TEACHER PERCEPTIONS OF PROFESSIONAL LEARNING COMMUNITIES: A STUDY OF THE RELATIONSHIP BETWEEN PROFESSIONAL LEARNING COMMUNITIES AND TEACHER INSTRUCTIONAL PRACTICES

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Dedication

To the love of my life, Erica McNeil, I cannot adequately express in words how much your love and support means to me. Thank you for the 20 years that you have stood beside me through all my efforts, failures, and achievements. You have always been my inspiration, and you are the reason that this accomplishment is possible. I thank you for all the sacrifices you have made during our marriage and throughout my career. I love you, dear, and the life that we have built together.

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This study is dedicated to my beautiful family because everything for me begins and ends with you all.

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Abstract

A key component of the Pittsburgh Public Schools' five-year strategic plan includes professional learning practices. Incorporating collaborative teams as part of the Professional Learning Community (PLC) within our schools is essential to achieving the outcomes outlined in the strategic plan. This research study considers the impact of collaborative teams within the PLC structure on teacher instructional practices. The goal of this research study was to determine whether PLCs have an impact on teachers' abilities to refine their instructional practices based upon the results of data, student needs, and ongoing collaboration with their colleagues. The effectiveness of the PLC intervention at Pittsburgh Science and Technology Academy was determined based upon three research questions: How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs? What role do professional learning communities have in the future academic success of students? Have professional learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices? A quantitative approach for data collection was used throughout this research study, and the two data collection instruments used were the SoCQ and the PLCA-R. The analysis of data collected suggests that teachers at Pittsburgh Science and Technology Academy are implementing collaborative practices as part of the PLC intervention and making changes to instruction based upon the collective learning that is occurring with their collaborative teams.

Chapter I: Overview of the Research Study

Introduction

There is a considerable amount of research that supports the idea that implementing Professional Learning Communities (PLC) within schools will significantly improve student achievement outcomes. PLCs ensure that educators are focused on student learning and have developed a shared mission and collective commitments. The shared mission is used to guide decision-making about teaching and learning. When educators have been involved in developing the mission and vision for teaching and learning within the school, there is a greater commitment to ensuring that all students achieve the goals and expected outcomes that have been mutually agreed upon. The central focus of the shared values and vision is found in having a collective commitment to focus on student learning.

Elena Aguilar states that mission and vision statements help teams to establish priorities and guides decisions (2016). Creating a mission and vision that has been agreed upon ensures that leaders can remind the team of their commitments to each other and to student learning (Aguilar, 2016).

Another key characteristic of PLCs includes a culture of collaboration and commitment to continuous improvement. Instructional practices and creativity are significantly influenced by the connections that teachers make with each other and with administrators. Although teachers implement these changes individually, the collaboration with their colleagues is essential to teacher learning and the improvement process. It is also important to note that the foundation of an effective PLC is the culture of shared and

supportive leadership. Teachers must be encouraged to share their feedback and take ownership of their professional learning experiences.

Background

I have served as the principal of Pittsburgh Science and Technology Academy since the summer of 2013. The mission of Pittsburgh Science and Technology Academy is to provide daily opportunities for students to develop the skills and knowledge necessary for post-secondary success in all disciplines with a focus on the STEM-related fields of life science, environmental science, computer science, or engineering. The school prepares students by providing a rigorous curriculum that requires advanced coursework and is characterized by excellent instruction, exploration and a commitment to achievement.

Teachers at Pittsburgh Science and Technology Academy were introduced to the essential ideas of PLCs at the start of the 2017-18 school year. The focus of our learning during this initial year of implementation included developing a common understanding of our collaborative team structure and purpose. During the 2017-18 school year, we established norms for our collaborative teams and determined which tools and protocols would be used to guide the learning of our collaborative teams. We learned that collaboration must be focused on student learning to provide the foundation necessary for continuous improvement in instruction and increases in student achievement.

Teachers were assigned collaborative teams and were asked to create team norms and collective commitments. The next phase of our learning included the use of three specific team learning protocols that were used to drive the individual and collective learning of the team. The protocols include the following areas: Unwrapping Standards,

Data Analysis, and Student Work. Additionally, the guiding questions that we considered as a team related to the three key areas of PLCs below:

- Focus on Learning:
    - Do we believe all students can learn at high levels?
    - Do we accept responsibility to ensure that all students learn?
- Build a Collaborative Culture
    - What do we expect students to learn?
    - How will we know when they learn it?
    - How will we respond when they don't?
    - How will we respond when they already know it?
- Focus on Results
    - Which students mastered specific essential standards?
    - Which instructional practices worked?

Our collaborative teams focused on developing and implementing SMART Goals and Common Formative Assessments as part of the next step for our learning as a PLC. The use of SMART goals ensured that the teams concentrated on the greatest areas of need based upon the data. Teachers also created a systematic plan to accomplish the goal while considering the tools that would be needed to check whether students are making progress. Currently, the focus of our collaborative teams includes implementing the learning team cycle. The learning team cycle is a five-step process: Analyze Data, Set Goals, Learn Individually and Collaboratively, Implement New Learning, Monitor, Assess, and Adjust Practice. The learning team cycle incorporates a continuous improvement model. Educators work collaboratively to gather evidence of current levels

of student learning, develop strategies and ideas to build on strengths and address weaknesses in that learning, and implement those strategies and ideas. Finally, it is necessary to analyze the impact of the changes to instruction in order to determine what should be applied during the next cycle of continuous improvement.

Identification of Capstone Focus

A key component of the Pittsburgh Public Schools (PPS) five-year Strategic Plan – Expect Great Things – includes professional learning practices. The district vision is that upon graduating from high school, all students are college, career, and life-ready, and prepared to complete a two- or four-year college degree or workforce certification. PPS adopted the National College and Career Readiness Indicators released by Redefining Ready! to help define and measure college, career, and life readiness for students within the district. Currently, less than 30% of PPS students who take the SAT are meeting the college readiness indicator of a 530 in math. Improving the quality and impact of professional learning through the use of collaborative teams as a part of the Professional Learning Community in our schools will be a key factor in achieving the outcomes outlined in the Strategic Plan. This research study will consider the impact of collaborative teams within the PLC structure on teacher instructional practices.

Research Questions

Indicators of effectiveness will be determined based upon three research questions that have been established for this study: How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs? What role do professional learning communities have in the future academic success of students? Have professional

learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices?

Expected Outcomes

This research study will be used to identify the current state of the PLC initiative at Pittsburgh Science and Technology Academy and determine the next steps that should be recommended for the school. Implementing PLCs effectively will improve the quality of professional learning and provide teachers with the support that is necessary to provide innovative and engaging classroom instruction and increase student achievement.

Fiscal Implications

The manner in which resources are allocated reveals the values of any organization, and time is one of the most precious resources in a school. School leaders must show their commitment to school improvement and increasing student achievement by providing teachers with the time that is necessary for meaningful collaboration. For the most part, creating systems and opportunities for this cost-neutral resource is available to all school leaders. However, time for collaboration must be a priority.

Summary

While this research study is focused on only teaching and learning that is occurring at one school, Pittsburgh Science and Technology Academy, the findings of this study could have implications that apply to all Pittsburgh Public Schools, given our focus on implementing PLCs throughout the school district. Qualitative data will be collected from all teachers who participate in this action search that will occur at Pittsburgh Science and Technology Academy. The data collected will be related to teachers' perceptions about the impact of PLCs on their instructional practices.

Chapter I introduced the background of this research study as well as the purpose and expected outcomes. Chapter II includes the literature that provides a detailed explanation of the characteristics of a PLC. The key ideas that are included in Chapter II include critical questions that guide the focus on learning for all students, Collaborative Culture and Collective Responsibility, Focus on Learning and Continuous Improvement, and Sustaining Change. Chapter III presents the Methodology of the study, which includes additional detail regarding the setting, participants, research design, and data collection process. Chapter IV provides the results of the research and the interpretation of the findings. Chapter V presents the conclusion of the study and additional recommendations based upon the results of the study.

Chapter II: Review of the Literature

Introduction

The purpose of this research study is to focus on determining the effectiveness of Professional Learning Communities. Indicators of effectiveness will be determined based upon three research questions that have been established for this study: How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs? What role do professional learning communities have in the future academic success of students? Have professional learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices? This research study will be used to identify the current state of the PLC initiative at Pittsburgh Science and Technology Academy and determine the next steps that should be recommended for the school. A key component of the Pittsburgh Public Schools' five-year Strategic Plan – Expect Great Things – includes professional learning practices. The district vision is that upon graduating from high school, all students are college, career, and life-ready, and prepared to complete a two- or four-year college degree or workforce certification. Improving the quality and impact of professional learning by implementing PLCs in our schools will be a key factor in achieving the outcomes outlined in the Strategic Plan.

What is a Professional Learning Community

It can be challenging to find agreement with defining Professional Learning Communities. There is a great amount of research available regarding implementing and sustaining PLCs within schools. Richard Dufour, Rebecca Dufour, Robert Eaker, and Thomas Many describe six characteristics of PLCs in the book *Learning by Doing* (2010):

1. Shared mission (purpose), vision (clear direction), values (collective commitments), and goals (indicators, timelines, and targets), which are all focused on student learning
2. A collaborative culture with a focus on learning
3. Collective inquiry into best practice and current reality
4. Action orientation or "learning by doing"
5. A commitment to continuous improvement
6. A results orientation

Three Big Ideas of Professional Learning Communities

The three critical components of PLCs identified by Dufour et al., (2010) provide the framework for this review. The three critical components include having a focus on learning for all students, a collaborative culture and collective effort to support student and adult learning, and a results orientation to improve practice and drive continuous improvement.

Shirley M. Hord writes that there are five distinct attributes of a PLC (1997). The five attributes that Hord identifies include: supportive and shared leadership, collective creativity, shared values and vision, supportive conditions, and shared personal practice. Within Hord's framework, it is important to note that PLCs are rooted in a culture of shared and supportive leadership. The school culture must be one that encourages teachers to share their feedback and take ownership of their professional learning experiences in an effort to achieve goals that have been mutually developed. In a professional learning community, the administration is not viewed as having all the knowledge that is necessary for school transformation. Hord points out the importance of collaborative relationships:

A school whose staff is learning together and participating in decisions about its operation requires a campus administrator who can let go of power and his/her own sense of omnipotence and omnicompetence and thereby share the leadership of the school (1997, p.18).

In order to create this culture of shared and supportive leadership, it is critical that principals are reflective concerning their own need for learning and growth. Principals must ensure that teachers feel comfortable providing honest feedback. In the article *Leaders as Leaders*, Lucianne Carmichael points out that principals must model the change and learning that they demand from others (1982). School leaders should show their vulnerability and willingness to try new things in order to model the important disposition of a continuous learner for the teachers that those school leaders supervise.

Encouraging teacher leadership and collaboration was the primary catalyst for increased student achievement at Adams Elementary School in North Carolina. In a research study conducted by Berry, Johnson, and Montgomery, it was determined that the ideas and expertise needed to turn the school around were already present and embedded in their own faculty, and the school simply needed a catalyst that would encourage more sharing of that expertise," (2005). Creating opportunities for ongoing discussion and collaboration was an essential part of the change process:

Several strategies have helped Adams become the kind of school where teachers openly discuss their practice and work together to solve knotty instructional problems. With consultant support from a regional education laboratory, teachers organized professional learning teams to research solutions to problems uncovered by a careful analysis of school data. In these professional learning teams, teachers share lessons learned, use protocols to

make decisions, and rely on systematic note taking to inform other colleagues about their work (Berry, Johnson, & Montgomery, 2005).

A focus on learning for all students. Another attribute of PLCs that Hord identifies as essential is teachers and administrators developing shared values and vision. Hord states that "sharing vision is not just agreeing with a good idea; it is a particular mental image of what is important to an individual and to an organization," (1997, p.21). Staff are encouraged not only to be involved in the process of developing a shared vision, but to use that vision as a guidepost in decision making about teaching and learning in the school (1997, p. 21). The central focus of the shared values and vision is found in having a collective commitment to focus on student learning. Louis and Kruse report that "the central focus on student learning creates a sense of moral authority in both private practice and public conversation" (1995, p.43). Louis and Kruse continue to state the following: Without a core of shared beliefs about institutional purposes, practices and desired behavior, the other elements of professional community that we will describe below cannot emerge. Even if teachers want to form more tightly connected social and professional connections, the absence of a core of shared values will produce, instead, misunderstanding, conflicts, and may also lead to interpersonal mistrust. This does not mean that teachers need full consensus about all aspects of their work, which erects an impossible standard against which to measure professional community. However, a delimited core of value positions in the school permits teachers to begin the task of developing a moral community that ultimately allows them to become advocates for teaching and learning. (1995, p.39).

Elena Aguilar states that mission and vision statements help teams to establish priorities and guides decisions (2016). It is also important to note that the creating a mission and vision that has been agreed upon ensures that leaders can remind the team of their commitments to each other and to student learning (Aguilar, 2016). It is that commitment to ongoing learning and student achievement that will guide the team as they work together to increase student engagement and student learning within the classroom. The mission and vision statements that are collaboratively developed should direct the behavior of the team as it relates to decision making, prioritizing and aligning the school culture (Aguilar, 2016).

A collaborative culture and collective effort to support student and adult learning. A culture of collaboration is another characteristic of PLCs. Ernest Boyer's research reports that the Basic School is a place where everyone comes together to promote learning and every classroom is, itself, a community (1995). Additionally, Boyer states that "in the Basic School, the separate classrooms are connected by a sense of purpose, a climate that is communicative, just, disciplined, and caring, with occasions for celebrations," (1995). The connections that teachers make with each other and with administrators have a significant impact on teacher creativity and the use of innovative instructional practices within the classroom. While teachers may implement these changes individually, the collaboration with their colleagues is essential to teacher learning and the improvement process. Hord builds upon the research of Boyer and concludes that most successful learning occurs when teachers teach effectively in their own classrooms but also find solutions together (Hord, 1997). Hord states that teachers are more likely to be consistently well informed, professionally renewed, and inspired when teachers are

encouraged and allowed to operate as team members, with shared goals, and time routinely designated for professional collaboration (1997).

A results orientation to improve practice and drive continuous improvement. Hord defines the PLC as a community of learners, in which the teachers and administrators in a school continuously seek and share learning and act on their learning (1997). Dufour and Fullan state that schools will not know whether all students are learning unless educators are hungry for evidence that students are acquiring the knowledge, skills, and dispositions deemed most essential to their success (2013). Dufour and Fullan continue to state that educators must systematically monitor student learning on an ongoing basis and use evidence of student learning to respond immediately to students who experience difficulty (2013). PLCs focus on improving instructional practice in order to drive continuous improvement. Mattos, Dufour, Eaker, and Many explain why the three big ideas are so important to the PLC process:

We cannot overemphasize the importance of the three big ideas to the PLC process. When educators truly embrace and act on these ideas, the answers to many of the inevitable questions that arise in PLC transformation become evident. Without this shared understanding of basic assumptions, every question that arises in a school can become a matter for debate based on individual opinions and personal war stories. When others accept these assumptions, they serve as filters that guide the decision-making process in a PLC (Mattos, Dufour, Eaker & Many, 2016).

Critical Questions Which Guide the Focus on Learning for All Students

Given the relentless focus on learning for all students, it is essential that teachers and administrators who participate in a PLC identify the specific learning targets that

students are expected to meet. Having this focus on specific standards and learning targets will ensure that the members of the PLC focus on learning for all students. Dufour and Fullan state that in a PLC, there are four critical questions that help educators focus relentlessly on learning for all students (2013):

1. What is it we want our students to learn? What knowledge, skills, and dispositions do we expect them to acquire as a result of this course, this grade level, and this unit of instruction?
2. How will we know if each student is learning each of the skills, concepts, and dispositions we have deemed most essential?
3. How will we respond when some of our students do not learn? What process will we put in place to ensure students receive additional time and support for learning in a way that is timely, precise, diagnostic, directive, and systematic?
4. How will we enrich and extend the learning for students who are already proficient?

Responding to these four questions ensures that teachers are continuously examining the effectiveness of their teaching practices. Teachers analyze the evidence of student learning together and consider more effective ways of assessing student learning in the classroom as they develop common formative and summative assessments (Dufour & Fullan, 2013). Working in collaborative teams, teachers develop a coordinated plan of support when students experience difficulty to avoid subjecting students to the traditional education lottery in which the response to a struggling student has been solely dependent on the individual teacher (Dufour & Fullan, 2013). Dufour et al. (2010) writes that if

teachers are to work collaboratively to clarify the essential learning, write common assessments, and jointly analyze the results, they must overcome the fear of being thought of as ineffective teachers by their colleagues and principals. Patrick Lencioni (2003) points out that effective teams consistently engage in productive and unguarded conflict and commit to accomplishing the goals established after reviewing all the information provided.

Furthermore, Aguilar explains that it is important for team members to identify which student needs are being addressed and the evidence being used to show that each need exists (2016). Aguilar provides six questions to keep students at the center of the learning for the team (2016):

1. How are our students' social, emotional, and academic learning needs at the center of our teamwork?
2. How is our team working toward creating equitable schools?
3. What current student data do we have to indicate that this is what we should focus on?
4. How will this focus help our school meet its goals and fulfill its mission?
5. Which student needs are we addressing?
6. What evidence is there to indicate that our students have those needs?

