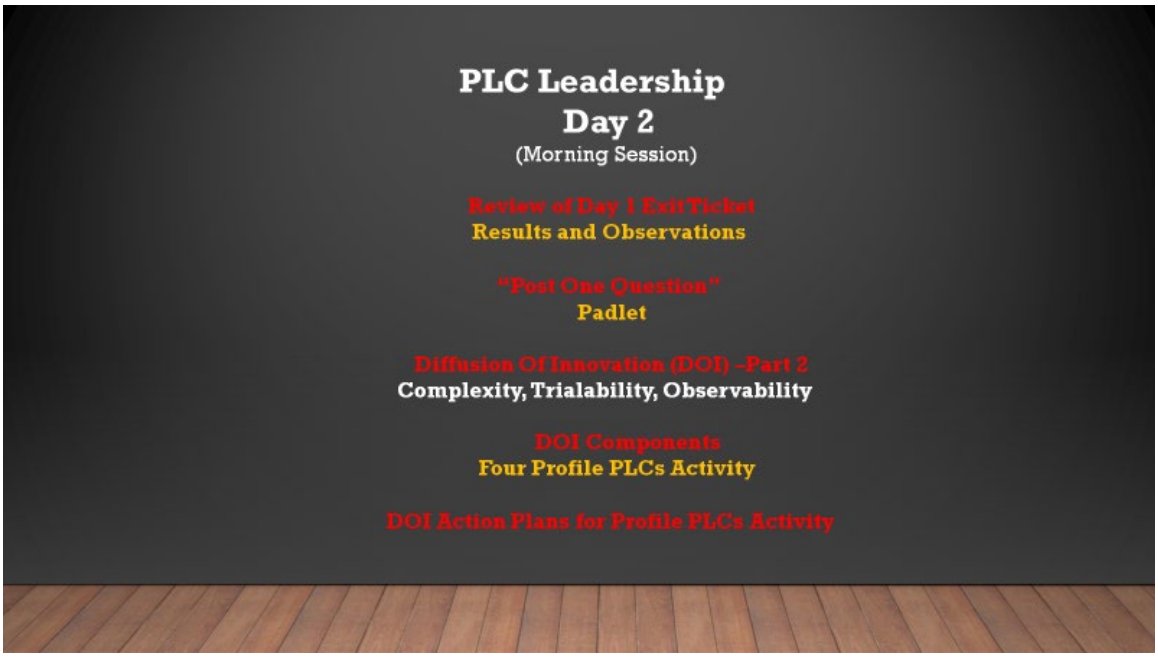
Video Clips

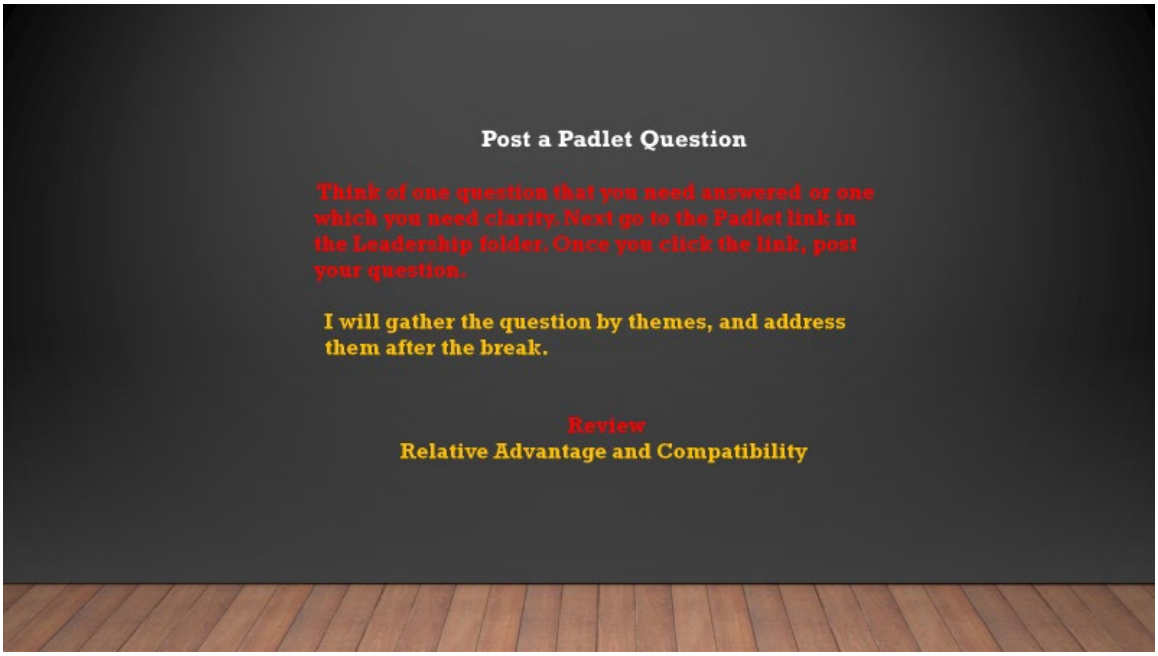


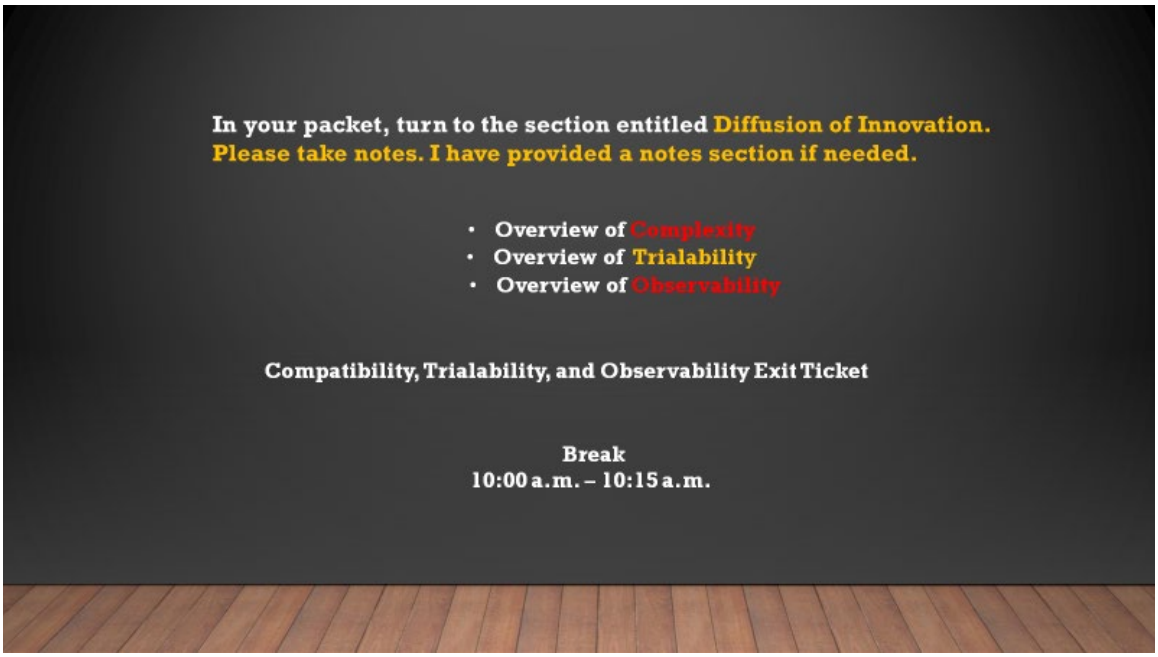
Nostalgic Commercial Clips

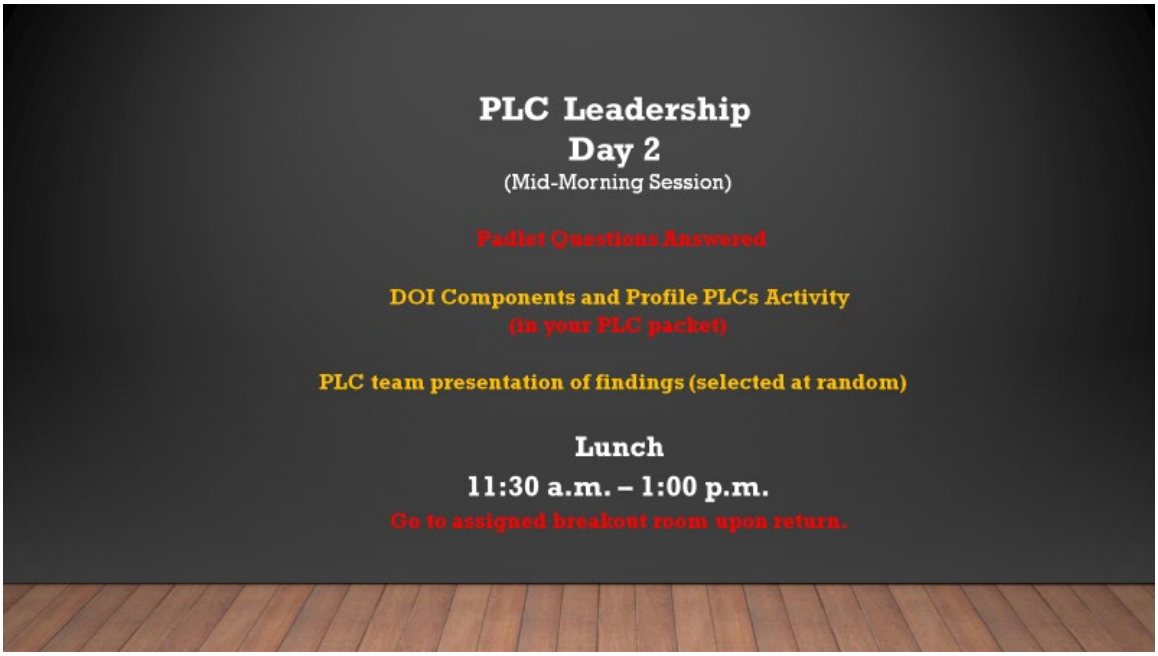
Relative Advantage	**"New Super Comet Cleanser"**
Compatibility	**"Look for the Union Label"**
Complexity	**"Maxwell House Coffee"**
Trialability	**"Alka-Seltzer: "Try it You'll Like It."**
Observability	**"Life Cereal: Mikey"**

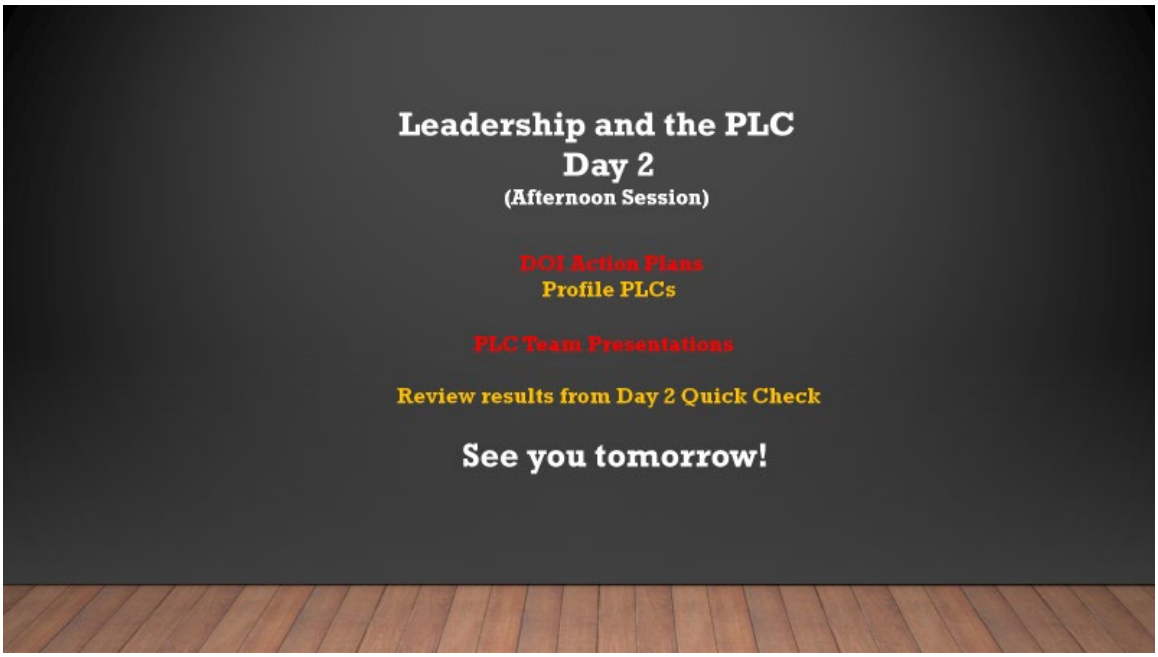

In your packet, turn to the section entitled Diffusion of Innovation
