

Fall 12-13-2016

# Beyond a Meeting: A Case Study Examining the Impact of Data-Focused Professional Learning Communities on Teacher Practice and Student Learning

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BEYOND A MEETING: A CASE STUDY EXAMINING THE IMPACT OF DATA-FOCUSED  
PROFESSIONAL LEARNING COMMUNITIES ON TEACHER PRACTICE AND STUDENT  
LEARNING

by

Deena W. Townsend

A Dissertation

Presented in Partial Fulfillment of Requirements for the

Degree of

Doctor of Education

in

Teacher Leadership

in the

Bagwell College of Education

Kennesaw State University

Kennesaw, GA

2016

# DATA-FOCUSED PROFESSIONAL LEARNING COMMUNITIES

## Acknowledgements

It is a humbling experience to finally reach one of my goals after many months of uncertainty, discovery, growth, happiness, and a whole range of emotions and experiences. I am truly thankful to everyone who touched my life in some way because I realize this accomplishment would not have been possible without your support each step of this journey.

First, thank you so much to my wonderful committee. I know there was a sweet spirit that designed my committee and created our partnership because each of you brought a level of expertise that was a perfect fit for making this scholarly journey one that I will always remember. Dr. Julie Moore, your guidance as committee chair was remarkable! You helped me understand this process and guided me over *all* the hurdles, big and small. Regardless of the questions I asked, you always graciously answered them and provided me with more questions to extend my thinking. It was also a bonus to use technology tools during this experience. Doodle has been a great productivity time saver.

Dr. Lynn Stallings, your many talents helped me in so many ways throughout this experience. I could read something and think it was my very best work, only to have your eyes see more, and request more from me. I am grateful that were interested in topic and shared so much of your time to make this dissertation possible.

Dr. Ann Bennett, your experience was just what I needed when I needed it. Your skills related to methodology made the use of photo elicitation in this study a reality. Again, I know there was a reason that you stepped in when you did. Additionally, your walk through this journey showed me what perseverance, courage, and dedication looks like.

It goes without saying that my professional colleagues helped make this journey possible as well. Nancy Larimer, Patricia Jackson, and Wendy Cox, your leadership in Professional

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Learning is exceptional. You transformed teaching and learning to make awareness and resources of high quality instructional practices accessible to all teachers in our school district regardless of location or number of years teaching experiences. Thank you for everything that you have shared with me over the years, from pizza to conversations about professional learning.

Amy Vitala and Rezenia Wilson, we have seen the best of times and some stumbling blocks as we each had our own twists and turns while completing this journey. Now our text sessions and talk sessions will have another twist – sharing our skills to make an impact on teaching and learning based on our new experiences. I appreciate our sessions when we would talk, debrief, talk, debrief, and continue to talk about what makes teacher leadership so important.

To the members of my PLC, thank you so much for your time and not looking at this experience as just “one more thing to do.” You had the best attitudes about everything! I learned so much from you and it was breathtaking to watch this experience unfold. Your commitment to learning and growing together should serve as a model for others and hopefully this work will be the starting point. Also, thank you to the principal where this research was conducted. I appreciate you providing access to your school and welcoming this process as a learning experience for teachers.

To my immediate and extended family and friends, thank you so much for your support and understanding throughout this journey. Brian, thanks for being a wonderful husband and father. I really appreciate you taking time to fill in when I just could not be there. I also appreciate the times when you would just take the kids, head to the movie theater, park, or some other place so I could have some quiet time to work. Also, thanks for the numerous times you

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cooked, cleaned, washed clothes, and did whatever else needed to be done around the house so that I could focus on school. I do not know what I would have done without you.

Brooke and BJ, although I cannot erase the events that I missed and redo them, I hope that you know that each and everything I do is because of both of you. You are our future. I hope that you have seen the example that I have set and realize that you have the potential to achieve any goal you work hard to achieve. I am looking forward to rejoining your worlds and catching up on the fun moments that I missed over the past few years. Remember, to always set your expectations high, work hard, and let your faith guide your actions.

*“A journey of a thousand miles begins with a single step.”*

*Chinese Proverb*

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### Abstract

The increased professional demands on educators without parallel increases in funding encourage schools to continually search for practical solutions to equip teachers with the knowledge and skills needed to improve their instructional effectiveness. This qualitative research study explored this issue by examining how participation in a data-focused professional learning community (PLC) affected teacher practice and perceptions along with determining how data-focused PLCs contributed to student learning outcomes. The study participants were a team of mathematics teachers from a public middle school in the southeastern United States serving grades sixth through eighth. The findings from this study were summarized through three themes that also provided responses to the research questions used to frame this study. The results affirmed that collaboration as a member of a PLC attributed to changes in teacher practice such as enhancements to participant instructional delivery and professional knowledge. In turn, improved teacher effectiveness also benefited students as evidenced by student performance on a variety of indicators. These findings contributed to the body of literature by other researchers (e.g., Little, 1982; McLaughlin & Talbert, 1993) who concluded that participation in a PLC with a defined collaborative structure provided teachers with job-embedded contexts to enhance their classroom practices. Likewise, due to the process of data-focused PLCs relying heavily on teachers learning through collaborative inquiry and using data to inform their decisions rather than assumptions, schools that embrace this structure provide an opportunity for high-quality instructional practices to be nurtured and sustained while supporting continuous growth in teaching and learning.

*Keywords:* data teams, job-embedded professional learning, professional learning communities, teacher collaboration, teacher learning

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## Chapter One: Introduction

*The New York Times science pages recently told the story of heart surgeons in Maine, New Hampshire, and Vermont—there are only 23 in all – who agreed in 1993 to observe each other regularly in the operating room and share their know-how, insights, and approaches. In the two years after their nine-month project, the death rate among their patients fell by an astonishing 25 percent. Merely by emphasizing teamwork and communication instead of functioning as solitary craftsmen, the study showed, all the doctors brought about major changes in their individual and institutional practices. For teachers who, like heart surgeons, have traditionally worked as isolated professionals, the experiment holds a powerful lesson.*

*Kathleen Cushman, 1996*

Teaching has been a profession where working in isolation rather than collaboratively has traditionally been the norm (Anfara, Caskey, & Carpenter, 2012; Flinders, 1988; Pomson, 2005; Schlichte, Yssel, & Merbler, 2005; Tye & Tye, 1984). Norms reinforce autonomy such as the practice of requesting the submission of individually created lesson plans. These norms require minimal collaboration to complete and encourage educators to remain in their individual classrooms, instruct their assigned students, and focus solely on issues around that core group of students (Little, 1990; Westheimer, 2008). Although limited changes have been made to the components of the classroom physical space, the design of the physical space still primarily consists of four walls with a door to separate educators. However, similar to professionals in the medical field, professional educators can learn from each other through collaborative practices. Just as surgeons in their field collaborate to reduce the death rate of patients, is it possible that through collaboration educators may increase learning by increasing instructional effectiveness?

### **Problem Statement**

Educational reforms (e.g., The No Child Left Behind Act of 2001 [NCLB], 2001; American Recovery and Reinvestment Act of 2009 [ACCA], 2009; Every Student Succeeds Act of 2015 [ESSA], 2015) have sharpened teachers' focus from simply teaching students to a more strategic emphasis on specific knowledge and skills students are learning and the evidence

available to validate that learning is taking place (Bausmith & Barry, 2011; Bolam et al., 2005; Hord, 1997). These reforms have transformed the perspective of educators to a focus on not only what is taught to students, but also raises questions about how students learn best and what professional learning teachers need to better meet the needs of their students. Since demands on educators have increased, it is essential that schools seek effective and fiscally responsible techniques to improve teaching and learning such as data-focused professional learning communities (e.g., Baccellieri, 2010; Reeves, 2000; Reeves, 2006; White, 2010). As Anfara, Caskey, and Carpenter (2012) point out, “In these challenging economic times...targeting funds to practices shown through research to have an impact on the desired outcome is surely the most prudent way to grow and maintain a quality teaching staff” (p. 176).

### **Research questions**

To explore the impact of professional learning communities that use data to guide their work, this study is organized around the following research questions:

1. How does participation in a data-focused professional learning community (PLC) affect teacher practice and perceptions?
2. How do data-focused PLCs contribute to student learning outcomes?

### **Purpose and Significance of the Study**

Individual teachers, schools, and districts are held accountable for many factors that influence student achievement. Of those variables, teacher effectiveness is one that may be developed through the use of professional learning communities (PLCs). According to DuFour (2004), professional collaboration focused on student learning rather than on the content being taught enables teachers to work on issues related to supporting student learning outcomes. Through the process of adopting PLCs, schools transform their culture to embrace change and

develop the capacity of teachers to serve as instructional leaders. In turn, these instructional improvements translate into gains in student performance (Baccellieri, 2010; DuFour, DuFour, & Eaker, 2008; Louis & Marks, 1998).

By providing teachers with time to collaborate, opportunities to engage in professional discourse, and an expectation to use data to inform decisions, schools create learning environments that support continuous growth. As Graham (2007) states, “developing a successful professional learning community is difficult work and requires organizational and leadership strategies that are both foundational and ongoing. [The main goal is] getting teachers to the point where innovation and practice can spread” (p. 14).

This research examined how data-focused PLCs in a middle school influence instructional effectiveness. PLC member perceptions were examined along with student learning outcomes to determine how the use of data-focused PLCs affected teacher classroom practice and perceptions. This study adds to the research on practical and transformative solutions for schools looking to improve effective instructional practices.

## **Background**

Joyce (2004) provides a powerful glimpse into historical contexts that helped shape modern day PLCs. Empirical research and anecdotal evidence (e.g., Hord, 1997; Lieberman & Miller, 2011; Senge, 1990) exists that focuses on the formation of groups that collaborate for various purposes related to educational advancement, despite differences in what those groups are called. Even in early years, Dewey (1929) alluded to problem solving through collaboration, “...educational practices provide the data, the subject-matter, which form the problems of inquiry. They are the sole source of the ultimate problems to be investigated” (p. 33). As Dewey (1929) suggested, this is not science that is too far removed from the original source of inquiry.



Rather, the groups that are experiencing an issue of practice are most closely connected to the problem and are best suited to take action on solving it.

Although schools have existed in some form for most of known history, use of PLCs in education has only been known to exist for approximately sixty years. All Things PLC (Solution Tree, n.d.), a website dedicated to sharing information related to professional learning communities, reports “The term *professional learning community (PLC)* first emerged among researchers as early as the 1960s when they offered the concept as an alternative to the isolation endemic to the teaching profession in the United States” (Solution Tree, n.d., para. 1). The term *PLC* has been used increasingly throughout the late 1980s and 1990s as more empirical evidence became available to support this work.

Through her work, Rosenholtz (1989) identified what became known as “learning-enriched schools” where “teacher collaboration linked to shared goals focused on student achievement led to improved teacher learning, greater certainty about what was effective, higher levels of teacher commitment and ultimately, greater gains in student achievement” (Solution Tree, n.d., para. 2). The characteristics of effective PLCs were described by Little and McLaughlin (1993) in the early 1990s. In 1995, Newmann and Wehlage’s meta-analysis on PLCs further supported the work of these structures that had been described by pioneers in the field. In the late 1990s, Louis and Marks (1998) conducted the School Restructuring Study (SRS) among 24 schools (eight elementary, eight middle, and eight high schools). As described by Louis and Marks (1998),

Our objective here is to document empirically the linkages among professional community, classroom organization for teaching and learning, and student performance. We do not argue that professional community "causes" certain features of classroom

organization, but we do seek to demonstrate that professional community is present when these features occur; and, we suggest, professional community supports features conducive to authentic student achievement, specifically, authentic pedagogy and social support for achievement. (p. 536)

This work marked a turning point in connecting teacher classroom practice to student learning outcomes.

The work of those researchers paved the way for DuFour, DuFour, Eaker, and their associates (2008, 2010, 2011) to offer new insights into the formation of PLCs and how educators in PLCs collaborate to address issues related to student learning and teaching while doing so. Continued contributions by these authors (e.g., Allison et al., 2010; Boudett, City, & Murnane, 2013; DuFour, DuFour, Eaker, & Many, 2010) increased the growing body of knowledge related to the value of PLCs for improving teaching and learning for the benefit of both students and educators.

### **Review of Relevant Terms**

The following definitions will be used in this research study.

**Professional Learning Community.** A professional learning community (PLC) is described as a group of professionals who have a central focus of collective purpose using a systematic process in which teachers work together to analyze and improve their classroom practice (DuFour, 2004).

**Data Team.** A Data Team is a type of PLC in which collaborative analysis of data and continuous inquiry is used to improve teaching and learning, and more recently, also leadership in education (Besser, 2010).

**Collaboration.** Collaboration will be defined as “Two or more people [who are] working together to accomplish a set of common goals through the process of sharing, learning, and building consensus among the group” (Bitterman, 2010, p. 13).

**School Culture.** School culture represents the shared norms, values, and procedural expectations that characterize a school community and might possibly encourage or stifle a change initiative (Garrett, 2010; Strahan, 2003).

### **Assumptions**

To proceed with the study, the researcher made the following assumptions:

1. Teachers will meet on a schedule as defined by the school and engage in conversations about instructional issues at those meetings.
2. Student data will be collected on common formative unit assessments.
3. Study participants will submit information as requested by the school or researcher.
4. Teachers will accurately and honestly share their opinions during interviews, focus groups, and on documents submitted.

### **Limitations of the Study**

This study was conducted based on the following limitations:

1. The researcher cannot guarantee that the opinions or views represented by participants reflect their honest opinions at the time of submission.
2. The researcher served in the role of a participant observer. Recognition of biases was acknowledged and the researcher analyzed information as objectively as possible.
3. The data collection period for this study coincided with a one-week Spring Break and a five-day state mandated standardized testing window. Both events provided breaks in

instruction and the school schedule. This might have potentially hindered the momentum of the participants in the study.

### **Delimitations of the Study**

A single, bounded case study was limited to only one middle school in the southeastern United States. Any similarities to other populations does not imply that generalizations should be made.

### **Summary**

The report of the research study consists of five chapters. Chapter One provides an introduction to the study along with a historical context of the topic. Chapter Two provides a review of the literature related to PLCs, including the various models and influences on teaching and learning. Chapter Three provides details about the study methodology that includes the research design, setting and participants, instrumentation and procedures, and ethical considerations. Chapter Four presents the findings of the study by reviewing an analysis of the data and discussion of the themes generated from the data. Chapter Five provides a discussion of the study, conclusions presented, and implications of this study for future research.

## **Chapter Two: Literature Review**

This literature review explores the formation of professional learning communities (PLCs) and their impact on student learning outcomes. DuFour (2004), a leading researcher on PLCs, defines a PLC as a focused group of professionals who have a collective purpose using a systematic process in which teachers work together to analyze and improve their classroom practice. PLCs are commonly developed through a shared purpose that is content-driven, data-driven, or collaborative-focused (Annenberg Institute, 2004). The impact of PLCs on the school is observed by reviewing teacher outcomes, student performance, school culture, and school effectiveness and improvement. Although some challenges exist, PLCs are commonly thought to be a positive support for improving individual and collective outcomes.

### **Theoretical Framework**

According to Creswell (2013), “Qualitative research begins with assumptions and the use of interpretive/theoretical frameworks that inform the study of research problems addressing the meaning individuals or groups ascribe to a social or human problem” (p. 44). A combination of theories support the work of PLCs and establish them as a relevant mechanism for teacher learning. Merriam (2001) stated, “no one theory or model of adult learning explains all that we know about adult learners, the various contexts where learning takes place, and the process of learning itself” (p. 3). Essential understandings related to these theories of focus combine to form a cohesive description of how knowledge is obtained, constructed, used, and adapted based on situational environments. Theories relevant to PLCs include adult learning theory, constructivism, transformative worldview, and connectivism.

**Adult learning theory.** Knowles (1980) provided a distinction between pre-adult pedagogy and andragogy with respect to adult learners. Knowles (1980) defined andragogy as exploration of adult learning whereas pedagogy explored how children and adolescents learn. Knowles (1980) makes the distinction that pedagogy refers to a state of teaching, conveying information, or *making* a person learn; in contrast, andragogy refers to *helping* a person learn. The deviation from the earlier term *pedagogy* resulted from a pragmatic realization that the characteristics of the term caused educators to violate those stated academic standards continually when used in adult-learning contexts (Knowles, 1980). Although Knowles provided evidence, critics (e.g., Davenport & Davenport, 1985; Merriam, 2001; Pratt, 1993) have expressed some concern over his premise based on their own views. Most notably, some of the adult learning assumptions can also be applied to children and are not limited to adults. However, these critiques do not negate his contributions toward shaping the foundation of adult learning theory.

Through his work, Knowles (1989) identified six traits of the adult learner. He specifically linked the following attributes to the andragogy framework:

1. The need to know: Adults possess a natural desire to understand the perceived benefits or potential negative consequences that may arise from not knowing.
2. Learner's self-concept: Adults transition from dependent learners to an approach that enables participants to self-direct their pathways to knowledge. Resistance to learning tends to subside as learners recognize their authority to create their own learning experiences rather than become resistant participants when ideas are forced upon them.

3. Role of learner's experience: Adults possess a greater collection of life experiences that tend to influence their perceptions when experiencing situations. Depending on previous experiences, adults may have positive or negative biases toward learning.
4. Readiness to learn: Adults identify with social roles that confirm the relevancy of learning in completing developmental tasks. Recognizing the relevance comes with maturity and creates a readiness to learn.
5. Orientation to learning: Adults encounter real-life situations that move learning from acquisition of knowledge to application of knowledge. Contextual use is highly likely.
6. Motivation to learn: Adults have greater persistence in learning when their motivation is intrinsic compared to extrinsic.

Thus, these assumptions reflected Knowles' (1980) evolving research redirection from a focus on teaching to a focus on learning. Knowles (1979) argued that the andragogical model enabled adults to be self-directed learners capable of selecting their own educational programs (professional learning). Hence he argues, "this model results in more effective learning by most adults in most learning situations – especially those involving complex competence-development such as professional performance" (p. 39).

**Constructivism.** Building upon Knowles' (1979, 1980, 1989) assertions, PLCs can also be viewed through constructivism and transformative perspectives. When educators work together to solve problems through inquiry, individuals do not shed their personal beliefs for sake of consensus building. In fact, to do so might deteriorate the "substantive conversation [needed] for groups to achieve deep understanding through dialogue that may lead to effective decision

making” (Easton, 2009, pp. 7-8). Rather, individuals need an opportunity to construct their own meaning through reflective dialogue (Hord, 1997; Horn & Little, 2010; Louis & Kruse, 1995). Crotty (1998) professed that researchers make interpretations based on their findings; however, social reality is viewed differently by each individual based on their direct experiences independent of what is observed. Similarly, this is true of individuals working in PLCs who may initially have an understanding of an issue before conversations occur. For example, Grossman, Wineberg, & Woolworth (2000) observed PLC member interactions and witnessed the group combine “individual knowledge to construct a broader understanding” (p. 37). In essence, the group fostered an increased capacity to interact with and learn from the experiences of others and in turn translate those understandings to better serve the needs of their students. The group’s response could also represent what Westheimer (2008) referred to as one of the aspirations of forming professional learning communities: “pursue social justice and democracy” (p. 759).

**Transformative worldview.** Insights from constructivism also encompass some of the transformative worldviews. Creswell (2013) elaborated on these constructivist roots and explained, “...postpositivists impose structural laws and theories that do not fit marginalized individuals or groups and the constructivists do not go far enough in advocating action to help individuals” (p. 25). The transformative framework provides a social context to share that information beyond the internal setting where the action occurred to raise awareness of needed reform, when applicable. For example, Christie, Carey, Robertson, & Grainger (2015) outlined the potential ripple effect when educators look beyond the current moment and toward future outcomes. The authors (2015) summarized,

If students are given the motivation, the means and the knowledge necessary to critically assess, challenge and change their assumptions they will have the chance to become



lifelong learners capable of acting for the best in a rapidly changing world. If they decide that some of those assumptions are invalid they have the possibility to change both their beliefs and their behavior. If enough individuals within a field change, the field itself has a chance to change. (p. 22)

Mertens (2010) expressed that the transformative worldview embraces the intertwining of research inquiry with politics and political change to challenge social oppression. For this reason, the transformative worldview parallels with many of the social challenges that PLCs face on a daily basis and the continuing reform mandates (e.g., ACCA, 2009; ESSA, 2015; The Goals 2000: Educate America Act [Goals 2000], 1994; NCLB, 2001) imposed by lawmakers.

Furthermore, as a researcher, I believe in the existence of divergent thinking and increasing access to these new ideas. I believe that the construction of this new information should encompass direct interaction with those individuals who are most closely involved in the issue to ensure that their story is authentically represented. Thus, where constructivism may not extend beyond understanding social reality through the perspectives of different participants, the transformative paradigm transforms research into action. According to Creswell (2013), “Qualitative research, then, should contain an action agenda for reform that may change the lives of participants, the institutions in which they live and work, or even the researchers’ lives” (p. 26). This position frames my belief that research that has the potential to improve the quality of life of other individuals should be communicated with those who have the capacity to use this information to address issues that often affect the underrepresented and marginalized individuals in our society. Therefore, findings that may be used to address issues of social change will be shared with appropriate individuals for consideration and action.

Both paradigms empower my platform and do not overshadow the relevance of the

research being conducted nor does it diminish the stories of the individuals being represented. Researchers have the potential to expose critical issues and raise awareness that might lead to improvements in the lives of those impacted (Creswell, 2013). Ultimately, it is this potential combined thirst for understanding and action that coexist to offer support for continued exploration of social constructs, sharing of findings, and changing behaviors that are irrational and unjust “[which] limit self-development and self-determination” (Creswell, 2013, p. 26).

**Connectivism.** Although traditional school-based PLCs have been in existence for an extended length of time, technology has provided additional options for meeting spaces of these groups to include entirely online and blended environments (Baran & Correia, 2014; Evans, 2015). According to Blitz (2013), “The Internet and mobile communication technologies have greatly expanded opportunities for teams of educators to reflect and collaborate with each other and experts outside their schools—and even outside their districts—for learning, joint lesson planning, and problem solving” (p. i). The use of technology platforms to link educators has increased in recent years and continues to emerge as access to information becomes more rapid and extends to a larger and more diverse group of educators (Evans, 2015; Hollins-Alexander, 2013; Sie et al., 2013). Hence, connectivism plays a smaller, but identifiable role in constructing the theoretical framework. Siemens and Conole (2011) identified connectivism as “a new theory of learning that addresses learning in complex, social, networked environments” (p. ii). Basically, learning occurs when an individual makes connections through network nodes that are fluid and change frequently (Evans, 2015).

### **Professional Learning Community Models**

Not all PLCs assemble with the same focus. Although some PLCs may be focused on a particular grade level or subject area, others may use data as the basis of their formation (Bolam

et al., 2005; DuFour, DuFour, & Eaker, 2004; Mindich & Lieberman, 2012). The Annenberg Institute (2004) provided guidance on the logistical elements that should be in place for the group to thrive. PLCs should also have a cohesive focus that is not fragmented into too many initiatives, including programs currently implemented.

Likewise, varying descriptions exist as to which expectations should drive the work of a PLC. DuFour (2004) describes the PLC model as one that includes a schoolwide shared commitment to ensuring that all students learn, collaboration has a collective purpose to analyze and improve classroom practices, and analysis of data to continually monitor student progress. This belief aligns with the three main tenets (Annenberg Institute, 2004) that organize teachers in their PLCs. Individuals often are focused on the content they teach, analyzing data that they share an interest in, or on other collaborative goals. Regardless of which goals these individuals select together, Jacobson (2010), a senior education specialist at Cambridge Education, notes that groups should be formed so that they build on the work of other groups and not work in isolation for a singular purpose.

### **Content-Focused Professional Learning Communities**

When content drives the work of the PLC, teams are formed with teachers who teach the same subject and often at the same grade level. The Annenberg Institute (2004) suggests that these teams are often engaged in conversation that reveals differing views related to instruction. According to DuFour (2014),

The teams agree on the specific knowledge and skills that students must acquire in each unit of instruction; monitor student learning through a process that includes team-developed common formative assessments; and use the results from the assessments to address the needs of individual students, improve individual teachers' instructional

practice, and discover areas in which the entire team needs additional training and support. (p. 31)

In this example, content clearly serves as the foundation for the work of the team. Teachers use the content as a blueprint to shape their conversations and establish their collective beliefs. By beginning with the curriculum, teachers in these PLCs not only collaborate with teachers in their building, but also with any others who also teach that curriculum. Jacobson (2010) referred to this approach in terms of a backward design model because the content propels the cycle of determining curriculum, assessment, and instructional methods. Included in this cycle is the need for feedback and reflection. The PLC's work is to constantly analyze their effectiveness in content delivery and search for ways to continually improve.