Collaborative Culture and Collective Responsibility

While the PLC includes the entire school or school district, collaborative teams include the educators that share students or teach the same subject areas. Dufour et al. (2010) writes that PLCs empower educators to make important decisions and encourages

their creativity and innovation in the pursuit of improving student and adult learning. Researchers have also found that systems that show continuous improvement have done so by establishing collaborative practices between teachers within and across schools (Mourshed, Chijioke, & Barber, 2010). Mourshed et al. (2010) reports that collaborative practice is all about teachers and school leaders working together to develop effective instructional practices, study what works well in the classroom, and do both with rigorous attention to detail and with a commitment to improving not only one's own practice but that of others. The collaborative team provides the structure and support systems that are necessary to develop an empowering PLC. Educators cannot accomplish these goals in isolation because no one person has all the time, skills, or knowledge to ensure all students learn at high levels, so educators in a PLC or district commit to working collaboratively to achieve this outcome (Mattos et al., 2016). Mattos and his colleagues see collaboration as a fundamental element of the PLC, and all members must work interdependently to achieve common goals for which the members are mutually accountable (2016).

Conditions necessary to support a culture of collaboration. ***Creating meaningful teams for collaboration.*** Collaborative teams can be created based upon various criteria. Fulton and Britton state that the typical model for a collaborative team in elementary schools is by grade-level teams (2011). Additional researchers state that the most powerful team structure is typically the grade level team in elementary schools and course-specific or subject-area teams in secondary schools because these structures readily align with shared responsibility for student learning (Dufour & Fullan, 2013). Regardless of whether the teams meet across the grade level or within their content groups, the team provides a window on the soul of the school, and engaging in a grade-level or subject-

specific team meeting will enable one to know how poised a school is to help students experience increased academic success (Saphier, King, & D'Auria, 2006). High-performing teams are created intentionally and with a great amount of thought given to the makeup of the team. Establishing and sustaining high-performing teams requires more than occasionally bringing adults together for conversations, but teams must work together interdependently to achieve common goals (Dufour & Fullan, 2013).

There are certainly challenges that arise when creating collaborative teams in schools. Small elementary schools may have only one teacher per grade level. Additionally, some high schools may have one teacher providing instruction in a specific subject area. It is important to note that interdisciplinary teams can also be a viable option, but often, members focus on the behavior of individual students rather than on working interdependently to improve learning for all students (Dufour & Fullan, 2013).

Providing time for collaboration. Finding enough time to meet with colleagues in order to address the four critical questions of a PLC can feel like an impossible task. Mattos et al. (2016) provides several reasons why educators need time to collaborate:

1. Educators are professionals and benefit from the insights, expertise, and collective efforts of a team of colleagues. Collaboration is not a frill; it is an essential element of professional practice.
2. The research base in support of collaboration is extensive both inside and outside of education. The collaborative team has been called the fundamental building block of a learning organization and the link between a collaborative culture and improving schools is well established.

3. Organizations demonstrate their priorities by how they use their resources. Time is one of the most precious resources in a school. In light of the strong correlations between meaningful collaboration and improved student achievement, it would be disingenuous for any board of education to argue that it wants better results, but it is unwilling to provide this essential, cost-neutral resource to achieve them.

Dufour and Fullan write that when teachers are collaborating with colleagues to develop curriculum, plan a lesson, create assessments, analyze evidence of student learning, and develop action-research projects to improve results, they are working – they are engaged in professional activities to better meet the needs of those they serve (2013).

Raywid writes that while additional time to work with colleagues will not assure success for schools, teachers must have sustained time for collaborative reflection on school practice, conditions, and events (1993). Raywid considered various ways that schools could provide collaborative time without substantially increasing school cost and surveyed schools across the country to learn about some innovative ways that teachers are finding time to collaborate. Some school districts have added additional non-instructional school days in order to provide teachers with full day professional learning opportunities. Teachers have been provided substitutes in order to build in collaborative time on regular school days. Schools have also adopted extended day schedules in order to provide teachers with the same amount of class time with students but an increased amount of professional learning time during the school day (Raywid, 1993).

Fullan and Miles discuss the importance of time in their analysis of the problems of change efforts within schools, and they concluded that time is the salient issue (1992).

> But time is energy. And success is likely only when the extra energy requirements of change are met through the provision of released time or through a redesigned schedule that includes space for the extra work of change. Time is also money. And Louis and Miles discovered that serious change in big-city high schools requires an annual investment of between $50,000 and $100,000. They also found some schools spending five times that much with little to show for it. The key seemed to be whether the money simply went for new jobs and expensive equipment or was spent for local capacity-building (acquiring external assistance, training trainers, leveraging other add-on funds, and so on). Nevertheless, some minimum level of funding is always needed (Fullan & Miles, 1992).

Mattos et al. (2016) advocates that teachers should meet at least weekly when following the collaborative team protocols that should be implemented within the school structure. Furthermore, weekly team meetings should last approximately one hour. Another way principals can provide extended time for collaborative team meetings is to devote professional learning days to the collaborative team process (Mattos et al., 2016). Some school districts have incorporated early dismissal or late start days for students, allowing for collaboration among the teachers and principals while students are not in the school building. Mattos et al. (2016) make it clear that principals and teachers will never find enough time for collaboration, so principals and teacher leaders must be creative in providing time for collaborative teams to meet while students are at school without increasing costs or losing a significant amount of instructional time.

> One of the ways in which leaders demonstrate the priorities of their organization is through the allocation of resources. In schools, one of the most precious resources – second only to human resources – is time. The schedule reflects the priorities of the school. If principals and superintendents hope to foster a collaborative culture, it is imperative that they create schedules that provide time for teachers to co-labor with their teammates (Mattos et al., 2016).

Clarity on the purpose and priorities of collaboration. The leader must clearly communicate the purpose and priorities of the collaborative team. Aguilar states that a leader needs to consistently remind team members that the purpose of the team is to improve experiences and outcomes for children (2016). The academic needs and improvement of teaching and learning should always be at the center of the work of the collaborative team. Dufour and Fullan state that a system that ensures educators are assigned into meaningful teams and given ample time to collaborate will not experience higher levels of student learning if the teams don't focus on the right work (2013). Principal meetings should not be used to review budget concerns, bus routes, and the latest issues in school law because these topics will contribute to developing the capacity of principals to lead an improvement process. Furthermore, teacher-level conversations should not focus on field trips, procedures for addressing students without materials, or the lack of resources available to the team, as these conversations will not provide the focus on student learning that is needed to raise the levels of student achievement (Dufour & Fullan, 2013). Collaborative teams should establish clear priorities in order to respond to the following questions (Dufour & Fullan, 2013):

1. What are the essential knowledge, skills, and dispositions our students must acquire?
2. What assessment processes will we use to gather evidence of student learning?
3. What does the evidence of student learning reveal about the effectiveness of different educational practices?
4. Who on our team is getting consistently better results in an important area of student learning, and what can we learn from this teammate?
5. Which students need additional time and support to help them acquire the essential knowledge and skills?
6. How will we provide those students with the additional time and support for learning in a way that is timely, precise, diagnostic, directive, and systematic?
7. Which students need enrichment and extension of their learning because they have already demonstrated proficiency?
8. What are the areas in which our students consistently struggle, and what is our theory regarding why these skills or concepts are proving difficult for them?
9. What do we need to learn individually and collectively to improve upon our ability to help students succeed?
10. What action research can we initiate to test the impact of our own learning?

"Bambino refers to collaborative teams as critical friends but concludes that by providing structures for effective feedback and strong support, these groups help teachers improve instruction and student learning," (2002). Bambino received training and support with implementing critical friends groups at her school. Members of the group met regularly to examine student work and discuss the process that teachers used to create the learning opportunities for students. According to Bambino, giving and receiving feedback is a priority of the work that is done within the teacher group (2002).

Members of the community must also study multiple sources of student data to discover where students are performing well and thus where staff members can celebrate (Hord, 2009). An important part of the process of professional learning within collaborative teams includes a commitment to collective learning, intentionally determined, to address student needs and the increased effectiveness of the professionals; and Peers sharing their practice to gain feedback and thus individual and organizational improvement (Hord, 2009).

Dufour et al. (2010) states that the purpose of collaboration – to help more students achieve at higher levels – can be accomplished only if the professionals engaged in collaboration are focused on the right work. Educators who are asked to work in collaborative teams will continue to struggle unless they come to a shared understanding of key terms (Dufour et al., 2010). When asking teachers to collaborate, principals are asking them to engage in a systematic process in which they work together, interdependently, to analyze and impact their professional practice in order to improve individual and collective results (Dufour et al., 2010). Principals must ensure that teams are clear about the work that is to be done during the collaborative team time.

> In a PLC, the process of collaboration is specifically designed to impact educator practice in ways that lead to better results. Over and over again, we have seen schools in which staff members are willing to collaborate about any number of things – dress codes, tardy policies, the appropriateness of Halloween parties – provided they can return to their classrooms and continue to do what they have always done. Yet in a PLC, the reason teachers are organized in teams, the reason they are provided with time to work together, and the reason they are asked to focus on certain topics and complete specific tasks is so that when they return to their classrooms they will possess and utilize an expanded repertoire of skills, strategies, materials, assessments, and ideas in order to impact student achievement in a more positive way (Dufour et al., 2010).

Demonstration of reciprocal accountability. As it has been noted previously, a commitment to providing teachers with time for collaboration is a key factor in building a culture of collaboration within the PLC. In addition to allotting time for collaboration, teachers should be provided the necessary resources and support to help move the individual and collective learning of the team forward. The obligation to provide teachers with the resources and assistance they need to meet expectations is commonly referred to as reciprocal accountability (Dufour & Fullan, 2013). Principals must consider what they can do to help collaborative teams succeed in clarifying the essential outcomes, monitoring student learning, and improving upon their individual and collective ability to teach those outcomes (Dufour & Fullan, 2013).

Principals and district leaders should not assume that teachers magically know how to work with colleagues, so it is critical for school leaders to provide support and lead that work if PLCs are to live up to their potential (Thessin & Starr, 2011). Stamford (CT) Public Schools introduced PLCs in the district's 20 schools in the 2007-08 school year. Although all teachers were provided time on a weekly basis to meet with other teachers to discuss their practice, school leaders realized that teachers were confused and, in some cases, even frustrated by this new direction (Thessin & Starr, 2011). Teachers had not received the necessary professional development and guidance to have the intentional and productive discussions about student learning and teacher instructional practice that were expected to improve student achievement.

Thessin and Starr (2011) report what was learned from Stamford and state that when implementing PLCs systemwide, districts play four key roles: ownership and support, professional development, clear improvement process, and differentiated support. Providing ownership and support is found in how districts look for ways to involve teachers and administrators in developing and leading the PLC process. This could include the creation of a district PLC Steering Committee. Ongoing professional development is necessary because districts must teach administrators and teachers how to work together effectively in PLCs. Additionally, district leadership should provide a clear picture of how PLCs fit into the district's improvement process so that each PLC's work fits into an overall plan. Lastly, school support should be differentiated according to each school's unique needs in order to help those schools move to the next step in their PLC growth (Thessin & Starr, 2011).

Dufour and Fullan (2013) assert that another strategy for demonstrating reciprocal accountability is by removing the obstacles that are preventing people from making progress.

> When principals and teachers in effective districts in the United States expressed frustration over not having sufficient time to do the work that was asked of them, the districts came up with creative ways to provide time. When the small size of schools and distance between schools resulted in isolated teachers without a collaborative team to support them, the district provided the technology and coordination to link schools and establish electronic teams. In another district, when a state mandate for merit pay threatened to undermine the collaborative culture and collective responsibility district leaders were trying to create, the central office and union leadership created a plan to provide enhanced compensation to all staff if individual schools and the district in general met specific student achievement targets. When teachers and principals in yet another district found that analysis of evidence of student learning was being hampered by the amount of time needed to prepare the data, the central office leadership team established a task force of teachers who found a software program that solved the problem. These real-world examples illustrate an important element of reciprocal accountability – a commitment to help identify and remove the obstacles that interfere with progress (Dufour & Fullan, 2013).

Dufour and Fullan also state that leaders who hope to demonstrate reciprocal accountability must have a process in place for the two-way exchange of information with people throughout the organization (2013).

Focus on Learning

Use of SMART goals. Dennis Sparks discusses the challenges of selecting schoolwide goals focused sharply on student learning. Sparks states that coming together to select a student learning goal in an academic area is often very hard work (1999). Sparks also states that schools are often creating goals that are too broad, which prevents the faculty from engaging in serious, in-depth study (Sparks, 1999). Chenoweth concludes that research and experience have identified five practices that typically yield improvement (2015):

1. Have a laser-like focus on what kids need to learn
2. Collaborate on how to teach that content by unpacking standards, mapping curriculum, designing lessons, and constructing assessments that measure whether students master those lessons
3. Use the results of classroom and district formative assessments to see which kids got it and need enrichment, and which kids didn't and need additional help
4. Find patterns in data and use them to improve instruction
5. Build personal relationships so that students trust teachers and so that parents, teachers, and administrators trust one another

Dufour et al. (2010) have repeatedly listed a results orientation as one of the characteristics of a professional learning community. Dufour and his colleagues have

found that the best way to help people throughout a school district to truly focus on results is to insist that every collaborative team establish SMART goals that align with school and district goals. Goals that are SMART are: Strategic, Measurable, Attainable, Results Oriented, and Time Bound (Dufour et al., 2010).

Jan O'Neill writes that setting goals that connect to the classroom and focus on student learning helps educators see, learn from, and communicate their results (2000).

> Understanding the difference between process and results goals is important to setting learner-centered, effective SMART goals. Our field observations confirm what many educational researchers have found: Most school goals are process oriented – geared toward activities, programs, and instructional methods. Examples of process goals are developing a balanced literacy program for primary students, implementing an integrated math/science curriculum for incoming freshmen, and adopting a zero-tolerance policy toward violence. Results goals give us better feedback on how well we help students learn (O'Neill, 2000).

The work of the collaborative team is to translate one or more of the school goals into a SMART goal that drives the work of the team (Dufour et al., 2010). It is important to note that the collaborative team is working toward a shared goal that has been mutually agreed upon. A school culture that is focused on results must also include a balance between attainable goals the teams feel they can achieve in the short term and stretch goals – goals so ambitious they could not possibly be achieved unless practices within the organization change significantly (Tichy, 1997).

According to Dufour et al. (2010), if schools and districts limit themselves to the pursuit of attainable goals, they run the risk of never moving outside their comfort zones. This will hinder the progress of any school or district that is focused on creating systemic change throughout the school system. The principal and teachers should focus on both stretch goals as well as goals that are short term in nature. Researchers have found that in the early stages of building a PLC, celebrating small wins is important to sustaining the effort of the members of the collaborative team, and attainable goals are an essential element of results-oriented small wins (Dufour et al., 2010). Furthermore, district goals should be clearly linked to the purpose of learning for all students, should establish challenging targets, and should require innovation and long-term commitment if they are to be achieved (Dufour et al., 2010).

Bailey and Jakicic write that the most powerful part of the collaborative process is the development and implementation of an action plan that is designed to close the gap between the current reality and the goal (2012).

Collaboratively analyzing evidence of student learning to improve instruction. When the collaborative team begins to create assessments to determine whether students have learned the identified essential learning outcomes, team members are beginning the work that will really make a difference for students and will challenge teachers' instructional practice (Bailey & Jakicic, 2012). DuFour et al. (2010) add that all steps in the PLC process are intended to provide a teacher team with transparent evidence of student learning so team members can determine which instructional strategies are working and which are not. As part of the collaborative learning process within the PLC, teachers engage in the creation of common assessments. Bailey and Jakicic state that the

term common assessment refers to those assessments given by teacher teams who teach the same content or grade level – no teacher can opt out of the process; it must be common to all teachers who teach that course or grade level (Bailey & Jakicic, 2012).

In high-performing PLCs, the assessment process must include team-developed common formative assessments as team members attempt to determine whether students are learning (DuFour et al., 2010). The team members then use the evidence of student learning from their common formative assessments to inform their individual and collective practice in four ways (Dufour et al., 2010):

1. To inform each teacher of individual students who need intervention because they are struggling to learn or who need enrichment because they are already proficient
2. To inform students of the next steps they must take in their learning
3. To inform each member of the team of his or her individual strengths and weaknesses in teaching particular skills so each member can provide or solicit help from colleagues on the team
4. To inform the team of areas where many students are struggling so that the team can develop and implement better strategies for teaching those areas

The benefits of common formative assessment are great, and common formative assessments do the following (as cited in Bailey & Jakicic, 2012):

1. Promote efficiency for teachers
2. Promote equity for students

3. Provide an effective strategy for determining whether the guaranteed curriculum is being taught and, more importantly, learned
4. Inform the practice of individual teachers
5. Build a team's capacity to improve its program
6. Facilitate a systematic, collective response to students who are experiencing difficulty
7. Offer the most powerful tools for changing adult behavior and practice

Bailey and Jakicic argue that PLCs should focus on common formative assessments for their work together because of the compelling research that these are the assessments that can truly improve student achievement (2012). More and more schools are creating team-based assessments in addition to a variety of other types of assessments because of the strong research base for using formative assessments to provide the necessary information teachers need about their students (Bailey & Jakicic, 2012).

Table 1 shows how a balanced assessment system that includes both formative and summative information about student learning will help teachers make short and long-term decisions about instructional practices to meet the needs of students (Bailey & Jakicic, 2012).

Table 1

A Balanced Assessment System

	Classroom Assessments		Common Formative Assessments	Interim or Benchmark Assessments	External Summative Assessments
Examples of practice	Worksheets, clickers, whiteboards, exit slips, conferences	Final exams, final projects	Tasks assessed with rubrics, short quizzes, common worksheets, and clickers	Quarterly tests or performances, writing samples	State tests, ACT, SAT, and Advanced Placement (AP) exams
Formative or summative?	Very formative	More summative	Very formative	More summative	Summative
Whose responsibility?	Classroom teachers	Classroom teachers	Collaborative teams at each school	District teams of representative teachers	An external group of "experts"
Purpose?	To give immediate feedback	To give a grade	To determine if students have learned the material and how to respond	To assess curriculum, instructional strategies, and pacing	To determine whether curriculum, instructional strategies, and pacing were appropriate

Dufour et al. (2010) conclude that all of the steps in the PLC process are intended to provide a teacher team with transparent evidence of student learning so team members can determine which instructional strategies are working and which are not. Collaboratively analyzing the evidence of student learning enables teachers to appropriately adjust their teaching practices, which is an essential part of the PLC process.