Please take notes. I have provided a notes section if needed.
Overview of Relative Advantage
Overview of Compatibility
Evaluation: Relative Advantage and Compatibility Exit Ticket

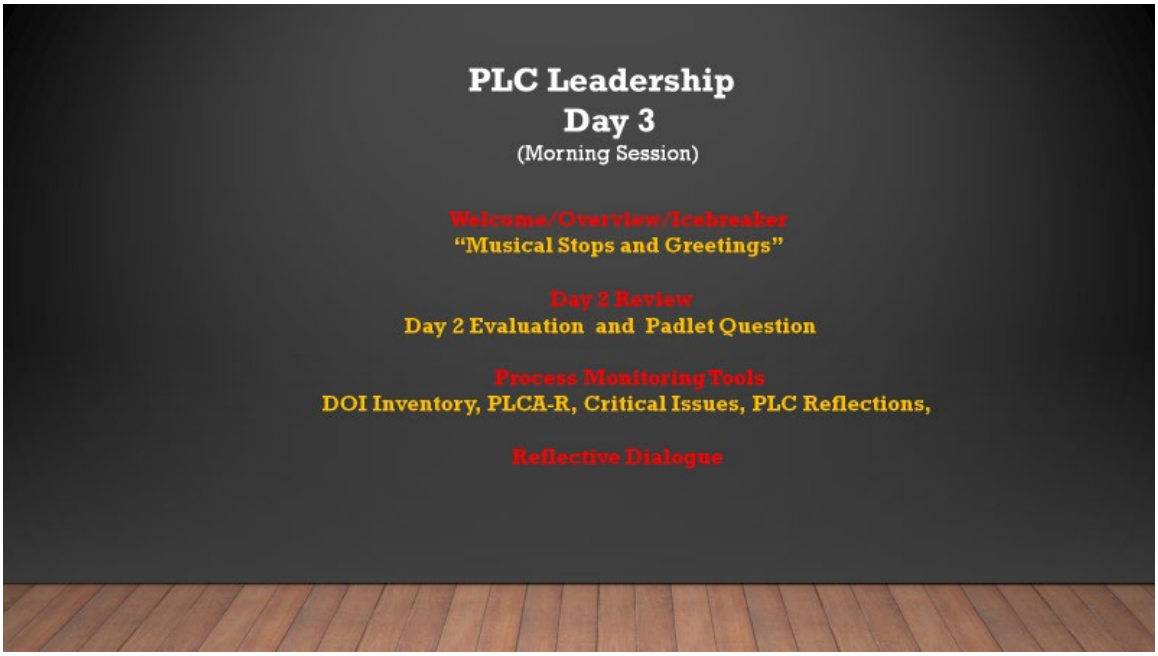

PLC Leadership
Day 2
(Morning Session)
Review of Day 1 Exit Ticket
Results and Observations
"Post One Question"
Padlet
Diffusion Of Innovation (DOI) –Part 2
Complexity, Trialability, Observability
DOI Components
Four Profile PLCs Activity
DOI Action Plans for Profile PLCs Activity