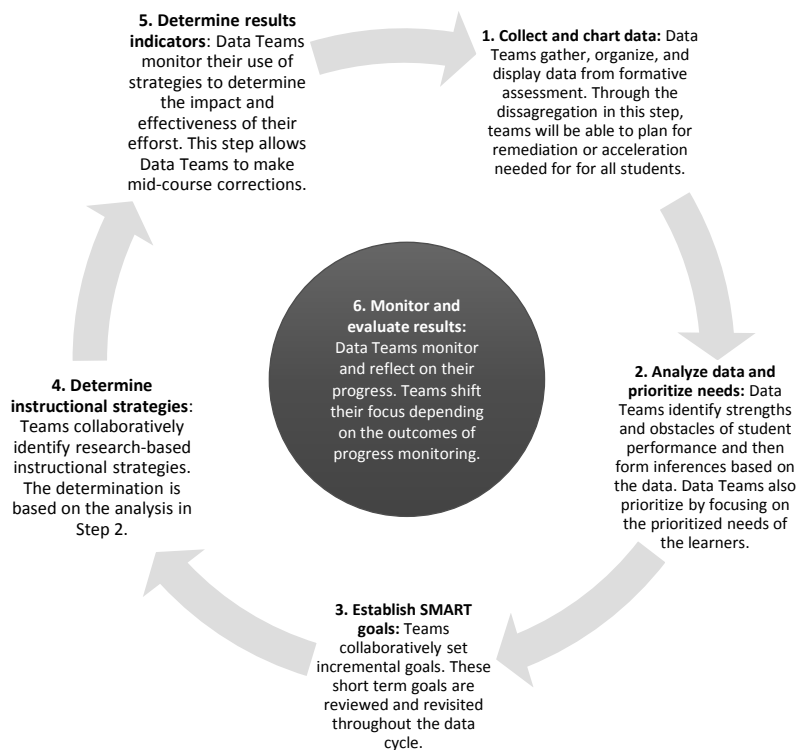
### **Data-Focused Professional Learning Communities**

PLCs that use data to focus their discussions are often referred to as "Data Teams." Simply stated, "Data Teams are collaborative teams designed to improve teaching, learning, and leadership" (Besser, 2010, p. 1). Traditionally, data-driven teams are "observing, analyzing, and providing feedback and ideas about school data and teacher and student work" (Annenberg Institute, 2004, p. 4). Although a traditional overarching goal of "raising student achievement" continues to guide most data teams, data-focused PLCs still need clarity when establishing their intended purpose and sources of information. For instance, Brodie (2013) provides a distinction between evidence-based practice and data-informed practice insisting that the two differ in outcomes. Brodie (2013) contends that evidence-based practice informs what teachers need to learn through reading relevant research whereas data-informed practice relies on teachers interpreting a variety of data sources, including classroom and local data (Brodie, 2013). While

one method relies primarily on research the other relies on multiple data sources which may be inclusive of making inferences through research-based evidence.

PLCs that focus on data often overlook individual student needs when the data is merely reviewed in aggregate. For example, as a part of Graham's (2007) study, one participant mentioned in an interview that he/she did not feel as if student learning was the focus, but rather, how teachers teach. As the participant stated, "most PLC conversations focused on what and how teachers would teach, but very little time was devoted to identifying how well students were learning and what strategies seemed to be most successful in promoting student learning" (as quoted in Graham, 2007, p. 8). Although data makes it easier to determine where the learning issues reside, teams must be careful not to neglect the individual student in the process. Hence, PLCs must find a balance between content delivery and using data to monitor its effectiveness.

PLCs that are data-focused engage in conversation around data which impacts teaching and learning. The Data Teams Process is one commonly accepted model that is used to guide teams through the inquiry cycle. The Data Teams Process (Allison et al., 2010) is a commercial product available through Houghton Mifflin Harcourt publishers and distributed by The Leadership and Learning Center. The Data Teams Process involves five interactive steps with an ongoing step 6 of monitoring and reflection (see Figure 1).



*Figure 1: The Data Teams Process. Adapted from Allison et al. (2010), *Data teams: The big picture, looking at data teams through a collaborative lens* (p. 3).*

Each phase in the process represents a strategic step toward achieving student performance results. To begin, data-based PLCs should collect and record data. This step will provide the group with an understanding of their current reality. Next, from the data collected, an analysis should be conducted to determine strengths and obstacles in student learning. Careful consideration should be made to not only include explicit strengths and obstacles, but also strengths and obstacles that can be inferred from the data. Next, the team should collaboratively develop a Specific, Measurable, Achievable, Relevant, and Timely (S.M.A.R.T.) target (O’Neill & Conzemius, 2006). Then, the team should review and select research-based instructional strategies that align with the desired target outcomes. These best practices and effective teaching strategies should be agreed upon by the group. Over time, strategies are revised as needed depending upon student responsiveness to the strategies. Finally, the team should determine

results indicators that will be used to monitor the effectiveness of the strategies and indicate progress toward the goal. Throughout the cycle, participants monitor and evaluate their results. This reflective exercise has PLC members engaging in collaborative inquiry with the artifacts and evidence collected during the cycle serving as the springboard for those conversations (Allison et al., 2010).

Another model involves the eight activities from the Data Wise Project at Harvard Graduate School of Education (Boudett, City, & Murnane, 2013). Boudett, City, and Murnane (2013) in collaboration with The Data Wise Improvement Process “found that organizing the work of instructional improvement around a process that has specific, manageable steps helps educators build confidence and skill in using data” (p. 5). Each of the eight activities is grouped into three categories: Prepare, Inquire, and Act. In the Preparation phase, members “establish a foundation for learning from student assessment results” (Boudett, City, & Murnane, 2013, p. 5). This phase begins with members organizing themselves for collaborative work by identifying a shared purpose and establishing norms for collaboration. During this phase, members also build their assessment literacy to ensure that everyone shares a common language and diminish the reliance on “data experts.” Hence, everyone shares responsibility in ownership and analysis of the data.

During the Inquire phase, members complete three key activities: create a data overview, dig deeper into student data, and examine instruction. When creating a data overview, members decide on how to present the data thoughtfully so that the “underlying educational stories and themes are transparent” (Boudett, City, & Murnane, 2013, p. 71). Data should be displayed in a manner that it encourages conversation. The data should not just be reviewed for answers and to draw conclusions, but also used to inspire questions and promote collaborative growth. With this

outcome in mind, members should find digging deeper into the data a smooth transition between the previous activities since members have focused their thinking on this activity. Members should seek strategies to develop a common understanding of how to analyze the data to identify learner proficiency and learner-centered problems. Multiple forms of data should be consulted to “illuminate, confirm, or dispute” (Boudett, City, & Murnane, 2013, p. 99) initial conclusions. Information gleaned from the data should then be used to link learning and teaching. During this activity, members examine instruction to identify effective practice or problems of practice. Both conclusions involve members selecting an instructional strategy and measuring its effectiveness based on student performance (Boudett, City, & Murnane, 2013).

Lastly, members enter the Act phase that involves creating an action plan, monitoring progress, and assessing results. After members decide what will be accomplished, the next step is to put the plan in writing. This plan should identify key actions and indicators that will be used to measure proficiency. The action plan should include intermediate checks to measure the effectiveness of the plan or to identify if adjustments are necessary. Finally, the improvement cycle continues with members continuing to build on prior knowledge and skills to refine future practices (Boudett, City, & Murnane, 2013).

Muhammad (2006/2007) states, “Meaningful data are the life-blood of a PLC. We cannot accurately focus on the success of each student without accurate, relevant, and timely data” (p. 15). In some settings, teachers made instructional decisions based on assumptions rather than concrete information or looked at many variables in isolation. The Data Team Process engages educators, teachers and administrators in collaborative discussions about reaching desired outcomes. Nielson and Pitchford (2010) stated, “In isolation, it is difficult to have a rich discussion of variables that affect data” (p. 189). The Data Team Process brings a repertoire of



strategies to the table and provides structure to make goal-setting and achieving goals attainable. At the heart of this process rests the premise that “working in a Data Teams structure requires teachers to share practices and strategies that work, to identify those that do not, to dig deeper into the root causes of the results they are seeking, to explore the contextual framework of the practices, and to share action research to find the best fit for their next steps” (Nielson & Pitchford, 2005, p. 180).

### **Professional Learning Communities with Various Collaborative Interests**

PLCs might also form as the result of other collaborative interests. The Annenberg Institute (2004) explained how PLCs problem solve around a particular need and work toward a desired outcome. These PLCs usually evolve because individuals saw the need to focus on one issue and pool their talents and resources to resolve the issue. In these settings, the work of the PLC is based more on dialogue than the presentation of information with limited interaction among group members. DuFour (2014) noted, “Members can turn to other teachers in the same department for advice or to other schools in the district where teachers are getting good results” (p. 32). Thus, the need to resolve an issue establishes an urgency to reach out to other colleagues for ongoing collaboration. This collaboration also creates a level of transparency among participants. DuFour (2014) expressed, “...transparency enables participants to identify a school or team that’s achieving exceptional results for specific students as well as schools that are struggling to help a particular group of students demonstrate proficiency” (p. 33).

Moreover, PLCs support and respect the professional growth of teachers. Whereas the older short-term professional development models approached the acquisition of new skills from a deficit model, PLCs encourage all educators to grow professionally and not just in areas that are viewed as perceived weaknesses. DuFour (2004) argued that professional development

should not be viewed as a separate entity or an occasional event, as it had been viewed traditionally. Fostering teacher development should “represent a focused, coherent effort to develop the collective capacity of school personnel to solve problems and sustain continuous improvement” (DuFour, 2004, p. 63). Through this approach, PLCs are viewed as a working group of individuals who “learn while doing” in a collaborative setting instead of a “sit and get” approach (DuFour, 2004).

### **PLCs in Online Environments**

As PLCs remain integral to educational practice, the environment in which they operate is transforming beyond face-to-face only settings to include online communities and combinations of the two. Blitz (2013) summarizes the functions of these online communities as follows:

Online PLCs are loosely defined as teams of educators who use digital and mobile communication technologies, at least part of the time, to communicate and collaborate on learning, joint lesson planning, and problem solving. Partially online (hybrid) PLCs combine online and face-to-face interactions. The Internet and mobile technologies provide teachers with opportunities to reflect and collaborate with each other and with experts outside their schools and to access information and other resources with few limitations of time, space, or pace. *Collaboration* is what distinguishes online PLCs from online professional development and learning more generally, such as online courses, webinars, or online training. (p. 1)

Although different studies (e.g., Evans, 2015; Olofsson & Lindberg, 2010) vary slightly on the interactions of teams studied (e.g., asynchronous versus synchronous) and frequency of interactions compared to traditional models, research in this field continues to develop. Blitz

(2013) concluded that approximately two-thirds of the empirical research reported deals with K-12 institutions and teachers from multiple schools or districts. Moreover, primary participants were math and science teachers and typically included online PLCs in existence less than a year. With the expansion of online PLC communities, traditional PLCs should be able to take advantage of technology to transform their collaboration and include flexible learning options.

### **Impact on Teaching and Learning**

Once PLCs are established, a logical progression is to determine their impact on teaching and learning. Learning Forward (formerly the National Staff Development Council) is an organization committed to enhancing educator professional growth through professional learning. Learning Forward has devoted numerous resources to providing evidence of the link between educator learning and student achievement and frequently shares their findings in publications and reports such as *Evidence of Effectiveness* (Learning Forward, 2011b). Additionally, Learning Forward has developed seven standards for professional learning that serve as a set of expectations for effective professional learning and are “indicators that guide the learning, facilitation, implementation, and evaluation of professional learning” (Learning Forward, n.d., p. 1). Hirsh (2012), executive director of Learning Forward, commented,

It is no accident that the standards for professional learning begin with the standard on learning communities. While many forms of professional learning may lead to improved knowledge and skills for adults, only the learning community offers a structure, process, and product that lead to systematic continuous improvement for both educators and students. (p. 64)

Moreover, research reviewed by The Annenberg Institute (2004) concluded that strong PLCs produced distinct advantages for the entire school community and for individual teachers. These

advantages included “substantial learning about good teaching and increased content knowledge, higher morale and enthusiasm, greater job satisfaction, and greater retention rates” (Annenberg Institute, 2004, p. 3). Through these advantages, districts and schools were able to increase “the capacity to sustain change” (Annenberg Institute, 2004, p. 4). For instance, initial efforts that started with one school expanded into a network of schools, and in some cases entire districts. The Annenberg Institute (2004) maintained, “The collective resources and support of a wider network help to overcome stumbling blocks to effective PLCs” (p. 7). In other words, repeated use of PLCs enabled the process to run more efficiently thereby increasing positive outcomes for schools and individuals.

Recognizing that PLCs include different individuals with different perceptions, schools sought to clarify objectives or goals when PLCs were formed. This step assisted in the process of determining if outcomes aligned with learning targets for the group. If the group continued to have unanticipated results, the group sought to clarify their purpose and identify potential antecedents to teaching and learning outcomes (Annenberg Institute, 2004). Pinpointing the triggers enabled groups to analyze outcomes more closely to the time of their occurrence rather than monitoring outcomes that were too far removed from the source to provide a strong connection to the antecedent.

### **Teacher Outcomes**

Teacher outcomes are typically the earliest indicator that the PLC process is working. Graham (2007) attempted to discover the impact of the PLC structure on teacher effectiveness. His study indicated a relationship between participating in PLC activities and teacher improvement. Sixth and seventh grade teachers who were interviewed as a part of the process revealed that “same-grade, same-subject PLC activities had an impact on their professional

improvement and the indicated catalyst was most often the opportunity to collaborate with others” (Graham, 2007, p. 8). Teachers engaged in discussion that was focused on teaching and learning instead of operational topics such as changes in the bell schedule or seasonal bulletin board displays. Teachers developed norms for their work that led to meaningful conversations among group members and allowed members to adopt strategies such as being able to objectively handle and respond to disagreement. Educators modeled strategies for each other and commented on the benefits of using a collaborative lens. Collaboration fostered a collegial spirit that led team members to feel a sense of community and a willingness to learn from each other (Graham, 2007). Hence, as teachers became more proficient in their instructional practices and they continued to share with each other, an environment was created that fostered teacher leaders.

Although a focus on student outcomes is an obvious target in professional learning communities, another important result is that teachers begin to identify other teachers who excel at their craft and serve as respected practitioners in the school community. For instance, Little’s (1982) review of research identified the PLC process as a learning environment for professional development that develops staff capacity to function as participants in an effective PLC as defined by results. Through the PLC process, job-embedded professional learning provides a non-threatening environment for teacher leaders to learn, refine, and share their experiences. DuFour, DuFour, Eaker, and Karhanek (2004) identified ways in which educators can collaborate to detect struggling students and provide early intervention. By working in a collaborative environment, educators reduced their learning curve, expanded their knowledge of high-yield instructional strategies, and transformed their practices for better student learning outcomes.

The Annenberg Institute (2004) concluded that PLC modeling of active learning and showing respect for the ideas of others empowered teachers as leaders. Moreover, this foundation had the potential to yield sustainable results in the form of establishing shared and supportive leadership that preserves the school's vision, maintains a focus on improvement, and invites others into the decision-making process (Annenberg Institute, 2004). Hirsh and Killion (2009) stated, "Collaboration among educators builds shared responsibility and improves student learning" (p. 469). Vescio, Ross, and Adams (2008) further supported this claim by contending that "actively engaging teachers in PLCs will increase their professional knowledge and enhance student learning" (p. 81).

### **Student Performance**

The formation of PLCs represents a commitment to nurturing the human capital of the teaching force. Although most PLCs continually frame their work around student outcomes, the work of the teachers makes their students' success possible. To achieve the benefits of improved student performance, researchers (e.g., Bolam et al., 2005; Ronfeldt, Farmer, McQueen, & Grissom, 2015) support functioning as a collaborative group working toward objectives rather than sticking to norms of tradition that structured teachers working as autonomous practitioners with minimal instances of interaction for the purposes of student-based inquiry. DuFour (2014) acknowledged, "As a result of the continual focus on improved adult learning, student learning also improved" (p. 32). Other researchers (e.g., Graham, 2007; Linder, Post, & Calabrese, 2012) suggest that effective PLCs can improve student performance. Graham (2007) concluded, "The first tenet of a PLC is a shared commitment to student learning" (p. 9). Student learning can be accomplished by reviewing data to make informed decisions such as developing instructional strategies to meet identified learning needs (Vescio, Ross, & Adams, 2008).

Each of the three types of PLCs, (content-driven, data-driven, and collaborative-focused on special interest) is relevant to the purpose of the group. For example, teams driven by content tend to view the content in terms of what essential skills each student will need to become proficient within a unit (Graham, 2007). The continued focus on outcomes enables teachers to improve and students to excel. Graham (2007) noted the work of several researchers (e.g., Darling-Hammond, 2000; Wright, Horn, & Sanders, 1997) who add to the literature (DuFour & Marzano, 2011; Learning Forward, n.d.; Louis & Marks, 1998; Reeves, 2006) supporting the notion that teachers have a significant impact on student learning and achievement. Darling-Hammond's (2000) examination of teacher qualifications data and school features data, such as class size, from a 50-state policy survey along with case studies yielded some noteworthy results. Triangulation of the data sources attributed to some confidence of the findings which "suggest[ed] that states interested in improving student achievement may be well-advised to attend, at least in part, to the preparation and qualifications of the teachers they hire and retain in the profession" (Darling-Hammond, 2000, p. 32). Similarly, Wright, Horn, and Sanders (1997) concluded in their longitudinal study of student test scores on state assessments along with other school factors (class size, teacher interaction, etc.) that "differences in teacher effectiveness were found to be the dominant factor affecting student achievement" (p. 66). Thus, when student learning begins with effective teachers, these findings support the use of identifying teachers with continually proven results and sharing their practices to further develop other teachers in the profession (Wright, Horn, & Sanders, 1997).

Few would argue against gains in student achievement; however, other opportunities to measure PLCs in terms of student outcomes exist. In addition to student achievement, student growth and closing the achievement gap may also be seen as a measure of PLC performance. At

most, *NCLB* (2001) reported struggling learners may be identified using achievement gap measures. Consequently, both student growth and achievement gap closure represent opportunities for future research.

### **School Culture**

As members of PLCs spend extended time together, it is common for these individuals to develop a sense of collegiality that might not otherwise occur. In turn, these interactions have the potential to influence school culture. School culture is the set of governing norms that have the ability to severely impact the outcomes of any change initiative (DuFour, DuFour, & Eaker, 2008). Positive school culture enabled PLCs to sustain their existence or progress even when changes in leadership or teachers occur. Garrett (2010) explains, “You can’t really categorize a PLC as a sequence of steps or a strategy. It’s really a shift in the culture” (p. 6). Breaking the mold from working individually focused roles to one where everyone learns together and grows together, Hord (1997) shared insight into how the stagnant roles of teachers teaching, students learning, and administrators managing do not represent a model where professional development works to benefit those involved in that cycle. Rather than remain complacent, schools that function as successful PLCs develop an intellectual culture of high quality where the acquisition and application of new knowledge is a priority (Hord, 1997).

Leadership should ensure that activities of professional learning communities contribute to a healthy school culture. Depending upon the existing culture when PLCs are established, this task might be easy or difficult. For example, in Graham’s (2007) study, he shares how a first-year school had few barriers in establishing PLCs. Graham (2007) reported at the first-year middle school “the faculty and school leadership did not have the additional challenge of addressing an existing culture that may have been hostile to collaboration and open



conversations” (p. 15). Regardless of a school’s length of existence, “change in the professional culture of a school is a significant finding because it demonstrates that establishing a PLC contributes to a fundamental shift in the habits of mind that teachers bring to their daily work in the classroom” (Vescio, Ross, & Adams, 2008, p. 84).

Furthermore, when using technology to complement the collaborative work of traditional PLCs, it is critical that the culture is receptive to this practice. Different factors complete the culture profile; thus, emphasis on the positive attributes should not be minimized, but publicized. Blitz (2013) stated, “The literature finds that teachers who collaborate online are engaged with the group, develop a sense of community, improve their knowledge of subject and pedagogical content, and intend to modify their instructional practices accordingly” (p. i). As the benefits become more prominent, participants should reframe their thinking about the online PLC process.

Unfortunately, sometimes the cultural and procedural norms in some school environments are so dysfunctional that an extensive amount of support and time is required to change the culture. For instance, schools with high employee turnover rates might meet this profile due to lack of consistency in expectations due to continual shifts in personnel. Although this task will require extended time to complete the process, the outcomes warrant the struggle. Harris (2010) shared, “Changing school cultures for the better is difficult but not impossible. Some of this can be done through capacity-building training that fosters and embeds professional learning communities” (p. 12).

### **School Effectiveness and Improvement**

Purposefully implemented PLCs promote teacher development, improved student performance, and a healthy school culture that is conducive to sustained results. Collectively,

these factors take root and develop effective school cultures that are continually able to celebrate improvements. These schools have a keen focus on student learning and results. They are not quick to adopt reform measures simply because an existing reform does not yield immediate success. Instead, these schools look to individuals in the school setting to collaboratively uncover barriers unique in that school setting that impedes growth. Hirsh and Killion (2009) affirmed,

Many reform models, as well as reformists, offer improvement models with the assumption that the model works under all conditions. Our view is that principles rather than practices are more transportable and that any reform model based on solid principles is better positioned to have a lasting and transformative impact (p. 465).

Through this statement, Hirsh and Killion (2009) offer solid advice related to establishing PLCs not as an “off the shelf” product, but as a deeply held principle that will permeate school culture and yield results. When these principles are instilled in PLC members from the beginning of the PLC, it has the potential to leave a legacy in the culture.

For instance, in a study conducted over a 34-month period by Bolam et al. (2005), the findings were that PLCs promoted school and systemwide capacity for sustainable improvement and student learning. The study utilized an array of research activities, including a literature review of articles beginning in 1990 along with references to antecedent ideas that led to the establishment of PLCs; collection and analysis of questionnaire survey responses from 393 schools across England; case studies at sixteen schools; and three workshop conferences attended by representatives from the case study and the project Steering Group aimed at supplementing data collected at sites and to provide a structure for sharing experiences about working within a PLC. Additionally, the researchers executed an expansive range of activities to disseminate information such as a project website. The case studies were conducted at schools identified as

early starter, developing, and mature stages of development levels and provided descriptive accounts of the PLC process at the sixteen school sites that exposed differences in effectiveness among the schools as well as within the same schools as time progressed (Bolam et al., 2005, p. 18). Likewise, analysis of surveys concluded four primary methods for promoting and sustaining effective PLCs. Bolam et al. (2005) reported, “optimising resources and structures; promoting individual and collective learning; specifically promoting and sustaining the PLC; leadership and management” (p. iv) as those four primary methods.

Similarly, research by Fullan (1999), Langer (2000), Little and McLaughlin (1993), and Louis, Kruse, and Marks (1998) affirmed that a primary characteristic in improving schools is the presence of a strong teacher professional community. Therefore, schools that begin the journey of establishing PLCs should review related literature and consult schools with existing PLCs, if available, to identify successful characteristics and pitfalls to avoid. By having the conversation as a part of the preparation phase, schools are likely to expedite the time frame of “practice phase” and move more quickly to recognize improvement. In turn, schools are likely growing in their effectiveness.

### **Challenges and Considerations**

The literature review highlighted the many benefits of PLCs in cultivating positive school outcomes. However, the rewards of PLCs are apparent after the challenges and growing pains subside. A variety of barriers to successful implementation exist depending upon the school environment. In school environments with open positions, hiring decisions should be made by individuals who are willing to sustain the process (Lujan & Day, 2009). Also, Hoffman, Dahlman, and Zierdt (2009) admitted, “With the ever-increasing demands placed on schools, teachers can become lost in the action of daily teaching routines and so feel powerless to affect

systemic change” (p. 29). Poorly planned PLC structures can lead to teachers feeling as if it is just “one more thing to do” and abstain from fully committing to the process (Thessin & Starr, 2011). If this occurs, it is often difficult to build motivation for a process that research (e.g., Graham, 2007; Linder, Post, & Calabrese, 2012) supports as having a positive impact on teacher proficiency and student achievement. Moreover, by not acknowledging disagreement, groups become stagnant by suppressing and hiding conflict. According to Grossman, Wineburg, and Woolworth (2000), “Negotiating the essential tension is an inevitable task for teachers' professional communities” (p. 46).

Another challenge in implementing PLCs is when school leadership is ineffective in gaining acceptance of the vision of collaboration and sustainable growth (DuFour, DuFour, & Eaker, 2008; Routman, 2012). In other words, some school environments simply lack individuals with the capacity to influence others and develop teacher leaders. In one example (Doolittle, Sudeck, & Rattigan, 2008), high schools in a school system entered into a partnership with a local university to create PLCs. One school in the study was described as resistant to change. Doolittle, Sudeck, and Rattigan (2008) reported, “This school lagged behind the district’s other five schools in their efforts to improve student achievement. With the building administration expressing a preference for working in isolation, little communication existed between the high school and the university” (p. 306). As such, this school was labeled as being uninformed of educational change models and having insufficient leadership capacity to initiate change (Doolittle, Sudeck, & Rattigan, 2008).

Additionally, challenges in isolating the effects of PLCs in comparison to other initiatives often make it difficult to report findings based on that topic alone (Baron, 2005). Most schools do not operate solely under the umbrella of a PLC structure without other reform initiatives in

place. Rather, multiple best practices are used to target certain areas within a school. Graham (2007) revealed, “At Central Middle [school], a strong positive relationship existed between professional learning community activities and teacher improvement, but this relationship was complex and contingent upon multiple factors at multiple levels” (p. 10). Although in some school communities with competing interests, it might be more challenging to gather data on the PLC outcomes. However, this should not deter schools from accepting the challenge and contributing to the growing body of evidence.

### **Summary**

Individual teachers, schools, and districts are held accountable for many factors that influence student achievement. Of those variables, teacher development is one that may be a practical and rewarding strategy through the use of effective PLCs. A review of the PLC literature concludes that properly implemented PLCs impact teacher proficiency, learning, sharing, and using practices from other professionals. Through the student learning process, schools transform the mindset of teachers to embrace change and develop the capacity of teachers to serve as instructional leaders. In turn, these instructional improvements translate into gains in student performance.