By providing teachers with protocols to guide their work, principals can help teachers make the analysis of evidence of student learning in the service of improved student and adult learning part of the school's organizational routine (Dufour et al., 2010). Protocols ensure all voices are heard on the critical issue at hand, help members look

closely at evidence of student learning, examine success as well as failure, and help participants become skillful in facilitating dialogue on the right work (as cited in Dufour et al., 2010).

Dufour et al. (2010) provide an example of a protocol for collaboratively analyzing evidence of student learning from Harvard's Project Zero, which includes the following six steps:

1. Team members examine evidence of student learning or examples of student work in silence and take notes on their observations.
2. The team leader asks, "What did you see?" Members are asked to make factual, non-evaluative statements.
3. The team leader asks, "What questions does this evidence of student learning raise for you?" Members speculate about students' thought processes and gaps in their understanding.
4. Members discuss implications for their teaching.
5. Members establish action plans to act on their learning.
6. Members share their reactions to and assessment of the meeting.

It is also important for teams to use protocols to create a safe environment for an individual teacher to pose a problem and seek the help of his or her colleagues (Dufour et al., 2010). According to Dufour et. al. (2010), teams should return to the results of their analysis when they prepare to teach the same unit in the next school year. Teachers should continue to use SMART goals each unit to improve student achievement from the previous school year. The evidence of student learning from previous years should be used to inform teaching practices in the future and get better results.

Continuous Improvement and Sustaining the Change

Provide ongoing support for teams. PLCs are cultures that constantly implement current priorities well by embedding the very processes that enable teams to be excellent at what they do today, but also open to next-generation innovations (Dufour & Fullan, 2013). Dufour and Fullan have expressed that leadership at all levels means creating the conditions – structures, support, systems, and culture – that allow others to succeed at what they are being asked to do (2013). In order to create a relentless focus on continuous improvement, leaders must first promote the success of others by addressing three issues (Dufour & Fullan, 2013):

1. What are the obstacles that are impeding progress?
2. What support and resources can we provide to promote progress?
3. How can we identify and celebrate examples of progress to build momentum for the reform and to increase individual and collective confidence about taking on the next challenge?

Furthermore, Dufour and Fullan argue that leaders at all levels must have a process to gather information on the current reality of those they are called upon to lead by addressing the following questions (2013):

1. Are systems in place to monitor progress, identify obstacles, and engage the organization in removing those obstacles?
2. Is the organizational structure congruent with the organization's strategic goals and priorities?

3. Do collaborative teams have a clear understanding of the rationale for the system's initiative, how they contribute to the initiative, and the short-term and long-term goals that should guide their work?
4. Do teams have sufficient autonomy to solve problems and take ownership of the initiative?
5. Do teams have sufficient time to focus on meaningful work?
6. Do teams have the necessary resources to move forward effectively?
7. What events, problems, or recurring conditions are contributing to setbacks for teams, and how can we work together to address those concerns?
8. Do we encourage team members to help one another?
9. Do we provide support for teams? In what form?
10. Are we helping teams approach problems with a learning orientation rather than a blame orientation? Are we modeling a learning orientation?
11. Does communication of ideas flow freely between team members and among teams?
12. Do team members show respect to one another?
13. Is there a sense of personal and professional affiliation and camaraderie within the team?
14. Do we demonstrate respect to team members by acknowledging their contributions to progress, attending to their ideas, and treating them with an assumption of good intentions?

15. Do we acknowledge and honor the efforts and achievements of individuals and teams through celebration of small wins?

Principals must consider how they are removing obstacles that hinder the progress of the collaborative team and the type of support that is needed in order to sustain the work of the PLC. Teams must have time to meet to do their work collaboratively and to respond to the assessments they administer (Bailey & Jakicic, 2012). Principals will also need to ensure that teachers are comfortable using data to inform their instruction. Bailey and Jakicic state that to create a supportive culture, it is important that data conversations stay focused on the facts – the student results and planning for response (2012). Principals and district leaders will need to remove any obstacles that prevent teachers from having easy access to the important data that is needed for them to have rich discussions about what students know and are able to do.

Improvement Science. Catherine Lewis provides an argument for how improvement science can be used by educators as a way to focus on continuous improvement, strategies for ongoing learning and attention to the knowledge-building, and motivational systems within schools (2015). In addition to the core framework of improvement science, the plan-do-study-act cycle (PDSA), researchers argue there are three fundamental questions that drive continuous improvement work, and provide the knowledge about how to sustain educators' motivation to improve instruction (Lewis, 2015). The fundamental questions are:

1. What are we trying to accomplish?
2. How will we know that a change is an improvement?
3. What change can we make that will result in improvement?

Lewis concludes that the ideas underlying improvement science are not new to education researchers given that improvement science focuses on identification, analysis, and remediation of a problem in a specified context using the PDSA cycle (2015). One of the examples of improvement science that Lewis shares is lesson study. The left-hand side of Figure 1 shows a collaborative process in which a team of teachers plans, enacts, and examines an intended improvement to instruction (as cited in Lewis, 2015).

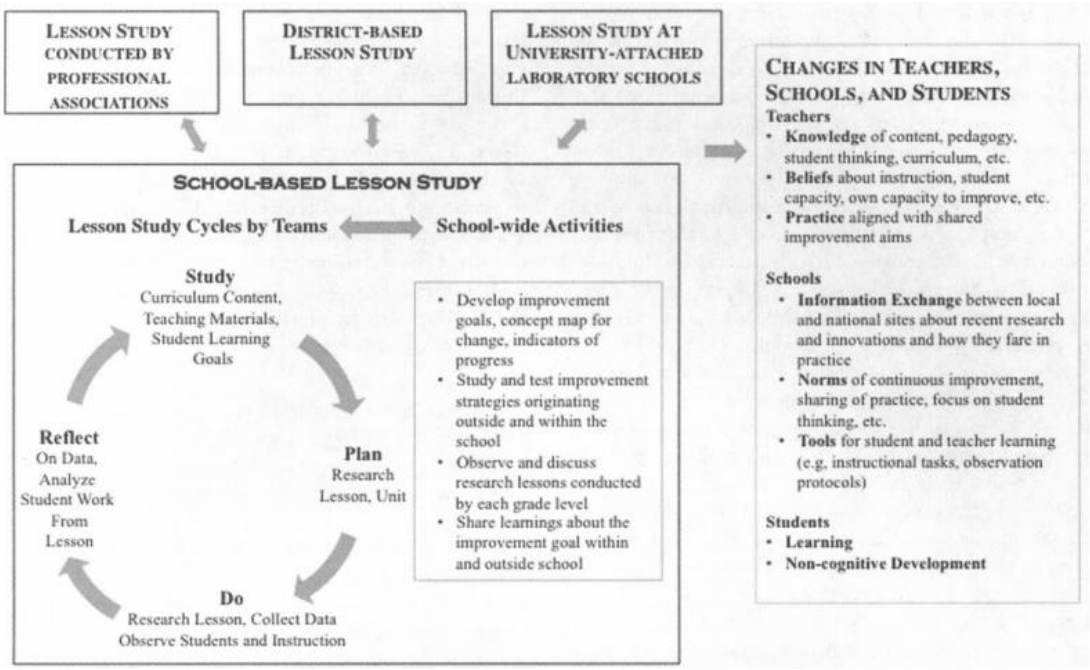

Figure 1

Improvement science at scale: Lesson study in Japan

This figure also shows how different forms of lesson study can be used to produce a locally managed system in which classroom educators lead the enactment, study refinement, and spread of instructional improvements (Lewis, 2015). Lesson study provides educators with an opportunity to choose an improvement aim, agree on how they will recognize improvement, identify the changes that might produce improvement, and then test these changes in the PDSA cycle (Lewis, 2015).

Lewis concludes that educators can improve instruction by integrating basic disciplinary knowledge with organizational processes, such as development of a shared improvement aim, cause-and-effect mapping to share current practice and identify potential drivers of improvement, and PDSA cycles to test potential improvements (2015).

Establishing widely dispersed leadership. Dufour and Fullan have concluded that widespread leadership is equally imperative for sustaining improvement efforts (2013). It is important for leaders to be intentional about developing other leaders who are committed to the school improvement process and work of the PLCs.

> Leadership development that sustains an improvement process means giving lots of people throughout the organization both challenging experiences directly tied to the system's goals and ongoing support and feedback to develop their collective capacity to meet those challenges. People at all levels are being groomed for leadership through their work, not away from their work. When an organization has created widespread ownership of the change process and developed the leadership potential of its members, people throughout the organization take collective responsibility for preserving its culture. Positional leaders may come and go, but the culture endures because it is grounded in collective leadership rather than dependent upon an individual (Dufour & Fullan, 2013).

In a PLC, there is collective ownership of the process, and to that end, the process itself should be guided not by one or two individuals but by teams that have been empowered with the capacity to do the work (Bailey & Jakicic, 2012). The PDSA cycle and development of common formative assessments encourages teams to build collective

capacity. Bailey and Jakicic agree that once teacher teams have received the necessary support to build their capacity to guide the work, it is critical for teams to go beyond what they view as traditional team leadership (2012).

Summary

The review of literature provides additional support of the extensive research that has been conducted regarding the impact of PLCs on teacher instructional practices and student learning. The three critical components of PLCs identified by Dufour et al. (2010) provided the framework for this review. The three big ideas shared include having a focus on learning, a collaborative culture, and a results orientation to improve practice and drive continuous improvement. The PLC process requires leadership that is resilient when confronted with adversity, problems, and plateaus (Dufour & Fullan, 2012). PLCs create a collaborative school culture, where teachers focus on analyzing the evidence of student learning and receive feedback from their colleagues on a regular basis. Teachers in a PLC are empowered to make changes to instruction based upon student data and feedback from colleagues. Teachers work in teams to develop common assessments and focus on the evidence of student learning with their colleagues as part of a continuous improvement cycle of learning.

CHAPTER III: Methodology

Purpose of the Study

The goal of this research study is to determine whether Professional Learning Communities have an impact on teachers' abilities to refine their instructional practices based upon the results of data, student needs, and ongoing collaboration with their colleagues. The researcher is interested in investigating the role that Professional Learning Communities have in the future academic success of students. All educators at Pittsburgh Science and Technology Academy will receive the results of the research study in order to understand the current state of the PLC initiative. Pittsburgh Science and Technology Academy faculty and staff will be able to create an action plan in order to increase the effectiveness of PLCs, and the overall professional learning opportunities for the staff.

The research of Richard Dufour provides the primary support for the implementation of the PLC intervention at Pittsburgh Science and Technology Academy. The critical components of PLCs identified by Dufour et al., (2010) include having a focus on learning for all students, creating a collaborative culture to support student and adult learning, and ensuring that there is a results orientation to improve practice and drive continuous improvement. Shirley M. Hord is among the many other researchers who have contributed to the growing emphasis on PLCs as a method of increasing student achievement. According to Shirley M. Hord, there are five distinct attributes of a PLC (1997) and they must include: supportive and shared leadership, collective creativity, shared values and vision, supportive conditions, and shared personal practice.

There is a substantial amount of research supporting the implementation of PLCs as an intervention to improve student achievement outcomes. PLCs provide the systems

and structures needed to ensure that educators focus on continuously improving instruction by maintaining an emphasis on student learning and collaboration that is based upon a shared mission and collective commitments. The shared mission of the PLC guides the decision making regarding teacher instructional practices and student learning. PLCs are rooted in a culture of shared and supportive leadership, and the researcher in this study is interested in determining how PLCs encourage teachers to share their learning, feedback, and take ownership of their professional learning experiences.

Research Questions

There are three research questions established for this study and these questions serve as the indicators of effectiveness of the intervention:

1. How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs?
2. Have professional learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices?
3. What role do professional learning communities have in the future academic success of students?

Research Setting: Establishing a Professional Learning Community

> Professional Learning Community (PLC) - "An ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve," (DuFour, DuFour, Eaker, Many, 2010, p. 10).

The implementation of PLCs at Pittsburgh Science and Technology Academy began during the 2017-18 school year. There were many mistakes along the way as the collaborative teams and norms for learning were established. Some of the challenges that teams faced were a result of a desire to move too fast throughout the process. The implementation of PLCs began by immediately establishing collaborative teams and focusing on developing common formative assessments across content areas. Creating common formative assessments was challenging for many reasons, but mainly because of the uniqueness of the school program and small learning community at Pittsburgh Science and Technology Academy. Most teachers provide very specific classes that are not offered by other members of their department.

During the 2017-18 school year, teachers worked within their teams to create SMART (Specific, Measureable, Attainable, Results-oriented, Time-bound) goals and action plans for accomplishing the goals that were established. It was important for teams to have an understanding of how common formative assessments were aligned to specific standards. Teachers were encouraged to work within their teams to create assessments that would measure student progress, and enable them to know that they had achieved their goal. We asked members of the collaborative teams to provide the specific action steps that would need to occur in order to achieve the goal. What were the resources needed? What individuals could serve as experts to provide support outside of other members of the collaborative team? Additionally, teachers were asked to establish the timeline for achieving this goal.

The guiding questions that we considered as a team related to the three key areas of PLCs below:

1. *Focus on Learning*: The fundamental purpose of school is to ensure that all students learn at high levels. There are four universal guiding questions:
    a. What is it we want our students to know?
    b. How will we know if students are learning?
    c. How will we respond when students do not learn?
    d. How will we enrich and extend the learning for students who are proficient? (Dufour & Fullan, 2013)
2. *A Collaborative Culture*: If we are to help all students learn, it will require us to work collaboratively in a collective effort to meet the needs of each student. There are four conditions for this to happen:
    a. Organization into meaningful collaborative teams with a focus on interdependent, common goals, and mutual accountability.
    b. Regular time for collaboration is embedded into the routine practices.
    c. Clarity on the purpose and priorities of their collaboration.
    d. Demonstration of reciprocal accountability. Providing resources, training, and ongoing support for PLC implementation success.

3. *A Results Orientation*: In order to know if students are learning and to respond appropriately to their needs, we must create a results orientation. There must be a hunger for evidence of student learning and use of that evidence to drive continuous improvement of the PLC process. There are four conditions needed to guide this focus on results:

    a. Everyone is working collaboratively with others to achieve SMART goals (Strategically and Specifically aligned with school and district goals, Measurable, Attainable, Results-oriented, Time bound).

    b. Everyone is working collaboratively to gather and analyze evidence of student learning regularly to improve professional and collaborative practice.

    c. Evidence of student learning is used on a regular basis to identify the individual and specific needs of students.

    d. Staff are assessing the effectiveness of every policy, program, procedure, and practice based upon its impact on student learning.

The most important task that teachers completed during the first weeks of implementing team protocols was to use collaborative time to create team norms and collective commitments. Collective commitments are essential to building team trust. An important characteristic of an effective team is the sense of trust that the team members

have among each other. Elena Aguilar (2016) states that when there is an agreement to do something and one or more members don't honor this agreement, trust can be eroded.

Collaborative Team Protocols

As a next step, teams incorporated three specific team learning protocols in order to drive the individual and collective learning of the team. The protocols introduced include the following areas: unwrapping standards, data analysis, and student work. Once each collaborative team had established team norms and collective commitments, it was time to engage in discussion using one of the three protocols as a way to focus on specific areas of learning as professionals. Teams used a protocol that requires seven steps for unwrapping standards:

1. Read the standard and eligible content, and circle verbs (skills).
2. Underline the nouns (concepts) to be taught.
3. Double underline any prepositional phrase (context).
4. Write each verb (skill) and noun (concept) combination as a separate learning target.
5. If a prepositional phrase (the context) is included at the beginning or the end of the standard/eligible content, include it in the target.
6. Examine each learning target asking the following questions:
    a. What are the instructional and assessment implications of this target?
    b. What would it look like to teach this target in the classroom (setting, materials, strategies)?
    c. Is the skill measurable?

   d. What would the assessment look like?
   e. Do we need to change the verb to make it more measurable?
7. After examining the instructional and assessment implications, are there any targets that are implicit or not directly stated in the standard/eligible content that should be included?

When using this protocol, teachers engage in a critical examination of each learning target in order to determine the instructional and assessment implications that are important for teachers to consider as they plan for student learning and classroom instruction. This protocol encourages teachers to think about what students will need to do in order to show mastery of the key concepts.

The data analysis protocol used incorporated a four-step process for discussing student data and considering the implications of the data. The four-step process of analyzing data using this protocol includes the following:

1. *Prepare and Preview* – During the first step of this protocol, teachers select the data to analyze and look for trends. Questions asked are about the patterns, categories, or trends emerging within the data. Additionally, the team identifies areas of strength and areas for improvement based upon the data.
2. *Probe* – The expectation during this step is for the team to consider multiple perspectives within the data, including equity, student groups, and various cohorts. The team will then select a specific, actionable area of focus and consider how different student groups performed on various questions. For detailed item-level analysis, teachers study

student responses on specific questions and determine what students needed to know in order to be able to perform well on the questions. This step will allow teachers to know which misconceptions will need further explanation.