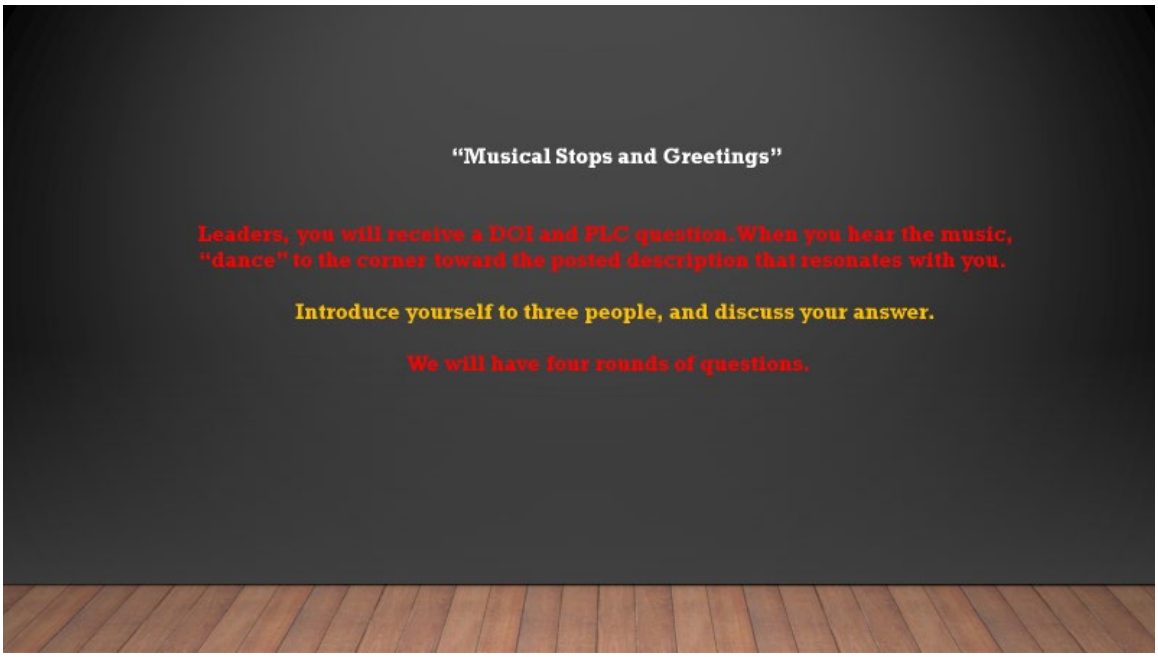

Post a Padlet Question
Think of one question that you need answered or one which you need clarity. Next go to the Padlet link in the Leadership folder. Once you click the link, post your question.
I will gather the question by themes, and address them after the break.
Review
Relative Advantage and Compatibility

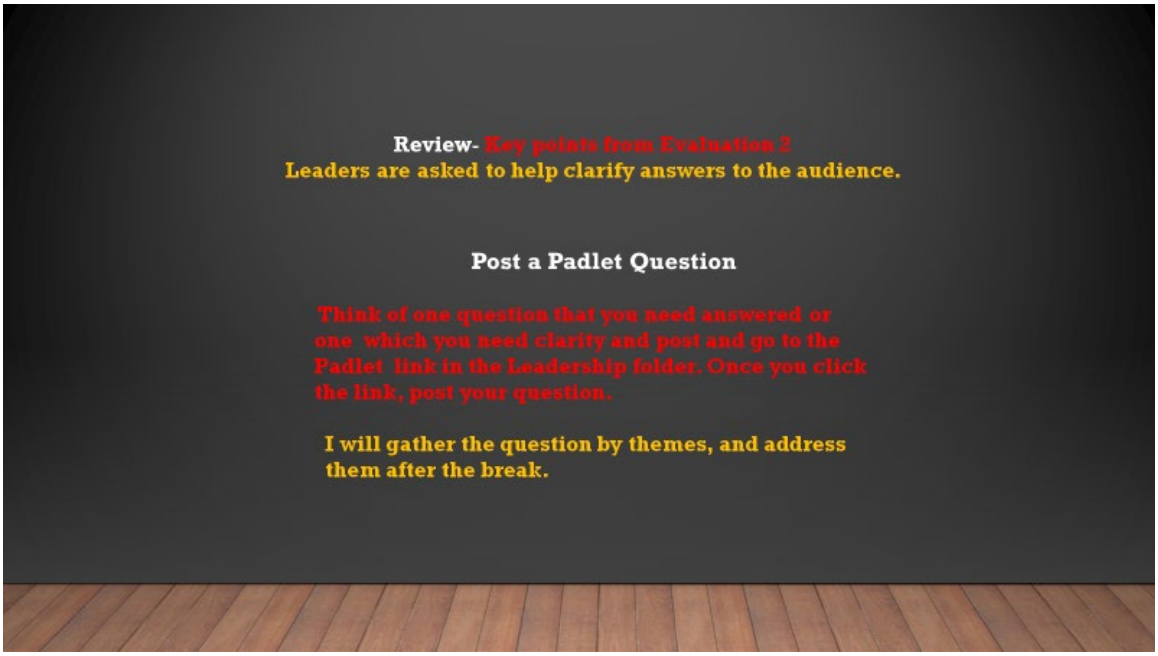

In your packet, turn to the section entitled Diffusion of Innovation. Please take notes. I have provided a notes section if needed.
Overview of Complexity
Overview of Trialability
Overview of Observability
Compatibility, Trialability, and Observability Exit Ticket
Break
10:00 a.m. – 10:15 a.m.

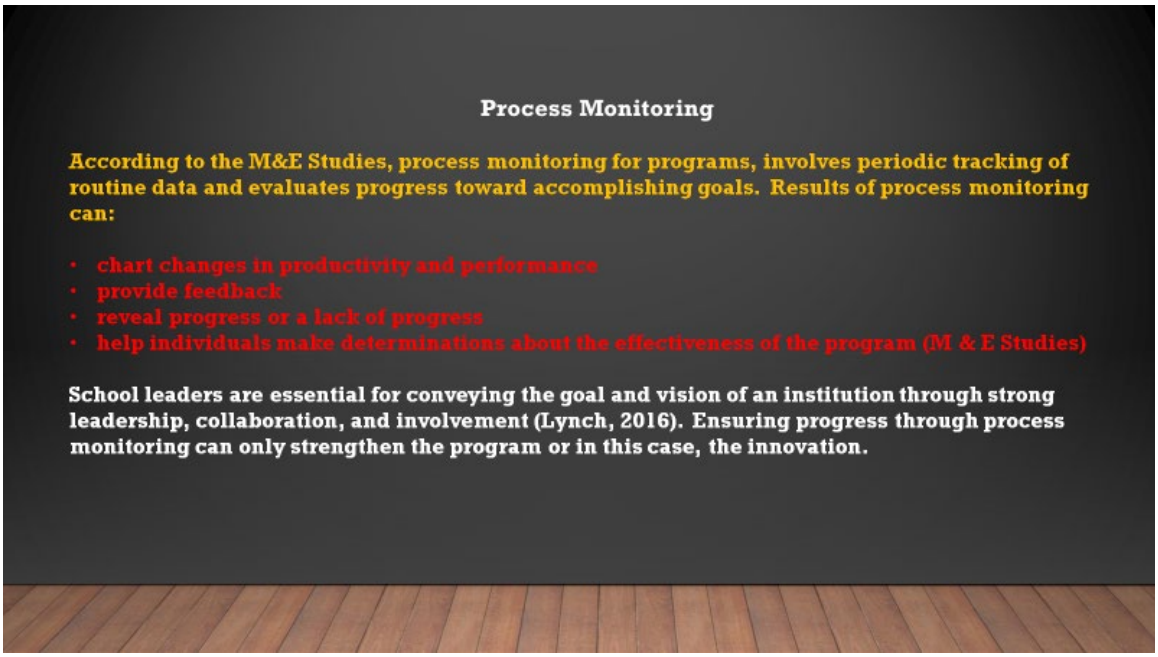

PLC Leadership
Day 2
(Mid-Morning Session)
Padlet Questions Answered
DOI Components and Profile PLCs Activity
(in your PLC packet)
PLC team presentation of findings (selected at random)
Lunch
11:30 a.m. – 1:00 p.m.
Go to assigned breakout room upon return.