Although challenges and barriers to successful implementation exist, schools are encouraged to commit to pursuing PLCs. By providing teachers with time to collaborate, flexibility to engage in professional discourse, and commitment to use data to inform decisions, schools create learning environments that support continuous growth. As Graham (2007) states, “developing a successful professional learning community is difficult work and requires organizational and leadership strategies that are both foundational and ongoing. [The main goal is] getting teachers at the point where innovation and practice can spread” (p. 14).

### **Chapter Three: Methodology**

This research examined how data-focused professional learning communities (PLCs) in a middle school influenced teacher capacity to use effective instructional practices that positively affect student learning. PLC member interactions and perceptions were examined to determine how the utilization of data-focused PLCs affected teacher classroom practice. Results from this study will contribute to the body of research aimed at providing established, cost-effective, and transformative solutions for schools looking to sustain effective instructional practices or for those looking to improve current practices. As shared by Schmoker (2009), PLCs represent powerful opportunities to shift teacher instructional practices that could lead to differences in student learning without additional costs.

For this study, a qualitative case study approach was used. The decision to use this approach was made after examining the research questions, the type of data to be collected, the data collection procedures, and the data analysis purpose and process in each of the five primary research traditions. According to Creswell (2013), a case study is characterized by a real-life exploration of a case or cases where multiple sources of data are collected to provide an in-depth description of the case. Along this same continuum, Stake (2005) further describes an instrumental case study when “a particular case is examined mainly to provide insight into an issue or to redraw a generalization” (p. 445). The details of this research conform to those characteristics, thus, a single instrumental case study provided the best match for the purposes of this research. Although literature (e.g., DuFour, DuFour, & Eaker, 2008; Fullan 2006; Hord, 1997) exists on different aspects of PLCs, the case in this study possessed unique and inherent features; hence, generalizations to other populations is not intended. However, sufficient detail is provided so that readers may consider whether findings may be informative in other contexts.

Moreover, Yin asserts (2014) that a case study is not limited to qualitative research, but may also include quantitative elements. Although some quantitative data was used since student scores were used to measure proficiency and draw conclusions about student learning outcomes, that information was used to deepen the understanding of the case rather than viewed as an isolated area of analysis.

### **Research Questions**

The intent of this study was to investigate PLCs that use data to influence decisions about their instructional practices. This study sought to answer the following research questions:

1. How does participation in a data-focused professional learning community (PLC) affect teacher practice and perceptions?
2. How do data-focused PLCs contribute to student learning outcomes?

### **Research Design**

In qualitative research, the researcher seeks to provide insight into how phenomena occur in natural settings rather than what caused the phenomena (Creswell, 2014; Stake, 2010; Crotty, 2003). Other characteristics of qualitative research include the researcher acting as the primary gatherer of information through multiple data sources (Creswell, 2014). Additionally, qualitative researchers are permitted to use their personal backgrounds and experiences to deepen their understanding of a particular situation. Merriam (2002) contends, “Qualitative research lies with the idea that meaning is socially constructed by individuals in interaction with their world” (p.

3). Within the context of qualitative research, this study was designed to explore patterns or changes in participant instructional practices and perceptions as members of a professional learning community through the use of a case study design. Although varying definitions exist on what constitutes a case study (Merriam, 2001; Stake, 1995; Yin, 2003), the essence of the case

study remains consistent. Rather, it involves a deep exploration of an identified phenomena, or case in its naturalistic environment.

Relying on a comprehensive overview of the competing arguments of Stake (1995), Yin (2003), and others (Creswell, 2013; Merriam, 2001), I formulated my understanding of case study and how it represented an appropriate method for my research. Exploration of the five commonly accepted research approaches (Creswell, 2013) enlightened me as to which qualitative approach might best work with my research questions. I primarily based this decision on the type of data collected in each study, the data collection procedures, and the data analysis purpose and process. I critiqued each research tradition to determine its intended purpose, main features, strengths, and limitations. When viewing the research questions associated with this study, a case study provided the most appropriate route to understanding how participant practices and perceptions were influenced based on their involvement as a member of a professional learning community (PLC).

Yin (2003, 2014) provided a more structured design approach compared to Stake (1995) who offered a more adaptable design such as allowing for major research design changes after a study has started. Yin (2014) concluded that case study is most appropriate to answer “why” and “how” questions rather than those which seek to identify a causal connection and also accepts the coexistence of both quantitative and qualitative data sources as measures of evidence. Although the purpose of including quantitative information is not to make generalizations about an entire population, it adds detail to illustrate a case. Furthermore, Yin (2014) recognized the design as a “blueprint” for the study that further supports his recognition of a planned approach rather than a “wait and see” response. Hence, Yin (2014) concluded, “research design is supposed to represent a logical set of statements” (p. 45). Yin (2014) also discussed how planning is a key



consideration prior to the analysis phase and how computer-assisted tools (technology) may expedite the process and assist with record keeping. Therefore, to minimize issues of ambiguity, I followed protocols outlined by Yin (2003) that asserted a more structured design rather than the flexibility model outlined by Stake (1995).

### **Site/Setting**

The school setting in this study was a public middle school in a suburban community in the southeastern United States. The school opened approximately ten years ago and has modern facilities. The school has an enrollment of approximately 1,300 students of varying ethnicities/races and exceptionalities (see Table 1). Forty-eight percent (48%) of the student population is White/Caucasian, thirty-four percent (34%) Black/African American, eleven percent (11%) Hispanic/Latino, with the remaining student population identified as American Indian, Asian, or Multi-Racial. Of this population, 11% are Students with Disabilities (SWD), 2% are English Language Learners (ELL), and 28% of the students qualify for gifted education services. In addition, about 25% of the student population receives meal assistance under the National School Lunch Program (United States Department of Agriculture, n.d.).

Table 1

#### *School Enrollment by Percent Demographic*

Characteristic	Percent of Enrollment
Ethnicity/Race:	
White/Caucasian	48%
Black/African American	34%
Hispanic/Latino	11%
American Indian, Asian, or Multi-Racial	7%

**Exceptionality:**

Students with Disabilities (SWD)	11%
English Language Learners (ELL)	2%
Gifted	28%
National School Lunch Program Recipient	25%

The 117 faculty and staff members include 60 classroom teachers, 12 special education teachers, one English Speakers of Other Languages (ESOL) teacher who dually serves students that are identified as English Language Learners (ELL) and special education, three counselors, one secretary, one bookkeeper, three clerks, one nurse, one special needs nurse, five paraprofessionals, seven custodians, twelve food service staff members, five administrators, one social worker, one speech pathologist, one media specialist, one media paraprofessional, and one campus police officer.

The school operates a bell schedule with seven 50-minute classes per day. Students in sixth, seventh, and eighth grades attend five core curriculum classes and two connections classes such as art, physical education, health, family and consumer science (FACS), chorus, band and orchestra each day. Students earn grades based on a 100-point grading scale with official report cards issued twice per year in eighteen-week increments. The school offers approximately fifteen extracurricular clubs and organizations. Since the school district does not endorse competitive sports for middle school students, only intramural sports are offered at the school with organized sports teams serving as an extension of the local community, but not affiliated with the school.

**Participants**

Since mathematics achievement continues to be an area of interest in the school district where this study took place, the participants for this study were selected from math teachers

within the middle school. There were three math PLCs at this school, each of which was invited to participate in the study, but only one was selected. The team of teachers all belonged to the same PLC, which meant that they all taught the same content area by grade level. The selected team of mathematics teachers contained five participants: four general education teachers and one special education teacher. Teachers were required to teach at least one section of mathematics for that grade level and share at least one period of common planning with other group members. These conditions ensured opportunity for discussions.

The school had a weekly collaboration block (two consecutive periods) on Wednesdays of each week. Teachers were informed at the beginning of the year that weekly collaboration was expected and notes from those meetings were to be posted to the shared network drive for administrative review, if necessary. Prior to the start of this study, participants had met weekly (excluding school breaks) for approximately eight months. During these weekly collaborative sessions, teachers discussed a variety of topics related to instructional and operational issues. Discussions of data focused on unit pre- and post-test data, informal analysis of common formative assessments, and other assessment data such as the *SMI: Scholastic Math Inventory* (Houghton Mifflin Harcourt Publishing Company, 2016) administered twice during the school year. *SMI* is a computer-adaptive mathematics test that provides a readiness indicator related to predicted student performance on certain topics.

Before inviting participants to join the study, I presented aggregated student trend data during one of the morning mathematics department meetings to provide teachers with background information that they could then consider when determining if the goals of the study might help them in their professional growth and academic growth of their students. Although the procedures associated with the professional learning community were available to all three

teams of mathematics teachers, only the selected team was observed for data collection and analysis. Thus, purposeful sampling (Creswell, 2013) occurred due to the established parameters.

After the group of teachers was selected based on the criteria used for participation, written informed consent was collected from each participant. The informed consent (Appendix A) was approved by both the university and school district Institutional Review Boards. Standard language was included which informed participants that their participation was voluntary, they may withdraw from the study at any time without prejudice, information collected would remain confidential, and their identities would not be disclosed. Furthermore, participants were reminded of these details as a part of any interviews, observations, or surveys administered during the study. No student participants were included in the study.

To collect demographic information on the participants, an online survey (Appendix B) was administered using SurveyMonkey (SurveyMonkey, Inc., 2016). Survey results from all participants, including me as the researcher, revealed that the number of years of teaching experience for participants in this study ranged from three years to 26 years. Teachers were in the age ranges of 30 to 59. Three of the participants selected White/Caucasian as their ethnicity and two participants selected Black/African American as their ethnicity. Participants were also asked to identify their highest degree held. Two of the participants held Bachelor's degrees and three held Educational Specialist degrees. The participants also possessed other endorsements as reviewed in Table 2. This table does not include endorsements held by the researcher who served as both a participant and observer in the study. Since the number of endorsements held by the researcher is four and this number exceeds the total endorsements held by the group, the inclusion of this information might potentially distort the appearance of the number of endorsements among the PLC members, and thus my endorsements were not included.

Table 2

*Number of Educator Endorsements Earned by Participants*

Number Held by Participants	Educator Endorsement
0	Coaching
0	ESOL
1	Gifted
0	Educational Leadership
1	Reading
0	Teacher Leadership
0	Teacher Support & Coaching
1	TSS (Teacher Support Specialist)
0	Other (specify)

**Researcher's Role**

Prior to working at the site of this study, a non-Title I school, I worked at a Title I<sup>1</sup> school for over a decade. I witnessed that school experience many shifts in structure due to changes in personnel, local policy, and federal legislation. Despite changes through the years, the one change that I observed to have the greatest impact was when teachers became learners of their craft through the Data Team Process (White, 2010). Although not labeled as such during the time of implementation, these teachers were functioning within PLCs (DuFour, DuFour, Eaker, & Karhanek, 2004). White (2010) stated, “Regardless of its name – Data Team, child-study group, or Professional Learning Community – collaboration allows us [teachers] to magnify our

<sup>1</sup> The Title I program provides financial assistance through state and local education agencies to public schools with high numbers or percentages of children from low-income families to help ensure that all students receive a quality education and meet academic standards. (U.S. Department of Education, Office of Elementary and Secondary Education, 2002).

strengths and work with other teachers who provide different but equally important strengths” (p. 48). This process illuminated teachers’ voices and empowered them to justify their actions through the use of data-based decision making rather than solely relying on assumptions or biases which lacked credible evidence to be held as a consistent truth. After implementing data teams at the school, I witnessed teachers use this structure to improve student learning with a diverse population of learners. Likewise, I also witnessed teachers become passionate about sharing new ideas with their colleagues and noticed how everyone involved seemed to benefit from the experience despite their starting point in the process (e.g., early adopter, resistor, etc.).

During the use of the Data Team structure at the school, no data was collected on teacher perceptions, and any conclusions were simply based on what I experienced. However, anecdotally what was evident is that the school had three years of consecutive growth in student achievement that earned the school the distinction of being named of one of the state’s Department of Education Reward schools for high academic progress. Likewise, during year four, I also witnessed the removal of some of the foundational elements of teacher collaboration that ultimately eroded the effectiveness of PLCs. Of those elements, the decision to have all teams meet in one large shared meeting space as opposed to each PLC meeting separately had the greatest influence. In addition to the background noise created from all groups meeting in one location, this communal arrangement discouraged some of the less experienced PLC members to share their confusion related to certain topics for concern over how they might be perceived as a professional by their peers. Although the change in location of the meetings was done in an attempt to provide a model of the process to some of the PLCs in the beginning performance level, the change hindered some of the higher performing PLCs that had already established a norm of acceptance of one’s entry point in the conversation.

Hence, it was my desire to understand how participation in a PLC affects teacher practice and perceptions in addition to how data-focused PLCs contribute to student learning outcomes. Because I have previous experience with the topic of interest as a teacher, as a researcher, I viewed my experience as background knowledge and pilot that was not ignored, but embraced and referenced as the study progressed (Crotty, 2003; Stake, 1995; Yin, 2014). For this study, I served in two roles, both a participant and observer. Each role required me to delineate my purpose based on the task to be accomplished. Likewise, to provide clarity to the research and maintain a level of integrity, I disclosed my dual roles as a participant-observer as well as my background related to the topic. One of the characteristics of qualitative research is that it is subjective, but that does not mean it should contain blatant biases that distort the quality of the research (Stake, 2010). Qualitative research does not negate the human quality of reflecting upon our experiences as we collect and analyze information (Stake, 1995; Stake, 2010); however, we cannot allow those personal experiences to overshadow our ability to examine and address our biases in reporting results. Most importantly, transparency in reporting those biases (personal experiences) was made available to the readers of this study.

### **Data Collection**

Data collection techniques aimed to build a cohesive progression between the worldview and research design. Multiple sources of data were collected to provide a comprehensive description of the study and “maximize the quality of inquiry” (Yazan, 2015, p. 142). Observations, semi-structured interviews, and surveys that are often described as common methods of qualitative research (Creswell, 2013; Stake, 2010) were used as a part of this study. In addition to these three methods, this case study research also included additional methods of data collection related to the implications of creating and sustaining data-focused PLCs. Yin

(2014) asserted, “For case study research, the most important use of documents is to corroborate and augment evidence from other sources” (p. 107). Hence, data (e.g., notes from team meetings, individual interviews, photos with narrative descriptions, etc.) was strategically collected with the anticipation that it was to be viewed as a combined field of documents rather than single entries without cohesion. Although one of the benefits of qualitative research is the collection of multiple sources of data that provide a vivid and diverse description of the phenomena being studied (Yin, 2010), it also poses some challenges with adequately representing the facts instead of what was constructed and reported by the researchers. For this reason, careful planning was used to ensure that the data collected was appropriate and would hold up to scrutiny once triangulation of the data occurred (Yin, 2003).

Stake (1995) proclaimed, “There is no particular moment when data gathering begins” (p. 49). However, this research proceeded with parameters of “what will be collected” and “when” to ensure that appropriate evidence was collected to provide responses to the research questions. A matrix outlining a summary of the data collection instruments used appears below (Table 3).

Table 3

*Data Collection Matrix*

Data Source(s):	Data Provided:	Instrument:	Frequency:
Q1: How does participation in a data-focused professional learning community (PLC) affect teacher practice and perceptions?			
Focus Group Interview (audio recording & notes)	Changes, if any, in the frequency and type of instructional strategies used	Focus Group Protocol (Appendix D); AudioNote ♦	At the end of the study
Focus Group Interview	Participant perceptions of transfer of learning from PLC meeting into classroom practice	Focus Group Protocol (Appendix D); AudioNote ♦	At the end of the study



Focus Group Interview	Participant perceptions of what encourages them to use an instructional strategy learned from a colleague	Focus Group Protocol (Appendix D); AudioNote ♦	At the end of the study
Focus Group Interview	Identifying how teachers share ideas, results, and successful strategies with PLC members and other educators	Focus Group Interview Protocol (Appendix D); AudioNote ♦	At the end of study
Minutes/Notes of Collaborative Minutes	Evidence of data-focused conversations and collaborative inquiry around student progress monitoring	Data-Focused Interview PLC Observation Protocol (Appendix E); AudioNote ♦	Once for each collaborative meeting
Photos & Captions from Participant Instagram© posts	Participant perceptions of how use of data-focused PLC interactions affected their classroom practice	Photo Assignment Protocol (Appendix F); Instagram ❖	Frequency varied dependent upon participant use
Individual Interviews	Participant perception about participation in a data-focused PLC and changes, if any, in instructional practice	Individual Interview Script (Appendix G); AudioNote ♦ ; Instagram ❖	At the end of study
PLC Self-Assessment	Changes, if any, in proficiency of use in each of the five steps of the <i>Data Team Process</i>	Implementation Rubric: Data Team Steps (Appendix C)	Twice, pre- and post-study

Q2: How do data-focused PLCs contribute to student learning outcomes?

Minutes/Notes of Collaborative Meetings	Progress and monitoring of student learning outcomes through collaborative conversations	Data-Focused Interview PLC Observation Protocol (Appendix E); AudioNote ♦	Once for each collaborative meeting
Aggregated Student Performance Data	Percent and number of students at each performance level by teacher on the teacher-created unit pre- and post-	Data Collection Chart; Apperson DataLink Connect software ♣	Twice, pre- and post-test

	test		
Individual Interviews	Participant examples of student learning	Individual Interview Script (Appendix G); AudioNote♦; Instagram❖	At the end of study

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*Note:* Symbols used to represent repeated use of the same software within this table. Citations key is provided for each listed symbol. ♣ = Apperson DataLink Connect (Apperson, 2015); ♦ = AudioNote (Luminant Software, 2016); ❖ = Instagram (Instagram, LLC, 2016)

The data collection matrix served as a visual roadmap to ensure that adequate data was collected to answer each of the research questions. The visual was also helpful in considering if additional information-questions might be needed as a guide when capturing accurate and adequate data to answer the original research questions.

As items were collected, memos were written on generic sticky notes instead of waiting until the data analysis phase to do so. This process ensured that certain details were not forgotten prior to the analysis phases of the study. Data (paper and digital formats) collected during the study were stored in secure environments and will be destroyed within five years after the conclusion of the study.

**Artifacts.** Artifacts were collected to provide evidence of collaboration (Creswell, 2013). For example, each professional learning community was required to have a designated recorder to take notes during their meetings and these notes were be collected to synthesize the types of discussions and decisions made during collaborative planning sessions. Additionally, the Data Team Process Implementation Rubric (Appendix C) modified from *The Leadership and Learning Center* (2010), which was already a requirement for each professional learning team to complete and self-report, was used to determine if there was movement from one performance level to the next as participants developed as a collaborative unit. This self-assessment was

completed pre-study by the PLC participants as a group and was used as a measure of baseline implementation of characteristics associated with data-focused PLCs.

Another artifact collected provided insight into the characteristics of the participants. Although not included in the data matrix since it does not relate to a specific research question, a survey was administered to collect information about participant demographics such as number of years teaching experience, advanced degrees held, special certifications held, and so forth. The survey was five questions and was administered online using the SurveyMonkey (SurveyMonkey, Inc., 2016) website.

**Focus Group.** At the end of the data collection period, a focus group interview was conducted using a predetermined focus group protocol (Appendix D). With participant consent, this session was audio recorded so that transcripts of these sessions could be used, if needed, to verify the accuracy of information recorded. The aim of the focus group interview was to gather additional perception data from participants. Questions were designed to allow for semi-structured responses and opportunities for the interdependence of participants to share their collective thoughts and generate new ideas based on the comments of others within the group.

**Observations.** During the weekly planning sessions, I participated as a member of the PLC and observed details related to the collaborative structure and my reflections of the meeting structure using that observational data. To complete this task, I referenced an observation protocol (Appendix E). This protocol was created to identify specific areas where data-generated discussion might occur, the team's responsiveness to those conversations, and my initial thoughts. There were a total of five observations completed during the data collection period of this study.

**Photos.** To strengthen the case and frame the context of the data collected, participants were asked to share photos of elements of their instructional practice that they deemed as significant (Appendix F). This strategy is referred to as photo elicitation and was first introduced in the mid-1950s by John Collier (Harper, 2002; Shaw, 2013). Collier was a photographer and researcher who named and used this strategy as a member of a multi-disciplinary team to “examine mental health in changing communities in the Maritime Provinces in Canada” (Harper, 2002, p. 14). According to Harper (2002),

Photo elicitation is based on the simple idea of inserting a photograph into a research interview. The difference between interviews using images and text, and interviews using words alone lies in the ways we respond to these two forms of symbolic representation. This has a physical basis: the parts of the brain that process visual information are evolutionarily older than the parts that process verbal information. Thus images evoke deeper elements of human consciousness than do words; exchanges based on words alone utilize less of the brain’s capacity than do exchanges in which the brain is processing images as well as words. These may be some of the reasons the photo elicitation interview seems like not simply an interview process that elicits more information, but rather one that evokes a different kind of information. (p. 13)

To automate the process of collecting photos, a password protected, restrictive viewing, shared Instagram (Instagram, LLC, 2016) account was available to both me as the researcher and participants to capture photos and participant commentary. Thus, this method of collecting photos represented what Shaw (2013) describes as “auto-driven photo-elicitation, where the interviewee or research participant supplies the photographs, thus ‘driving’ the interview” (p. 787). Similarly, Justesen, Mikkelsen, and Gyimóthy (2014) summarized participant-driven-

photo-elicitation (PDPE) as “a visual research method in which participants are provided with a camera, are asked to provide a number of photographs in relation to a specific phenomenon and are subsequently interviewed” (p. 31). As part of the photo elicitation process, the photos were discussed during the individual interview phase to gather additional information about participant perceptions. Shaw (2013) stated, “The major advantage of auto-driven photo-elicitation is that the inclusion of photos contributes to full, data-rich interviews” (p. 787). Hence, the photos prompted participants about situations that occurred previously and enhanced the discussion used to glean understanding about the intended description and message of photos from the participant’s point of view. At the end of the study, five participants captured a total of nineteen photographs.

**Individual Interviews.** After the focus group, semi-structured interviews were conducted with each participant to gather additional information about individual participant perceptions based upon what Padgett, Smith, Derejko, Henwood, and Tiderington (2013) describe as photo elicitation interviewing (PEI). According to Padgett et al. (2013), PEI represents a research method based on the following principles: “(a) visual data to enhance and deepen (non-PEI) interviews, (b) participant control of the photography with minimal direction, (c) shared meaning making and reflection with the study interviewer, and (d) respect for privacy and sensitivity” (p. 1436). The interviews were semi-structured and took place approximately two weeks after the focus group. Interviews allowed participants an opportunity to share information not visible in the photos nor online in the participant commentary found on Instagram (Instagram, LLC, 2016).

### **Data Management**

To assist in the organization of data for analysis, a data management plan was created based on the type of data to be collected. According to Stake (1995), researchers should have a

data storage system. Although the general structure will be in place, the data storing system is meant to be organic and responsive to the needs of the study (Stake, 2010). Using this organic format respects the idea that every aspect cannot be predetermined since knowledge is consistently acquired and influencing outcomes. Two key components of my storage plan included a researcher's journal and Instagram (Instagram, LLC, 2016) as a method to collect photos and self-reflections from participants.

### **Data Analysis**

The data was obtained from multiple sources with varying formats and lengths. Thus, ATLAS.ti (Muhr, 2016), a computer assisted qualitative data analysis software (CAQDAS) was used to efficiently store, sort, and organize the data. Prior to importing the data into the software, several steps were performed to provide structure to the process. First, I created a one-page document that included my research questions and theoretical framework. This one-pager served as a visual reminder of the focus of the research and provided me with a lens to view the data. Next, as recommended by Saldaña (2016), I created a preliminary list of codes (Table 4) in an attempt to harmonize the data with the research questions and theoretical framework. Preliminary codes were created but not assigned to primary documents (observations, surveys, interviews, etc.) collected based on storage location, field notes, and other characteristics. Although there was no guarantee that the codes would be used in the coding process, it provided me with some codes to consider when getting started.

Table 4

#### *Provisional list of codes*

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Code Description

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Teacher practice

Teacher perceptions

Student learning

Teacher collaboration

Time management

Application of knowledge

Sharing vulnerabilities

Memoing was completed as data was received (Stake, 1995), and this was an informal process relying on generic sticky notes to capture details that might be used in the later stages of coding. ATLAS.ti (Muhr, 2016) was used to store documents in a digital format and assist with memoing, coding, and developing themes (Saldaña, 2016).

After these preliminary steps, I then reviewed and coded the primary documents (e.g., PLC focus group audio files, Instagram (Instagram, LLC, 2016) captions and photos, PLC observations, etc.) in ATLAS.ti (Muhr, 2016). Once all primary documents received initial codes using an *open coding* technique, I used the Code Manager within ATLAS.ti (Muhr, 2016) to determine the frequency of code use. Codes with high frequency were revisited to determine if second cycle coding was necessary to further strengthen the relationship between the code and the primary document. At the conclusion of the coding process, 137 quotations were derived from 72 codes and 57 memos. This information was then categorized into two groups: teacher-oriented and student-oriented. From these two categories, three major themes appeared. Two of the themes provided insight into how participation in a data-focused PLC affected teacher practice and perception, and the third theme aligned with how data-focused PLCs contributed to student learning outcomes (Appendix H).

### **Limitations of the Study**

This study was conducted based on the following limitations:

1. The researcher cannot guarantee that the opinions or views represented by participants reflected their honest opinions at the time of submission.
2. The researcher served in the role of a participant observer. Recognition of biases were acknowledged and the researcher analyzed information as objectively as possible.
3. The data collection period for this study coincided with a one-week Spring Break and a five-day state mandated standardized testing window. Both events provided breaks in instruction and the school schedule. This might have potentially hindered the momentum of the participants in the study.