3. *Plan* – Teams develop an action plan to address the area of focus. Teachers begin to plan for changes in their approach to teaching the standard and concept. During the third step of planning, teachers decide which students will need additional instruction. It is also critical to determine how students will be assessed to determine mastery after the reteaching. Any district level supports to assist in the reteach or reassessment should be considered. Lastly, the team discusses how student misconceptions may have arisen and how the reteaching addresses each misconception.
4. *Pursue* – Teachers implement the action plan and assess student progress.

The student work protocol is the third tool that teams were encouraged to use during collaborative team meetings. The specific objectives of this protocol are three-fold:

1. To analyze student work from a task within a lesson or unit to establish evidence of alignment with the rigor of the targeted PA Core State Standards.
2. To determine how students performed on an assignment and reflect on evidence of what students know and are able to do as well as what additional feedback or instruction is needed to help them progress.

3. To provide suggestions for improving the assignment and related instructional materials.

Teachers bring student work samples to the team meeting that are standards aligned. It is important for teachers to choose tasks that are central to the learning goals of the unit or lesson, as this will provide the best opportunity for high quality feedback from members of the team. Teachers collect and submit for review multiple samples of student work that represent a range of learning levels.

The student work protocol requires the entire team to review the student work together. Reviewing the student work as a team ensures the incorporation of discussion and collaboration within the process. Each member of a team independently records their findings prior to team discussion. After the individual review of the student work, the team discussion focuses on understanding all reviewers' analyses of both the task and the students' responses. Guiding questions are included at each step of the process within the student work protocol as a way of promoting and extending the discussion. The student work protocol includes a five-step process:

1. Analyze the Task – The first step for the Collaborative Team is to develop a focused understanding of the task itself. The team must take the necessary time to gain an understanding of what the task is asking students to know and do.
    a. Guiding Questions
        i. What content and performance demands does the task make on students?
        ii. What is the purpose of the task?

iii. Which PA Core Standards and Eligible Content seem to be targeted by the task?

iv. What types of student reasoning are required by the task?

2. Examine Instructional Context and PA Core Standards Alignment of the Task – After establishing a clear understanding of the nature and demands of the task, the team now looks at the task in its instructional context. Members of the team limit their analysis to the materials in the lesson that support the teaching and learning of the required skills and knowledge for the task, not the samples of student work.

    a. Guiding Questions

        i. Where does the task occur within the instructional sequence? What have students already learned from the lesson when they approach the task? What will they learn after?

        ii. Does the lesson include sufficient and effective instruction and scaffolding leading up to the task?

        iii. Do the expectations described in the scoring guidelines correspond with the analysis of the task in Step 1?

        iv. Is the task central to the learning goals of the lesson and unit?

v. Which standards targeted in the lesson match the content and performance demands of the task? (*See Figure 2 for Alignment Descriptors)*

vi. Do the directions, prompts, and/or scoring guidelines for the task adequately provide or indicate opportunities for students to demonstrate the requirements of the targeted standard(s) for the task?

ALIGNMENT DESCRIPTORS: Use these descriptors in considering the quality of the alignment between the targeted standards and the task.

Full Alignment	The expectations of the task address all aspects of the identified standard(s).
Partial Alignment*	The expectations of the task address the most central aspects of the identified standard(s). However, some of the less central aspects of the standard(s) may not be addressed (likely by design).
Limited Alignment**	The expectations of the task do NOT address the most central aspects of the identified standard(s). However, some of the less central aspects of the standard(s) are addressed.
No Alignment	The expectations of the task do not address the identified standard(s).

Figure 2

Standards and Task – Alignment Descriptors

3. Analyze Individual Student Work – The team examines the collected range of student responses to the task, first individually then, in Step 4, as a group.

    a. Guiding Questions

        i. What does the student's work demonstrate about their understanding of the task?

        ii. What does the student's work demonstrate about their proficiency with the requirements of the targeted standards and eligible content?

iii. What does the student's work demonstrate about the depth of their understanding and reasoning ability?

iv. How does the application of the scoring guidelines and rubrics related to the task support an understanding of the student's proficiency?

4. Analyze the Collection of Student Work – After each sample has been individually considered, the team analyzes the whole collection of samples of student work.

    a. Guiding Questions

        i. In what aspects of the task have students generally performed well?

        ii. What are the most frequent and fundamental problems students appear to have with the task? Are there common errors made across the collection of student work?

        iii. What does the range of student work demonstrate about the clarity of the task, directions, and supporting materials?

        iv. In what ways do the scoring guidelines and rubrics aid in the evaluation of student proficiency on the targeted standards?

v. In what ways does the task allow (or not allow) students to demonstrate various levels of proficiency with the targeted standards?

vi. Is there evidence of consistent levels of reasoning and understanding across the samples of student work?

vii. What are the implications of the findings for the collection of student work for further task development?

5. Provide Suggestions for Next Steps in Instruction and Improvement – The team uses insights from the review team's analysis of the task and student work to suggest next steps for instruction to address student needs and improvements the developer(s) might make to the task, instructional context, supporting materials, and scoring rubrics.

    a. Guiding Questions

        i. Are the task instructions clear to students? How could they be modified to increase student understanding of the task's expectations?

        ii. Is the task properly placed within the overall lesson and unit plan? What modifications to instructional context might improve student performance?

        iii. Does the task allow a variety of students to demonstrate their own level of proficiency? What

modifications might be made to the task to elicit evidence of various levels of proficiency?

iv. Do the task prompts, directions, and requirements provide students with a clear opportunity to demonstrate proficiency of the targeted standards?

v. Does the task allow students to demonstrate deep understanding and reasoning about the related concepts, topics or texts?

vi. What modifications to the scoring guidelines/rubrics would improve guidance for evaluating student proficiency on the targeted standards?

vii. What instructional strategies should be utilized to assist students in deepening their current level of performance?

During the first two years of establishing PLCs at Pittsburgh Science and Technology Academy, the researcher focused on providing teachers with the specific tools to encourage teams to develop the practices emphasized within the review of the literature. The researcher provided teachers with time for collaboration as well as the structure necessary for meaningful collaboration to occur. Teachers were given specific guidelines and procedures to follow during collaborative team time. The tools provided supported teachers with developing common formative assessments, analysis of data, and analysis of student work.

The Learning Team Cycle

During the 2019-20 school year teachers were introduced to the learning team cycle in effort to support our district emphasis on continuous improvement. Dufour and Fullan state that educators must systematically monitor student learning on an ongoing basis and use evidence of student learning to respond immediately to students who experience difficulty (2013). The learning team cycle is a process that helps teachers systematically identify the changes needed to improve instruction and student learning. Stephanie Hirsh and Stacy Crow state that empowering teacher teams to learn and solve problems together requires a vision of a certain way of knowing and working as well as an infrastructure that provides teams with leadership, resources and support (2018).

Implementation of the learning team cycle has created more opportunities for teachers to take ownership of their own professional learning. The PLC intervention during the 2019-20 school year focused on increasing the relevancy of professional learning for teachers by recognizing that teachers should take part in deciding what they should learn and how they obtain the desired skills and knowledge. It was the intention of the researcher to encourage teachers to learn both individually and collaboratively, and to model the actions of a continuous learner. Hirsh and Crow report that collaborative learning puts teachers in constant structured communication with one another, offering a consistent and reliable means for teachers to find support, solve problems, and grow as a result of working with expert peers (2018). The role of the researcher throughout this intervention has been to ensure that teachers have the necessary resources, time, and materials necessary for collaboration.

Using the learning team cycle, teachers address learning challenges that they have identified as important to tackle as a team. Teachers must prioritize the problems that they want to address first, and then use the five-stage process to collaborate and take the necessary steps to address the problem. This process can be aligned with any school improvement goals identified within the school, or a comprehensive plan that addresses areas of growth for the entire school district. The learning team cycle engages teams in an inquiry based process where educators receive feedback from their colleagues and implement changes to classroom instruction based upon individual learning as well as collective learning of the team. Hirsh and Crow explain the teacher learning team cycle (2018):

1) *Analyze data*: In this stage, team members analyze data so they can identify and better understand the exact problem they are addressing. Data is organized and displayed for analysis and the team examines data for trends, issues and opportunities.
2) *Set goals*: Teams identify student and educator learning goals. Teachers create data summary statements that are specific to the needs of their students. Student learning targets are expressed as SMART goals. The student learning goals influence teacher decisions about improvement goals for educators.
3) *Learn individually and collaboratively*: Teachers should gain new knowledge and skills by examining their assumptions, attitudes, and beliefs. During this stage, team members will focus on their learning goals that they set for themselves and their students. Team members

begin to differentiate their individual learning and seek out support from colleagues or coaches to address their learning goal. Teams and individuals may participate in book studies, explore instructional materials, participate in online courses, or participate in practice sessions with peers. The purpose of this stage is to incorporate their learning into the lessons that they are planning for students.

4) *Implement new learning:* Teachers are now ready to implement their refined lessons and assessments within the classroom. Once teachers have changed their practices and behaviors in order to affect how they teach and the ways students learn, they are now ready to apply their learning within the classroom. Support from coaches, principals, and teacher colleagues continues during this stage.
5) *Monitor, assess, and adjust practice:* Teams use evidence of student learning and feedback from students and peers to assess and refine the implementation of the new instructional strategies. Teams use formative and summative assessments to determine whether the learning goals were achieved.

Each of the first three stages of the learning team cycle includes outcomes that the researcher emphasized as part of this continuous process of learning. During stage one of the cycle, the teams were to write data summary statements. It was important for teams to create statements that identify what they see in the data and not the assumptions that they might make when analyzing the data. The researcher provided teams with support by first determining whether a data literate PLC is evident at Pittsburgh Science and Technology.

The researcher explained to the staff that a data literate culture is one that includes team members who know where to go to find the data they need and how to access it. Having a sense of trust within the team, makes it easy for teachers to seek help from others when they do not feel they have a skill set required for data analysis. Lastly, a data literate culture includes team members who are willing to advocate for the necessary time for data decision-making tasks.

The expected outcome during stage two of the learning team cycle are the student and educator learning goals. The researcher supported the teams with translating the data summary statements into student goals. The student learning goals emphasize the learning priorities and helps to give a clear sense of purpose and alignment as teams monitor student progress. Educator learning goals identify the skills and knowledge teachers individually and collectively need to help students achieve their learning goal (Hish & Crow, 2018). Hirsh and Crow state that the teacher learning goal will consider the knowledge, attitudes, skills, aspirations, and behaviors (KASABs) necessary to achieve the student learning goal (2018).

The third outcome that the researcher introduced to the team as part of the learning team cycle is the learning agenda. As teams learn individually and collaboratively it is necessary to write a plan that addresses how the team and individual will achieve the outcomes they established in their learning goals (Hirsch & Crow, 2017). The key actions that are included within the learning agenda include accessing expertise, reflecting on new knowledge, and assessing new understanding. Team members must identify and access the experts who have the skills and knowledge that they need to gain. Accessing the knowledge can occur as a result of observing instruction being modeled by the expert,

participating in lesson studies, and reflecting on instruction with a peer. Engaging in reflection throughout the process of learning will help individuals and teams understand how their attitudes, knowledge, and assumptions have changed as a result of their individual and collaborative learning. Lastly, the learning agenda includes an opportunity for the team to check for their readiness to implement the new learning.

A Culture of Continuous Improvement

Laura Calvert states, "For real learning to take place, adult learners must become agents of their own learning," (2016). Creating a culture of continuous improvement will be the result of educators taking ownership of their own learning. The intervention that the researcher implemented during the 2019-20 school year continued to build upon the PLC practices in place at Pittsburgh Science and Technology Academy. However, the intervention also supported an increase in teacher ownership of their professional learning experiences. Calvert defines teacher agency as the capacity of teachers to act purposefully and constructively to direct their professional growth and contribute to the growth of their colleagues (2016). The learning team cycle, as part of the work of the collaborative teams, supports teachers with the process of planning for and presenting their own professional learning. The goal of the continuous improvement model is for educators to systematically improve their instruction and engage in cycles of learning with their colleagues. The researcher incorporated an intervention that created collaborative learning opportunities where teachers determined the topics based upon student needs as determined by the data. Teachers were given the autonomy to choose their collaborative teams based upon common goals and interests between the members of the team.

The researcher noted in Chapter 2 several practices that school leaders can use to increase opportunities for meaningful educator collaboration. Raywid writes that while additional time to work with colleagues will not assure success for schools, teachers must have sustained time for collaborative reflection on school practice, conditions, and events (1993). Raywid considered various ways that schools could provide collaborative time without substantially increasing school cost. One of the innovative ways that the researcher provided time for teachers to collaborate was by providing substitutes in order to build in collaborative time on regular school days. The opportunity for additional collaborative time was a necessary intervention and providing substitutes for class coverage did not substantially affect the school budget. Teachers were given regularly scheduled time to engage in discussion, analysis, and reflection as part of the learning team cycle.

Research Design

The researcher obtained approval from the California University of Pennsylvania Institutional Review Board prior to conducting any research. Additionally, the Pittsburgh Public School's Data Governance and Research Review Board reviewed the researcher's request to conduct research within the school district and the review board approved the request. The researcher provided potential participants in the research study with a letter that outlined the purpose of the study, amount of involvement of participants, and information concerning the anonymity of all participants in the study. All participants in this study have been teaching at Pittsburgh Science and Technology Academy since the 2016-17 school year. All volunteers were asked to participate in a survey and questionnaire as part of the research study.

The researcher considered incorporating administrator observations as part of the data collection process. The purpose of this research study is to determine the impact of PLCs on teacher instructional practices, so observing teachers as they collaborate would provide the researcher with some additional insight about teacher concerns as they implement the intervention. Data collected during these observations would show how teachers respond to the various resources and tools provided to support the work of the collaborative teams. However, after considering this data collection process, the researcher chose not to be a participant-observer during collaborative team meetings. The principal being a participant-observer during these meetings would significantly influence teacher behavior.

Ultimately, the researcher chose to use inquiry data to capture teacher perceptions and attitudes about the effectiveness of the PLC intervention. Using inquiry data enables the researcher to understand teacher concerns about the PLC intervention, and the impact the intervention is having on teacher instructional practices. Therefore, this research study incorporated a quantitative approach for data collection. Given the researchers role as a researcher practitioner within the school community, it was essential to ensure that the approach taken in the research study was as objective as possible. The researcher considered having teachers respond to questions face to face, but the process of collecting and analyzing the feedback collected during these interviews would be extremely time consuming. Additionally, it would be more difficult for teachers to share their honest feedback when their responses are not anonymous.

Using a quantitative approach to this research study enabled the researcher to describe the context of the intervention while minimizing the researcher's own bias.

Quantitative research methods allow data to be collected directly from many participants by using surveys and questionnaires. The use of quantitative methods enables the researcher to accurately understand the current situation and use statistical analysis to answer the research questions.

Quantitative data was collected by asking participants in the research study to complete the Stages of Concern Questionnaire (SoCQ) twice during the school year. Please see Appendix 1 for the SoCQ. Using the survey link provided, teachers completed the SoCQ online. The SoCQ provided the researcher with an understanding of teacher concerns and perceptions regarding the implementation of the intervention. Data generated by the SoCQ were used to answer research question one: How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs?

The SoCQ stems from the Concerns-Based Adoption Model (CBAM) which began with the work of Frances Fuller in the late 1960s. The SoCQ is used to help researchers monitor the implementation of change and gain more insight about how educators understand the innovation being implemented. Participants who completed the SoCQ responded to 35 questions to determine their level of concern at various times during the implementation of the school intervention.

Seven stages of concern about innovations are identified and include the following: Refocusing, Collaboration, Consequence, Management, Personal, Informational, and Unconcerned. The SoCQ has a set of scales that assists with numerical analysis of the perception of the intervention. Participant responses are organized using a Likert scale and scores are structured according to the following ranges: 0–Irrelevant, 1–2

= Not True of Me Now, 3–5 = Somewhat True of Me Now, and 6-7= Very True of Me Now.

The SoCQ highlights how teachers may experience different concerns at various times as the intervention is implemented. The lowest level of intensity, *Unconcerned*, indicates that the participant in the study has little to no concern about their involvement with intervention. The next level of intensity, *Informational*, shows that the individual is aware of the intervention and interested in learning more details about the intervention. At this stage of concern, the participant in the intervention is not revealing any concern about the impact that the intervention will have on them. The individual would like more information about the implementation process and requirements of the intervention. Once the intensity of the concern reaches the *Personal* level, the participant has revealed some uncertainty about the requirements of the intervention. There may be questions as to whether he or she will be able to meet those requirements. The participant in the study is also thinking about possible conflicts based upon existing demands or personal commitment. When concerns of the individual increase to the *Management* level he or she begins to focus on the processes and tasks of using the innovation. Individuals are now raising concerns about how to efficiently implement the intervention within their schedule. Questions about the impact of the intervention on students suggests that the participant's level of concern is at the stage noted as *Consequence*. The participant is also interested in knowing how relevant the intervention will be for students, the outcomes that will be evident, and any changes needed to improve the outcomes. The level of concern identified as *Collaboration* shows the participants willingness to work productively with

others to use the innovation. At the last stage of concern, *Refocusing*, the participant is seeking other ways to incorporate the intervention to increase its benefits to students.

The Professional Learning Communities Assessment-Revised (PLCA-R) enabled the researcher to collect additional quantitative data. The PLCA-R is included in Appendix 2. The PLCA-R was administered twice during the 2019-20 school year. Using the survey link provided, teachers completed the PLCA-R online. This survey assesses the perceptions that participants have about the school principal, staff members, and stakeholders based upon the attributes of PLCs. The survey includes statements about PLC practices in schools and participants read the statements and use a four-point scale to reflect their degree of agreement with the statement. Participants rate whether they strongly agree, agree, disagree or strongly disagree with each statement. The PLCA-R focuses on five attributes of PLCs: Shared and Supportive Leadership, Shared Values and Vision, Collective Learning and Application, Shared Personal Practice, and Supportive Conditions.