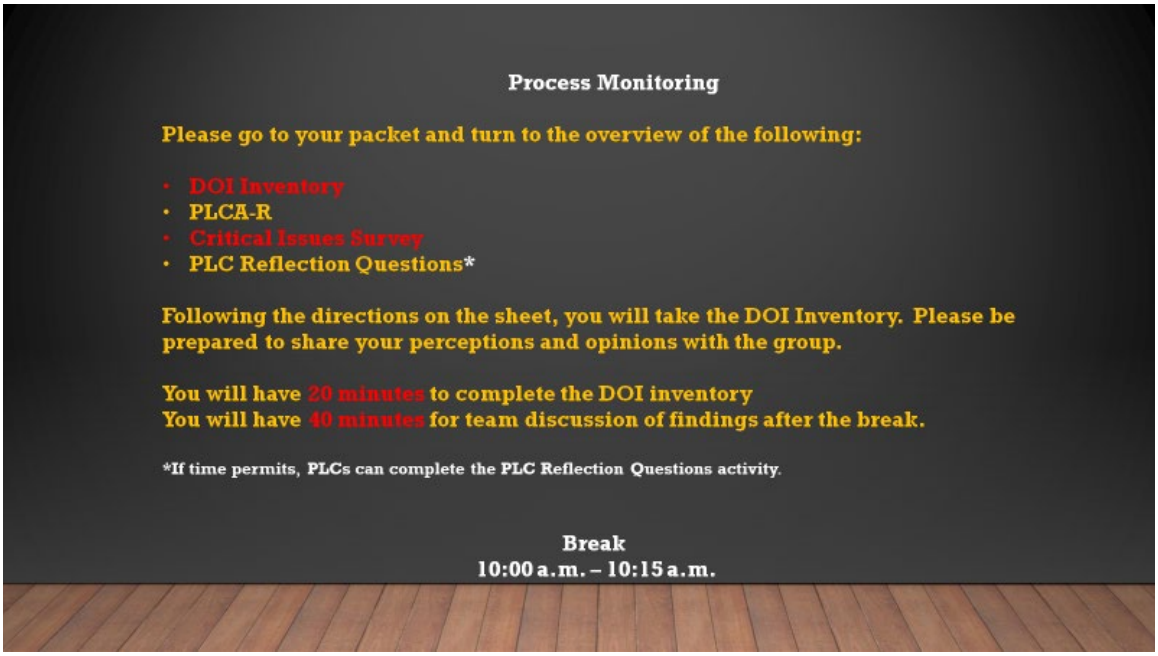

Leadership and the PLC
Day 2
(Afternoon Session)
DOI Action Plans
Profile PLCs
PLC Team Presentations
Review results from Day 2 Quick Check
See you tomorrow!

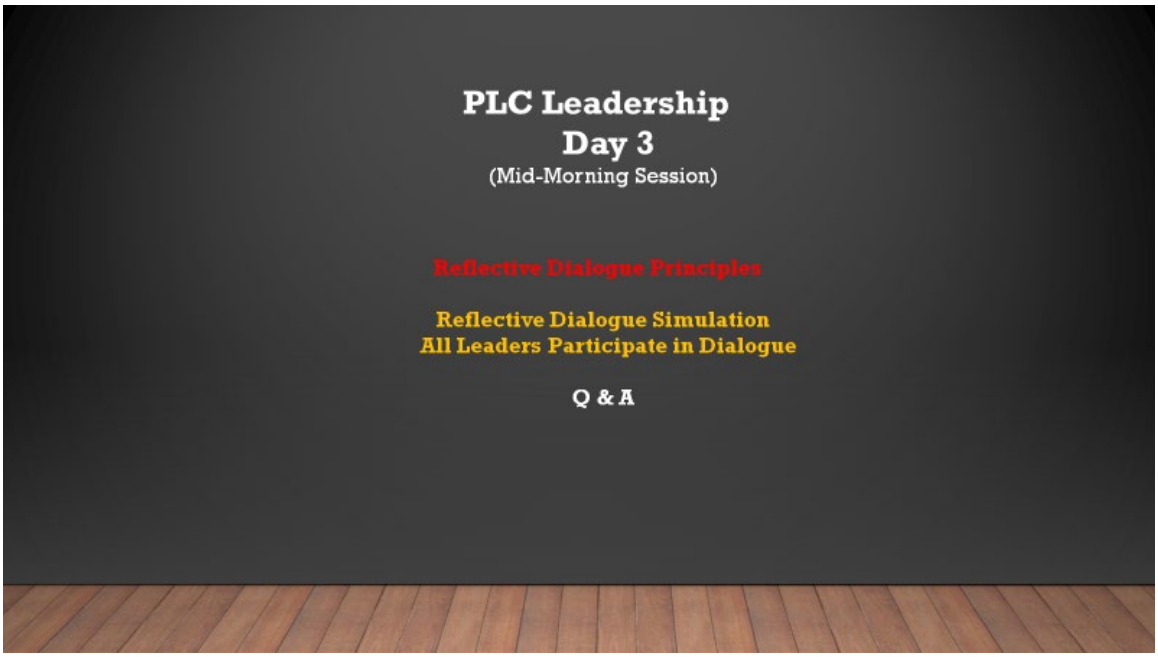

PLC Leadership
Day 3
(Morning Session)
Welcome/Overview/Icebreaker
"Musical Stops and Greetings"
Day 2 Review
Day 2 Evaluation and Padlet Question
Process Monitoring Tools
DOI Inventory, PLCA-R, Critical Issues, PLC Reflections,
Reflective Dialogue