### **Strategies to Ensure Trustworthiness**

In designing and implementing this study, strategies to ensure trustworthiness for qualitative measures were used. Shenton's (2004) explanation of Guba's constructs reflects four criteria to determine if trustworthiness exists: credibility, transferability, dependability, and confirmability. Based on these four criteria, I developed and implemented strategies in my study to ensure trustworthiness.



**Credibility.** To ensure that I adopt well-established research methods that have been used previously, I referred to data collection instruments used in previous studies (e.g., Bitterman, 2010; Hatten, Forin, & Adams, 2013; Jedlicka, K, 2014; Morrow, 2010; Pratt, 2014; Reese, 2013) or implemented instruments (e.g., Coos Bay School District, n.d.) and consulted the work of reputable authors (e.g., DuFour, DuFour, Eaker, & Many, 2010; Graham & Ferriter, 2010; Strahan, 2013) for potential items to include in my data collection instrument.

As a teacher, I actively participated as a member of the learning community to develop an early familiarity with the norms and procedures of the group.

Multiple sources of data were collected to provide opportunities for triangulation of data. The multiple sources of data collected improved the confidence of the findings during the triangulation process since it was not reliant on a few or limited pieces of information (Stake, 2010).

As appropriate, I shared my thinking with peers to probe for constructive feedback and challenge of assumptions and misconceptions. Prior to the data collection and analysis phases, I communicated with members of my dissertation committee to maintain a growth-oriented approach to my study. I relied on them to ask me reflective questions and ensure that I adhered to written guidelines and unwritten protocols. Likewise, I used reflective commentary to challenge my initial thoughts.

**Transferability.** To give other researchers who may consider implementing a similar study sufficient background knowledge, I will share a thick description of the phenomena under investigation in Chapter Four. Geertz (1973) explained, “thick description” provides outside observers with contextual information to sort information into a “meaningful frame” (p. 30). I

provided a detailed description of the data collection environment since transferability may also mean same methods, different environment.

**Dependability.** To ensure dependability, I consulted empirical studies (e.g., Bolam et al, 2005; Grossman, Wineberg, & Woolworth, 2000; Horn & Little, 2010; Newmann & Wehlage, 1995; Strahan, 2003) related to PLCs in school environments as references. I provided a thorough description of the research design, implementation factors, and data gathering procedures and requested scrutiny of these items.

**Confirmability.** I relied on artifacts and evidence provided by participants to support my conclusions. A data collection matrix outlining the data to be collected to answer each research question was developed to provide transparency of the research steps. Likewise, I relied on existing instruments or adapted versions to provide consistency with previous research in this area of study or on this topic.

### **Ethical Considerations**

I have met the requirements for the Collaborative Institutional Training Initiative (CITI Program) certification. This research involved human subjects, and there were no known risks to participants. Additionally, I followed Lichtman's (2014) ethics guidelines and designed an agreement that consisted of nine non-negotiable items to guide my work as a researcher.

1. The use of human subjects in a research study will not cause harm or potential bodily injury to the participants in the study.
2. Participants will be notified of any non-life threatening potential risks that are a normal part of the study prior to consenting to participate in the study.
3. Human subjects or their legal guardian, if a minor, must consent to participation in the study.

4. Human subjects may withdraw from the study at any time without prejudice.
5. Participant information will remain confidential and the information shared during the study will remain confidential. Participant initials will be used as pseudonyms in all reports of the data to protect participant identities.
6. As a researcher, I will respect participants and not seek to extract information that is not directly related to the study.
7. Researcher and participant relationships will remain professional at all times. Participants will always be treated with dignity and respect.
8. Participants who demonstrate inappropriate behavior or behavior that threatens the integrity of the data will be excluded from the study.
9. Data collected during the study will provide evidence of the researcher's findings. Thus, data will not be misrepresented nor contain blatant inaccuracies.

The final results of the study will be shared on an open-source database for research studies such as Digital Commons after final approval.

### **Conclusion**

This chapter provided an overview of the rationale for the selected research paradigm and methods of data collection. The chapter identified data sources and the procedures for collecting, storing, and analyzing data. This section concluded with information related to ethical practices for this study.

## **Chapter Four: Findings**

The purpose of this study was to determine how a group of middle school teachers who were members of a professional learning community (PLC) and used data to guide their work altered their classroom practice and perceptions. The following research questions were used to frame this study:

1. How does participation in a data-focused professional learning community (PLC) affect teacher practice and perceptions?
2. How do data-focused PLCs contribute to student learning outcomes?

To thoroughly investigate these research questions, qualitative methodology was used to examine this case study. This approach allowed me to collect multiple sources of data with the intent to develop a comprehensive description of this case and participant perceptions.

Chapter Four provides descriptions of the data collected and an overview of a typical PLC meeting. This chapter also reports the findings through a discussion of the themes identified from the data. This chapter concludes with a summary of the findings.

### **Data Descriptions**

A variety of data was collected and analyzed to support this research. Primary data collected included participant demographic surveys, data team process self-assessment rubrics (pre- and post-study), audio recording and field notes from a focus group interview, audio recordings and field notes from individual participant interviews, audio recordings and observation notes from PLC meetings, participant Instagram (Instagram, LLC, 2016) posts (photos and captions), and aggregated unit assessment data (pre- and post-tests).

**PLC Meeting Overview**

The school structure required PLCs to meet once weekly. At the beginning of the school year, each team selected the day and time of their PLC content collaborative planning based on a consensus of the team. The decision to allow each PLC to select their own meeting day and time was done in an effort to accommodate teachers who taught multiple grade levels or subjects. By requiring all PLCs to meet on a certain day of the week and at a certain time during planning periods, some teachers may not have had the opportunity to attend more than one content collaborative planning session if they taught multiple content areas or subject areas. After taking this into consideration, the PLC for this study selected Wednesday of each week as their meeting day.

The bell schedule for the school provided sixth-grade teachers with a planning period from 2:30 – 4:15 p.m. (see Figure 2) each day, except for times when the school bell schedule was altered due to events such as Conference Week when students were dismissed two hours early.

6 <sup>th</sup> Grade		7 <sup>th</sup> Grade		8 <sup>th</sup> Grade	
HR	8:50 – 9:15	HR	8:50 – 9:15	HR	8:50 – 9:15
1 <sup>st</sup>	9:20 – 10:10	1 <sup>st</sup>	9:15 – 10:05	1 <sup>st</sup> Connections	9:20 – 10:10
2 <sup>nd</sup>	10:15 – 11:40 Lunch	2 <sup>nd</sup>	10:10 – 11:00	2 <sup>nd</sup> Connections	10:15 – 11:05
3 <sup>rd</sup>	11:45 – 12:35	3 <sup>rd</sup>	11:05 – 12:30 Lunch	3 <sup>rd</sup>	11:10 – 12:35 Lunch
4 <sup>th</sup>	12:40 – 1:30	4 <sup>th</sup> Connections	12:35 – 1:25	4 <sup>th</sup>	12:40 – 1:30
5 <sup>th</sup>	1:35 – 2:25	5 <sup>th</sup> Connections	1:30 – 2:20	5 <sup>th</sup>	1:35 – 2:25
6 <sup>th</sup> Connections	2:30 – 3:20	6 <sup>th</sup>	2:25 – 3:15	6 <sup>th</sup>	2:30 – 3:20
7 <sup>th</sup> Connections	3:25 – 4:15	7 <sup>th</sup>	3:20 – 4:15	7 <sup>th</sup>	3:25 – 4:15

Figure 2: School Bell Schedule

As a part of the agreed upon group norms (personal communication, July 31, 2016) that the PLC selected at the beginning the school year (Table 5), the team agreed to start the meetings at 3:00 p.m. on Wednesdays. Since one of the team members taught an accelerated pace course and as the researcher, I taught multiple grade levels and could not join the group until the beginning of seventh period, the PLC agreed that the two teachers present at the 3:00 p.m. meeting start time would begin by creating a draft version of the lesson plans for the following week and deciding which handouts to submit for photocopying for the entire group. Beginning with those tasks allowed the majority of the instructional and data-focused discussion to take place once all members were present.

Similar to the research conducted by Little (1982), participants in this study relied on norms to define their working relationship. By establishing norms, the team created expectations for working and learning together. According to Richardson (1999), “Any group that meets regularly or that is trying to ‘do business’ needs to identify its existing norms or develop new norms” (p. 1). These norms were evident throughout the group’s interactions and helped to provide structure to the collaboration process.

Table 5

*PLC Norms*

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Description

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- Start and end on time. We will meet in room 610 on Wednesday afternoons at 3 p.m. (DT will join once her 6<sup>th</sup> period class ends)
- Agendas for the meetings will be sent out on Tuesday so all participants will come prepared with materials and ideas.
- All participants will remain actively involved in the conversation in order to make a knowledgeable decision.
- After open discussion, a decision will be reached by consensus.

- We will encourage active participation by having one PLC member be the Airtime Checker (keeps us all on the conversation at hand; draws in those that are not contributing)
- Everyone will have different responsibilities for looking at resources in order to encourage participation and strong decision making.

The PLC meetings were held in the classroom of the PLC facilitator. This classroom was located in one of the exterior classrooms on the back side of the building. Once all members were present, the team worked within a structure where each team member had a specific role and set of responsibilities (personal communication, July 31, 2016) (Table 6). PLC roles were based on some of the recommended Data Team roles by Besser, Flach, and Gregg (2010). Members volunteered for roles based on their interests and if they thought they would be a good fit to meet the responsibilities of a particular role. I served as the Data Technician for the group. I volunteered for this role since I was experienced in using Excel to create spreadsheets and graphs.

The PLC facilitator was responsible for leading the group through the agenda items and her approach often set the tone of each meeting. For example, if the agenda was rather lengthy, she would remind us at the beginning of the meeting and kept us on target by moving at an appropriate pace from one topic to the next. The facilitator was able to efficiently lead the discussions by projecting various items on to the board using a laptop and a document camera that was hooked up to an overhead LCD projector. The facilitator was also able to switch between screens such as the agenda, student work, data charts, and so forth based on the topic of discussion by the team.

Table 6

*PLC Member Roles and Responsibilities*

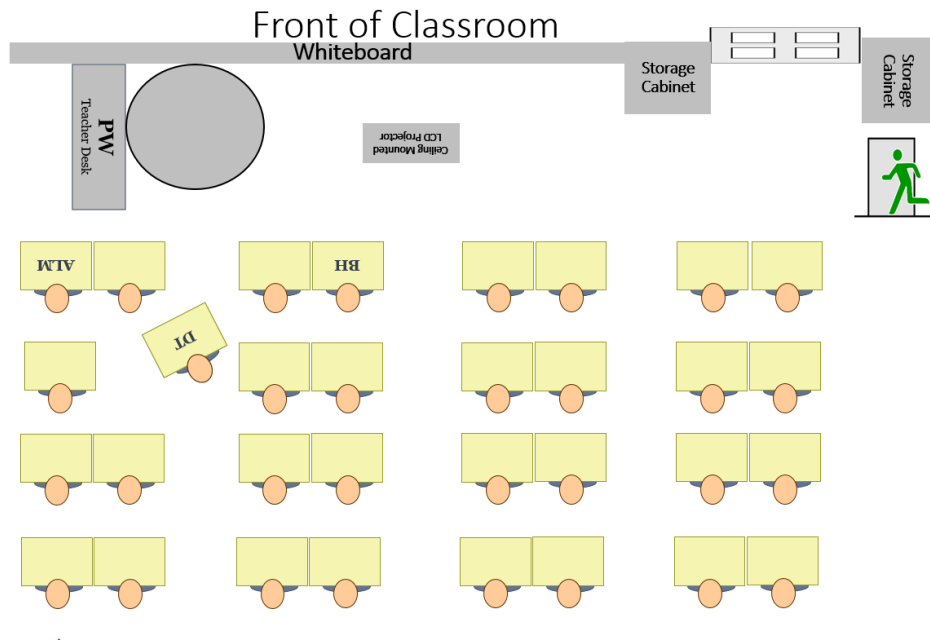
Role	Responsibilities
Facilitator	<ul style="list-style-type: none"> <li>• Develop the agenda and distribute to everyone prior to meeting</li> <li>• Facilitate the meeting</li> <li>• Keep the team focused on the agenda</li> <li>• Ensures that all members' voices are heard and that no one voice dominates the conversation.</li> </ul>
Recorder	<ul style="list-style-type: none"> <li>• Takes minutes/notes at meetings.</li> <li>• Saves minutes/notes to t:// drive<sup>2</sup></li> </ul>
Airtime Checker	<ul style="list-style-type: none"> <li>• Encourages active participation.</li> <li>• Keeps us on the conversation at hand.</li> <li>• Draws in those that are not contributing.</li> </ul>
Data Technician	<ul style="list-style-type: none"> <li>• Collects data from each team member</li> <li>• Prepares report to view grade level results for the pre- and post-assessments.</li> </ul>
Timekeeper	<ul style="list-style-type: none"> <li>• Monitors time</li> <li>• Table topics for discussion, when appropriate</li> </ul>

Since the PLC facilitator sat at her teacher desk near the front of the classroom so that she could have access to the audiovisual equipment connections, the other PLC members sat in student desks near the front of the classroom in various arrangements based on how the facilitator had her current student seating charts (see Figure 3). The team would often relocate desks to best accommodate their laptops, reference books, and other materials. No PLC member sat beyond the second row of student desks from the front of the classroom. Thus, the seating arrangement was flexible and allowed members to work in close proximity to each other and interact frequently during the meetings. The seating arrangement also allowed any member who might be late to a meeting to join the group with minimal interruptions once the meeting was already in progress. For example, in the sample seating arrangement example provided, this

<sup>2</sup> The t://drive is a shared network drive that is accessible to all school staff.



would have been the case for the member not in attendance when I created the sketch of the seating arrangement of PLC members.



*Figure 3: Sample Seating Arrangement of Attending Participants at PLC Meeting*

When the team came together to meet, there was always an agenda of certain topics to discuss. Before the PLC meeting, the facilitator would usually ask the other team members if there were any items that we would like to add to the agenda at the next team meeting. She would make this request either via email or by asking us as we saw each other in the hallway, mailroom, or other location. Agenda items would also include those items requested by administration to be included on the agenda. Since the agenda for the meetings varied from week to week, the team did not assign specific timeframes for each discussion item and allowed the conversations to develop organically. This organic development was also noted in the team's approach to implementing the five steps of the data team process. The team did not specifically label and identify each step in the process, but the conversations remained focused on looking at student data and discussing next steps. These next steps would typically look like rewording an

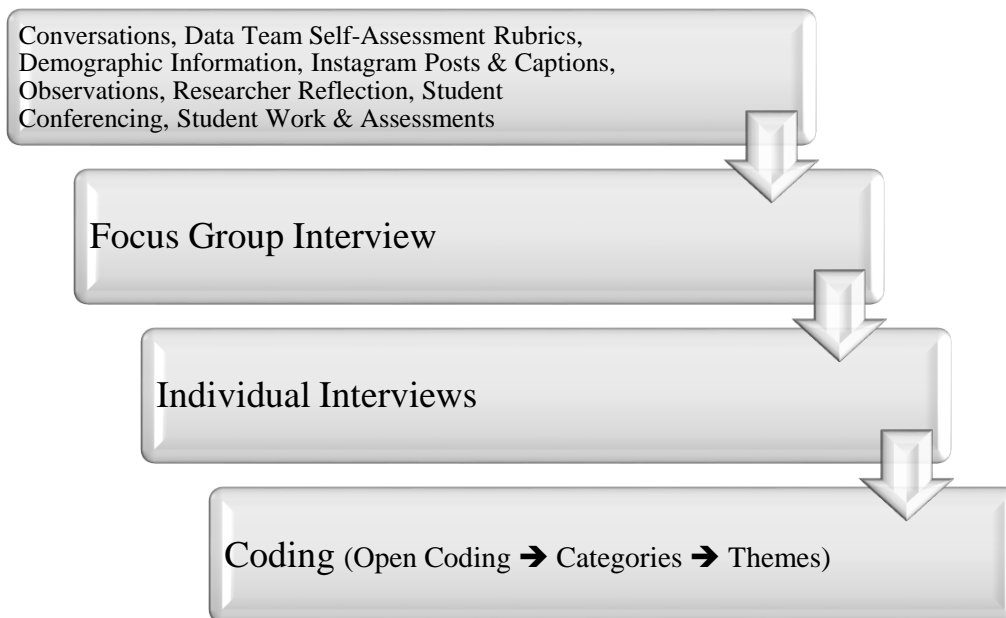
assessment question to make it easier for students to understand, modeling and choosing between different instructional strategies to teach a concept, or jointly developing a remediation strategy for students who were not proficient on either a formative or summative assessment. Although these working structures were already in existence prior to the study, the structures were also evident during the data collection period for the study.

Of the five steps, the one that provided the most challenge for the PLC to implement with fidelity was the creation of S.M.A.R.T. goals. The team would often set a goal about the percent of students they would like to see proficient by the end of a unit, but did not use the typical wording often seen in reference materials related to the topic (O'Neill & Conzemius, 2006). However, as a whole, the team had not received training on the language of S.M.A.R.T. goal creation and was clearly unaware of this as evidenced by the Data Team Implementation rubric pre-assessment. On that step in the rubric, the team wrote a response that read, "What is a smart goal?"

Once the PLC meetings were in session, all team members engaged in the conversation during some point in the meeting. This was most likely as a result of the PLC only including five members and the setting was contained within a close space. To aid in the discussion, team members might have opted to bring manipulatives or an actual strategy to model for the team. For example, one review idea involved a game called, "Quiz, Quiz, Trade." Although the other members had clearly used this strategy before, I was unaware of the strategy and benefited from seeing another PLC member model the strategy along with sharing management techniques for using the strategy as well and verbalizing possible student misconceptions. Participants maintained this level of interaction until the meeting was normally adjourned around 4:15 p.m., which was the school day dismissal time.

### Identified Themes

Multiple sources of data were collected and, when analyzed (Figure 4), revealed patterns that appeared more frequently. During the earlier phase, the data exposed what was actually taking place and only through personal communication was limited information available related to participant perceptions. However, once the focus group interview and individual interviews were conducted, this data offered additional insight into those patterns that resurfaced in various formats. These patterns of information were most visible after listening to audio recordings of individual interviews, the focus group interview, and PLC meetings; analyzing participant posts in Instagram (Instagram, LLC, 2016); examining field notes from PLC meeting observations; analyzing student work; and reviewing participant pre- and post-self-assessments on the Data Team Implementation Rubrics.



*Figure 4:* Progression from Data Sources to Themes

Another view of the development of themes relied on using ATLAS.ti (Muhr, 2016) to analyze the network created from a single primary document (Figure 5). For example, the Focus

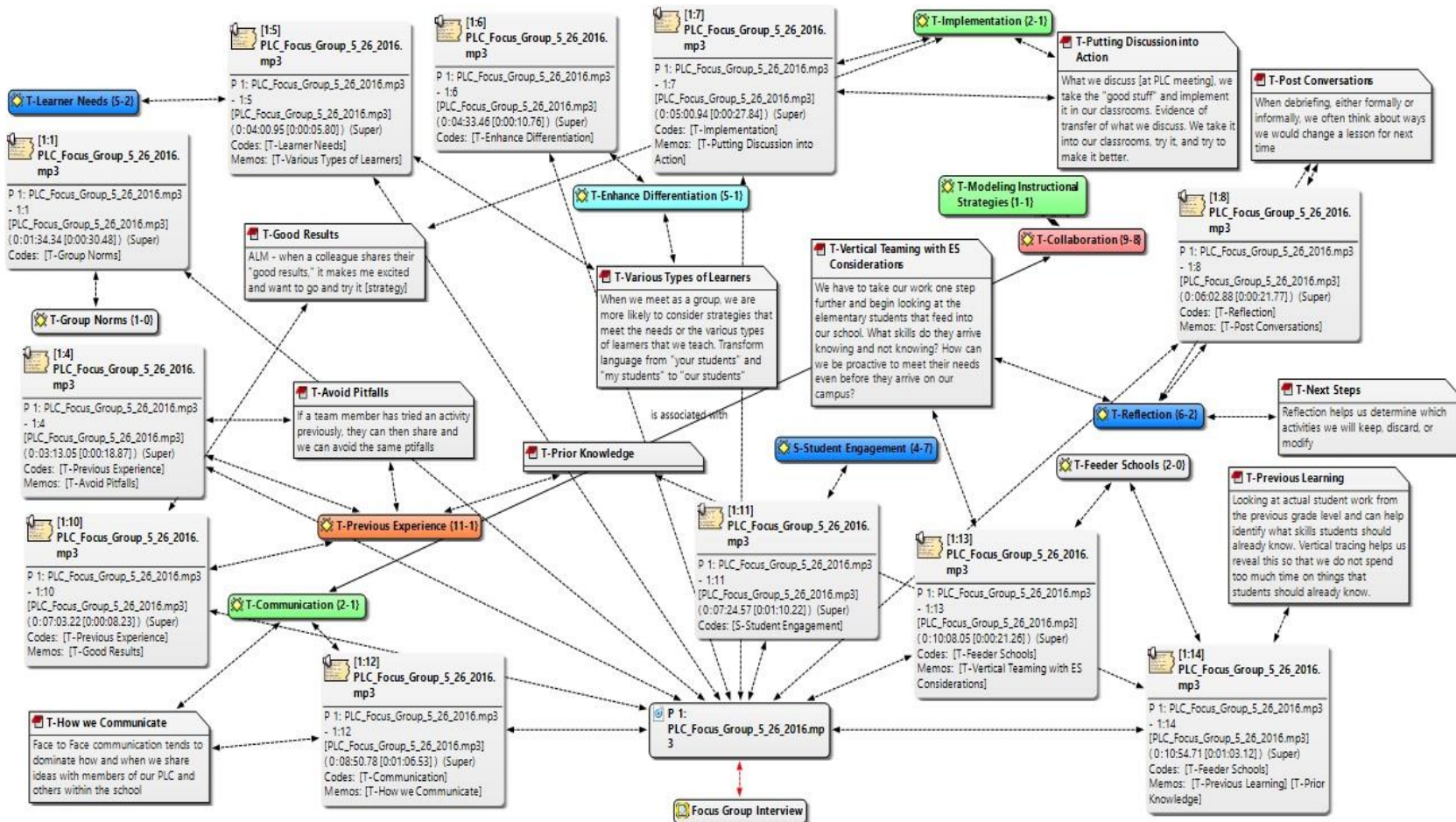


Figure 5: Focus Group Interview Primary Document Network

Group Interview allowed participants to share their personal and collective thoughts. As such, the relationship between the audio recording and the codes and memos generated supported the development of themes constructed after multiple primary documents were analyzed and mapped using ATLAS.ti (Muhr, 2016).

Triangulation of the data (Stake, 2010; Yin, 2003) provided confidence in the reported findings since more than one data source was used to develop the themes. Reviewing comments from participants was essential in uncovering their actual thoughts and perceptions as opposed to what I may have initially thought after viewing my field notes. As illustrated in Figure 5, the network of codes, memos, and quotations generated from a single primary document demonstrates the complexity and depth of relations with pattern frequency evident in the numbers that appear in parenthesis next to the code title. The codes are identified based on the color bars presented in the diagram. For purposes of this study, the color pink was used to indicate an overarching theme<sup>3</sup> within a network. The green color indicates a code that was linked directly to the theme without subcodes. The dark blue color indicates a code that linked directly to the theme and it also contains subcodes. Finally, the light blue and orange colors indicates subcodes. The light blue color indicates the number of quotations linked to the code is less than ten and the orange color indicates the number of quotations linked to the code at ten or greater.

Comprehensive analysis of data collected in this study revealed three main themes from those patterns and are listed below.

Theme #1: Embracing Collaboration

Theme #2: Reflecting into Planning

Theme #3: Evidence of Student Learning

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<sup>3</sup> Theme is synonymous with Super Code in ATLAS.ti (Muhr, 2016).

### Theme #1: Embracing Collaboration

Participants in this study shared a variety of comments throughout this process. Although a total of three themes emerged from analysis of the data, embracing collaboration will be discussed first since this theme represents a link to the other two themes. Reflection from participants (personal communication, May 26, 2016; personal communication, May 31, 2016; personal communication, June 1, 2016) revealed how the interdependence of their experiences provided insights and opportunities that might not have otherwise existed without collaboration. Within this theme, the data contained 14 memos along with 17 codes and 38 quotations. This data was analyzed to support my findings. Table 7 represents examples of comments shared by participants during the focus group and individual interviews. These comments implied that collaboration enabled participants to recognize the value of working within a group, rather than working alone.