Validity of the Data Collection Tools

The SoCQ pilot instrument was sent to a sample of teachers and college faculty in 1974. The interventions measured with the SoCQ were teaming in elementary schools and the use of instructional modules in colleges. The pilot study included those who were using the intervention as well as those who were not incorporating the intervention. Archie George, Gene Hall and Suzanne Stiegelbauer state that item correlation and factor analyses indicated that seven factors explained more than 60% of the common variance among the 195 items and that the hypothesized scales corresponded to the factor scales (2013). Subscales were developed after 363 questionnaires were returned. In order to

support test validity, participants who completed the pilot questionnaire were interviewed and each person's responses were classified to determine the correlations between the interview data and the person's classification on the 195-item measure.

The researchers determined that the questionnaire could be reduced to 35 items, all selected from the original 195-item instrument. George et al., (2013) state that for two years the 35-item SoCQ was used in cross-sectional and longitudinal studies of 11 educational innovations and several validity studies were explored. Those participating in these studies were interviewed, their responses were rated and the ratings were contrasted with the SoCQ data.

> Individuals were asked to respond to stages of concern definitions and to indicate their relative intensity of concern. Levels of Use interview tapes also were analyzed to determine concerns. The SoCQ data were interpreted and predictions were made about what concerns each respondent expressed in an interview. Those predictions were compared to actual interview data. Finally, extensive dialogue and interaction helped the project staff develop and refine procedures for interpreting the data. The general conclusion was that the SoCQ accurately measures the stages of concern about an innovation. (George et al., 2013).

The SoCQ was analyzed to study the relationship between scores on the stages of concern scales. Other variables such as intercorrelation matrices, judgments of concerns based upon interview data and confirmation of expected group differences, and changes over time were used to investigate the validity of the SoCQ scores (George et al., 2013).

Olivier, Hipp and Huffman developed the PLCA-R to measure the attributes of PLCs that Shirley M. Hord emphasizes in her framework. The researcher in this study was interested in determining the extent to which PLCs are evident within routine practices at Pittsburgh Science and Technology Academy, and the PLCA-R has been widely used for this purpose by researchers. The PLCA-R provides the researcher with quantifiable data related to teacher perceptions about the school functioning as a PLC. Furthermore, the PLCA-R identifies specific collaborative and community practices that teachers engage in that relate to PLC activities.

Hipp and Huffman (2010) state that the most recent use of the PLCA-R as a diagnostic tool confirmed internal consistency resulting in the following Cronbach Alpha reliability coefficients for factored subscales (n=1209): Shared and Supportive Leadership (.94); Shared Values and Vision (.92); Collective Learning and Application (.91); Shared Personal Practice (.87); Supportive Conditions – Relationships (.82); Supportive Conditions – Structures (.88); and a one-factor solution (.97).

The initial PLC Assessment did not address the need for collection, interpretation, and use of data to improve the efforts of the PLC. To address this need, developers of the assessment included specific items related to data within the PLCA-R.

> To verify the relevance of the seven new statements directly addressing a school's utilization of data, we solicited responses to Expert Opinion Questionnaire from educators who had knowledge of the original PLCA measure or attributes of PLCs. The panel of experts consisted of school administrators and teachers, district and regional education supervisory personnel, university faculty and staff, educational consultants, and

doctoral students studying PLCs. The PLCA revision process also sought feedback from several researchers and doctoral students who had utilized the measure. The Expert Opinion Questionnaire had respondents rate proposed measure statements in terms of their relevance to data practices within a PLC (Hipp & Huffman, 2010).

The PLCA-R utilized in this research study includes 52 questions that use a Likert scale for responses. The PLCA-R enabled the researcher to collect data related to research questions one, two, and three: How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs? Have professional learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices? What role do professional learning communities have in the future academic success of students?

Summary

This quantitative research study provides an in-depth investigation of the implementation of PLCs at Pittsburgh Science and Technology Academy. The goal of this research study is to determine whether Professional Learning Communities (PLCs) have an impact on teachers' abilities to refine their instructional practices based upon the results of data, student needs, and ongoing collaboration with their colleagues. The teachers participating in this study have engaged in all PLC interventions at Pittsburgh Science and Technology Academy and have been teaching at the school since the 2016-17 school year. The SoCQ and PLCA-R diagnostic tools were used to collect data related to the research questions presented in this study.

Chapter IV provides a description of the results of the research and interpretation of the findings based upon analysis of the data.

CHAPTER IV: Data Analysis and Results

Purpose of the Study

The purpose of this research study was to determine whether Professional Learning Communities have an impact on teachers' abilities to refine their instructional practices based upon the results of data, student needs, and ongoing collaboration with their colleagues. PLCs provide the support structures needed to help educators continuously focus on improving instruction, and the researcher in this study was interested in determining how PLCs encourage teachers to share their learning and feedback, and take ownership of their professional learning experiences.

There are three research questions established for this study:

1. How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs?
2. Have professional learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices?
3. What role do professional learning communities have in the future academic success of students?

Research Setting

Pittsburgh Public Schools offers several magnet school programs for students and families who are interested in a specialized program. Pittsburgh Science and Technology Academy is a magnet school that offers a personalized, advanced curriculum for students who have an interest in STEM education. The mission of Pittsburgh Science and Technology Academy is to provide daily opportunities for students to dream, discover,

and design. The school program is designed to help students develop the skills necessary for post-secondary success in all disciplines with a focus on the STEM-related fields of life science, environmental science, computer science, or engineering. Some important features of the program include a one-to-one laptop program, block scheduling of classes to support acceleration of coursework, and internships that enable students to learn from professionals in the STEM fields.

Students enter Pittsburgh Science and Technology Academy during the sixth- and ninth-grade years, and there are currently 589 students enrolled in the school. Students are accepted into Pittsburgh Science and Technology Academy by completing a magnet application. Students are selected by a weighted lottery system. The weights give students extra chances for admission. Students receive weights for scoring proficient on the most recent PSSA math and reading tests, meeting family income guidelines, scoring in the top 50% of their class on their most recent PSSA math exam, and having 90% or better attendance in the previous school year. There are two schools that have technology and science programs, and students who attended those schools receive additional weights for admission as well. This lottery system was implemented to ensure that the student population of Pittsburgh Science and Technology Academy is comparable to the entire Pittsburgh Public School District population and includes students from all neighborhoods throughout the city.

The student population of Pittsburgh Science and Technology Academy includes 362 male students and 227 female students, 226 African American Students, 269 White students, 54 Multi-racial students, 25 Asian students, 13 Hispanic students, and fewer than

five students who identify as American Indian. Table 2 includes additional details regarding the school demographics.

Table 2
Enrollment at Pittsburgh Science and Technology Academy

Grade	06	07	08	09	10	11	12
American Indian	0	0	<5	<5	0	0	0
Asian	<5	<5	<5	<5	7	<5	5
African American	25	24	20	49	38	41	29
Hispanic	<5	<5	<5	<5	<5	<5	<5
Multi-Racial	<5	8	6	<5	11	14	8
Caucasian	22	43	22	60	53	33	36
Male	35	51	38	73	63	53	49
Female	19	29	15	45	47	42	30
Total	54	80	53	118	110	95	79

Pittsburgh Science and Technology Academy opened in 2009 after almost two years of planning. The school is located in the Oakland area of Pittsburgh and is within walking distance of several colleges and universities in the area. The school program design was a result of collaborative efforts between Pittsburgh Public Schools, Carnegie Mellon University, University of Pittsburgh, US Steel Corporation, DSF Charitable Foundation, and many other local community partners. The academy was established to meet the increasing need to provide families with new educational options. No other school in the Pittsburgh region offers a whole school program focused on STEM learning

and preparing scientifically literate students to meet the demands of the university and business community. Additionally, there is a significant disparity in the representation of White students and students of color in the STEM fields. One of the most important objectives in designing a STEM magnet school was to ensure that the school district intentionally addressed the lack of equity in providing students of color with opportunities for advanced coursework in the STEM fields.

The philosophy of Pittsburgh Science and Technology Academy is built upon the belief that all students can succeed in advanced STEM coursework with the right amount of time and support. Students enter the school with various learning experiences, so it is essential that students receive instruction that is appropriate for their level of mastery. All middle school students receive 80 minutes of math and science instruction daily. Another important feature of the middle school program includes classroom looping for all core classes. Students who enter the sixth grade will continue to have the same core classroom teachers throughout their middle school experience. This allows teachers to build strong relationships with students and families and understand more about their students' interests and learning styles. All students participate in an advisory program and are assigned a teacher who provides weekly guidance and support as students navigate their academic program during their middle and high school experience.

Teachers in the middle school program work collaboratively within grade-level teams. The professional learning time for teachers occurs each Wednesday, and students receive a one-hour early dismissal in order for teachers to have this opportunity for collaboration and learning with their colleagues. During the professional learning time, teachers are able to meet within their grade-level teams, content areas, or as a whole group

to address various topics. Teachers are open about their instructional practices and show a willingness to share with others any changes that they make in order to meet the needs of their students.

During the ninth-grade year, students take both biology and chemistry. These two classes provide students with the fundamental concepts in these content areas. During ninth-grade, students learn about the four STEM concentration classes that begin once students enter their sophomore year. The four STEM concentrations include body and behavior (life science), computers and connections (computer science), environment and energy (environmental science), and form & function (engineering). Each concentration has a unique sequence of courses over a two-year period that engages students at a deep level within the discipline.

The executive experience is another unique feature of the school program at Pittsburgh Science and Technology Academy. The executive experience course is a field-based internship available to students in the 12th grade. The executive experience course offers students an authentic work experience where students are learning from professionals in the STEM fields while also developing research and collaboration skills. During the executive experience internship, students work in interdisciplinary teams to design and implement a project under the guidance of a university professional or industry leader.

During the 2018-19 school year, the staff developed the following definition for professional learning: “Professional Learning will provide all educators with the strategies, knowledge, and skills necessary to enable students to succeed in a well-rounded education and to meet state academic standards.” Additionally, the key attributes of

Professional Learning at Pittsburgh Science and Technology Academy were determined to be**:**

1. Personalization (addressing specific needs based upon observation, feedback, and request; professional learning that is relevant to the educator)
2. Collaboration (common goals and mutual accountability)
3. Data-driven learning (discussing specific instructional practices that work, evidence of student learning, and specific standards that students have/haven't mastered)
4. Classroom focus (impacts learning in the classroom)
5. Ongoing support (not stand-alone training but long-term and systematic opportunities for learning with follow up that is embedded throughout the process – including implementation time)
6. Instruction to improve parent engagement (working more effectively with families)
7. Inclusion (systems of support and interventions for all students, effective instruction for students with disabilities)
8. Outcomes based (professional learning regularly evaluated for impact on teacher effectiveness and student achievement, feedback/evaluations used to improve quality of professional learning)
9. Access to experts and other institutions of higher education
10. "Balcony" or Macro-perspective (observation from administration or based upon school goals)

Building upon this definition, at the start of the 2020 school year, the staff established a theory of action based upon certain professional learning areas of focus. The theory of action established guiding principles for professional learning and a belief that implementing these practices and principles will result in increased rigor, student voice, engagement, and achievement for all students. Furthermore, the staff is committed to

providing professional learning that focuses on culturally responsive pedagogy that challenges inequality and emphasizes creating authentic connections between students and staff. The staff believes that a continuous effort and commitment to these professional learning guiding principles will lead to an increased level of mutual trust and respect that will help students rise to higher expectations in all areas and be empowered as agents of social change.

Teachers Participating in the Research Study

The implementation of PLCs at Pittsburgh Science and Technology Academy began during the 2017-18 school year. The 17 teachers participating in this research study have contributed to carrying out the PLC practices from the start of this process. The teachers who volunteered to participate in this research study have an average of 14.2 years of teaching experience. Table 3 provides additional information about the participating teachers. Teaching experiences range from five to 28 years.

Table 3
Teacher Demographics

Participant	Number of Years Teaching	Number of Years at Science and Technology Academy
1	17	5
2	5	5
3	25	11
4	14	9
5	10	8
6	12	6
7	28	11
8	11	11
9	9	9
10	10	9
11	10	10
12	12	8
13	18	10
14	19	10
15	12	6
16	9	7
17	21	8

Data Collection

The researcher used inquiry data to capture teacher perceptions and attitudes about the effectiveness of the PLC intervention. A quantitative approach for data collection was

used in order to describe the context of the intervention while minimizing the researcher's own bias. Quantitative research methods allow data to be collected directly from many participants by using surveys and questionnaires. The two data collection instruments used in this research study were the SoCQ and the PLCA-R. Table 4 shows how each data collection instrument is aligned to specific research questions.

Table 4
Link between Data Collection Instrument and Research Questions

Research Question	Data Collection Instrument
1. How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs?	PLCA-R, SoCQ
2. Have professional learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices?	PLCA-R
3. What role do professional learning communities have in the future academic success of students?	PLCA-R, SoCQ

Stages of Concern Questionnaire (SoCQ)

The SoCQ was used to gain more insight about how participants understand the innovation being implemented. Participants responded to the 35 questions included in the SoCQ, which was used to determine the participants' level of concern when beginning the implementation of the intervention and at the conclusion of the intervention. Seven stages of concern about innovations are identified and include the following: refocusing, collaboration, consequence, management, personal, informational, and unconcerned. The SoCQ has a set of scales that assists with numerical analysis of the perception of the intervention. Participant responses are organized using a Likert scale, and scores are structured according to the following ranges: 0 = Irrelevant, 1–2 = Not True of Me Now,

3–5 = Somewhat True of Me Now, and 6–7 = Very True of Me Now. Table 5 includes a description of each stage of concern.

Table 5
Stages of Concern Questionnaire (SoCQ)

Level of Intensity	Title	Description
0	Unconcerned	Indicates that the participant in the study has little to no concern about their involvement with intervention.
1	Informational	Shows that the individual is aware of the intervention and interested in learning more details about the intervention.
2	Personal	The participant has expressed uncertainty and is thinking about possible conflicts based upon existing demands or their personal commitment.
3	Management	The participant is focusing on the processes and tasks of using the innovation. Individuals are now raising concerns about how to efficiently implement the intervention within their schedule.
4	Consequence	The participant is also interested in knowing how relevant the intervention will be for students, the outcomes that will be evident and any changes needed to improve the outcomes.
5	Collaboration	The participant shows a willingness to work productively with others to use the innovation.
6	Refocusing	The participant is seeking other ways to incorporate the intervention to increase its benefits to students.

Each of the 35 statements in the SoCQ represent one of the seven fundamental stages of concern. There are five statements that align to each level of intensity of the SoCQ. Appendix F shows how each statement corresponds to one of the stages.

Research Question 1: How do PLCs ensure that teachers make changes to instruction, based upon the results of data and student needs?

The researcher considered the mean scores of the SoCQ in order to analyze the results of the survey responses. Figure 5 shows the mean scores of the SoCQ. The data shows that the greatest change in mean scores between the first and second administration of the SoCQ are found in the questions aligned to Stage 0. The data suggests that teachers were not concerned about the use of collaborative team protocols at the start of the intervention. However, it is reasonable to conclude that the significant change in responses at the end of the year were due to the challenges of teaching students from home as a result of the COVID-19 school closure that began March 13, 2020. The number of teachers that agreed with question number 21, I am preoccupied with things other than this innovation, increased significantly. Additionally, question 30 asks teachers to respond to the following: “Currently, other priorities prevent me from focusing my attention on this innovation.” The data indicates a substantial shift in the amount of attention teachers felt that they could give to the collaborative team protocols that were being implemented as part of the PLC process at the end of the school year.

The data reveals that teachers became more concerned with ensuring that the focus of their collaborative teams was relevant to student learning, and teachers considered the changes that they needed to make in order to improve student outcomes. Additionally, teachers began to think about how student feedback could influence their

instructional practices. The responses documented at Stage 4 point out these changes in teacher attitudes during the implementation of the intervention.

It is important to note that the SoCQ shows that teachers were interested in collaborating in order to increase student academic success. The data indicates teachers had a desire to work collaboratively in order to make changes to their instruction. The researcher suggests that teachers were willing to engage in collaborative professional learning in order to change their practice based upon the response of teachers to questions 27 and 29 of the SoCQ. Teacher response to questions 27 and 29 had an average of 5.35 on the Likert scale for the beginning-of-the-year (BOY) SoCQ and 4.94 for the end-of-the-year (EOY) SoCQ.

The responses to questions aligned with Stage 6 of the SoCQ draw attention to how teachers are now seeking other ways to incorporate collaborative team protocols within the practices of the PLC in order to enhance student learning outcomes. Teachers are reflecting on their experiences with students based upon the collaborative team practices and are making modifications to instruction. See Figure 3 for the mean for each of the stages of concern.