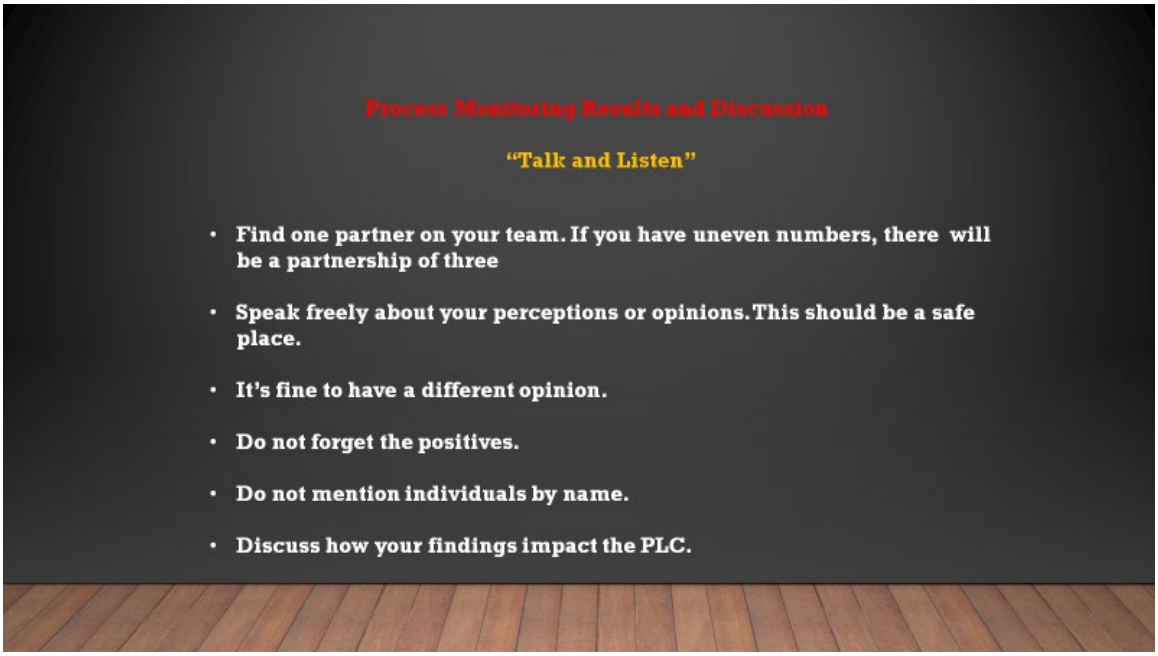

"Musical Stops and Greetings"
Leaders, you will receive a DOI and PLC question. When you hear the music, "dance" to the corner toward the posted description that resonates with you.
Introduce yourself to three people, and discuss your answer.
We will have four rounds of questions.

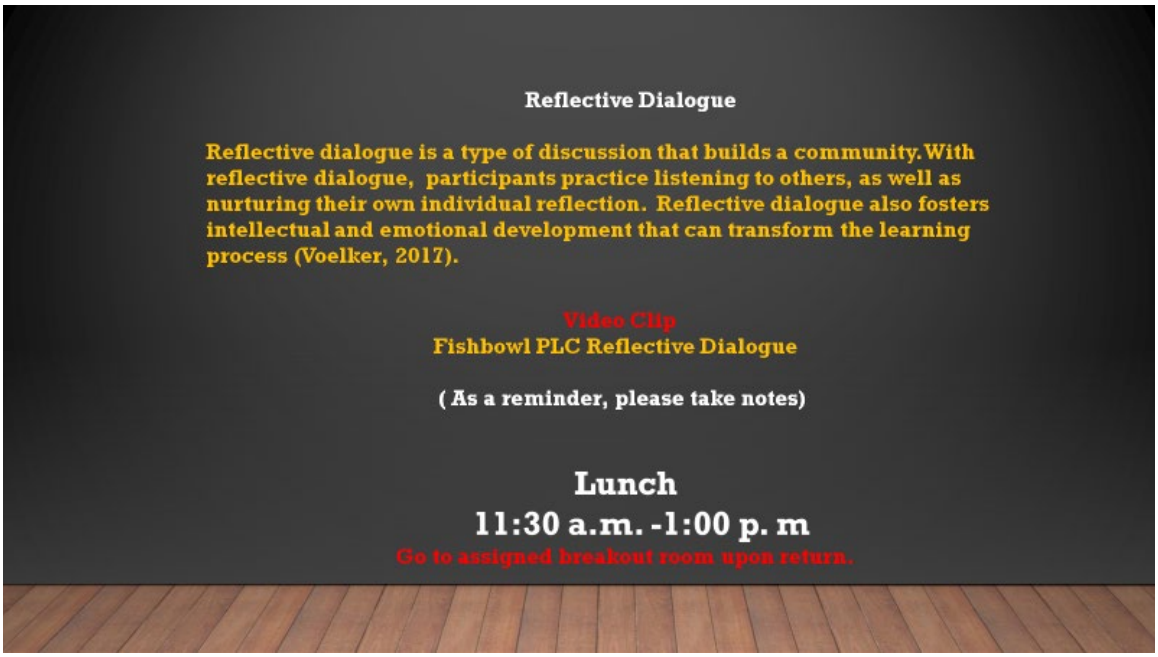

Review- Key points from Evaluation 2
Leaders are asked to help clarify answers to the audience.
Post a Padlet Question
Think of one question that you need answered or one which you need clarity and post and go to the Padlet link in the Leadership folder. Once you click the link, post your question.
I will gather the question by themes, and address them after the break.

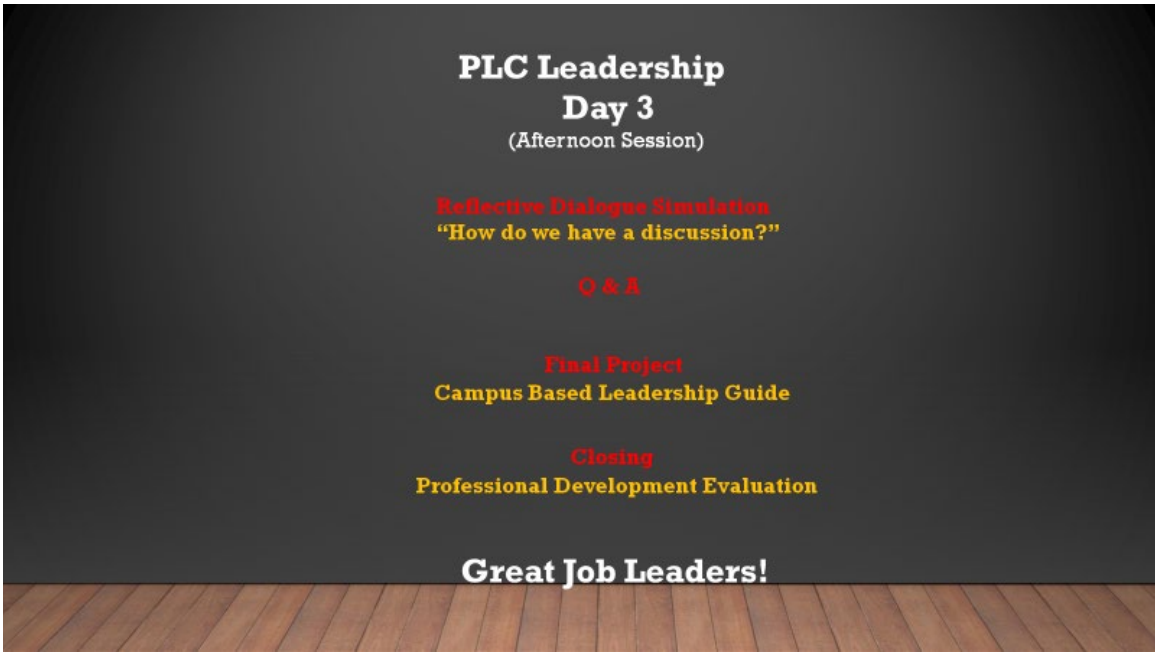

Process Monitoring
According to the M&E Studies, process monitoring for programs, involves periodic tracking of routine data and evaluates progress toward accomplishing goals. Results of process monitoring can:
chart changes in productivity and performance
provide feedback
reveal progress or a lack of progress
help individuals make determinations about the effectiveness of the program (M & E Studies)
School leaders are essential for conveying the goal and vision of an institution through strong leadership, collaboration, and involvement (Lynch, 2016). Ensuring progress through process monitoring can only strengthen the program or in this case, the innovation.