Table 7

#### *Examples of Participant Comments within the “Embracing Collaboration” Theme*

Participant	Response
BH	If a team member has tried an activity previously, they can then share and we can avoid the same pitfalls. (Focus Group, 16:33)
ALM	I think I’m very fortunate to be a part of a very strong PLC. [I] feel like we work well together. We value other members’ opinions. We use other’s opinions. I think this has been interesting to post our pictures and stuff. Now I’m an Instagram account person. (ALM Interview, 529-617)
SR	When we meet as a group, we are more likely to consider strategies that meet the needs of the various types of learners that we teach. Transform language from “your students” and “my students” to “our students.” (Focus Group, 4:00)
ALM	When a colleague shares their “good results,” it makes me excited and what to go try it [strategy]. (Focus Group, 7:03)
PW	I just think that we’ve grown professionally quite a bit and I feel like we all have

our focus on what's best for students all the way around. (PLC Focus Group Cont, 18:23)

Boudett, City, & Murnane (2013) contend, "Collaboration ensures that teachers share a common language when addressing learner-centered problems. If teachers are inconsistent in their identification of the problem, this will lead PLCs to be inconsistent in their response since they are essentially addressing different problems" (p. 103). During PLC meetings, teachers often shared student work and brainstormed ideas related to overcoming barriers to learning for a particular student or group of students. When trying to address these obstacles, the team especially appreciated hearing from one team member. This team member taught an advanced content course with an accelerated pace and therefore she remained ahead in the curriculum and provided details about "what worked" and "what did not work" for student learning. In the initial stages, this represented mostly one-way communication. As the PLC members began to embrace collaboration, others in the group began to share not only their successes related to helping on-target and underperforming learners, but they also shared their struggles as well. In turn, PLC members began to rely on each other to help them "avoid pitfalls" as described by one team member (Focus Group, 3:13).

These findings are consistent with a primary characteristic related to Data Teams. Nielsen and Pitchford (2010) assert,

Working in Data Teams structure requires teachers to share practices and strategies that work, to identify those that do not, to dig deeper into root cause of the results they are seeing, to explore the contextual framework of the practices,...find the best fit for their next steps. (p. 180)

Although participants did not verbalize their experience as job-embedded professional learning, the learning among colleagues by participating in a PLC was evident in their practice, reflective statements, and general comments toward their participation in the study. Morrissey (2000), stated,

In developing professional learning communities, SEDL has noted that change *requires* learning, based on the understanding that one cannot make improvement unless one knows *how* to improve. More simply stated, “you don’t know what you don’t know.” In order for school staff to appreciate and value the changes needed for improving teaching and learning, not only must there be clear reasons for making the changes but also staff must be given a road map of sorts. (pp. 23-24)

In other words, collaboration provided opportunities for solution-focused dialogue that fostered teacher professional growth. The school was purposeful in promoting these interactions by providing a schedule that allowed for weekly collaboration and requiring common summative assessments across PLCs. Bocala and Boudett (2015) affirmed, “Authentic school-based experiences support educators in learning about data literacy for teaching” (p. 3). Instead of resting on complacency, schools focused on improvement and understand that meaningful contexts help educators see the relevance of *their* learning. As participant PW stated, “I just think that we’ve grown professionally quite a bit and I feel like we all have our focus on what’s best for students all the way around” (PLC Focus Group Cont, 18:23). In other words, these interactions represented an “interweaving of teacher learning and professional community” (Grossman, Wineburg, Woolworth, 2000, p. 10). Morrissey (2000) concluded,

When one works alone, the individual learner (plus a book, article, or video) is the sole source of the new information and ideas. When new ideas are processed in interaction



with others, multiple sources of knowledge and expertise expand and test the new concept as part of the learning experience. The professional learning community provides a setting that is richer and more stimulating. (p. 4)

While working in isolation, these gains in professional knowledge still may have been attained but quite possibly over a longer period of time. Collaboration accelerates teacher learning because teachers become active participants rather than sole practitioners who lack colleagues to support their assumptions, challenge their misconceptions, or use questioning as a tool of inquiry. Consequently, “Isolation is the enemy of improvement” (Schmoker, 2005, p. 141). Lack of collaborative inquiry can often repress the effectiveness of the team by limiting the opportunities for rich discussions.

This approach tended to strengthen the PLC’s commitment toward student growth since the data was authentic and personally relevant to the participants. As summarized by Vescio, Ross, and Adams (2008), the most effective PLCs were those characterized by “collaboration with a clear and persistent focus on data about student learning” (p. 89). As a result of collaborative problem solving, the group enhanced their professional knowledge once the question types shifted from simple questions to more complex questions that required participants to pause, reflect, and realize that not all questions may have answers at that given moment. Boudett, City, and Murnane (2013) suggested, “The real value in looking at this kind of data is not that it provides answers, but that it inspires questions” (p. 84). Similarly, Woodland and Mazur (2015) suggested, “PLCs engage teachers in critical questions that exist for educators” (p. 9).

Additionally, examination of the “Embracing Collaboration” code to code network (Figure 6) in ATLAS.ti (Muhr, 2016) exposed a variety of topics that were reviewed during

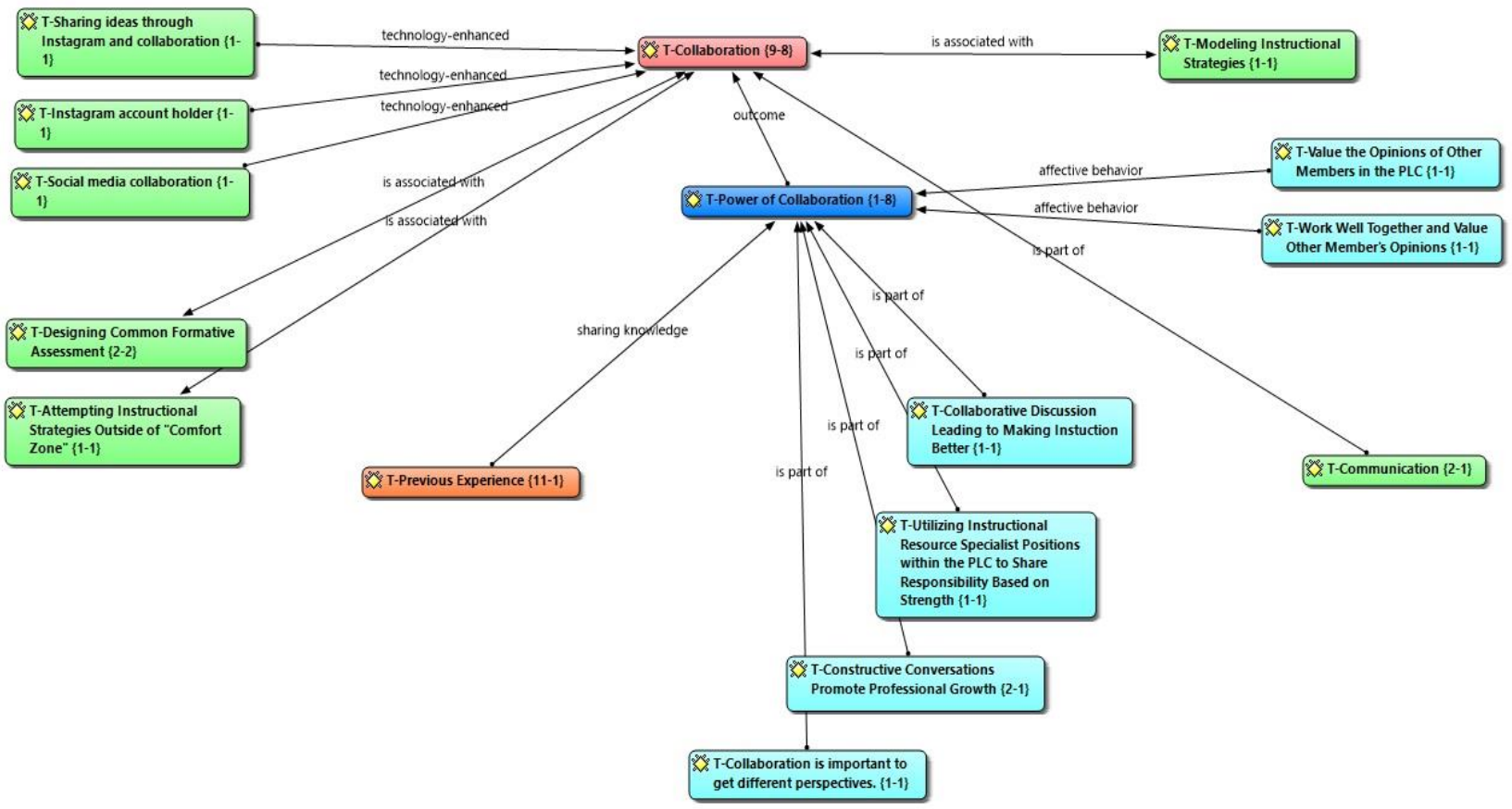


Figure 6: “Embracing Collaboration” code to code network.

collaborative planning sessions which led to the emergence of patterns in the data. These topics were mixed and often stemmed from the questions posed by members of the PLC after reviewing student data instead of resulting from a generic set of question parameters.

For example, during a collaborative planning session, one of the team members recommended eliminating the pre-test on a recent unit since she had previously taught the unit and students performed poorly on the pre-test due to lack of prior knowledge about the topics (PLC Focus Group Cont, 8:06). To strengthen this argument, the participant went on to share that one student wrote on her pre-test, “This is a waste of paper” (PLC Focus Group Cont, 9:38). The group then had a conversation based on alternatives such as how might an Almost There Assessment be used in lieu of a pre-test to still capture data, but possibly more meaningful data (PLC Focus Group Cont, 10:20). However, the group ultimately decided on an alternative not previously considered. The idea was to continue to give a pre-test as a measure to assist with guiding instruction, but also use a formative assessment after each topic or group of standards to assess student understanding (PLC Focus Group Cont, 12:38). Interestingly, this reflective conversation stemmed from a question posed to the group (PLC Focus Group Cont, 6:16) rather than not engaging in the conversation and reminding the group that pre-tests are required to be given by all contents areas at the school. The Data Team engaged in a reflective conversation and used communication to reach a viable solution. Hence, communication is a part of collaboration as evidenced in the code to code network in Figure 6.

Similar to this example, participants were not reluctant to share their previous experience related to teaching a certain concept. By sharing their personal stories related to instruction, Data Team members were more likely to try a given strategy since it could be validated by someone they knew. For example, participant ALM shared, “When a colleague shares their good results, it

makes me excited and want to go and try it [strategy]” (Focus Group, 7:03). In turn, sharing experiences and knowledge among Data Team members attributed to the “Power of Collaboration” code in Figure 6. Consistent with the overarching theme presented in the code network, the power of collaboration is an outcome of effective collaboration and sharing of ideas, information, and talents of Data Team members.

Additionally, teachers were able to share information through different formats. While traditional face-to-face communication tended to dominate the majority of collaboration time and sharing of ideas (Focus Group, 8:50), participants also used Instagram (Instagram, LLC, 2016) as a tool to collaborate and share instructional strategies. Since most Data Team members typically teach at the same time, this often presents a challenge to observe each other delivering instruction or observing student reaction to instruction. Thus, posting photos and captions on Instagram (Instagram, LLC, 2016) provided flexibility to collaborate in a non-traditional, but emerging online tool.

In analyzing the code-to-code network, participant responses, memos, and other related data, collaboration was consistently demonstrated by participants. Participants were engaged in the process of learning and sharing from each other. Their actions concluded that their planning sessions represented more than mere meetings, but a sustained focus on collaboration leading to improvements in their professional growth with end results also benefiting students. According to Fullan (2016), “...collaborative cultures focusing on instructional practice are a crucial part of implementing Learning Forward’s Implementation standard” (p. 48). In other words, it is one thing to have a conversation, think of a plan, and talk about intended actions, but execution and delivery yields results.

**Theme #2: Reflecting into Planning**

An additional recurring theme developed based on data discussions of PLC participants studying student performance, reflecting on their practices, and then planning how they would adjust those practices. The data for this theme concluded with 30 memos along with 16 codes and 42 quotations. This theme was developed after I analyzed the network formed when the code-to-code relations were identified. Figure 7 illustrates this network mapping and how each code represents a part of the overarching theme.

Altogether, this network (see Figure 7) broadened my understanding of how teachers used reflection as a starting point when developing next steps or what some might refer to as a plan for improvement. Study participants made numerous connections about student learning and how instruction could be enhanced to promote greater student achievement.

When examining the data, a series of codes related to student work and outcomes was noticeable. Within the “Reflecting into Planning” code-to-code network, five codes demonstrated student outcomes that could be partially attributed to some detail that was altered by Data Team members after planning conversations. The relation of the codes in this network also revealed how data was used by team members to inform decisions. I also noticed how reflection continued to resurface and how reflective practices translated into sharing of best practices among the team. As ALM stated, “What we discuss [at PLC meeting], we take the “good stuff” and implement it in our classroom. [This is] evidence of transfer of what we discuss. We take it into our classrooms, try it, and try to make it better” (Focus Group, 5:00). Thus, as I analyzed the codes, the process of “reflecting into planning” was obvious.

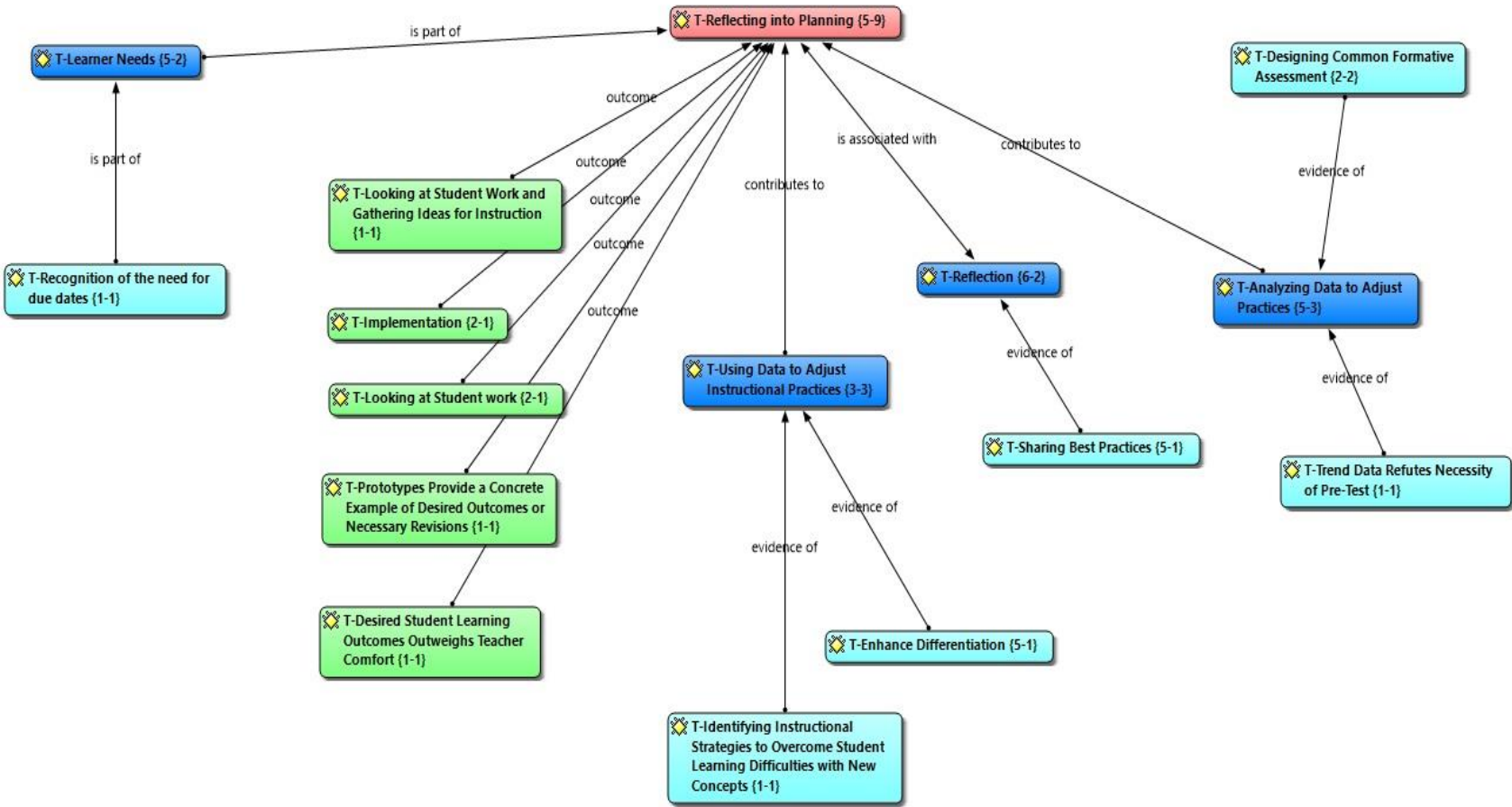


Figure 7: “Reflecting into Planning” code-to-code network.

This inquiry technique identified as “Reflecting into Planning” gained its recognition through a series of steps collectively labeled as Cognitive Coaching (Costa & Garmston, 2002).

Costa and Garmston (2002) defined Cognitive Coaching as the following:

Cognitive Coaching is a nonjudgmental, developmental, reflective model derived from a blend of psychological orientations of cognitive theorists and the interpersonal bonding of humanists. The model is informed by the current work of brain research, constructivist learning theory, and practices that best promote learning. (p. 5).

Moreover, Cognitive Coaching “strengthens professional performance by enhancing one’s ability to examine familiar patterns of practice and reconsider underlying assumptions that guide and direct action” (Costa & Garmston, 2002, p. 5). Furthermore, Costa and Garmston (2002) acknowledged that the system is “systemic, rigorous, and data-based” (p. 5). These characteristics mirror the underlying routines and interactions of the PLC members despite the fact that this process is typically referenced when an individual is coached. The PLC participants informally engaged in the process and used their individual experiences to construct meaning of their situations and forecast next steps. This was a development that I had not anticipated when brainstorming provisional codes; however, the outcome represented a compelling illustration of how participation in a PLC led to changes in teacher practice.

Additionally, examining student work samples provided another glimpse into how reflection anchored teacher practice. Although not formally trained on “Looking at Student Work” protocols (Blythe, Allen, & Powell, 2008), participants repeatedly shared student work samples and discussed what the work samples revealed about student comprehension and misconceptions. In turn, these conversations often led participants to discuss how instruction

might be modified to attain higher student performance results. Although some of the instructional adjustments recommended by participants were within an immediate time frame of a couple of weeks, it was not uncommon for the PLC members to also discuss how a particular concept could be taught differently for the next school year.

Moreover, the conversation of “Reflecting into Planning” not only dealt with face-to-face instruction but also assessments used as tools to measure student learning and instructional effectiveness. During at least two of the PLC meetings held during the data collection period of this study, common formative assessments were reviewed by the PLC and revised based on recommendations from team members. Jacobson (2010) notes, “Common formative assessments create opportunities to improve assessment design skills, analyze results across classrooms, and collaborate on how to adjust instruction accordingly” (p. 39). Rather, Data Team members were not bystanders in the process, but hands-on participants who learned by doing instead of relying on the work of one person to sustain the group.

Additionally, PLC members used assessments as targets for what students should know, understand, and be able to do to demonstrate proficiency by the end of a unit. Having the assessment at the beginning of the unit enabled participants to “rethink” how unit tasks might be modified to better prepare students for the summative assessment. For example, one member shared in her Instagram (Instagram, LLC, 2016) post (see Figure 8) that she would adjust the study guide to better align with the standards in the unit. Although this may have been a small change in practice, PLC members agreed that when students know the targets they are more likely to reach them.



plc3825

SHOW ALL WORK ON A SEPARATE SHEET OF PAPER.

**NS.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.**


Write an integer to represent each description.

1. The football player had a 9 yard loss on the play. $-9$	2. The stock market went down 84 points today. $-84$
3. A pay cut of \$3,500. $-3,500$	4. A person who has paid off all of his/her debts: $0$
5. A loss of \$31,251 on an investment. $-31,251$	6. A profit of \$32,678 on an investment. $32,678$
7. Deposit \$827 into a bank account $+827$	8. $8^\circ$ below zero. $-8$

9. What is the opposite of  $\frac{3}{8}$ ?

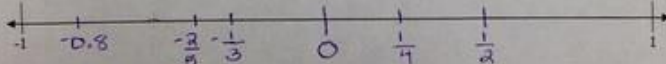
a) 38      b)  $\frac{8}{3}$       c)  $\frac{3}{8}$       d)  $-\frac{8}{3}$

**NS.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.**



10. Graph the points  $(-5, -3, 0, 1, 3, 7)$  on the number line above.

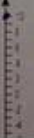
11. Below is a number line from  $-1$  to  $1$ . On the number line, mark  $0, \frac{2}{5}, \frac{1}{3}, \frac{1}{2}, \frac{1}{4}, -0.8$ .



**NS.6a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,  $-(-3) = 3$ , and that 0 is its own opposite.**

12. What is another way to write  $-(-21)$ ?  $21$

13. On the vertical number line, plot 10 and its opposite. What is the distance of each point from zero? What is the distance between 10 and its opposite?



The distance of each point from zero is 10.  
The distance between 10 and its opposite is 20.

plc3825 I am working on a study guide and a key to post to my blog for unit 7. After discussing in PLC, it seemed best to include standards on the study guide as a way to aid students. The discussion prompted me to start doing so immediately. ALM

Figure 8. Evidence of participant reflection and plans for modifying study guide practices.

As mentioned previously, “Embracing Collaboration” contributed to the development of the other themes formed from this study. Effective data-focused collaboration encouraged reflection that was centered on student achievement. When team members “embraced collaboration,” they transitioned from sharing a broad range of ideas to reflective dialogue aimed at a cycle of continuous improvement (Learning Forward, 2011b). This was clearly evident in one of the conversations where the team reviewed unit post-test results and discussed ideas for how the team would address those learners that were far from proficient at the end of the unit.

Through collaborative conversations, one member shared how she used a flipped classroom model to maintain the suggested pacing of her advanced content course and not decrease in-depth learning experiences as a result of this rapid pace. Participant BH shared, “*Flipping Classroom* instruction might be used as a tool to remediate for those [students] who enter the grade level without certain prerequisite skills that they should have mastered in earlier grades” (PLC Focus Group Cont, 0:15). Reflection on this conversation, reminded the team of how a plan that was formulated for accelerated learners might be changed to remediate learners with known deficits earlier in the year before problems surfaced. As Data Team member PW stated, “Reflection helps us determine which activities we will keep, discard, or modify” (Focus Group, 6:39). This is just one of several comments (see Table 8) shared by participants related to how reflection led to planning.

Table 8

*Examples of Participant Comments within the “Reflecting into Planning” Theme*

Participant	Response
ALM	What we discuss [at PLC meeting], we take the “good stuff” and implement it in our classroom. Evidence of transfer of what we discuss. We take it into our classrooms, try it, and try to make it better. (Focus Group, 5:00)
PW	Reflection helps us determine which activities we will keep, discard, or modify. (Focus Group, 6:39)
PW	When debriefing, either formally or informally, we often think about ways we would change a lesson for next time. (Focus Group, 6:02)
BH	<i>Flipping Classroom</i> instruction might be used as a tool to remediate for those [students] who enter the grade level without certain prerequisite skills that they should have mastered in earlier grades. (PLC Focus Group Cont, 0:15)
PW	I would just much rather use our instructional time more wisely and if we are going to collect data make data that is worthwhile. You know, because if we can identify where the issues are prior to a test and then you can address those issues with the kids then what we’re doing is we’re using what they need to know...not

just the process of going through [giving a test]. (PLC Focus Group Cont, 11:22)

PLC members recognized their opportunities to use what they learned to enhance their practices with a sustained focus on the potential benefit for students.

In another example, one member of the PLC modeled how to teach a concept related to the use of decomposing numbers based on place value as a strategy when solving long division problems. Collaboration enabled the group to dissect the strategy to determine what potential misconceptions might create learning problems for students. The PLC developed ideas for how the strategy could be revised to make it less confusing for students, but still allow teachers to deliver instruction that met the language of the standards. As summarized by Darling-Hammond (1997), reflecting with other teachers allows teachers to share their experiences about new ideas and strategies that lead to planning, implementation, and ultimately changes in instruction.