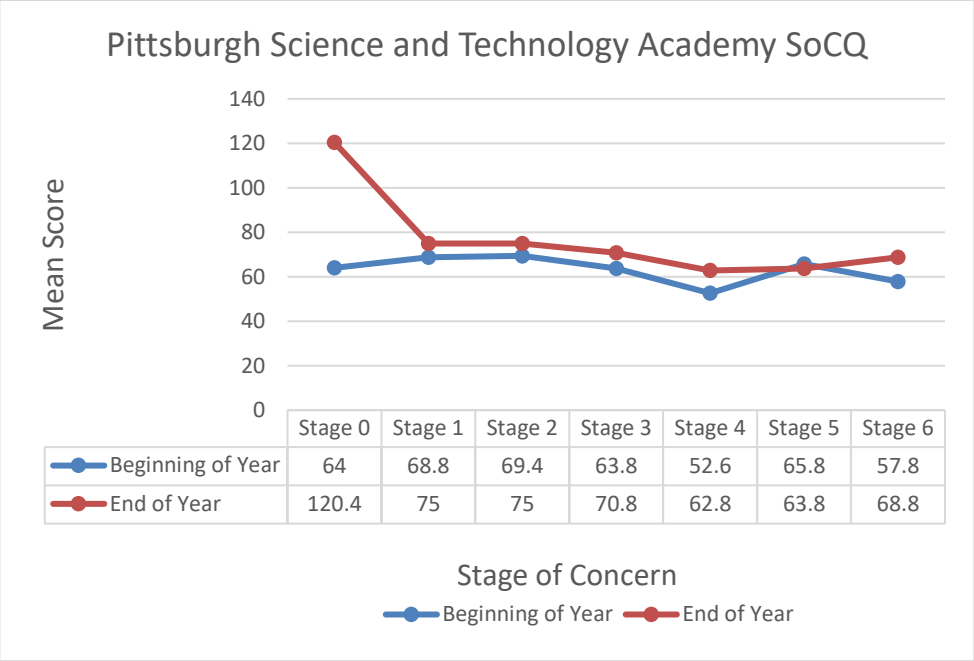

Figure 3

Stages of Concern Mean Scores for Participants

The PLCA-R enabled the researcher to collect additional quantitative data to address Research Question 1: *How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs?* The survey includes statements about PLC practices in schools, and participants read the statements and use a four-point scale to reflect their degree of agreement with the statement. Responses from the PLCA-R in the area of Collective Learning and Application were considered in order to address the first research question.

The data shows an increase from 82.4% at the beginning of the year to 100% of participants agreeing or strongly agreeing that staff members plan and work together to search for solutions to address diverse student needs. The data shows that 94.1% of the participants believe staff members work together to seek knowledge, skills, and strategies and apply this new learning to their work. During the first administration of the PLCA-R,

76.5% of the participants agreed that staff members collaboratively analyze multiple sources of data to assess the effectiveness of instructional practices. There was a slight change in response to this question during the second administration of the PLCA-R, as 70.6% of the participants agreed with this statement at that time. Additionally, the PLCA-R showed a 23.5% increase at the end of the year of teachers who believe staff members collaboratively analyze student work to improve teaching and learning.

The results of the PLCA-R support the proposition that a supportive culture of collaboration exists that enables teachers to make changes to instruction based upon the learning needs of students. Figure 4 shows the second set of PLCA-R data which is related to collective learning and application.

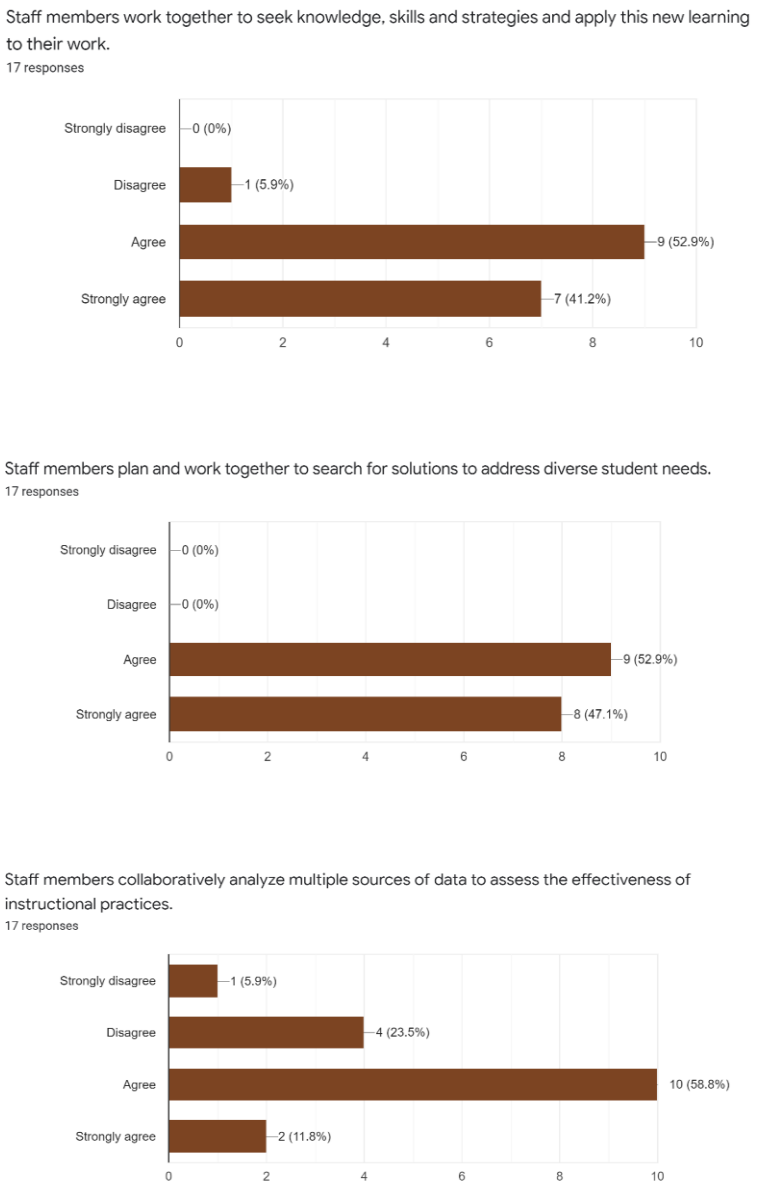

Figure 4
Collective Learning and Application

Research Question 2: Have professional learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices?

Providing teachers with ongoing opportunities to work with their colleagues to refine teaching practices is a critical attribute of PLCs. The PLCA-R emphasizes shared personal practice as one of the five attributes included in the assessment tool. Initially,

only 29.4% of the participants reported that opportunities exist for staff members to observe peers and offer encouragement, but this increased to 52.9% at the end-of-the-year. The end of the year PLCA-R showed a 47.1% agreement that staff members provide feedback to peers related to instructional practices. However, end-of-the-year results also show 100% of the teachers agreeing that staff members informally share ideas and suggestions for improving student learning.

Another key question presented in the PLCA-R addresses whether staff members collaboratively review student work to share and improve instructional practices. The participant responses increased from 58.8% agreement to 70.6% agreement at the end-of-the-year. Opportunities for coaching and mentoring are evident within the PLC practices implemented, as 64.7% of the participants agreed that mentoring and coaching is available to teachers. The results of the beginning-of-the-year and end-of-the-year PLCA-R showed 94.1% agreement that individuals and teams have the opportunity to apply learning and share the results of their practices. When asked whether staff members regularly share student work to guide overall school improvement, 52.9% of the participants agreed, which was an increase from 29.4% at the beginning-of-the-year.

Participant responses to the PLCA-R are organized in Figure 8 using a four-point Likert scale, and scores are structured according to the following ranges: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree. The PLCA-R provided the researcher in this study with quantifiable data related to teacher perceptions about the school functioning as a PLC. The PLCA-R identifies specific collaborative and community practices that teachers engage in that relate to PLC activities.

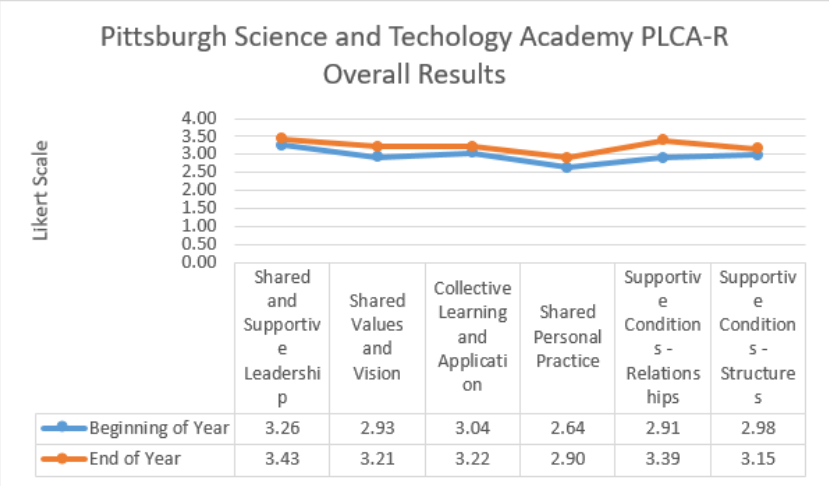

Figure 5
Overall Participant Response for PLCA-R

Figure 5 highlights the significant change that occurred from the beginning-of-the-year to the end-of-the-year administration of the PLCA-R. The data shows that the majority of teachers surveyed agree that six attributes of PLCs are being implemented at Pittsburgh Science and Technology Academy. Shared Personal Practice was the only category where teacher responses did not fall between agree and strongly agree on the scale. Table 6 shows the mean scores and standard deviations for each of the categories included on the PLCA-R.

Table 6
Mean Scores and Standard Deviations for Each Principle Addressed in the PLCA-R

Six Principles – PLCA-R	**Beginning of Year**		**End of Year**	
	Mean	SD	Mean	SD
Shared and Supportive Leadership	3.26	.22	3.43	.23
Shared Values and Vision	2.93	.12	3.21	.16
Collective Learning and Application	3.04	.22	3.22	.27
Shared Personal Practice	2.64	.49	2.90	.45
Supportive Conditions – Relationships	2.91	.35	3.39	.30
Supportive Conditions – Structures	2.98	.28	3.15	.20

The data shows that there was a positive increase in all six areas addressed by the PLCA-R. The greatest change in the mean value is noted in the area of Supportive Conditions Relationships. Table 7 shows the overall responses on the PLCA-R as the relate to the PLC principle, supportive conditions – relationships.

Table 7
Participant Responses: Shared and Supportive Conditions – Relationships

Statement (Shared and Support Conditions – Relationships)	**BOY Mean**	**EOY Mean**
Caring relationships exist among staff and students that are built on trust and respect.	3.29	3.77
A culture of trust and respect exists for taking risks.	3.24	3.65
Outstanding achievement is recognized and celebrated regularly in our school.	2.47	3.06
School staff and stakeholders exhibit a sustained and unified effort to embed change into the culture of the school.	2.71	3.18
Relationships among staff members support honest and respectful examination of data to enhance teaching and learning.	2.82	3.29

Participant responses suggest that the PLC practices implemented significantly increased teacher belief in the relationships that create shared and supportive conditions at Pittsburgh Science and Technology Academy. The data further suggests that caring relationships previously existed among students and staff and the PLC protocols significantly enhanced the relationships among students and staff. Table 8 highlights the area that had the lowest Likert scale response scores on the PLCA-R.

Table 8
Participant Responses: Shared Personal Practice

Statement (Shared Personal Practice)	BOY Mean	EOY Mean
Opportunities exist for staff members to observe peers and offer encouragement.	2.24	2.53
Staff members provide feedback to peers related to instructional practices.	2.35	2.59
Staff members informally share ideas and suggestions for improving student learning.	3.59	3.76
Staff members collaboratively review student work to share and improve instructional practices.	2.53	2.88
Opportunities exist for coaching and mentoring.	2.53	2.65
Individuals and teams have the opportunity to apply learning and share the results of their practices.	3.00	3.24
Staff members regularly share student work to guide overall school improvement.	2.24	2.65

The data suggests that teachers do not believe there are opportunities available for peer-to-peer observations, and staff members do not regularly share student work to guide overall school improvement. The data further indicates that teachers believe there are other opportunities available for individuals and teams to apply their learning and share the results of their practices with their colleagues. Shared and supportive leadership had the highest rate of agreement on the PLCA-R. Table 9 shows the mean scores for teacher beliefs in the area of shared and supportive leadership.

Table 9
Participant Responses: Shared and Supportive Leadership

Statement (Shared and Supportive Leadership)	BOY Mean	EOY Mean
Staff members are consistently involved in discussing and making decisions about most school issues.	3.41	3.76
The principal incorporates advice from staff members to make decisions.	3.59	3.71
Staff members have accessibility to key information.	2.88	3.24
The principal is proactive and addresses areas where support is needed.	3.29	3.35
Opportunities are provided for staff members to initiate change.	3.41	3.65
The principal shares responsibility and rewards for innovative actions.	3.18	3.29
The principal participates democratically with staff sharing power and authority.	3.47	3.59
Leadership is promoted and nurtured among staff members.	3.29	3.35
Decision-making takes place through committees and communication across grade and subject areas.	3.29	3.53
Stakeholders assume shared responsibility and accountability for student learning without evidence of imposed power and authority.	2.94	3.06
Staff members use multiple sources of data to make decisions about teaching and learning.	3.12	3.24

The data reflects a significant change in the belief of teachers regarding their influence on school decisions. Teachers were asked whether they are consistently involved in discussing and making decisions about most school issues, and there was an increase of .62 in the mean score response of participants at the end-of-the-year. The data also indicate that teachers believe the principal incorporates advice from staff members to make decisions, and opportunities are provided for staff members to initiate change.

Research Question 3: What role do professional learning communities have in the future academic success of students?

Data from the SoCQ and PLCA-R were used to respond to Research Question 3. The BOY and EOY responses to the SoCQ show that teachers were looking for more ways to ensure that their collaborative time enhanced student learning and created improved student learning outcomes.

Table 10
Participant Responses: SoCQ Consequence

Statement	BOY Mean	EOY Mean
I am concerned about students' attitudes toward the innovation.	2.53	2.88
I am concerned about how the innovation affects students.	3.82	4.89
I am concerned about evaluating my impact on students.	4.35	4.06
I would like to excite my students about their part in this approach.	2.76	3.35
I would like to use feedback from students to change the program.	2.65	3.65

The data indicates that at the beginning of the year, teachers were expressing some apprehension about the intervention and were uncertain about the demands that the PLC intervention would add to their workload. The EOY responses in Table 10 show a significant change in teacher attitudes concerning the implementation of PLC practices. The EOY data show that the majority of participants in the research study feel that the statements are somewhat true of them now.

Table 11
Participant Responses: SoCQ Collaboration

Statement	BOY Mean	EOY Mean
I would like to coordinate my efforts with others to maximize the innovation's effects.	5.35	4.76
I would like to know what other faculty are doing in this area.	5.35	5.12

Collaborative learning creates opportunities for teachers and school leaders to work together to develop effective instructional practices. The EOY data indicates teachers have a desire to work collaboratively in order to make changes to their instruction. As stated within the review of the literature, researchers have found that systems that show continuous improvement have done so by establishing collaborative practices between teachers within and across schools (Mourshed, Chijioke, & Barber, 2010).

The response to Questions 27 and 29 of the SoCQ suggests teachers are willing to engage in collaborative processes in order to change their instructional practice. Teacher responses to questions 27 and 29 had an average of 5.35 on the Likert Scale for the BOY SoCQ and 4.94 for the EOY SoCQ.

The PLCA-R provided the researcher with quantifiable data related to teacher perceptions about the school functioning as a PLC. Data from the PLCA-R further supports the claim that teachers are implementing collaborative practices as part of the PLC intervention and teachers are making changes to instruction based upon the collective learning that is occurring within the PLC. Table 12 shows the mean scores of four responses to the PLCA-R in the area of Collective Learning and Application.

Table 12
Participant Responses: Collective Learning and Application

Statement (Collective Learning and Application)	BOY	EOY Mean
Staff members work together to seek knowledge, skills and strategies and apply this new learning to their work.	3.29	3.35
Staff members plan and work together to search for solutions to address diverse student needs.	3.06	3.47
School staff members and stakeholders learn together and apply new knowledge to solve problems.	2.76	3.24
Staff members collaboratively analyze multiple sources of data to assess the effectiveness of instructional practices.	2.76	3.35

Furthermore, Table 8 reflects an increase in teacher beliefs regarding the realization of shared personal practice as a PLC attribute at Pittsburgh Science and Technology Academy. The data shows increases in the mean scores of all seven responses regarding shared personal practices. The data provides a strong indication that the PLC intervention had a positive influence on teachers sharing their practice and working collaboratively to improve instructional practices.

Additional Artifacts

Teachers were given an opportunity to share their comments related to the six principles of PLCs that are identified on the PLCA-R. One staff member stated that they believe the majority of staff engages in the activities identified related to collective learning and application, but not all staff. Another participant in the research study made shared a comment regarding collective learning and application on the BOY PLCA-R stating that “not all staff are on board with the PLC intervention.” During the BOY PLCA-R assessment, one participant shared that they feel teachers are unengaged, data is

not relevant, and that outstanding achievement is not recognized or supported by staff but rather viewed in a jealous way.

Participants shared on the EOY PLCA-R that teachers do not have the opportunity to observe one another's classes due to scheduling conflicts. Another participant in the research study stated that he or she would love to expand collaborative team time to take turns observing a colleague's class and to provide feedback. It was also expressed that relationships among the staff members are strong, but do not encourage open and honest dialogue about teaching and learning because there is some fear of upsetting one another.

Summary

Chapter IV has presented the results of this research study and an interpretation of the findings. The data shared indicates that there is evidence that the implementation of PLCs at Pittsburgh Science and Technology Academy has had an impact on teachers' ability to refine their instructional practices based upon the results of data, student needs and ongoing collaboration with their colleagues. The SoCQ and PLCA-R diagnostic tools were used to collect data related to the research questions presented in this study.

Chapter V provides a conclusion about the effectiveness of the PLC intervention at Pittsburgh Science and Technology Academy. Presented in the next chapter are implications of the research, including the fiscal impact of PLCs within the school and across the school district. Lastly, Chapter V includes details of how the results and learning from the research study can apply to the school and district level.