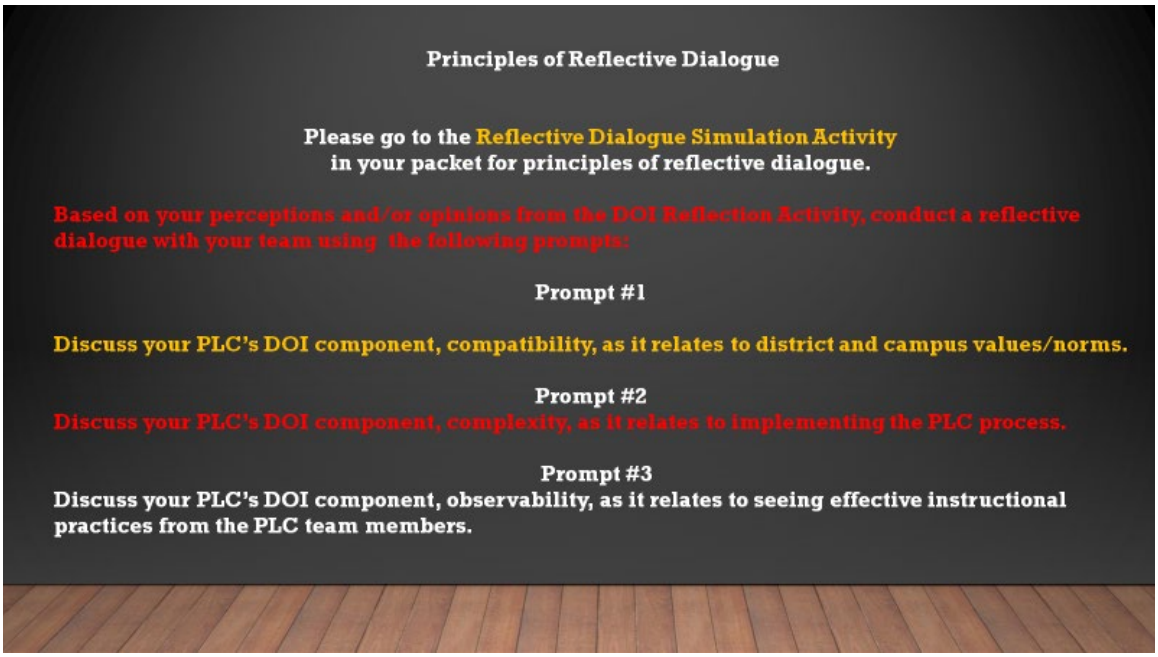

Process Monitoring
Please go to your packet and turn to the overview of the following:
DOI Inventory
PLCA-R
Critical Issues Survey
PLC Reflection Questions*
Following the directions on the sheet, you will take the DOI Inventory. Please be prepared to share your perceptions and opinions with the group.
You will have 20 minutes to complete the DOI inventory
You will have 40 minutes for team discussion of findings after the break.
*If time permits, PLCs can complete the PLC Reflection Questions activity.
Break
10:00 a.m. – 10:15 a.m.

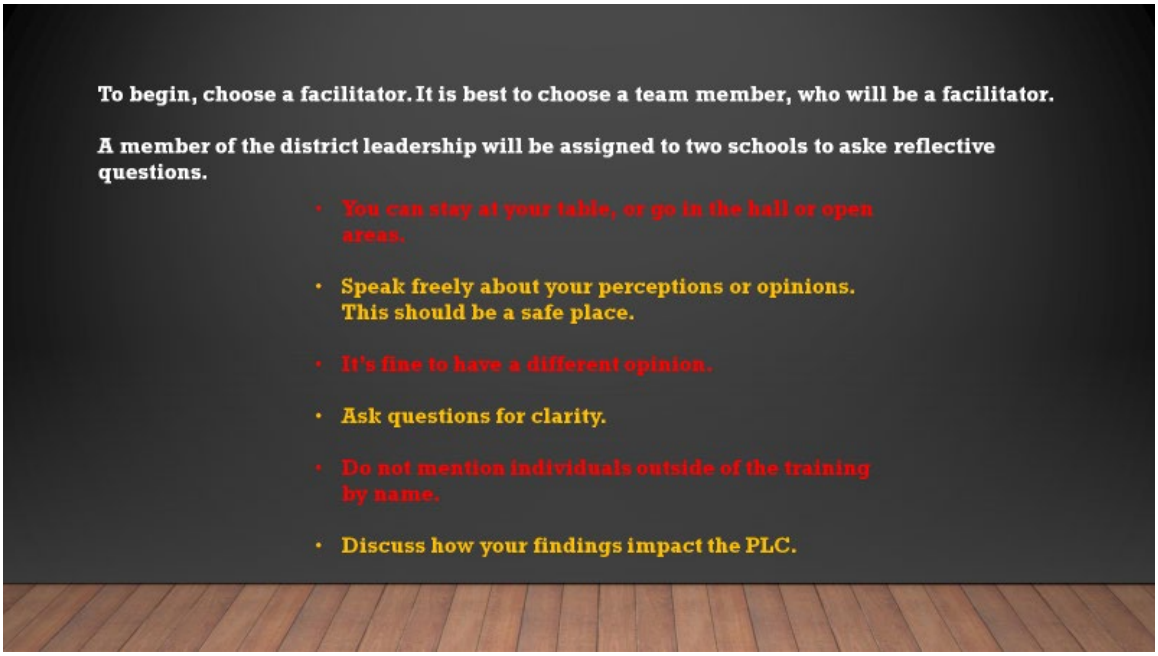

PLC Leadership
Day 3
(Mid-Morning Session)
Reflective Dialogue Principles
Reflective Dialogue Simulation
All Leaders Participate in Dialogue
Q & A

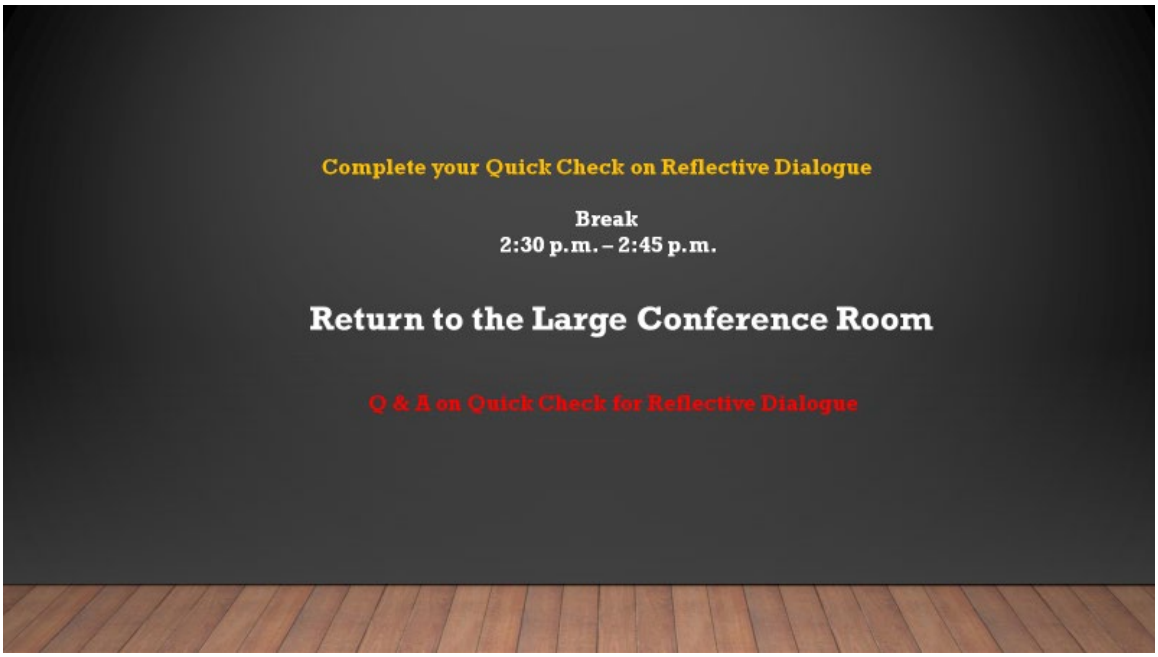

Process Monitoring Results and Discussion
"Talk and Listen"
• Find one partner on your team. If you have uneven numbers, there will be a partnership of three
• Speak freely about your perceptions or opinions. This should be a safe place.
• It's fine to have a different opinion.
• Do not forget the positives.
• Do not mention individuals by name.
• Discuss how your findings impact the PLC.