### **Theme #3: Evidence of Student Learning**

The final theme developed in this study represented who benefits when educators continually work to improve their practice – students! Data connected to the “Evidence of Student Learning” theme concluded with 8 memos along with 15 codes and 24 quotations. Although the “Evidence of Student Learning” network (see Figure 9) had less intricate and reduced codes linking directly to the main idea than the previous two themes, since collection of data from student participants was not a focus of this research, the data collected was sufficient to make a determination about evidence of student learning. Data analyzed for this theme demonstrated participant ability to identify problems of practice and use collaborative inquiry to determine student results indicators. Lai and McNaughton (in press) suggested, “An integral part of

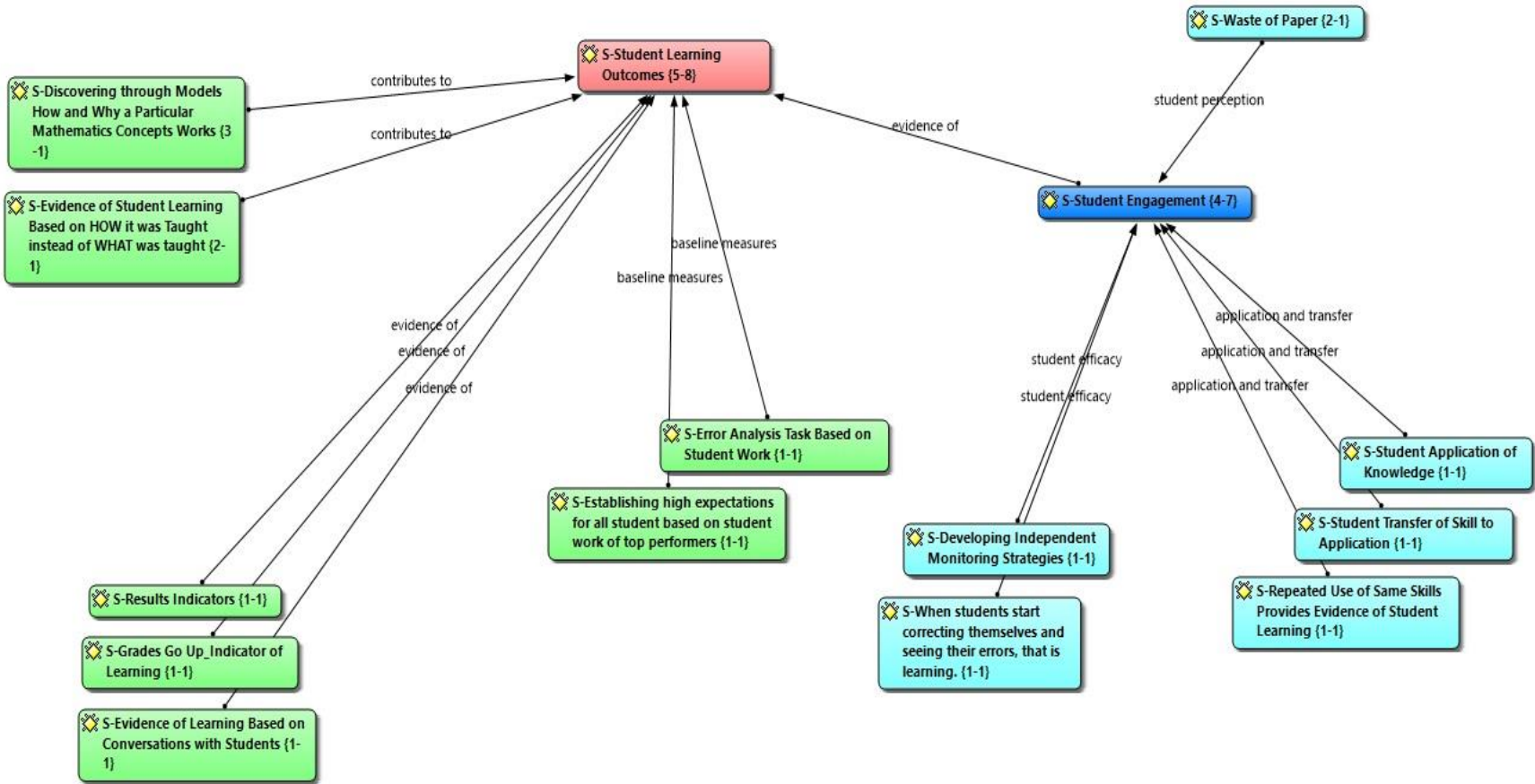


Figure 9: “Evidence of Student Learning” code-to-code network.

analyzing and using data is therefore learning how to match the pattern in achievement to patterns in teaching” (p. 4). Specifically, teachers began to think about how their effective use of instructional strategies might be measured by student learning outcomes.

Although the previous two themes primarily involved factors that were teacher-focused, the third theme, “Evidence of Student Learning”, involved students demonstrating their response to instruction in a variety of ways. In the visual representation of this network (Figure 9), the relating factors that linked codes provided the best indicator of what contributed to the Evidence of Student Learning theme. For instance, participant PW shared how conferences with students revealed student understanding or misconception of information during the independent study (PW Interview Notes, 743-820). Conferencing with students, coupled with other data such as traditional pre- and post-tests, supported the formation of the “Evidence of Student Learning” theme.

Similarly, student response to instruction was also identified by looking at student work samples. In addition to formative assessment data and the standard paper-pencil summative assessment administered at the end of the unit during the data collection period, students also completed a culminating performance task that required them to apply their learning in an authentic context. Hence, student engagement also contributed to establishing the “Evidence of Student Learning” theme. I noticed that the student engagement branch contained different indicators that provided insight into student performance. For example, students exhibiting characteristics of “application and transfer” were more likely to complete an assignment as written compared to those students who demonstrated “efficacy” and could self-check and advocate for their response (personal communication, July 31, 2016). As participant PW shared, “When students start correcting themselves and seeing their errors; that is learning” (PW

Interview Notes, 743-820). Relating back to the previous two themes, evidence of student learning enabled participants to see how their actions contributed to student learning.

By anchoring collaborative conversations around data, participants learned through shared experiences and constructed relationships (Kolb, 1984) from that information apart from other knowledge that may have been acquired through traditional professional development formats. Researchers (e.g., Louis & Marks, 1998; Rosenholtz, Bassler, & Hoover-Dempsey, 1986) confirmed the use of school professional learning communities as a way to provide teachers with job-embedded professional development. These interactions among colleagues enhanced the professional knowledge and skill execution of those members who participated in PLCs. Teachers who acquired these new skills, implemented them with the support of the PLC, and continued to reflect and revise their practices, often observed changes in practice that contributed to academic growth for their students (Baccellieri, 2010; DuFour, DuFour, & Eaker, 2008; Louis & Marks, 1998). Likewise, Morrissey noted (2000), “Our experience suggests that research-proven practices can be more effectively transferred to the classroom when teachers have the support of their professional colleague as they learn about and implement new programs and processes” (p. 22).

At the conclusion of the data collection period, PLC members administered a post-test and recorded the results on the pre- and post-test data chart as required for completion by all PLCs at the local school where this study took place. The results implied that teacher instructional strategies improved student learning outcomes as evidenced by a decrease in the number of students in the “Does Not Meet” or “Not Proficient” performance level from 389 students or 98.0% on the pre-test to 72 students or 17.6% on the post-test (see Figure 10). The scores for students in the two small group special education classes were not included since a

**PLC: Math 6**

**Unit 7**

Teacher	Total # Students		# Students Does Not Meet (Below 70%)		% Does Not Meet (Below 70%)		# Students Meets (70% - 84%)		% Meets (70% - 84%)		# Students Exceeds (85% - 100%)		% Exceeds (85% - 100%)	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
BH	84	84	79	0	94.0%	0.0%	3	10	3.6%	11.9%	2	74	2.4%	88.1%
ALM	162	168	161	57	99.4%	33.9%	1	67	0.6%	39.9%	0	44	0.0%	26.2%
SR					#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!
DT	32	33	30	1	93.8%	3.0%	2	10	6.3%	30.3%	0	22	0.0%	66.7%
PW	119	123	119	14	100.0%	11.4%	0	65	0.0%	52.8%	0	44	0.0%	35.8%
					#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!
Totals	397	408	389	72	98.0%	17.6%	6	152	1.5%	37.3%	2	184	0.5%	45.1%

Figure 10. Pre- and Post-Test Data Chart.<sup>4</sup>

<sup>4</sup> The color-coding was used to make it easier for members to enter data in the appropriate column and row and does not indicate any critical details within the data.

different assessment instrument was used. The decision to use an alternative assessment was based on the needs of the students and to complete an assessment for the unit prior to the end of the school year. There were a total of thirteen students in those two classes.

Although some may insist that teacher instruction was not the primary factor related to student growth, research (e.g., National Committee on Teaching & America's Future, 1996; Marzano, 2006) supports the value of teacher effectiveness as a major factor contributing to student academic gains. Learning Forward (formerly the National Staff Development Council) strengthens this statement by establishing a relationship between teacher effectiveness as a result of professional learning and consistently advocates this message in the organization's purpose that reads, "Every educator engages in effective professional learning every day so every student achieves" (Learning Forward, 2011a).

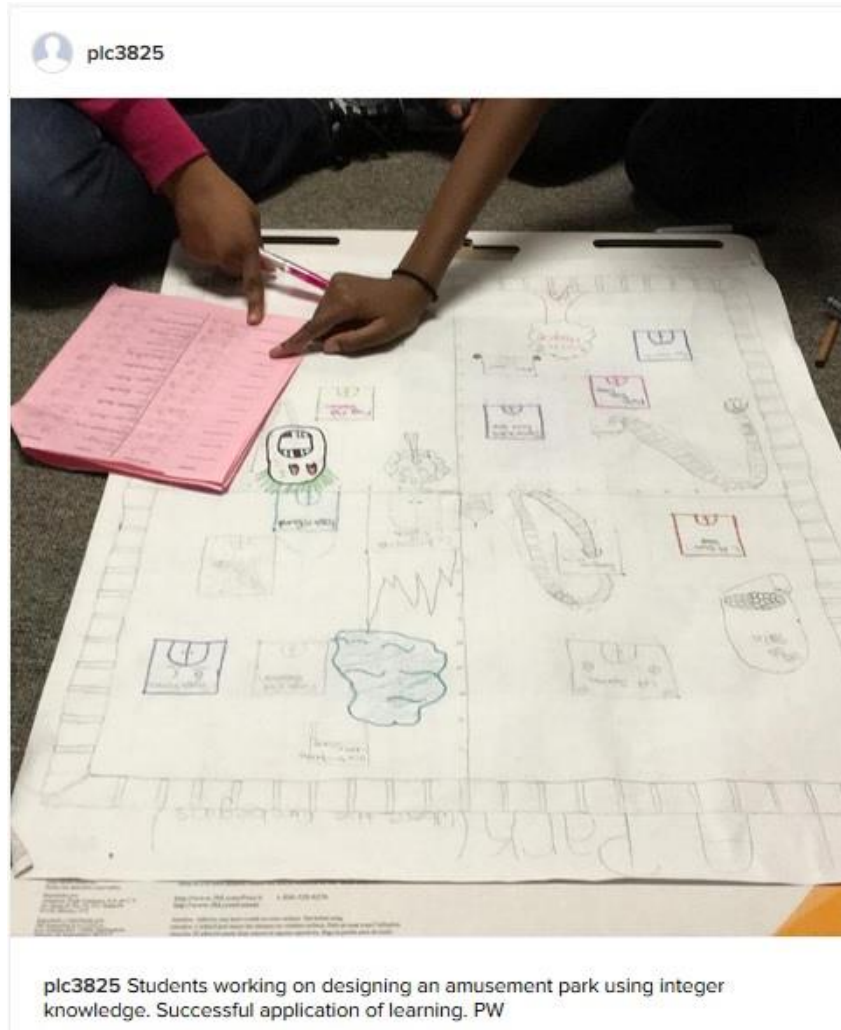
Additionally, perceptions obtained from participants who taught this unit last year further supported how modifications of strategies improved student performance on certain assignments within the unit. For example, participant ALM shared how the intervals of the coordinate plane should be changed to increments of one unit (personal communication, March 30, 2016). This decision was based on students previously setting intervals in different amounts and too much time being spent on uncovering the meaning behind the intervals prior to assessing the actual standards of the task. Thus, the Data Team was receptive to the sharing of this personal experience, adjusted the task accordingly, and noticed improvements in students understanding of the task and demonstration of their learning.

Another insight shared by participant PW also contributed to how group collaborative discussions led to improvements in the design and instructional delivery of the unit compared to last year (personal communication, July 31, 2016). Although the unit still allowed students to



work at their own pace, an enhancement from last year was organizing the pre-test and subsequent lessons by standard. This change allowed the team to connect student lack of understanding directly to a standard instead of merely looking at a lesson and making a blanket statement about a student's perceived deficits. Collaborative conversations provided the team with a common language about how instructional design would remain the same, be modified, or eliminated. Thus, one could infer that aside from normal school year growth, collaboration enhanced certain aspects of the unit as evidenced by teacher perceptions of student performance on certain assignments compared to last year.

Although assessment scores tend to serve as the primary indicator of student performance, PLC members relied on a variety of data sources to examine student learning. For example, one participant explicitly stated, "So, we are not limiting student performance to test scores" (Focus Group, 7:25). Members wanted to construct a portfolio of student learning rather than a snapshot approach that may not fully depict how students transferred their knowledge and skills to authentic learning situations. To visualize this statement, one member's Instagram (Instagram, LLC, 2016) post (see Figure 11) was of a student's culminating task which required the student to use his/her knowledge and skills from the unit to build an amusement park.



*Figure 11.* Participant Instagram post with example of student application of learning.

Since this task extended beyond rote “skill and drill,” she was able to assess students’ understanding of the concepts based on their ability to apply what they had learned. Connecting this student learning outcome back to the pre-test data, students most likely would not have been able to master this task prior to instruction since only eight students out of the 397 students who took the assessment demonstrated proficiency at or above 70% based on the pre-test.

At the very beginning of the data collection period, students were ending a unit on statistics with some of the concepts of number line usage extending into the next unit. The unit

from which this data was collected was a self-paced independent study on understanding and using rational numbers (without computation) where students completed personalized learning activities based on their proficiency level with each lesson. Prior to completing assignments, teachers taught a preview lesson that provided students direct instruction related to the lesson concepts. The unit was originally designed so that after completing each lesson, students would check their answers using an answer key posted in the classroom. Students would then take a quiz on the concepts in that lesson to determine if they met 80% proficiency and were ready to move on to the next lesson or if they needed to complete remediation exercises before moving on to the next lesson. As previously stated, an enhancement prior to this unit and subsequently implemented during this unit was a revision to the pre-test and how this unit was designed. The teacher who taught an advanced content course shared insight into how classroom walk-through comments stated that the unit lacked adequate differentiation (PLC Meeting Observation Notes, March 30, 2016). This led to a collaborative redesign of the independent study unit among the Data Team members who discussed and agreed to sort and group the questions on the pre-test by standard. Members were already using the Apperson DataLink Connect (Apperson, 2015) software to run reports such as an Item Analysis for teacher use. Members agreed to run the Student Proficiency Report and provide students with a copy their individual report. Next, students analyzed their performance on each standard and then used this information to determine which lessons, if any, they could exempt based on proficient pre-test results.

Another indicator of student learning was discovered during one of the individual interviews held with a participant. The participant shared what students revealed during conferences that she had with them. The participant commented, “Conversations with students revealed their reflection of the project. [Students] immediately correct themselves” (PW

Interview Notes, 743-820). Hence, this reminds teachers that sometimes it's not "what" was taught, but "how" it was taught. From this example, students learned how to analyze their errors based on poor performance on a previous task. Rather than relying solely on reteaching of the concept, this teacher taught students how to analyze their errors and provided them with a critical thinking skill that could then be used in other settings away from the original task.

An additional approach to examining data that supported this theme was done by creating a visual representation of the frequency of word patterns contained in participant captions from their Instagram (Instagram, LLC, 2016) posts. Members were asked to reflect on their experiences and document changes in practice as a result of data-based conversations. This basic text editing technique is referred to as *code landscaping* (Saldaña, 2016). Code landscaping uses "tags" or most frequently represented words or phrases contained in large amounts of text to creatively illustrate these patterns (Saldaña, 2016). I used Wordle (Feinberg, 2014) which is a free online software that creates word clouds. Word clouds are generated when text is cut-and-pasted from an original source into the software program. The software then generates a design that contains words or phrases that appear most often in a larger font size than those that appear less frequently. Text used to create the visual representation was collected by using the captions from participant posts in the shared Instagram (Instagram, LLC, 2016) account within this social media platform. The Wordle graphic (see Figure 12) revealed that the word "students" was the most frequently used word in participant captions based on its larger font size compared to other words in the graphic.

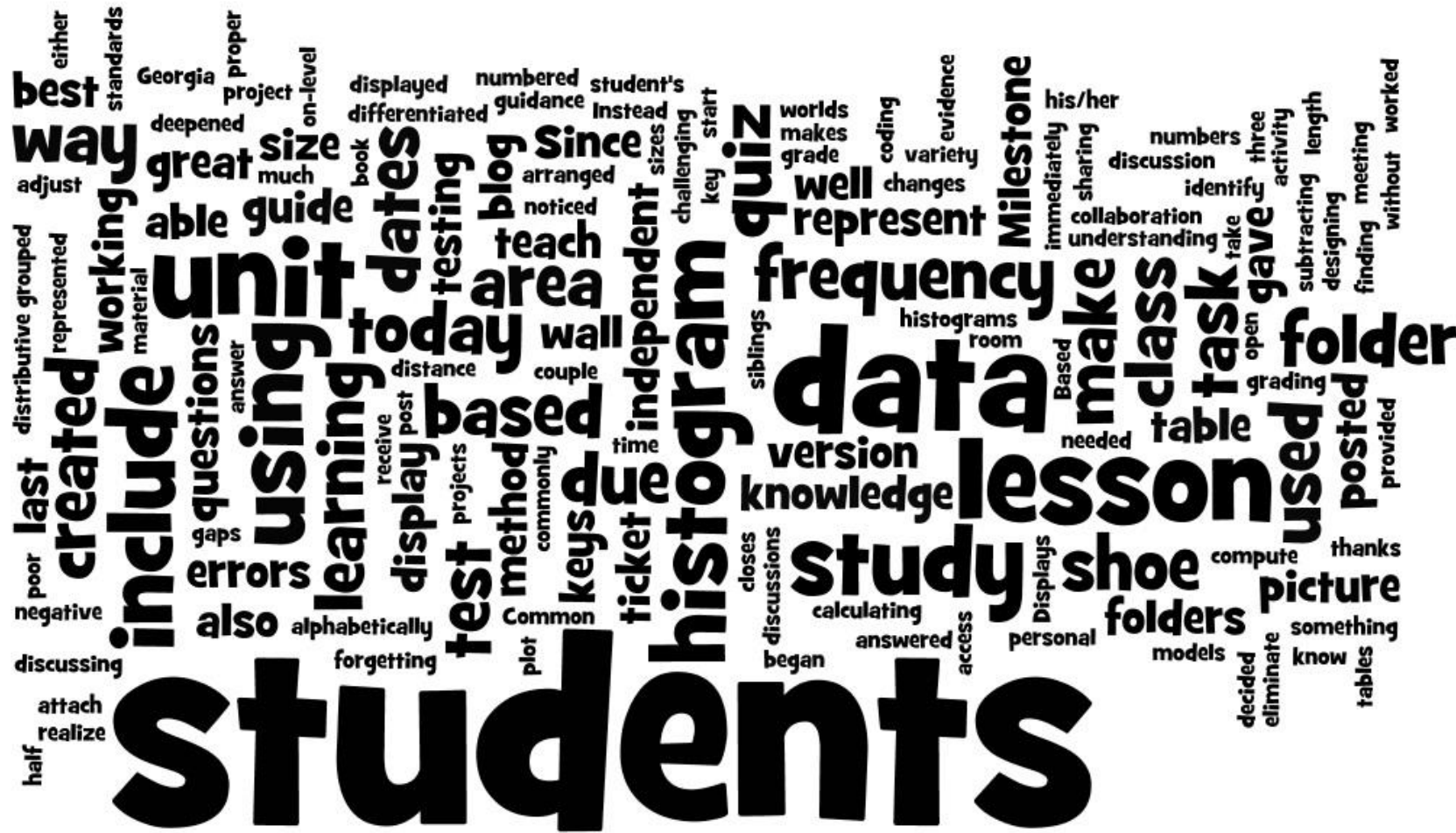


Figure 10: Visual representation of participant captions in Instagram (created from [www.wordle.net](http://www.wordle.net)).

The largest word patterns in the visual representation established that the central focus of members individually and collectively was on “students.” PLC members were able to learn from each other thereby enhancing their professional skillset and simultaneously remain focused on the desired outcome to improve student performance. As stated by Bolam et al. (2005), “A key purpose of professional learning communities is to enhance staff effectiveness as professionals, for the ultimate benefit of students” (p. 10).

### **Summary**

The findings in this study support the use of data-focused PLCs as a collaborative venue for rich discussions related to teaching and learning through the emergence of three themes: Embracing Collaboration, Reflecting into Planning, and Evidence of Student Learning. Each theme illustrated the benefits associated with data-focused PLCs and how this team approach affected changes in teacher practice that contributed to student learning outcomes. Grossman, Wineberg, and Woolworth (2000) shared, “...some people know things that others do not know and the collective’s knowledge exceeds that of any individual” (p. 32). In reviewing the data collected in this study, the results were influenced by teacher collaboration and the advantages of working within a group as opposed to individually.

Furthermore, the findings agree with some of the interconnected goals that contribute to the desire to develop PLCs as identified by Westheimer (2008). The focus of these goals is to build, examine, and sustain PLCs with the intent to experience the following outcomes:

- (1) improve teacher practice so students will learn;
- (2) make ideas matter to both teachers and students by creating a culture of intellectual inquiry;
- (3) develop teacher learning about leadership and school management;
- (4) promote teacher learning among novice

teachers; (5) reduce alienation as a precondition for teacher learning; and (6) pursue social justice and democracy. (Westheimer, 2008, p. 759)

As previously stated, the ultimate goal is to improve teaching and learning for both teachers as the adult learners and students. This learning not only relates to anticipation of noticing short-term outcomes such as changes in teacher practice, but also long range hopes of sustaining the enhancements to teacher effectiveness. Moreover, this research also rests on the transformative worldview which takes into consideration the “social justice and democracy” elements referenced by Westheimer (2008). Rather, educators are encouraged to implement innovative student learning opportunities that create positive and equitable learning environments to offer successful outcomes for every student (ESSA, 2015). If these practices are found to have favorable outcomes for student learning, it deserves to be acknowledged, shared, and continued instead of remaining elusive to those who could potentially benefit from this work.

Outside of normal school operating expenditures, no extra money was spent to implement PLCs at this local school. Other than the time required for participants to meet with me to complete interviews, no additional time was required of the participants. The comments received from participants through interviews, meeting observations, and Instagram (Instagram, LLC, 2016) posts overwhelmingly supported their approval of working collaboratively as a member of a data-focused PLC. Hence, data-focused PLCs represent a low-cost model to achieving and possibly sustaining teacher professional growth and student learning. White (2007) concluded, “*Data on purpose* leads not only to first-order, direct changes in classroom practice and individual student achievement, but also to second-order, system-level changes in school culture that ultimately benefit all students” (p. 207).

## **Chapter Five: Discussion, Conclusions, and Implications**

Teacher collaboration yields various results for both teachers and students (Hattie, 2009; Little, 1982; Louis & Marks, 1998; McLaughlin & Talbert, 1993, & Mindich & Lieberman, 2012). This study examined the practice and perceptions of a professional learning community (PLC) containing middle school math teachers that used data to guide their work. Data collected through this study affirmed the use of PLCs as a means to enhance teacher practice through collaborative conversations. PLC participants intuitively established a cycle of learning, planning, and changing as a part of their collaboration. This final chapter reviews the findings and provides responses to the research questions aligned with this study. This chapter also explains the limitations of the findings. I also share my comments and perceptions based on my role as a researcher and as a participant observer. Additionally, I outline a relationship to previous literature in an attempt to explain similar patterns or noticeable differences. This chapter concludes with a discussion of the implications for future practice, implications for future research, and summarizing remarks.

### **Discussion of Findings**

Data collected through interviews (individual and group), minutes/notes from collaborative planning sessions, participant Instagram (Instagram, LLC, 2016) posts (captions and photos), and aggregated student performance data on a teacher-created assessment substantiate the use of PLCs in enhancing teacher practice. Participant perceptions revealed that the group enjoyed the opportunity to collaborate and found value in learning from colleagues (Focus Group, 5:52). Furthermore, since participants were personally connected to the students, they developed a shared excitement when favorable results of student performance were attained.



## Research Questions and Responses

Two research questions guided the work of this study. Analysis of the data collected was used to form a response to each question. In qualitative research, the goal is not to generate absolute proof but to provide confidence in the context of the findings (Stake, 2010).

- 1) How does participation in a data-focused professional learning community (PLC) affect teacher practice and perceptions?

PLCs have continued to grow in popularity in schools due to their profound and numerous benefits (Woodland & Mazur, 2015). Woodland & Mazur (2015) share, “They [PLCs] are purported to positively impact school culture, improve teacher self-efficacy, reduce teacher isolationism, and boost an organization’s overall capacity, and build a shared culture of high-quality instructional practice” (p. 7). Thus, consistent with these intended benefits, overall responses from participants concluded that collaboration affected their perceptions of working together to collaboratively discuss issues related to student performance. Numerous instances revealed how after collaboration teachers were likely to revise a certain instructional strategy or assignment based on something they learned while collaborating with members of the PLC. Members were also more likely to try a new idea when it was validated by someone within the PLC as opposed to something they “heard about” or “read about.” As one participant shared, “When a colleague shares their “good results,” it makes me excited and want to go try it [strategy].” Participants also reflected about some of the struggles they experienced during the earlier stages of the process and how reflection assisted in their personal growth. Participants began to realize that not every problem has an immediate solution. When they took the time to reflect on an issue and seek multiple perspectives, this improved the final outcome. This was

clearly evident when the PLC collaboratively revised the final curriculum unit that was used for the student independent study.

Another indicator of teacher change in practice and perceptions was obtained through examining the PLC results on the Data Team Process Implementation Rubric (Appendix C) pre- and post-study results. Prior to the study, the PLC ranked themselves at the Beginning level for one of the steps in the process, at the Basic level for three of the steps in the process, and at the Proficient level for one of the steps in the process. On the pre-study rubric completion, the team was not familiar with the terms “SMART goal” nor “results indicators” as evidenced by their question asking what each of these terms meant on their submitted rubric. Both terms represent fundamental considerations for data-focused PLCs. However, by the end of the study, the team’s perception of their ability to execute the steps within the Data Team Process to guide their data-based decisions improved. On the post-study rubric, the team measured their performance at the Proficient level for four of the steps and at the Basic level for one of the steps (see Figure 13). The PLC made noticeable improvements in their ability to understand and use data to enhance their teaching and learning practices for the potential benefits of students.