Chapter V: Conclusions and Recommendations

Introduction

Recommendations based upon the analysis of data collected during this research study are included in Chapter V. Additionally, an examination of the effectiveness of the PLC intervention at Pittsburgh Science and Technology Academy is presented. The fiscal implications of implementing PLCs within the school and across the school district are explored along with suggestions about systems of support, accountability structures, and the shared values that are needed to move forward with the PLC intervention at the district level.

The intervention that the researcher implemented during the 2019-20 school year continued to build upon the PLC practices in place at Pittsburgh Science and Technology Academy. The intervention also supported an increase in teacher ownership of their professional learning experiences, as the learning team cycle encourages teachers to prioritize the problems that they want to address first and then use a five-stage process to collaborate and take the necessary steps to address the problem.

The purpose of this research study was to determine whether PLCs have an impact on teachers' abilities to refine their instructional practices based upon the results of data, student needs, and ongoing collaboration with their colleagues. A quantitative approach for data collection was used throughout this research study, and the two data collection instruments used were the SoCQ and the PLCA-R. The data collection instrument used to address each research question is shown in Table 13.

Table 13
Research Questions Associated with Each Data Collection Instrument

Research Question	Data Collection Instrument
1. How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs?	PLCA-R, SoCQ
2. Have professional learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices?	PLCA-R
3. What role do professional learning communities have in the future academic success of students?	PLCA-R, SoCQ

Implications of Key Findings

It is critical to note that a key component of the Pittsburgh Public Schools' five-year strategic plan includes professional learning and the implementation of PLCs at Pittsburgh Science and Technology Academy began during the 2017-18 school year. Central office support was provided to all school leaders from the assistant superintendent for professional development to assist school leaders with making the connection between the strategic plan and improvements in the quality and impact of professional learning. The use of collaborative teams as part of PLCs was the essential process school leaders were to embrace in order to improve student achievement and the outcomes outlined in the strategic plan. The 17 teachers participating in this research study have contributed to carrying out the PLC practices and engaging in collaborative team practices from the start of this process.

Shared and Supportive Leadership. Providing teachers with ongoing opportunities to work with their colleagues to refine teaching practices is a critical attribute of PLCs, but this can be achieved only when school leaders make it a priority to

offer teachers these opportunities. In Chapter II the researcher noted several practices that school leaders can use to increase opportunities for meaningful educator collaboration. Teachers must have uninterrupted time that encourages deep reflection on instructional practice and classroom conditions that support or hinder student achievement. Table 14 shows that shared and supportive leadership had the highest rate of agreement on the PLCA-R. Table 14 shows the mean scores for teacher beliefs in the area of shared and supportive leadership. The data reflects a significant change in the belief of teachers regarding their influence on school decisions. Teachers were asked whether they are consistently involved in discussing and making decisions about most school issues, and there was an increase of .62 in the mean score response of participants at the end of the year. The data also indicate that teachers believe the principal incorporates advice from staff members to make decisions, and opportunities are provided for staff members to initiate change.

A significant finding that is supported by the data collected in this research study includes the ability and willingness of the school leader to ensure that teachers play a key role in making decisions about school issues such as their own professional learning. The principal researcher in this study created school processes that allowed teachers to experience individualized learning that was teacher directed and teacher centered. Based upon an analysis of the data collected in this research study, it is apparent that the collaborative team protocols and implementation of the learning team cycle encouraged teachers to play a key role in contributing to the learning of their colleagues.

Table 14
Participant Responses: Shared and Supportive Leadership

Statement (Shared and Supportive Leadership)	BOY Mean	EOY Mean
Staff members are consistently involved in discussing and making decisions about most school issues.	3.41	3.76
The principal incorporates advice from staff members to make decisions.	3.59	3.71
Staff members have accessibility to key information.	2.88	3.24
The principal is proactive and addresses areas where support is needed.	3.29	3.35
Opportunities are provided for staff members to initiate change.	3.41	3.65
The principal shares responsibility and rewards for innovative actions.	3.18	3.29
The principal participates democratically with staff sharing power and authority.	3.47	3.59
Leadership is promoted and nurtured among staff members.	3.29	3.35
Decision-making takes place through committees and communication across grade and subject areas.	3.29	3.53
Stakeholders assume shared responsibility and accountability for student learning without evidence of imposed power and authority.	2.94	3.06
Staff members use multiple sources of data to make decisions about teaching and learning.	3.12	3.24

The data suggests that shared and supportive leadership is a demonstrated characteristic of the PLC at Pittsburgh Science and Technology Academy. The principal researcher implemented the learning team cycle as part of the work of the collaborative teams in order to support teachers with the process of planning for and presenting their own professional learning. The data collected from the first administration of the PLCA-R

show that 94.1% of teachers surveyed believe the principal provides opportunities for teachers to initiate change. The EOY PLCA-R increased to 100% of teachers surveyed agreeing that the principal provides opportunities to initiate change. Furthermore, data collected from EOY PLCA-R show 100% agreement that the principal is proactive and addresses areas where support is needed.

It is essential to note the principal researcher's personal commitment to creating the structures of support and actively engaging with teachers throughout the implementation of the PLC initiative. After initially learning about the impact of PLCs during the district leadership meeting, the researcher in this study reflected on the key attributes of PLCs and immediately created structures of support to encourage the school teams to develop the practices emphasized within the review of the literature. The researcher believes that the data supports an emphasis on principals being personally accountable and internalizing the learning in order for teachers to adopt the practices that are critical for successful implementation of PLCs in schools. PLCs must be led by principals who create the systems of support that are essential for meaningful collaboration. Principals must provide specific guidelines and procedures to follow during collaborative team time and offer the support that teachers need for careful analysis of data and student work.

Table 14 shows that 88.2% of teachers surveyed believe staff members use multiple sources of data to make decisions about teaching and learning. The high rate of agreement with this question suggests that the implementation of PLCs has had an impact on teachers using data to make decisions about classroom instruction. The researcher believes that school leaders are primarily responsible for providing the support and

structures that are needed to consistently create opportunities for teachers to discuss data and make changes to instruction based upon data. As stated previously, the goal of the continuous improvement model is for educators to systematically improve their instruction and engage in cycles of learning with their colleagues. The data collected suggest that the principal plays a critical role in creating collaborative learning opportunities where teachers determined the topics based upon student needs as determined by the data.

Collective Learning and Application. The researcher considered data collected from the PLCA-R in the area of collective learning and application in order to address the first research question*: How do PLCs ensure that teachers make changes to instruction based upon the results of data and student needs?* The EOY PLCA-R showed an increase from 82.4% to 100% of participants agreeing or strongly agreeing that staff members plan and work together to search for solutions to address diverse student needs. The data show that 94.1% of the participants believe staff members work together to seek knowledge, skills, and strategies and apply this new learning to their work. The BOY PLCA-R shows that 76.5% of the participants agreed that staff members collaboratively analyze multiple sources of data to assess the effectiveness of instructional practices. Furthermore, the PLCA-R showed a 23.5% increase at the end of the year of teachers who believe staff members collaboratively analyze student work to improve teaching and learning.

Laura Calvert states, “For real learning to take place, adult learners must become agents of their own learning” (2016). The data suggest that the collaborative team protocols implemented support the creation of a culture of continuous improvement, as educators noted that they are able to take ownership of their own professional learning and

work collaboratively in order to improve instruction within their classrooms. The intervention that the researcher implemented during the 2019-20 school year supported the PLC practices in place at Pittsburgh Science and Technology Academy and increased teacher ownership of their professional learning experiences. Calvert states that teacher agency is the capacity of teachers to act purposefully and constructively to direct their professional growth and contribute to the growth of their colleagues (2016). The learning team cycle was a critical aspect of the collaborative team protocols used at Pittsburgh Science and Technology Academy. The data indicate that the intervention created collaborative learning opportunities and teachers determined the focus of learning based upon student needs identified by data.

The results of the PLCA-R support the proposition that a supportive culture of collaboration exists at Pittsburgh Science and Technology Academy that enables teachers to make changes to instruction based upon the learning needs of students. The researcher believes that a critical change in the mindset of principals is necessary because teachers must be given more autonomy as part of a PLC. Teachers should eventually choose their collaborative teams based upon common goals and interests among the members of the team.

Shared Personal Practice. The researcher considered data collected from the PLCA-R in the area of shared personal practice in order to address the second research question: *Have professional learning communities provided ongoing opportunities for teachers to work with colleagues to refine teaching practices?* There are many ways that principals can provide regular opportunities for teachers to refine teaching practices. The PLCA-R emphasizes shared personal practice as one of the five critical attributes of a

PLC. The data collected from the PLCA-R indicate that the learning team cycle and collaborative team protocols increased opportunities for teachers to work with their colleagues to refine teaching practices. The BOY PLCA-R showed that only 29.4% of the participants reported that opportunities exist for staff members to observe peers and offer encouragement, but this increased to 52.9% at the end of the year. Additionally, the EOY PLCA-R showed a 47.1% agreement that staff members provide feedback to peers related to instructional practices. However, end-of-the-year results also show 100% of the teachers agreeing that staff members informally share ideas and suggestions for improving student learning.

PLCs provide teachers with opportunities to collaboratively review student work and improve instructional practices. The participant responses increased from 58.8% agreement to 70.6% agreement at the end of the year in this area of collaborative review of student work. The results of the beginning-of-the-year and end-of-the-year PLCA-R showed 94.1% agreement that individuals and teams have the opportunity to apply learning and share the results of their practices. The data further indicate that teachers believe there are other opportunities available for individuals and teams to apply their learning and share the results of their practices with their colleagues.

The data suggest that an area for improvement is found in the opportunities available for peer-to-peer observations. Additionally, staff members do not regularly share student work to guide overall school improvement. Table 15 shows the mean scores for teacher beliefs in the area of shared personal practice.

Table 15
Participant Responses: Shared Personal Practice

Statement (Shared Personal Practice)	BOY Mean	EOY Mean
Opportunities exist for staff members to observe peers and offer encouragement.	2.24	2.53
Staff members provide feedback to peers related to instructional practices.	2.35	2.59
Staff members informally share ideas and suggestions for improving student learning.	3.59	3.76
Staff members collaboratively review student work to share and improve instructional practices.	2.53	2.88
Opportunities exist for coaching and mentoring.	2.53	2.65
Individuals and teams have the opportunity to apply learning and share the results of their practices.	3.00	3.24
Staff members regularly share student work to guide overall school improvement.	2.24	2.65

Shirley M. Hord writes that a school whose staff is learning together and participating in decisions about its operation requires a principal who can let go of power and his/her own sense of omnipotence and omnicompetence and thereby share the leadership of the school (1997, p. 18). A significant change that the researcher made throughout the process of implementing the PLC initiative was to create more opportunities for teacher ownership of professional learning. The researcher believes that the connections that teachers make with each other during the process of problem solving and grappling with new instructional practices is essential to building a culture of trust within the PLC. Administrators have a significant impact on teacher creativity and the use of innovative instructional practices within the classroom. An important part of the process of implementing the PLC practices at Pittsburgh Science and Technology Academy was to encourage teachers to think creatively and recognize teachers for

implementing innovative instructional strategies. Although the principal researcher noted teachers were making individual changes, it was essential to emphasize the importance of collaboration with their colleagues that was essential to the improvement process.

Shared and Supportive Conditions. Participant responses on the PLCA-R suggest that the collaborative team protocols and additional practices implemented as part of the PLC have significantly increased teachers' belief about the type of shared and supportive conditions that exist at Pittsburgh Science and Technology Academy. The data further suggest that caring relationships previously existed among students and staff, and the PLC protocols significantly enhanced the relationships among students and staff.

Table 16
Participant Responses: Shared and Supportive Conditions – Relationships

Statement (Shared and Supportive Conditions)	BOY Mean	EOY Mean
Caring relationships exist among staff and students that are built on trust and respect.	3.29	3.77
A culture of trust and respect exists for taking risks.	3.24	3.65
Outstanding achievement is recognized and celebrated regularly in our school.	2.47	3.06
School staff and stakeholders exhibit a sustained and unified effort to embed change into the culture of the school.	2.71	3.18
Relationships among staff members support honest and respectful examination of data to enhance teaching and learning.	2.82	3.29

The researcher notes that PLCs require administrator support in the areas of structures as well as relationships. Teachers must prioritize their time in order to meet the ever-changing demands of the district leadership, school leadership, students, and families. Therefore, it is essential that principals provide teachers with the systems of

support that will help teachers collaborate effectively with a focus on continuous student learning and growth. Dufour states that PLCs are cultures that constantly implement current priorities well by embedding the very processes that enable them to be excellent at what they do today, but also open to next-generation innovations (Dufour & Fullan, 2013). It is critical that principals adapt to these challenges and create the structures of support that will enable teachers to effectively problem solve, share their practice, and make changes to instruction based upon student data.

Recommendations

The data collected during this research study has strengthened the researcher's belief that principals must continuously focus on student and adult learning, provide teachers with opportunities for meaningful collaboration, and create a culture of continuous improvement. In order to create a relentless focus on continuous improvement, leaders must first promote the success of others by addressing three issues (Dufour & Fullan, 2013):

1. What are the obstacles that are impeding progress?
2. What support and resources can we provide to promote progress?
3. How can we identify and celebrate examples of progress to build momentum for the reform and to increase individual and collective confidence about taking on the next challenge?

The researcher believes that Pittsburgh Public Schools' central office leadership has introduced school leaders to research-based PLC practices, but there is a need to create mutual accountability systems in order for school leaders to embrace these PLC practices within their school settings. As a next step, central office leadership and school leaders

should work collaboratively to administer the PLCA-R throughout the school district and use the data to create individualized support systems for school leaders to address the areas of growth identified by the data collected.

Dufour and Fullan argue that leaders at all levels must have a process to gather information on the current reality of those they are called upon to lead by addressing the following questions (2013):

1. Are systems in place to monitor progress, identify obstacles, and engage the organization in removing those obstacles?
2. Is the organizational structure congruent with the organization's strategic goals and priorities?
3. Do teams have sufficient autonomy to solve problems and take ownership of the initiative?
4. Do teams have sufficient time to focus on meaningful work?
5. Do teams have the necessary resources to move forward effectively?
6. What events, problems, or recurring conditions are contributing to setbacks for teams, and how can we work together to address those concerns?
7. Do we encourage team members to help one another?
8. Do we provide support for teams? In what form?

9. Are we helping teams approach problems with a learning orientation rather than a blame orientation? Are we modeling a learning orientation?
10. Does communication of ideas flow freely between team members and among teams?
11. Do we demonstrate respect to team members by acknowledging their contributions to progress, attending to their ideas, and treating them with an assumption of good intentions?
12. Do we acknowledge and honor the efforts and achievements of individuals and teams through celebration of small wins?

The researcher recommends as a next step that the questions presented by Dufour and Fullan above are considered by Pittsburgh Public Schools' central office leadership and school-based leadership. In collaboration with central office leadership, principals should consider how they are removing obstacles that hinder the progress of the collaborative team.

Teacher teams must be given the necessary time to meet. Principals will need to address conflicts with teacher schedules and find creative ways to offer teachers more collaborative time. This research study along with the research provided in the review of literature points out how teachers benefit from collaboratively learning and sharing their learning with each other in meaningful ways. Time for collaboration must be a priority that central office leaders and school-based leaders honor and respect in order for teachers to value this important time with their colleagues. Dufour and Fullan write that when

teachers are collaborating with colleagues to develop curriculum, plan a lesson, create assessments, analyze evidence of student learning, and develop action-research projects to improve results, they are working – they are engaged in professional activities to better meet the needs of those they serve (2013).

Central office leadership should consider the fiscal resources provided to schools and the allocation of time to support the work of PLCs across the district given the emphasis of this work within the school district's strategic plan. As a result of the COVID-19 pandemic, many school districts across the nation anticipate significant reductions in their budget. It is important to note that implementing these practices and supporting PLCs across the school district will have minor fiscal implications on schools and the school district. Mattos et al. (2016) point out that in light of the strong correlations between meaningful collaboration and improved student achievement, it would be disingenuous for any board of education to argue that it wants better results but it is unwilling to provide this essential, cost-neutral resource to achieve them. The cost of implementing this intervention at Pittsburgh Science and Technology Academy has been marginal, as we have been able to access internal support from district leadership and purchase reading materials and tools at a minor cost. The expense associated with building teacher and school leader capacity in order for teams to collaboratively use data to make informed decisions about instructional practices and student learning is minimal in comparison to the costly software programs that many school districts are purchasing at this time.

Principals should be mindful of the type of support needed in order to sustain the work of the PLC. Principals will need to ensure that teachers are comfortable using data to

inform their instruction. Principals and district leaders will need to remove any obstacles that prevent teachers from having easy access to the important data needed to engage in rich discussions about what students know and are able to do.

Future Directions for Research

This research study provided the researcher with quantifiable data related to teacher perceptions about Pittsburgh Science and Technology Academy functioning as a PLC. This research study examined whether PLCs have an impact on teachers' abilities to refine their instructional practices based upon the results of data, student needs, and ongoing collaboration with their colleagues. Recommendations for future research include the following:

1. Incorporate a mixed research methods approach for data collection that will include student learning data, student interviews, teacher interviews and teacher artifacts. Student learning data would include a common formative assessment administered multiple times throughout the school year with a particular group of students. The collection of various forms of quantitative and qualitative data will enable the future researchers to draw conclusions about the innovation utilizing the results of student learning, contextual information, and multiple perspectives.
2. Duplicate this research study in several schools throughout the Pittsburgh Public School District. Following the same methodology for data collection in multiple schools within the school district will provide central office leadership with a more accurate assessment of

the implementation of PLCs across the district and the impact of PLCs on teacher instructional practices. Central office leadership would then be able to provide school leaders with differentiated support in order to build leadership capacity for continuous school improvement efforts.