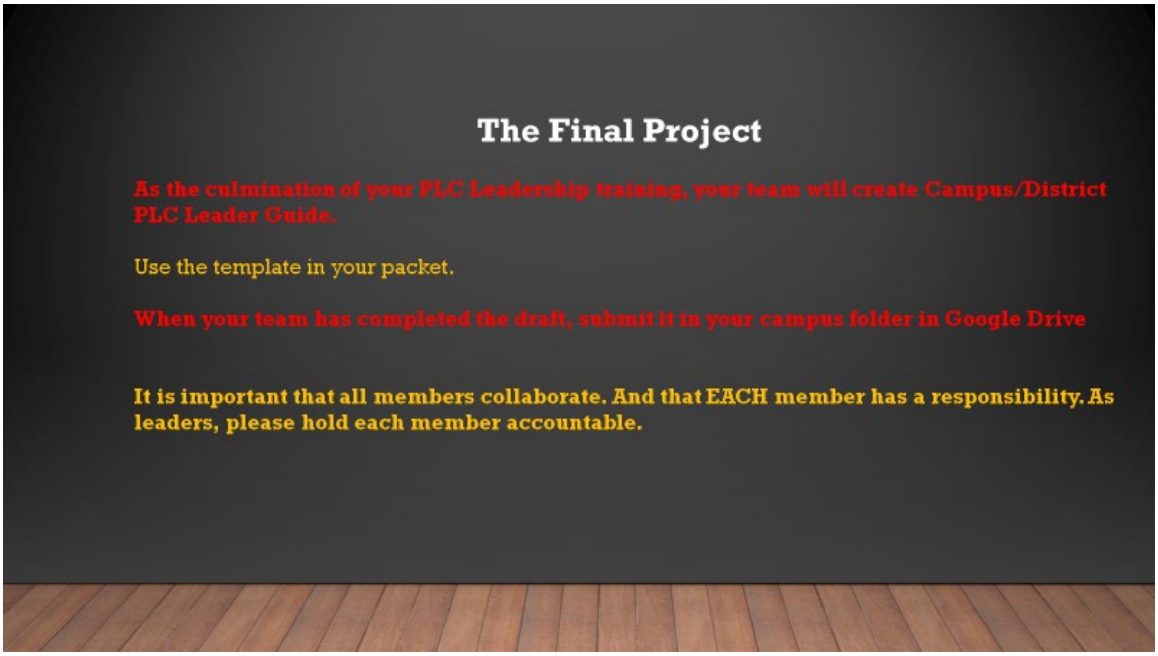

Reflective Dialogue
Reflective dialogue is a type of discussion that builds a community. With reflective dialogue, participants practice listening to others, as well as nurturing their own individual reflection. Reflective dialogue also fosters intellectual and emotional development that can transform the learning process (Voelker, 2017).
Video Clip
Fishbowl PLC Reflective Dialogue
(As a reminder, please take notes)
Lunch
11:30 a.m. -1:00 p. m
Go to assigned breakout room upon return.

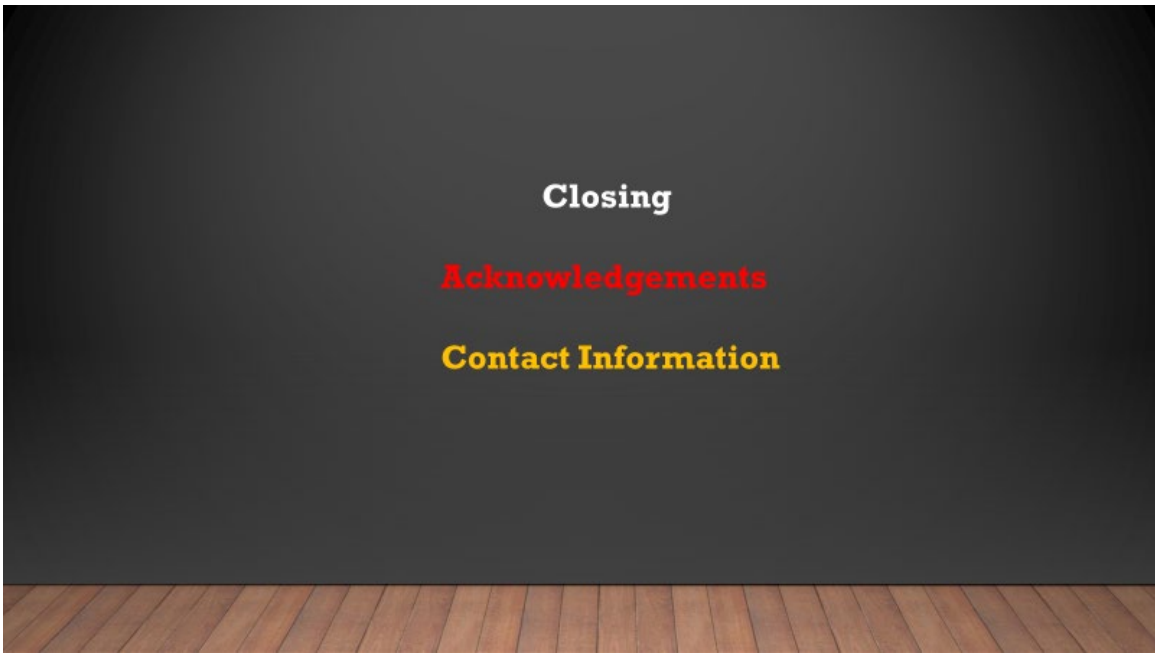

PLC Leadership
Day 3
(Afternoon Session)
Reflective Dialogue Simulation
"How do we have a discussion?"
Q & A
Final Project
Campus Based Leadership Guide
Closing
Professional Development Evaluation
Great Job Leaders!