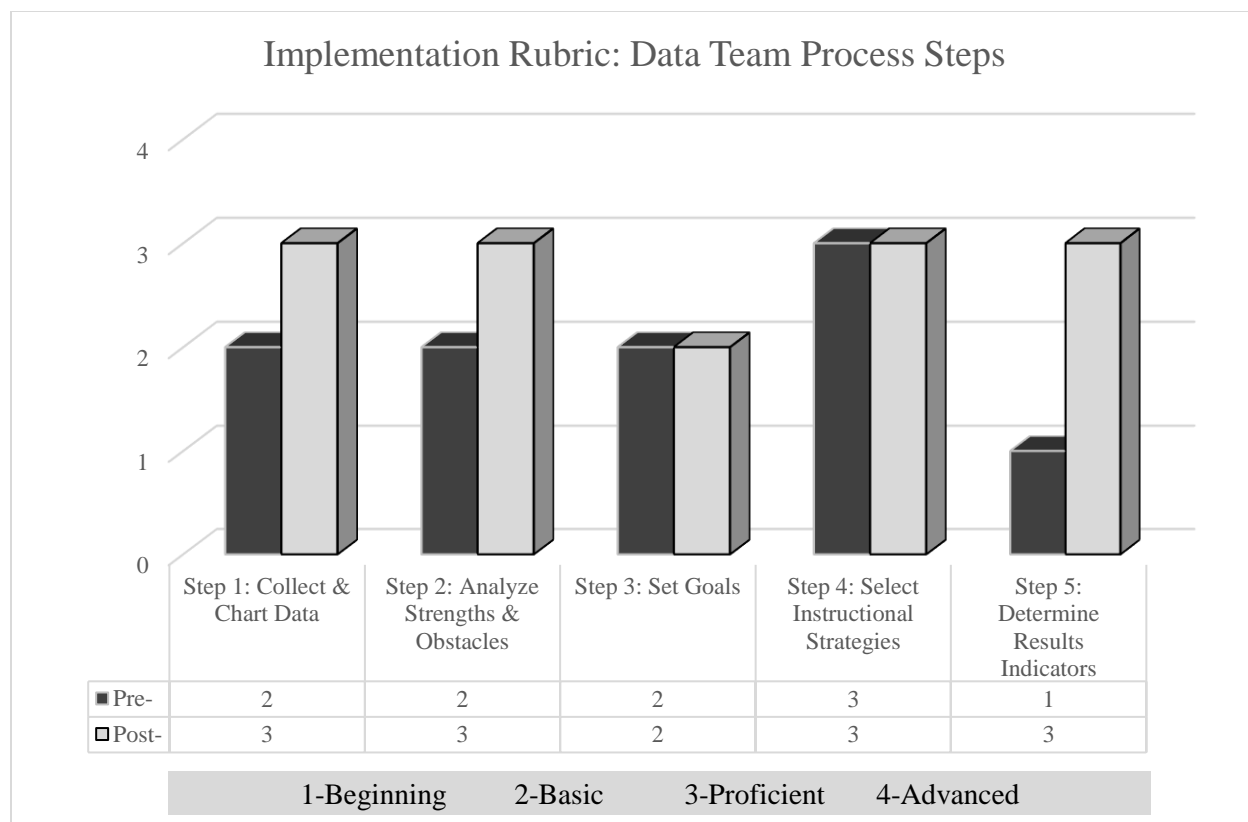


Figure 13: Data Team Process Implementation Steps Pre- and Post-Study PLC Self-Assessment Comparisons.

2) How do data-focused PLCs contribute to student learning outcomes?

According to Morrissey (2000), “One cannot assume that schools can transform themselves into productive and successful places of learning for students without first addressing the learning that must occur among teachers” (p. 24). After examining the influence on teacher practice and perceptions, it was also prudent to determine if these enhancements to teacher effectiveness also contributed to student learning outcomes. Student learning was measured by a variety of indicators. When learning outcomes are analyzed in isolation, it may illustrate an inaccurate picture of student achievement and growth. For this study, the PLC looked not only at student common assessment results, but also other details such as conversations with students about their learning and student work samples that required students to transfer skills to authentic

learning situations. By reviewing multiple sources of information, it informed participants that using data-based decisions was a practice that should be continued.

As previously stated, this conclusion was drawn after consulting a variety of data sources related to this study. Each data source added another layer of evidence in making a determination about student learning. Moreover, it was when teachers reached the point in which they could form links between their classroom practice and student performance data that the cycle of learning becomes clearly identifiable for both students and teachers (Bocala & Boudett, 2015). Both groups begin to identify with what they were learning and how it impacted them.

### **Limitations of Findings**

Limitations of the findings are inherently based on the design of the study. This case study was not meant to be generalized to other populations (Yin, 2003). There are certain characteristics that exist at the study site that may not be replicated at other schools with similar demographics. Consequently, since this study was conducted at only one site, the findings are limited to that bounded case; however, this does not exclude these findings from contributing to the growing body of research related to PLCs and their influence on teacher instructional practices and student achievement.

Although multiple sources of data were collected, each was not without its own limitation. While measures were taken to maintain the integrity of the data collected, opinions accepted from participants were assumed to represent their honest opinion at the time of submission, although no guarantees could be made. Another limitation with regard to data in this study, is that data generated for this study was the main source of information used to make a determination about the findings of the study. Although an abundance of data was generated through various contexts, limitations existed based on the amount and scope of data used.

Additionally, I served as both a participant and observer in this study. I also possessed experience working in a PLC setting at a previous school. The recognition of biases was essential in describing my prior knowledge related to the topic and how I could remain as neutral as possible when working as a member of the PLC. In some instances, it was necessary to abstain from conversation to allow the group to naturally work through a process of figuring out a response.

### **Researcher Comments**

I used a researcher's journal to capture my reflections during non-specific points of the study. As thoughts occurred, I made additional entries into the journal. The summary below captures those reflections that I found most interesting.

- Working in a nurturing and “suspended judgment” environment was necessary for the group to grow. Although we each have our own individual skill sets, we were comfortable with saying, “can you show me.” Sometimes if there was one team member that had experience with a strategy, they could show others in the group and no one doubted their professionalism simply because they did not know every strategy in the universe.
- Feedback on using a social media component via the password protected shared Instagram (Instagram, LLC, 2016) account was positive. Although there were some learning curve issues initially with setting up an account and learning how to post, participants embraced the idea and became excited about their growth in this area. Participants also commented on how this would be helpful for next year because they could use it to remember certain aspects of the unit. The use of photos and captions is

- what made the difference, in their minds, from standard reflections that are primarily narratives without visuals to support what is written.
- Although a focus of the study was on collaboration, it was beneficial to conduct both individual interviews and a focus group interview. The patterns represented in both the group and individual interviews were similar. The dynamics of the team worked well and I often wondered how this might have looked had the team dynamics been different. Grossman, Wineberg, and Woolworth (2000) contend, “Teacher community works most smoothly when teachers self-select into groups of like-minded colleagues” (p. 47). The group of individuals was congenial and cordial, even when expressing their disagreement about a certain issue. However, it was important for me to be mindful that there is a distinct difference between cordial conversations and interactions that promote learning and not let the congeniality of the group overshadow instances of actual learning by PLC members (Westheimer, 2008). Often times, because the group was similar in their thought processes, conversations revealed that most of the group shared the same dissatisfaction, but did not express their displeasure since they assumed it was something that was required. This became clear during one of the conversations where the group discussed shifting from a pre-test to an almost-there test on units where the trend data revealed that students typically have not had any prior knowledge or previous experience with the topic. To strengthen this argument, one student wrote at the top of her pre-test, “This was a waste of paper.”
  - Throughout this process, I often wondered how providing PLC facilitators with professional development might have impacted the progression of the PLC process of

the school as a whole. As mentioned earlier, I have previous experience working in a PLC. The previous school offered monthly 30-minute before school training sessions for PLC facilitators on issues such as meeting agenda development, completing data forms, and conflict resolution. During our PLC meeting, sometimes the agenda was organic in nature, although the conversations were productive to the overall collegiality and function of the group. It then appeared to me that maybe the group needed the relaxed structure to fully develop as a “social” group first, and then as a “work” group second. Morrissey (2000) argued,

There were very few opportunities, either within school or outside of it, for staff to do fun things together, learn together, laugh together, or just get to know each other. Little or no work had been done with school staffs to acknowledge the value and differences in culture, experience, and expertise that they [teachers] brought to the school environment. (p. 16).

Lai and McNaughton (in press) shared a similar sentiment and suggested, “The use of PD [professional development] emphasizes learning through social interactions in PLCs” (p. 5) Lai and McNaughton (in press) referenced this statement when reviewing the process of collaborative analysis and use of data in PLCs. Furthermore, Westheimer (2008) proclaimed, “Teachers cannot learn from each other if they rarely see or talk to one another” (p. 769). However, it is still essential to recognize that there is a distinct difference between cordial conversations and interactions that promote teacher learning (Westheimer, 2008).

- Even though my teaching assignment for next year will move me to a different grade level and not allow me to continue as a member of this PLC, I would like to see this

PLC serve as a model for other PLCs at the local school in terms of what were some of their strengths and obstacles and how the team worked together to address those issues.

Although I was aware of the structure of quantitative research, qualitative research was more suitable for this study by providing a detailed description of the case (Creswell, 2013; Merriam, 2004). Even though quantitative data would have given statistical measures, it would have been limited in capturing participant perceptions. Although there are some surveys that may have been used, these too would be limiting in the quality and range of information shared by participants. The use of semi-structured interviews allowed me to gather specific data for the study as well as providing participants with an opportunity to share additional details about their experience. Likewise, as social media continues to expand in popularity, I foresee other opportunities to use this technology to enrich teacher professional growth. Roth (2014) suggested,

As with the development of online courses and degree programs, one approach to teacher professional development is to build virtual learning communities, relying on more accessible and functional Internet-based resources that allow participation from colleagues offsite, both synchronously and asynchronously. (p. 211)

Likewise, since connectivism was one of the theories used to frame this research, it is worthwhile to note that teacher learning was enhanced through communicative technology.

### **Relationship to Previous Literature**

Years of research (Table 9) related to PLCs concludes that this topic remains a viable endeavor for schools looking to enhance teacher practice. Although the structure varies depending upon the focus of the group, a common theme among these groups is the desire to



work collaboratively to address a common concern. For this study, the primary objective was to research a group that exhibited the characteristics of a data-focused PLC as described by DuFour (2004). Similar to previous literature (e.g., Little, 1982; Louis & Marks, 1998; Horn & Little, 2010), the participants in this study confirmed growth in their professional practice and skills needed to improve student learning.

Table 9

*Studied Related to Professional Learning Communities*

Researcher(s)	Purpose/Objective	Participants	Outcomes	Research Design/ Data Collection
Little (1982)	To determine how the social structure of schools supports teachers in “learning on the job”	105 teachers and 14 administrators at six urban desegregated schools (three elementary and three secondary schools)	<p>“Learning on the job” is supported by the frequency and type of workplace interactions. Schools that used norms of collegiality and experimentation toward continuous improvement were more successful* than those that did not.</p> <p><i>*Success was measured by looking at the aggregated standardized achievement scores in reading, language arts, and math over a 3-year period.</i></p>	Focused Ethnography; Semi-structured interviews and observations
Rosenholtz, Bassler, & Hoover-Dempsey (1986)	To examine teacher perceptions of organizational factors that provide the best opportunities for	1,213 teachers in 78 elementary schools	Collaboration with colleagues and linking coordination and goal setting were identified, along with other contributing factors in skill acquisition by	Surveys

	professional development.		teachers.	
McLaughlin & Talbert (1993)	Assess factors that either constrain or enable the best work of teachers and students. (McLaughlin & Talbert, 1993, p. 3)	California – 7 public schools & 3 private schools from 3 districts; Michigan – 6 public schools from 4 districts	Strong professional communities with strategic opportunities for embedded contexts, enable teachers to acquire knowledge, develop new practices, and sustain change.	Case study
Louis and Marks (1998)	To document empirically the linkages among professional community, classroom organization for teaching and learning, and student performance.	24 nationally selected restructuring schools (eight elementary, eight middle, and eight high schools)	The presence of school professional communities supports classroom practices beneficial to enhanced teacher learning and authentic student achievement.  This work marked a turning point with connecting teacher classroom practice to student learning outcomes.	Mixed Methods
Grossman, Wineberg, & Woolworth (2000)	To identify what distinguishes a community of teachers from a group of teachers sitting in a room.	22 English and social studies teachers, a Special Education teacher and an ESL teacher, from an urban high school	Teachers learn through an intentionally formed teacher community. The interactions in these groups are characterized by four dimensions that operate on a continuum from beginning to mature.	Case study; field notes, e-mails, journals, interviews, evaluations, think-alouds
Horn & Little (2010)	To determine and understand workplace interactions, specifically conversational routines of groups, that attribute to	Two teacher groups at the same urban high school. One group consisted of mathematics teachers and the	The use of structured conversational routines supported the development of uncovering problems of practice and provided teachers with opportunities for	Smaller set of data obtained from a larger comparative case study

	teacher professional learning and improvement.	other group consisted of English teachers.	professional learning. Results from the study encouraged the use of workplace learning through a structured support provided by a professional community.	
Mindich & Lieberman (2012)	To trace the PLC implementation factors at selected	Two middle schools selected from 33 New Jersey public schools that participated in an initial survey.	Certain situations, resources, relationships, and leadership structured in a PLC environment could be linked to satisfactory development of teacher professional practice.	Survey data from 33 schools and case study data (interviews and observations) from two schools

As indicated in earlier research (e.g., Allison et al., 2010, Bolam et al., 2005; Mindich & Lieberman, 2012), data was used to bind conversations and frame the process of collaborative inquiry of the PLC. Student data in the form of assessment scores and student work provided the PLC with a common interest to analyze, discuss, and plan for improvement. As these conversations continued to develop in breadth and complexity, so did the need for participants to expand their thinking about how to address particular issues. The team quickly began to realize that their collective contributions assisted in enhancing current practices with the ultimate goal of contributing to student learning outcomes.

Earlier in the school year, the group collaboratively developed group norms based on each member sharing what they saw as a participant behavior that detracted from successful collaboration and learning. After the group openly shared their responses, the group then jointly developed operational (e.g., when agenda will be sent out) and relational (e.g., participants will remain actively involved) norms to address those potential barriers to successful collaboration.

This preliminary step framed the “workplace interactions” of the group and provided a common language for resolving disagreements if they were to occur. According to Roth (2014), “Conflict may be minimized by allowing group members ample time early on to openly discuss their personal expectations and goals, while working toward a shared vision for group outcomes” (p. 212). Sometimes in the rush to get “right to work,” norm setting is skipped because participants view it as a formality that is not necessary since professional educators are required to have a college degree and must possess certain credentials prior to entering the classroom. However, having a college degree or certificate does not eliminate human emotions that can disrupt successful collaboration and learning. Hence, these *norms of collegiality* provided the PLC with a common language for collaboration that assisted the group in uncovering issues and identifying a variety of approaches to solving them.

Once the PLC had an agreed upon structure in place, the group continued to learn and grow together while solving authentic problems of practice. In thinking about the complex nature of schools, sample scenarios might provide some guidance on how to approach a particular learning issue; however, learning of abstract concepts by adults is enhanced when it is learned in meaningful contexts (Kolb & Kolb, 2005). The abstract concepts in this situation, related to the real-life daily interactions that required teachers to combine their collective wisdom, reference the data, develop a plan of action, and modify as needed based on results. Rather, the PLC became immersed in a cycle of experiential learning where knowledge was constructed through transformation of experience (Kolb, 1984). Similarly, this PLC’s experience mirrored the outcomes of McLaughlin & Talbert’s (1993) work that identified strong professional communities with goal-oriented embedded contexts that enabled teachers to acquire knowledge, develop new practices, and sustain change. Additionally, the preceding work of Rosenholtz,

Bassler, and Hoover-Dempsey (1986) also concluded that collaboration with colleagues around a shared goal, along with other factors, aided in the skill acquisition by teachers.

Acknowledging PLC's as a supportive environment for collaborative inquiry among teachers, a combination of outcomes from this study align with the work of previous researchers (e.g., Grossman, Wineberg, & Woolworth, 2000; Horn & Little, 2010, Mindich & Lieberman, 2012). The PLCs at this local school were purposefully created (Grossman, Wineberg, & Woolworth, 2000) based on the content area and grade level of the students served. This intentional characteristic provided PLC participants with opportunities for meaningful, context-specific opportunities to "learn while doing." Although teachers in this study did not use specific protocols for professional learning (Easton, 2009), the group used a data-focused structure that supported the PLC's development in identifying and solving problems of practice and learning and growing together through those experiences (Horn & Little, 2010). Furthermore, enhancements to teachers' knowledge and skills refined their professional practice and contributed to student learning outcomes (Louis & Marks, 1998; Mindich & Lieberman, 2012).

### **Implications for Future Practice**

As the demands of educators continue to increase, so does the need to identify inexpensive and results-proven methods for improving student learning outcomes. Since interdependence is a key element of fostering collaboration, schools should not only establish a regular schedule for meeting times to occur, but also use a structured process to limit distractions that might derail the conversations. The Data Teams Process (Allison et al., 2010) and the Data Wise model (Boudett, City, & Murnane, 2013) both provide manageable processes for schools interested in this work. Additionally, schools should consider various options for monitoring group progress. A valuable component of this study was the use of reflection tools such as

teacher interviews and Instagram (Instagram, LLC, 2016) postings. The photo elicitation (Harper, 2002) process used to gather additional information about participant postings deepened my understanding of the participant perceptions and strengthens the appeal for schools to consider implementing PLCs. For instance, the photos served as a visual cue to engage participants in the interview phase instead of only relying on a verbal question prompts. Since the photos were taken and shared by participants, it helped to establish a personal extension of the participant since each person shared what represented a change in practice to them. Also, since participants were able to share photos using a social media platform, this improved the accessibility of information by all participants and served as an archive of professional practice in the future.

Another potential implication for future practice is moving from understanding to action. McLaughlin and Talbert (2006) asserts, "...the call is for all children to learn to high standards and to have access to high-quality instruction" (p. 1). With the signing of the *ESSA* (2015), President Barack Obama shared, "With this bill, we reaffirm that fundamentally American ideal—that every child, regardless of race, income, background, the zip code where they live, deserves the chance to make of their lives what they will" (U.S. Department of Education, n.d.). However, public schools still rely on a model where teachers represent the primary facilitator of knowledge acquisition. Therefore, much of the success of students rests on the effectiveness of teachers and the laws and policies designed to govern education practice. White (2010) suggests, "Knowledge – the stuff jobs are made of, no matter the economy – is a person's most valuable asset. And that makes teachers more important than ever. Extraordinary teachers could be the most potent antipoverty program in the country" (p. 48). Although poverty is not the only barrier to success for some students, these challenges represent the need to pursue the field of

opportunities that can exist when educators work together to eradicate or minimize issues affecting student performance.

The data collected in this study complement similar studies (Table 9) related to professional learning communities as a support to foster teacher professional growth and student learning outcomes. The results from this study aligned with the majority of the literature in which a structured process existed for collaboration. Rather, these groups had expectations of certain actions that should occur during the collaborative sessions instead of meeting to discuss either a broad range or non-cohesive topics, or topics that dealt with mostly operational issues as opposed to instructional issues.

Acknowledging the need to seek low-cost, practical routines to enhance teacher effectiveness, PLCs provide a sound and consistently tested process to support the need for more collaboration among teachers. Rather than limit opportunities for teachers to work together in a structured process to collectively pursue a common goal, schools should build supports that make collaboration focused on student learning and teacher sharing of best practices possible.

### **Implications for Future Research**

The implications for future research that are provided are more suitable for learning environments that already have some level of implementation with PLCs and are looking to delve deeper. However, it does not exclude those interested in learning more about PLCs from also examining these considerations. A logical consideration would be to provide teachers with formal training on “Looking at Student Work” (Little, Gearhart, Curry, & Kafka, 2003). Teachers intuitively brought student work samples to share as evidence of student learning; however, sometimes it took the group quite a bit of time to clearly articulate exactly what would qualify as evidence of proficiency within the student work samples. Although the group was eventually

able to formulate a shared understanding, having a common language on what this looks like before starting might have helped the group reach their consensus more quickly.

Also, future research could expand the study by also looking at the essential characteristics of PLCs (DuFour, DuFour, Eaker, & Karhanek, 2004; Hord, 2004) and noting which of these elements exist among the higher functioning PLCs. Future research could also seek to collect data from student participants to understand their perceptions of which instructional strategy they felt was most beneficial to them. Additionally, the favorable results of this study and others provide encouragement to those seeking to further explore this topic.

Furthermore, approaches to technology integration are other areas to revisit. One of the participants had a more difficult time with using technology compared to the others. At the time of the initial training, none of the participants had any photos to post since it was primarily an opportunity to set up an Instagram (Instagram, LLC, 2016) account. Prior to this study, none of the participants previously had an Instagram (Instagram, LLC, 2016) account and used cell phones primarily for making calls, texting, and looking up information. After one participant took her photos, the participant's android cell phone stopped working and she had to get a new phone from her cell phone carrier. At that time, we then learned that her cell phone carrier only offered cloud storage of data contained on the phone through third-party cloud storage services which was not set up prior to the time that the phone stop working. Thus, the initial photos were lost. After taking another set of photos, the participant then accidentally deleted the second set of photos before posting, but after sharing them with the researcher during the individual interview. Although one of the requests was for participants to post their responses as close to the time of taking photos as possible, for different reasons, this timeframe varied from individual to individual. From this experience, future researchers should assist participants without an



automatic cloud storage option from their cell phone carrier with setting up a third-party cloud storage service (e.g., Dropbox, Google Drive, etc.) for photographs. This should only be done if participants are comfortable with doing so and if it does not infringe upon IRB restrictions.

Technology also provides another area of opportunity for considerations with future research. In one-to-one (1:1) computing environments where each student has his/her own tablet or other digital device issued by the school system, the research could be expanded to allow students to capture photos to share thoughts about their learning or misconceptions if permitted by IRB requirements. This step would provide another layer of evidence related to the transfer of teacher practice to student learning.

### **Conclusion**

Recognizing the advantages associated with working collaboratively rather than in isolation, schools looking to transform from “pockets of perfection” to pervasive high-quality practice should consider the use of data-focused PLCs. Data-focused PLCs are a relatively low-cost technique that has many benefits for teachers and the students of teachers who use them. For this study, there were no monetary or other expenditures required to implement PLCs. Additionally, since the team met during the regularly scheduled school day in a block of time reserved for collaborative planning, no meeting adjustments were required. Thus, the school plan provided a structure where teachers could discuss educational issues within data-focused contexts and enhance their professional practice at the same time.

Bolam et al. (2005) contend, “An effective PLC has the capacity to promote and sustain the learning of all professionals in the school community with the collective purpose of enhancing pupil learning” (p. iii). Groups that focus their conversations around a shared goal arguably perform best when the group is cohesive in their understanding of the goal and the

desired results. Data is one medium that focuses these conversations and provides PLCs with a common language for monitoring results. Moreover, “effective use of data is key to improving student outcomes” (Wilhelm, 2011, p. 30). Through these conversations and other professional interactions, PLCs build capacity in instructional staff so that when the structure is maintained, teacher and student growth should be enriched and sustainable over time. Roth (2014) summarized, “Research shows that time spent in faculty learning communities translates into improvements in both teaching effectiveness and student learning” (p. 209). This study contributes to that principle and offers insight for those interested in effective implementation of PLCs.

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**Appendix**

## Appendix A

### PARTICIPANT CONSENT FORM

**Title of Research Study:** Beyond the Core: Creating and Sustaining Data-Focused Professional Learning Communities

**Researcher's Contact Information:** Deena Townsend, ,  
dtownse9@students.kennesaw.edu

#### Introduction

You are being invited to take part in a research study conducted by Deena Townsend of Kennesaw State University under the supervision of Dr. Julie Moore. Before you decide to participate in this study, you should read this form and ask questions about anything that is unclear.

#### Description of Project

The purpose of the study is to determine how participation in a data-focused professional learning community affects teacher practices and perceptions and student learning.

#### Explanation of Procedures

Participants will be asked to allow the researcher to observe a professional collaboration session and take observational notes. Participants will be asked to share photos and reflection of the effects on teaching practices. Participants will be asked to complete a personal interview and focus group interview. The interviews will be audiotaped so that responses may be transcribed for data analysis.

#### Time Required

The regularly scheduled professional collaboration session should not exceed 75 minutes. The length of time to share photos should not exceed 3-5 minutes per photo and reflection shared. Both the personal interview and focus group interview should not exceed 75 minutes each.

#### Risks or Discomforts

There are no known risks or anticipated discomforts in this study.

#### Benefits

Although there will be no direct benefits to you for taking part in the study, the researcher may learn more about changes in teacher in instructional practices and perceptions by participating as a member of a data-focused professional learning community. Likewise, the researcher will gain information related to the changes in teacher practices and potential outcomes on student learning.

#### Compensation

None

**Confidentiality**

The results of this participation will be confidential. Participant information will remain confidential and the information shared during the study will remain confidential. Pseudonyms will be used to protect participant identities. Data (paper and digital formats) collected during the study will be stored in secure environments and will be destroyed within five years after the conclusion the study.

**Inclusion Criteria for Participation**

You must be 18 years of age or older to participate in this study.

**Signed Consent**

I agree and give my consent to participate in this research project. I understand that participation is voluntary and that I may withdraw my consent at any time without penalty.