Summary and Conclusion

Chapter V has presented a conclusion about the effectiveness of the PLC intervention at Pittsburgh Science and Technology Academy. The analysis of data collected indicates that teachers are implementing collaborative practices as part of the PLC intervention and making changes to instruction based upon the collective learning that is occurring within the PLC.

This study supports the researcher's belief that PLCs are effective when teachers have access to supportive conditions that include principal leaders who foster a culture of collaboration and focus on continuous improvement. The researcher believes PLCs require central office support in order to create the accountability structures that are necessary for systemic implementation of PLCs throughout a school district. This research study has affirmed the researcher's conviction to provide professional learning opportunities that offer the autonomy for teachers to shape their learning and the tools to support meaningful collaboration and continuous improvement.

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APPENDICES

Appendix A

California University of Pennsylvania Institutional Review Board Approval

Institutional Review Board
California University of Pennsylvania
Morgan Hall, 310
250 University Avenue
California, PA 15419
instreviewboard@calu.edu
Melissa Sovak, Ph.D.

Dear Shawn,

Please consider this email as official notification that your proposal titled "Teacher Perceptions of Professional Learning Communities (PLC): The Relationship Between PLCs and Teacher Instructional Practices" (Proposal #18-102) has been approved by the California University of Pennsylvania Institutional Review Board as submitted.

The effective date of approval is 9/20/19 and the expiration date is 9/19/20. These dates must appear on the consent form.

Please note that Federal Policy requires that you notify the IRB promptly regarding any of the following:

(1) Any additions or changes in procedures you might wish for your study (additions or changes must be approved by the IRB before they are implemented)

(2) Any events that affect the safety or well-being of subjects

(3) Any modifications of your study or other responses that are necessitated by any events reported in (2).

(4) To continue your research beyond the approval expiration date of 9/19/20 you must file additional information to be considered for continuing review. Please contact instreviewboard@calu.edu

Please notify the Board when data collection is complete.

Regards,

Melissa Sovak, PhD.
Chair, Institutional Review Board

Appendix B

Pittsburgh Public Schools Data and Research Review Board Approval

Expect great things.
Pittsburgh Public Schools

September 9, 2019

Shawn McNeil
417 Lexie Way
Jefferson Hills, PA 15025

Dear Mr. McNeil,

The Pittsburgh Public School's Data Governance and Research Review Board has reviewed your request to conduct research within our District. Your research request, *Teacher Perceptions of Professional Learning Communities (PLC): The Relationship between PLCs and Teacher Instructional Practices,* has been officially approved by this Review Board.

Per your proposal, you will ask teachers to participate in an optional activity, where they will provide information about their PLC perspectives. They will do this via two anonymous surveys: the Professional Learning Communities Assessments - Revised (PLCA-R) and the Stages of Concern Questionnaire. Each survey would be take two times during the 2019-20 school year.

As a condition of your approval, the following provisions are in place:

- Participants must understand their participation is optional, and can be stopped at any time.
- Survey completion cannot interfere with student instructional time.
- Confidentiality of all data must be ensured. In addition, this data cannot be shared nor used for any other purpose other than what is stated in the research proposal and must be destroyed per the terms in the proposal.
- The District, school, and participating staff should not be named in any public information.

Any major modifications to the research design, instruments, or approved timeline must be forwarded to the Data and Research Review Board for separate approval. Again, you are required to keep any identifying information related to all human subjects confidential and safeguarded as outlined in your research submission.

Thank you for your interest in working with the Pittsburgh Public Schools.

Sincerely,

Deborah Friss

Deborah Friss

cc: Data and Research Review Board Files

Deborah Friss
Director, Research and Evaluation
Office of Data, Research, Evaluation and Accountability

341 Bellefield Avenue
Pittsburgh, PA 15213

dfriss1@pghschools.org
Phone: 412-529-3710

Parent Hotline:
412-529-HELP (4357)
pps.k12.pa.us

Appendix C

Informed Consent Letter

Informed Consent for a Research Study

Title of Project: ***Teacher Perceptions of Professional Learning Communities (PLC): The Relationship Between PLCs and Teacher Instructional Practices***

PRINCIPAL INVESTIGATOR – *Mr. Shawn McNeil*

You are being asked to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please read the following information carefully and feel free to ask the researcher if there is anything that is not clear or if you need more information.

PURPOSE OF THE RESEARCH STUDY

A key component of the Pittsburgh Public Schools (PPS) five-year Strategic Plan: Expect Great Things, includes professional learning practices. The district vision is that all students graduate high school college, career, and life-ready prepared to complete a two-or four-year college degree or workforce certification. Improving the quality and impact of professional learning by implementing PLCs in our schools will be a key factor in achieving the outcomes outlined in the Strategic Plan. This research study will focus on determining the effectiveness of Professional Learning Communities (PLC). Additionally, this research study will be used to identify the current state of the PLC initiative at SciTech and determine next steps that should be recommended for the school.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete a survey and questionnaire. Your total time commitment will be approximately one hour. Please note that there are no risks or discomforts associated with this study.

You meet the qualifications to participate in this study as a teacher who has been employed at SciTech since the 2016 school year. Your participation in this study will help provide the necessary data to inform our next steps related to the PLC initiative at SciTech. Additionally, you can expect to benefit from this study by gaining more knowledge and understanding of various elements of PLCs.

CONFIDENTIALITY

Your responses to the survey and questionnaire will be anonymous. You will not be asked to write any identifying information when completing these forms. In doing this, we believe there is minimal risks associated with this research study. Your answers in this study will remain confidential and anonymous. We will minimize any risks by maintaining all data on password-protected computer drives and destroying raw data within two weeks of the completion of the research project.

CONTACT INFORMATION

This research study has been approved by the California University of Pennsylvania Institutional Review Board. This approval is effective September 20, 2019 and expires September 19, 2020. The Pittsburgh Public School's Data Governance and Research Review Board has also approved this request to conduct research within our District. If you have questions at any time about this study, you may contact the researcher, Shawn McNeil, at mcn6174@calu.edu or Dr. Kevin Lordon at lordon@calu.edu. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with the Primary Investigator, please contact the Institutional Review Board at instreviewboard@calu.edu.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

CONSENT

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

Appendix D

Professional Learning Communities Assessment-Revised (PLCA-R)

Professional Learning Communities Assessment – Revised

Directions:
This questionnaire assesses your perceptions about your principal, staff, and stakeholders based on the dimensions of a professional learning community (PLC) and related attributes. This questionnaire contains a number of statements about practices which occur in some schools. Read each statement and then use the scale below to select the scale point that best reflects your personal degree of agreement with the statement. 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)

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

Professional Learning Communities Assessment - Revised

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.				
2.	The principal incorporates advice from staff members to make decisions.				
3.	Staff members have accessibility to key information.				
4.	The principal is proactive and addresses areas where support is needed.				
5.	Opportunities are provided for staff members to initiate change.				
6.	The principal shares responsibility and rewards for innovative actions.				
7.	The principal participates democratically with staff sharing power and authority.				
8.	Leadership is promoted and nurtured among staff members.				
9.	Decision-making takes place through committees and communication across grade and subject areas.				
10.	Stakeholders assume shared responsibility and accountability for student learning without evidence of imposed power and authority.				
11.	Staff members use multiple sources of data to make decisions about teaching and learning.				
COMMENTS:					

Professional Learning Communities Assessment - Revised

STATEMENTS		SCALE			
	Shared Values and Vision	**SD**	**D**	**A**	**SA**
12.	A collaborative process exists for developing a shared sense of values among staff.				
13.	Shared values support norms of behavior that guide decisions about teaching and learning.				
14.	Staff members share visions for school improvement that have an undeviating focus on student learning.				
15.	Decisions are made in alignment with the school's values and vision.				
16.	A collaborative process exists for developing a shared vision among staff.				
17.	School goals focus on student learning beyond test scores and grades.				
18.	Policies and programs are aligned to the school's vision.				
19.	Stakeholders are actively involved in creating high expectations that serve to increase student achievement.				
20.	Data are used to prioritize actions to reach a shared vision.				
COMMENTS:					

Professional Learning Communities Assessment - Revised

STATEMENTS		SCALE			
	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.				
22.	Collegial relationships exist among staff members that reflect commitment to school improvement efforts.				
23.	Staff members plan and work together to search for solutions to address diverse student needs.				
24.	A variety of opportunities and structures exist for collective learning through open dialogue.				
25.	Staff members engage in dialogue that reflects a respect for diverse ideas that lead to continued inquiry.				
26.	Professional development focuses on teaching and learning.				
27.	School staff members and stakeholders learn together and apply new knowledge to solve problems.				
28.	School staff members are committed to programs that enhance learning.				
29.	Staff members collaboratively analyze multiple sources of data to assess the effectiveness of instructional practices.				
30.	Staff members collaboratively analyze student work to improve teaching and learning.				
COMMENTS:					

Professional Learning Communities Assessment - Revised

STATEMENTS		SCALE			
	Shared Personal Practice	**SD**	**D**	**A**	**SA**
31.	Opportunities exist for staff members to observe peers and offer encouragement.				
32.	Staff members provide feedback to peers related to instructional practices.				
33.	Staff members informally share ideas and suggestions for improving student learning.				
34.	Staff members collaboratively review student work to share and improve instructional practices.				
35.	Opportunities exist for coaching and mentoring.				
36.	Individuals and teams have the opportunity to apply learning and share the results of their practices.				
37.	Staff members regularly share student work to guide overall school improvement.				
COMMENTS:					

5

Professional Learning Communities Assessment - Revised

STATEMENTS		SCALE			
	Supportive Conditions - Relationships	**SD**	**D**	**A**	**SA**
38.	Caring relationships exist among staff and students that are built on trust and respect.				
39.	A culture of trust and respect exists for taking risks.				
40.	Outstanding achievement is recognized and celebrated regularly in our school.				
41.	School staff and stakeholders exhibit a sustained and unified effort to embed change into the culture of the school.				
42.	Relationships among staff members support honest and respectful examination of data to enhance teaching and learning.				
COMMENTS:					

Professional Learning Communities Assessment - Revised

STATEMENTS		SCALE			
	Supportive Conditions - Structures	**SD**	**D**	**A**	**SA**
43.	Time is provided to facilitate collaborative work.				
44.	The school schedule promotes collective learning and shared practice.				
45.	Fiscal resources are available for professional development.				
46.	Appropriate technology and instructional materials are available to staff.				
47.	Resource people provide expertise and support for continuous learning.				
48.	The school facility is clean, attractive and inviting.				
49.	The proximity of grade level and department personnel allows for ease in collaborating with colleagues.				
50.	Communication systems promote a flow of information among staff members.				
51.	Communication systems promote a flow of information across the entire school community including: central office personnel, parents, and community members.				
52.	Data are organized and made available to provide easy access to staff members.				
COMMENTS:					

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

Appendix E

Stages of Concern Questionnaire (SoCQ)

Stages of Concern Questionnaire
#_____

The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the adoption process.

The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years' experience using them. Therefore, **many of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time.** For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For example:

This statement is very true of me at this time.	0	1	2	3	4	5	6	(7)
This statement is somewhat true of me now.	0	1	2	3	(4)	5	6	7
This statement is not at all true of me at this time.	0	(1)	2	3	4	5	6	7
This statement seems irrelevant to me.	(0)	1	2	3	4	5	6	7

Please respond to the items in terms of **your present concerns,** or how you feel about your involvement with **this** innovation. We do not hold to any one definition of the innovation so please think of it in terms of your own perception of what it involves. Phrases such as "this approach" and "the new system" all refer to the same innovation. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with the innovation.

Thank you for taking time to complete this task.

The innovation that we are concerned with is our implementation of common formative assessments and collaborative team protocols as part of our PLC structures.

0	1 2	3 4 5	6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

Circle One Number For Each Item

1. I am concerned about students' attitudes toward the innovation.	0 1 2 3 4 5 6 7
2. I now know of some other approaches that might work better.	0 1 2 3 4 5 6 7
3. I am more concerned about another innovation.	0 1 2 3 4 5 6 7
4. I am concerned about not having enough time to organize myself each day.	0 1 2 3 4 5 6 7
5. I would like to help other faculty in their use of the innovation.	0 1 2 3 4 5 6 7
6. I have a very limited knowledge of the innovation.	0 1 2 3 4 5 6 7
7. I would like to know the effect of reorganization on my professional status.	0 1 2 3 4 5 6 7
8. I am concerned about conflict between my interests and my responsibilities.	0 1 2 3 4 5 6 7
9. I am concerned about revising my use of the innovation.	0 1 2 3 4 5 6 7
10. I would like to develop working relationships with both our faculty and outside faculty using this innovation.	0 1 2 3 4 5 6 7
11. I am concerned about how the innovation affects students.	0 1 2 3 4 5 6 7
12. I am not concerned about the innovation at this time.	0 1 2 3 4 5 6 7
13. I would like to know who will make the decisions in the new system.	0 1 2 3 4 5 6 7
14. I would like to discuss the possibility of using the innovation.	0 1 2 3 4 5 6 7
15. I would like to know what resources are available if we decide to adopt the innovation	0 1 2 3 4 5 6 7
16. I am concerned about my inability to manage all that the innovation requires.	0 1 2 3 4 5 6 7
17. I would like to know how my teaching or administration is supposed to change.	0 1 2 3 4 5 6 7
18. I would like to familiarize other departments or persons with the progress of this new approach.	0 1 2 3 4 5 6 7

0	1 2	3 4 5	6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

Circle One Number For Each Item

19. I am concerned about evaluating my impact on students.	0 1 2 3 4 5 6 7
20. I would like to revise the innovation's approach.	0 1 2 3 4 5 6 7
21. I am preoccupied with things other than the innovation.	0 1 2 3 4 5 6 7
22. I would like to modify our use of the innovation based on the experiences of our students.	0 1 2 3 4 5 6 7
23. I spend little time thinking about the innovation.	0 1 2 3 4 5 6 7
24. I would like to excite my students about their part in this approach.	0 1 2 3 4 5 6 7
25. I am concerned about time spent working with nonacademic problems related to the innovation.	0 1 2 3 4 5 6 7
26. I would like to know what the use of the innovation will require in the immediate future.	0 1 2 3 4 5 6 7
27. I would like to coordinate my efforts with others to maximize the innovation's effects.	0 1 2 3 4 5 6 7
28. I would like to have more information on time and energy commitments required by the innovation.	0 1 2 3 4 5 6 7
29. I would like to know what other faculty are doing in this area.	0 1 2 3 4 5 6 7
30. Currently, other priorities prevent me from focusing my attention on the innovation.	0 1 2 3 4 5 6 7
31. I would like to determine how to supplement, enhance, or replace the innovation.	0 1 2 3 4 5 6 7
32. I would like to use feedback from students to change the program.	0 1 2 3 4 5 6 7
33. I would like to know how my role will change when I am using the innovation.	0 1 2 3 4 5 6 7
34. Coordination of tasks and people is taking too much of my time.	0 1 2 3 4 5 6 7
35. I would like to know how the innovation is better than what we have now.	0 1 2 3 4 5 6 7

Please complete the following:

1. How long have you been involved with the innovation, not counting this year?
   Never ___ 1 year ___ 2 years ___ 3 years ___ 4 years ___ 5 or more ____

2. In your use of the innovation, do you consider yourself to be a:
   non-user ___ novice ___ intermediate ___ old hand ___ past user ____

3. Have you received formal training regarding the innovation (workshops, courses)?
   Yes ____ No ____

4. Are you currently in the first or second year of use of some major innovation or program other than this one?
   Yes ____ No ____

   If yes, please describe briefly:

   _____

   _____

   _____

Thank you for your help!

Appendix F

Stages of Concern and Corresponding Questions

Item	Statement
Stage 0	
3	I am more concerned about another innovation.
12	I am not concerned about this innovation at this time.
21	I am preoccupied with things other than this innovation.
23	I spend little time thinking about this innovation.
30	Currently, other priorities prevent me from focusing my attention on this innovation.
Stage 1	
6	I have a very limited knowledge of the innovation.
14	I would like to discuss the possibility of using the innovation.
15	I would like to know what resources are available if we decide to adopt this innovation.
26	I would like to know what the use of the innovation will require in the immediate future.
35	I would like to know how this innovation is better than what we have now.
Stage 2	
7	I would like to know the effect of reorganization on my professional status.
13	I would like to know who will make the decisions in the new system.
17	I would like to know how my teaching or administration is supposed to change.
28	I would like to have more information on time and energy commitments required by this innovation.
33	I would like to know how my role will change when I am using the innovation.

Stage 3	
4	I am concerned about not having enough time to organize myself each day.
8	I am concerned about conflict between my interests and my responsibilities.
16	I am concerned about my inability to manage all the innovation requires.
25	I am concerned about time spent working with nonacademic problems related to this innovation.
34	Coordination of tasks and people is taking too much of my time.
Stage 4	
1	I am concerned about students' attitudes toward this innovation.
11	I am concerned about how the innovation affects students.
19	I am concerned about evaluating my impact on students.
24	I would like to excite my students about their part in this approach.
32	I would like to use feedback from students to change the program.
Stage 5	
5	I would like to help other faculty in their use of the innovation.
10	I would like to develop working relationships with both our faculty and outside faculty using this innovation.
18	I would like to familiarize other departments or people with the progress of this new approach.
27	I would like to coordinate my effort with others to maximize the innovation's effects.
29	I would like to know what other faculty are doing in this area.

Stage 6	
2	I now know of some other approaches that might work better.
9	I am concerned about revising my use of the innovation.
20	I would like to revise the innovation's instructional approach.
22	I would like to modify our use of the innovation based on the experiences of our students.
31	I would like to determine how to supplement, enhance, or replace the innovation.