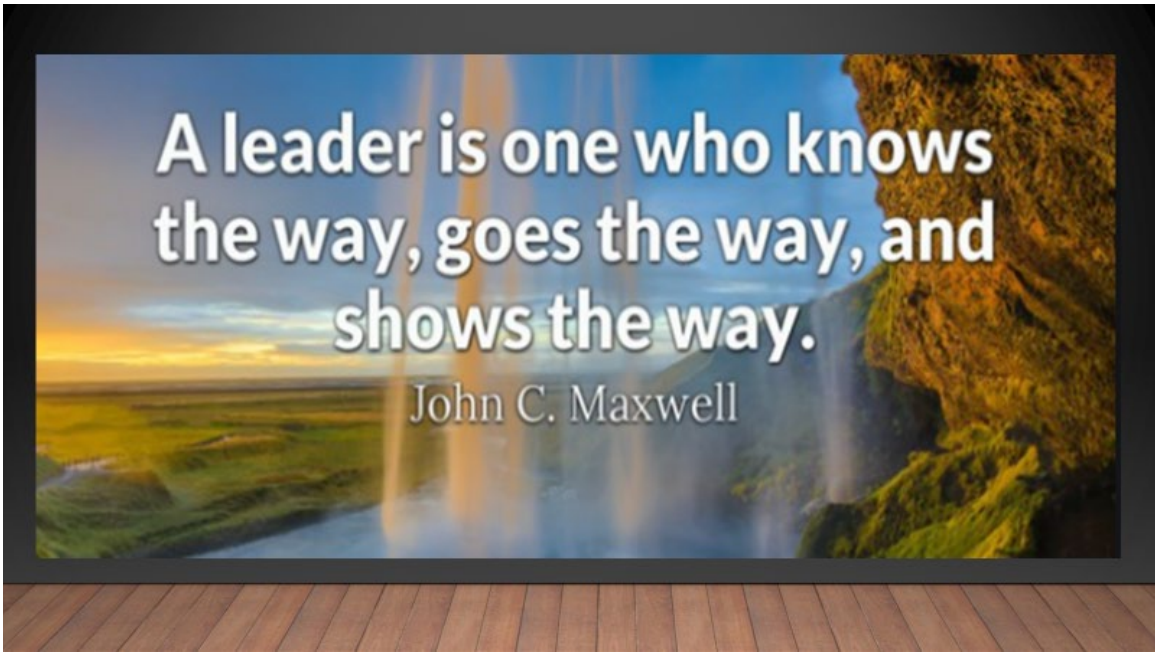

Principles of Reflective Dialogue
Please go to the Reflective Dialogue Simulation Activity
in your packet for principles of reflective dialogue.
Based on your perceptions and/or opinions from the DOI Reflection Activity, conduct a reflective dialogue with your team using the following prompts:
Prompt #1
Discuss your PLC's DOI component, compatibility, as it relates to district and campus values/norms.
Prompt #2
Discuss your PLC's DOI component, complexity, as it relates to implementing the PLC process.
Prompt #3
Discuss your PLC's DOI component, observability, as it relates to seeing effective instructional practices from the PLC team members.


To begin, choose a facilitator. It is best to choose a team member, who will be a facilitator.
A member of the district leadership will be assigned to two schools to aske reflective questions.
You can stay at your table, or go in the hall or open areas.
Speak freely about your perceptions or opinions. This should be a safe place.
It's fine to have a different opinion.
Ask questions for clarity.
Do not mention individuals outside of the training by name.
Discuss how your findings impact the PLC.


Complete your Quick Check on Reflective Dialogue
Break
2:30 p.m. – 2:45 p.m.
Return to the Large Conference Room
Q & A on Quick Check for Reflective Dialogue


The Final Project
As the culmination of your PLC Leadership training, your team will create Campus/District PLC Leader Guide.
Use the template in your packet.
When your team has completed the draft, submit it in your campus folder in Google Drive
It is important that all members collaborate. And that EACH member has a responsibility. As leaders, please hold each member accountable.


Closing
Acknowledgements
Contact Information


A leader is one who knows the way, goes the way, and shows the way.
John C. Maxwell


PLC Leadership:
Transforming Your Teams
Daphne Kahn-Wiley

Appendix B: Interview Protocol Checklist

Date Time	Participant Name: Interview Site	Assign ID#

Instructions for Interviews

Interviewer: _____ Participant ID#: _____

Date of Interview: ___/____/____ Time of Interview: _____

This interview will be an audio recorded face-to-face 30- to 40-minute semistructured activity. You will be asked a set of questions designed to allow you to openly express your views and opinions from your perspective.

To preserve anonymity, I will not use personal information such as your name, school, school district, or any other identifiable information in the report. To protect your privacy, I will utilize a participant ID number in the study to mask your identity. To maintain confidentiality, the audio recording used during this interview will be destroyed after it has been transcribed. The transcription will be stored in a password-protected file on my home computer for a period of 5 years per Walden University protocol.

In this study I will explore teachers' perceptions of the math PLC implementation and review previously accessed Math PLC Meeting minutes to shed light on factors involved for the successful adoption of an innovation. I will ask questions from the standpoint of the following factors: relative advantage, compatibility, complexity, trialability, and observability. At key points during the interview, I will provide you with a definition of each term. This is a reminder that participation in this interview is voluntary and you may withdraw at any time with no consequences.

Before we begin the interview, I am presenting to you your Participant ID#.

Do you have any questions about this process?

I will begin recording now.

#	Interview Questions / Potential Probes	Notes
Research Question 1*: How do math teachers and the supervising administrators perceive the (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability of the math PLC program?*		
Relative advantage is the extent to which an innovation like a PLC is better than a competing option or previous innovation the teachers implemented.		
1	How do/did you rate PLC meetings in comparison to other initiatives for increasing math achievement? Potential Probe(s): Based on your answer, what do you think are/were the reason(s)?	
2	Are/were there any advantages to working as a PLC at the school? Disadvantages? Potential Probe(s): What resulted from the advantages? What resulted from the disadvantages?	
Compatibility is the extent to which the PLC innovation aligns with the values and experiences of an organization (the school).		
3	Please describe how the math PLC meetings benefit/benefited your (a) instructional planning (b) instructional practices, and (c) student learning. Potential Probe(s): Can you give me specific details?	

#	Interview Questions / Potential Probes	Notes
4	Please describe how math teachers collaborate/collaborated during PLC meetings. Potential Probe(s) Can you share any specific experiences you had that you think reflect collaboration?	
5.	Please explain how the math PLC processes align/aligned with the district expectations for PLC processes. Potential Probe(s): Please describe what you know about district expectations for PLC meetings.	
Complexity is the level of understanding and the level of ease in implementing an innovation such as the PLC process.		
6.	Please explain what you understand/understood about PLC processes. Potential Probe(s): If there are any, please explain staff duties during PLC meetings. Please explain what the PLC agenda addresses/addressed.	

#	Interview Questions / Potential Probes	Notes
7.	Please describe what effect PLC training at the school has had/had on your understanding of PLC processes. Potential Probe(s): Please describe how difficulties in understanding PLC processes, if any, have been/were addressed?	
8.	If the math PLC received resources and supports, please describe how they helped the math PLC implement PLC processes. Potential Probe(s): What supports and resources did the math PLC receive?	
Trialability is the extent to which the PLC innovation is given a trial period to look at the tentative direction.		
9.	Please discuss any modifications or follow-up plans instructional staff made as a result of reviewing PLC (a) instructional practices, (b) student data, and (c) process monitoring. Potential Probe(s): Please describe the reasons for the change addressed in (a), (b), (c).	

#	Interview Questions / Potential Probes	Notes
Observability is the extent to which the PLC innovation results or benefits are visible to the teachers in the math PLC.		
10.	Please describe if you observed anything in the PLC meetings that resulted in positive student outcomes. Potential Probe(s): Could you be specific on what you observed? Please describe if you have observed actions from other members in the math PLC meetings that resulted in positive outcomes.	

#	Interview Questions / Potential Probes	Notes
How are math teachers observed to implement the PLC components? [Related to Research Question 2]		
11.	Please describe your experiences with how math teachers are/were observed implementing the PLC process. Potential Probe(s): Please describe the feedback the PLC received from observing the PLC implementation process. Can you describe the effect the PLC meetings at the school have had/had on your instructional practices? Student achievement? Please describe what is in the archival documents that reflect DOI components such as (a) collaborative planning and (b) instructional practices.	
The last two question in Research Question 1 are not applicable to previous teachers at the school, if any, as they serve as a historical reference and may no longer have access to archival data.		
	Invitation of Additional questions	
	This portion of the interview is completed. Do you have any additional questions for me?	

#	Interview Questions / Potential Probes	Notes
	Statement of Appreciation and Final Statement Thank you so much for your time, your responses, and your participation. You will receive the opportunity to review the draft final study results in a process described as member checking. This process will involve approximately 20 minutes of time and you will be invited to provide feedback and changes to the draft findings and return them to me within 7 days. I will make myself available for any questions regarding the draft findings by email, phone, or in person. A summary of the full report will be sent to you electronically upon final approval of my study. Once again, thank you for time, and if you have any questions or concerns, please feel free to contact me.	
Research Question 2: *Review of Archival Documents* *What is recorded in archived documents to reflect the PLC innovation implementation?*		