---

Signature of Participant or Authorized Representative, Date

---

Signature of Investigator, Date

---

PLEASE SIGN BOTH COPIES OF THIS FORM, KEEP ONE AND RETURN THE OTHER TO THE INVESTIGATOR

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. Questions or problems regarding these activities should be addressed to the Institutional Review Board, Kennesaw State University, 585 Cobb Avenue, KH3403, Kennesaw, GA 30144-5591, (470) 578-2268.

## Appendix B

### ONLINE SURVEY CONSENT FORM

**Title of Research Study:** Beyond the Core: Creating and Sustaining Data-Focused Professional Learning Communities

**Researcher's Contact Information:** Deena Townsend, ,  
dtownse9@students.kennesaw.edu

#### Introduction

You are being invited to take part in a research study conducted by Deena Townsend of Kennesaw State University under the supervision of Dr. Julie Moore. Before you decide to participate in this study, you should read this form and ask questions about anything that is unclear.

#### Description of Project

The purpose of the study is to determine how participation in a data-focused professional learning community affects teacher practices and perceptions and student learning.

#### Explanation of Procedures

Participants will be asked to complete an online survey to collect demographic information.

#### Time Required

The survey should take about 5 minutes to complete.

#### Risks or Discomforts

There are no known risks or anticipated discomforts in this study.

#### Benefits

Although there will be no direct benefits to you for taking part in the study, the researcher may learn more about changes in teacher in instructional practices and perceptions by participating as a member of a data-focused professional learning community. Likewise, the researcher will gain information related to the changes in teacher practices and potential outcomes on student learning.

#### Compensation

None

#### Confidentiality

The results of this participation will be confidential. Participant information will remain confidential and the information shared during the study will remain confidential. Pseudonyms will be used to protect participant identities. Data (paper and digital formats) collected during the study will be stored in secure environments and will be destroyed within five years after the conclusion the study.

### **Inclusion Criteria for Participation**

You must be 18 years of age or older to participate in this study.

### **Use of Online Survey**

IP addresses will not be collected.

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. Questions or problems regarding these activities should be addressed to the Institutional Review Board, Kennesaw State University, 585 Cobb Avenue, KH3403, Kennesaw, GA 30144-5591, (470) 578-2268.

PLEASE PRINT A COPY OF THIS CONSENT DOCUMENT FOR YOUR RECORDS, OR IF YOU DO NOT HAVE PRINT CAPABILITIES, YOU MAY CONTACT THE RESEARCHER TO OBTAIN A COPY

I agree and give my consent to participate in this research project. I understand that participation is voluntary and that I may withdraw my consent at any time without penalty.

I do not agree to participate and will be excluded from the remainder of the questions.

### **1. Number of years of teaching service?**

- 0-3
- 4-7
- 8-13
- 14-19
- 20+

### **2. Age?**

- 18-29
- 30-39
- 40-49
- 50-59
- 60+

### **3. Which race/ethnicity best describes you? (Please choose only one.)**

- American Indian or Alaskan Native

- Asian / Pacific Islander
- Black or African American
- Hispanic American
- White / Caucasian
- Multiple ethnicity / Other (please specify)

**4. What is the highest level of education you have completed?**

- Some college
- Bachelor's (Education)
- Bachelor's (Some other field)
- Master's (Education)
- Master's (Some other field)
- Specialist's
- Doctoral degree
- Professional degree (MD, JD, etc.)
- Other (please specify)

**5. What educator endorsements have you earned?**

- Coaching
- ESOL
- Gifted
- Leadership
- Reading
- Teacher Leadership
- Teacher Support & Coaching
- TSS
- Other (please specify)

## Appendix C

### IMPLEMENTATION RUBRIC: DATA TEAM STEPS

DATA TEAM 5-STEPS	Beginning 1	Basic 2	Proficient 3	Advanced 4
<b>1 Collect and Chart Data</b>	<ul style="list-style-type: none"> <li>DT primarily uses annual summative data</li> <li>Members do not consistently complete and/or bring data agreed upon to meetings, or provide to DT LEADER/TECHNICIAN as requested</li> </ul>	<ul style="list-style-type: none"> <li>Members bring required data with them to the meeting</li> <li>DT has a schedule to regularly collect student data throughout year</li> </ul>	<ul style="list-style-type: none"> <li>Pre assessment / Almost There and Post assessment data are used throughout the year</li> <li>Data assembled for discussion purposes <u>prior</u> to start of meeting</li> <li>Results include number and percentage of students proficient, close to proficient, and far from proficient</li> <li>Data includes the names of students that are close to proficient and far from proficient. Students in critical student groups (SWD, ELL, and RTI) in these two proficiency levels have been identified.</li> </ul>	<ul style="list-style-type: none"> <li>Results are disaggregated according to specific learning goal (standard)</li> <li>Data results are shared and celebrated with stakeholders</li> </ul>
<b>2 Analyze Strengths and Obstacles</b>	<ul style="list-style-type: none"> <li>Data is not analyzed</li> <li>Data analysis focuses only on obstacle- no review of strengths is completed</li> <li>Team struggles to set priorities for teacher actions or student learning that are based on student needs</li> <li>Discussion focuses mostly on factors that teachers cannot influence</li> </ul>	<ul style="list-style-type: none"> <li>Data is analyzed to identify student needs for the team as a whole</li> <li>Little time or priority is given to individual teacher data to identify classes or student-specific needs and strengths</li> <li>Team rarely sets priorities based on leverage or use of priority or power standards</li> <li>Team identifies so many priorities that focus will be problematic</li> </ul>	<ul style="list-style-type: none"> <li>Identification of student strengths and needs are within the direct influence of teachers Needs/strengths identified result directly from thorough analysis of student work from all team members</li> <li>Student academic needs are prioritized to reflect those areas that will have greatest impact within subject area and/or targeted standards</li> </ul>	<ul style="list-style-type: none"> <li>Targeted needs have impact in multiple subject areas...for example...identifying supporting details, cause and effect, writing, summarizing, problem solving, critical thinking</li> </ul>



<p style="text-align: center;"><b>3</b> <b>Set Goals</b></p>	<ul style="list-style-type: none"> <li>• Goals are not established If established, goals are general/not specific</li> <li>• Goals are not measurable</li> </ul>	<ul style="list-style-type: none"> <li>• Goals are established, but not based on most critical student needs</li> <li>• Goals may target critical needs, but are not measurable</li> <li>• Team rarely, if ever, revisits goals or actions set in the beginning of the year</li> </ul>	<ul style="list-style-type: none"> <li>• Goals are SMART <b>S</b>pecific to targeted subject area, grade level, and student population <b>M</b>easurement instrument to be used and the element examined must be measurable <b>A</b>chievable percentage gains or increases <b>R</b>elevant target tending to urgent needs <b>T</b>ime when the assessment will take place</li> <li>• Goals are reviewed and adjusted as needed</li> </ul>	<ul style="list-style-type: none"> <li>• SMART Goals are set relative to and/or support individual students (proficient, close, far, etc.)</li> </ul>
<p style="text-align: center;"><b>4</b> <b>Select Instructional Strategies</b></p>	<ul style="list-style-type: none"> <li>• Team spends little, if any of their time discussing instructional strategies which produce student results</li> <li>• Team members may lack good understanding of, familiarity with, or experience using a variety of research-based instructional strategies</li> <li>• No agreements are made relative to trying new/different approaches</li> <li>• Team consistently uses lecture and notetaking as preferred instructional strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Team uses some research based instructional strategies, but they are not consistently used on a daily basis by all team members</li> <li>• Some members of team are reluctant to implement, discuss, or consider using new strategies or bringing evidence of use (e.g., student work)</li> <li>• Strategies used are inconsistent in promoting high levels of critical thinking or student engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Strategies selected are research-based and battle-tested (e.g., evidence of success exists)</li> <li>• Strategies are clearly linked to student needs identified by careful analysis of student work or data</li> <li>• All teachers know/understand strategies, agree to implement, and bring evidence of use to meetings (e.g., student work samples)</li> <li>• Strategies target both procedural (skills) and declarative (concepts) knowledge</li> <li>• Strategies clearly promote critical thinking and engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Strategies promote literacy development (e.g., reading, writing, listening, speaking) Strategies promote skill/concept development in other subject matters (e.g., number sense)</li> <li>• Team models the strategy so all members have a common understanding for implementation</li> </ul>

<p style="text-align: center;"><b>5</b> <b>Determine Results Indicators</b></p>	<ul style="list-style-type: none"> <li>• Team does not identify results indicators</li> </ul>	<ul style="list-style-type: none"> <li>• Team may have identified some results indicators, but do not monitor results</li> <li>• Results indicators may exist, may be monitored, however, they are not directly tied to critical student needs (e.g., SMART goals)</li> </ul>	<ul style="list-style-type: none"> <li>• Results indicators describe teacher behaviors that will be seen if the selected strategies are implemented</li> <li>• Results indicators describe student actions/results that demonstrate strategy use</li> <li>• Results indicators describe the change in student performance to be expected if the strategy is having the desired impact</li> <li>• Results indicators align to SMART goals</li> </ul>	<ul style="list-style-type: none"> <li>• Results indicators establish time line to monitor the implementation of the strategy</li> <li>• Results indicators include clear and detailed descriptions that allow others to replicate the described practices</li> </ul>
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Adapted from...90/90/90 Schools™ Summit Center

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## Appendix D

### Focus Group Protocol

The purpose of this study is to determine if data-focused professional learning communities (PLCs) help to develop teacher capacity to use effective instructional practices that translate into gains in student performance. Student achievement data collected by teachers as a part of the data team process will be used to measure student performance. Teacher perception data will be collected through observations of PLC meetings, focus group, and individual surveys and interviews. This data will be used to determine if there is a relationship between participation in a data-focused PLC and student outcomes.

Your participation in this session is completely voluntary and your responses will be confidential. Your responses will remain confidential and will be used only for class and educational purposes. At this time, I would like to ask for your verbal consent and also inform you that your participation in this focus group implies your consent. If at any time you need to stop or take a break, please let me know. You may also withdraw your participation at any time without consequence. Are there any questions or concerns before we begin? Then with your permission, we will begin the session.

#### **Guidelines (Kruger, 1998; Morgan, 1997):**

Some norms that will help our discussion go more smoothly include:

1. Everyone should participate to have a shared voice and no one voice should dominate the conversation.
2. Since the session will be audiotaped, remember to allow one person to speak at a time to ensure that information collected is audible.
3. Please avoid sidebar conversations.
4. The focus group will last no longer than one hour. Please silence your cell phones at this time. If you need to keep your cell phone on, please put it on vibrate. If an emergency arises during our time together and you need to take a call, please leave the room to do so.

#### **Guiding Questions for Focus Group Discussion:**

Let's do a quick round of introductions. For record keeping purposes, please state your initials and number of years teaching experience.

1. Has being a part of a professional learning community (PLC) made a difference in the frequency of use and types of instructional strategies used? Why or why not? (RQ1)
2. How have you seen PLC members transfer learning into their classrooms?
3. How have you transferred learning into your classroom and how can you do you know this works? (RQ1)
4. When does learning about an instructional strategy from a colleague encourage you to use it? (RQ1)

5. How do you communicate ideas, results, successful strategies to members of the PLC and other educators within the school community? (RQ1, RQ2)

**Thank you for your time today!**

**Possible Probing Questions (Kruger, 1998; Morgan, 1997)**

1. Would you explain further?
2. Can you provide an example?
3. Please describe what you mean?
4. Can you clarify? I want to make sure that I understand.
5. One thing that I have heard several people mention is \_\_\_\_\_. I am curious as to what the rest of the group thinks about this.
6. Are there any other thoughts that occurred to you?

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**Appendix E**

**Data-Focused Professional Learning Community (PLC) Observation Protocol**

Date and Time of Observation (include start and end time): \_\_\_\_\_

Grade Level/Subject Area of PLC Members: \_\_\_\_\_

Observer: \_\_\_\_\_

PLC Members Present (use pseudonym): Subject 1: Subject 2: Subject 3: Subject 4: Subject 5: Subject 6: Subject 7:		
Sketch seating arrangement of PLC members:		
Meeting Start:	Observation Notes:	Reflection:

<p>Roles Observed:</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Airtime Checker/Focus Monitor</li> <li><input type="checkbox"/> Data Technician</li> <li><input type="checkbox"/> Facilitator</li> <li><input type="checkbox"/> Recorder</li> <li><input type="checkbox"/> Timekeeper</li> <li><input type="checkbox"/> Other: _____</li> </ul>		
<p>Problem Identified During Meeting:</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Academic problem identified (briefly describe):</li> <li><input type="checkbox"/> Behavior problem identified (briefly describe):</li> </ul> <p>What data source was used to identify the problem?</p>	<p>Observation Notes:</p>	<p>Reflection:</p>

<p>SMART Goal Established: (RQ2)</p>	<p>Was a goal established by the PLC to address the problem? Yes / No</p> <p>Which of the elements of a SMART goal were present:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Specific</li> <li><input type="checkbox"/> Measurable</li> <li><input type="checkbox"/> Attainable</li> <li><input type="checkbox"/> Relevant</li> <li><input type="checkbox"/> Time-bound</li> </ul>	<p>Observation Notes:</p>	<p>Reflection:</p>
<p>Improvement Strategies/ Implementation Evaluation: (RQ1)</p>	<p>What improvement strategies were discussed by the PLC? (list)</p> <p>What plans were made for monitoring implementation of the strategies?</p>	<p>Observation Notes:</p>	<p>Reflection:</p>

<p>Summarize the focus of the PLC meeting as observed: (if agenda available or provided, attach copy):</p>			
<p>Closure Activities: (RQ1)</p> <p>Did the PLC engage in a closure activity?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>	<p><input type="checkbox"/> Summarized PLC decisions (problem identification, goal, implementation and monitoring)</p>	<p><input type="checkbox"/> Constructed new learning (learned/replicated, take-aways, etc.)</p>	<p><input type="checkbox"/> Evaluated PLC meeting (+/△) or other rating system)</p>

*Adapted from <http://adminblog.cbd9.net/wp-content/uploads/2011/12/DataTeamObservationTool-12711.pdf>*



## Appendix F

### Photo Assignment Protocol

Dear (Participant First Name):

Thank you for agreeing to participate in a research study that will examine professional learning community (PLC) member interactions and perceptions to determine how the utilization of data-focused PLCs affects teacher classroom practice. This study will also examine the use of effective instructional practices that positively affect student learning.

As a member of an existing PLC at this local school, this study will involve observing and sharing some of the ongoing processes that are already in place. Outside of your regularly scheduled weekly content collaborative planning sessions, this study will take about 2-3 hours of your time over the next eight to ten weeks. Your participation in the study consists of the following expectations:

#### **Capturing Photographs:**

- Over the next six weeks, you will take six to twelve photographs of your instructional practices that illustrate how the use of data discussions during PLC meetings affected your instruction. Photos should capture your successes as well as areas of opportunity.
- No human subjects are allowed in the photographs. If a human subject is necessary to fulfill this photo assignment, consider concrete objects that represent the person you want to photograph.
- When you take a photograph, think about how this artifact made you feel and why it represents how data-focused conversations influenced your instructional practice.
- To automate the process of collecting photographs, a password protective, restrictive viewing, shared Instagram© account will be used by all participants, including me as a participant-observer. All participants will share access to the account and should not disclose the contents of the account nor access information.
- When you are ready to post your photographs to the shared Instagram© account, refer to your reflection and share a brief caption description along with your photo. At the end of your caption description, include your initials or pseudonym in parenthesis to assist with identifying comments.

#### **Photo-Elicitation Interview:**

At the end of the six-week period, we will meet within the next two weeks for an individual face-to-face interview for approximately thirty minutes to one hour. This will be your opportunity to share your insights and provide additional details about the photographs you submitted. The interview will be audiotaped so that I may transcribe your responses for data analysis. All of your responses are confidential.

Additional details related to the specifics of the interview will be sent out closer to the interview date.

I appreciate your participation.

Sincerely,  
Deena Townsend  
Graduate Student, Kennesaw State University

## Appendix G

Participant Pseudonym \_\_\_\_\_  
Date \_\_\_\_/\_\_\_\_/\_\_\_\_

### *Script*

Welcome and thank you for your participation today. My name is Deena Townsend and I am a graduate student at Kennesaw State University conducting a research project dissertation titled, "Beyond the Core: Creating and Sustaining Data-Focused Professional Learning Communities." This interview will take about 30 minutes and will include 4 questions regarding the photos you selected to share related to your experience as a member of a data-focused professional learning community. I would like your permission to audio record this interview so I may accurately document the information you convey. If at any time during the interview you wish to discontinue the use of the recorder or the interview itself, please feel free to let me know and we will stop. All of your responses are confidential.

At this time I would like to ask for your verbal consent and also inform you that your participation in this interview also implies your consent. Your participation in this interview is completely voluntary. If at any time you need to stop, take a break, or return a page, please let me know. You may also withdraw your participation at any time without consequence. Do you have any questions or concerns before we begin? Then with your permission, we will begin the interview.

For this interview, our focus is on learning about your experience as a member of a data-focused professional learning community. Prior to the interview, you were asked to select four photographs from the shared Instagram account to share and discuss. Again, the pictures and any commentary you provide will be confidential. The pictures will solely be for the purpose of this interview to elicit responses to questions as we proceed with the interview.

1. Which picture represents your current reality of how you felt about teaching and learning during the early stages of this process? Why?
2. Which picture represents a change in your instructional practice? Why? Do you attribute this change to the collaboration with your colleagues or was there something else that influenced you to make the adjustment?
3. Which photo represents, through your perceptions, proof that students were learning based on not what you taught, but how you taught?
4. Which photo represents a struggle that you faced during teaching? How did you overcome that struggle? How, if at all, did data guide you in determining a solution for this situation?

**Appendix H****Code Lists***Provisional Code List*


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 Code Description
 

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Teacher practice

Teacher perceptions

Student learning

Teacher collaboration

Time management

Application of knowledge

Sharing vulnerabilities

*Cycle 1 Code List (Open Coding)*

**S-Developing Independent Monitoring Strategies**

**S-Discovering through Models How and Why a Particular Mathematics Concepts Works**

**S-Error Analysis Task Based on Student Work**

**S-Establishing high expectations for all student based on student work of top performers**

**S-Evidence of Learning Based on Conversations with Students**

**S-Evidence of Student Learning Based on HOW it was Taught instead of WHAT was taught**

**S-Grades Go Up Indicator of Learning**

**S-Repeated Use of Same Skills Provides Evidence of Student Learning**

**S-Results Indicators**

**S-Student Application of Knowledge**

**S-Student Engagement**

**S-Student Introduction to New Terminology**

**S-Student Learning Outcomes**

**S-Student Transfer of Skill to Application**

**S-Students Struggle with Reading and Following Directions**

**S-The rides weren't as creative as some. It wasn't super fancy, but I tell them [students] all the time, I'm not look for...I'm just looking for do you understand.**

**S-Waste of Paper**

**S-Waste of Time**

**S-When students start correcting themselves and seeing their errors, that is learning.**

**T-Administrative Requirement**

**T-Administrative Requirement to Watch a SIOP video Hijacked this Meeting**

**T-Analyzing Data to Adjust Practices**

T-Analyzing Instructional Strategies

T-Apprehension Toward Online Testing

T-Attempting Instructional Strategies Outside of "Comfort Zone"

T-Benefits and Concerns of Open Response Questions

T-Class Size

T-Collaboration

T-Collaboration is important to get different perspectives.

T-Collaboration with Colleagues Leading to Change in Instructional Practice

T-Collaborative Discussion Leading to Making Instruction Better

T-Communication

T-Constructive Conversations Promote Professional Growth

T-Designing Common Formative Assessment

T-Desired Student Learning Outcomes Outweighs Teacher Comfort

T-Enhance Differentiation

T-Error Analysis

T-Feeder Schools

T-Group Norms

T-I have been in other PLCs, other subject PLCs. The thing that I thought made ours better was really the structure, the organization, and everybody being ready to share...coming with ideas. Some of the other PLCs that I have been members of were kind of, it was just very unorganized and people would just come, "Well, what are we doing next week?" There was no, I felt like we were just going week by week. There was no structure, whereas we [math PLC] came together with, everybody had ideas, everybody was ready. We were organized. We had a plan.

T-I just would much rather use our instructional time more wisely and if we are going to collect data make data that is worthwhile. You know, because if we can identify where the issues are prior to a test and then you can address those issues the kids then what we're doing is we're using what they need to know...not just this process of going through, "Ok, they want us to give pre-test data." It's worthless.

T-Identifying Instructional Strategies to Overcome Student Learning Difficulties with New Concepts

T-Implementation

T-Instagram account holder

T-Intentional stops during instruction to inform students of product expectations

T-Learner Needs

T-Looking at Student work

T-Looking at Student Work and Gathering Ideas for Instruction

T-Meaningful Tasks

T-Modeling Instructional Strategies

T-Need for deadlines next year

T-Power of Collaboration

T-Previous Experience

T-Protecting Instructional Time

T-Prototypes Provide a Concrete Example of Desired Outcomes or Necessary Revisions

T-Providing Students with Clear Examples of Learning Outcomes

T-Questioning

T-Recognition of the need for due dates

T-Reflecting into Planning

T-Reflection

T-Respecting Student Time

T-Sharing Best Practices

T-Sharing ideas through Instagram and collaboration

T-Social media collaboration

T-Strong PLC

T-Teacher Struggle v. Student Struggle

**T-Time Management**

**T-Trend Data Refutes Necessity of Pre-Test**

**T-Using Data to Adjust Instructional Practices**

**T-Utilizing Instructional Resource Specialist Positions within the PLC to Share Responsibility Based on Strength**

**T-Value the Opinions of Other Members in the PLC**

**T-Work Well Together and Value Other Member's Opinions**

*Cycle 2 Code List (Categories)*

Teacher-Oriented	Student-Oriented
<p>Codes (53): [T-Administrative Requirement] [T-Administrative Requirement to Watch a SIOP video Hijacked this Meeting] [T-Analyzing Data to Adjust Practices] [T-Analyzing Instructional Strategies] [T-Apprehension Toward Online Testing] [T-Attempting Instructional Strategies Outside of "Comfort Zone"] [T-Benefits and Concerns of Open Response Questions] [T-Class Size] [T-Collaboration] [T-Collaboration is important to get different perspectives.] [T-Collaboration with Colleagues Leading to Change in Instructional Practice] [T-Collaborative Discussion Leading to Making Instruction Better] [T-Communication] [T-Constructive Conversations Promote Professional Growth] [T-Designing Common Formative Assessment] [T-Desired Student Learning Outcomes Outweighs Teacher Comfort] [T-Enhance Differentiation] [T-Error Analysis] [T-Feeder Schools] [T-Group Norms] [T-I have been in other PLCs, other subject PLCs. The thing that I thought made ours better was really the structure, the organization, and everybody being ready to share...coming with ideas. Some of the other PLCs that I have been members of were kind of, it was just very unorganized and people would just come, "Well, what are we doing next week?" There was no, I felt like we were just going week by week. There was no structure, whereas we [math PLC] came together with, everybody had ideas, everybody was ready. We were organized. We had a plan.] [T-I just would much rather use our instructional time more wisely and if we are going to collect data make data that is worthwhile. You know, because if we can identify where the issues are prior to a test and then you can address those issues the kids then what we're doing is we're using what they need to know...not just this process of going through, "Ok, they want us to give pre-test data." It's worthless.] [T-Identifying Instructional Strategies to Overcome Student Learning Difficulties with New Concepts] [T-Implementation] [T-Instagram account holder] [T-Intentional stops during instruction to inform students of product expectations] [T-Learner Needs] [T-Looking at Student work] [T-Looking at Student Work and Gathering Ideas for Instruction] [T-Meaningful Tasks] [T-Modeling Instructional Strategies] [T-Need for deadlines next year] [T-Power of Collaboration] [T-Previous Experience] [T-Protecting Instructional Time] [T-Prototypes Provide a Concrete Example of Desired Outcomes or Necessary Revisions] [T-Providing Students with Clear Examples of Learning Outcomes] [T-</p>	<p>Codes (19): [S-Developing Independent Monitoring Strategies] [S-Discovering through Models How and Why a Particular Mathematics Concepts Works] [S-Error Analysis Task Based on Student Work] [S-Establishing high expectations for all student based on student work of top performers] [S-Evidence of Learning Based on Conversations with Students] [S-Evidence of Student Learning Based on HOW it was Taught instead of WHAT was taught] [S-Grades Go Up Indicator of Learning] [S-Repeated Use of Same Skills Provides Evidence of Student Learning] [S-Results Indicators] [S-Student Application of Knowledge] [S-Student Engagement] [S-Student Introduction to New Terminology] [S-Student Learning Outcomes] [S-Student Transfer of Skill to Application] [S-Students Struggle with Reading and Following Directions] [S-The rides weren't as creative as some. It wasn't super fancy, but I tell them [students] all the time, I'm not look for...I'm just looking for do you understand.] [S-Waste of Paper] [S-Waste of Time] [S-When students start correcting themselves and seeing their errors, that is learning.]</p>

Teacher-Oriented	Student-Oriented
Questioning] [T-Recognition of the need for due dates] [T-Reflecting in to Planning] [T-Reflection] [T-Respecting Student Time] [T-Sharing Best Practices] [T-Sharing ideas through Instagram and collaboration] [T-Social media collaboration] [T-Strong PLC] [T-Teacher Struggle v. Student Struggle] [T-Time Management] [T-Trend Data Refutes Necessity of Pre-Test] [T-Using Data to Adjust Instructional Practices] [T-Utilizing Instructional Resource Specialist Positions within the PLC to Share Responsibility Based on Strength] [T-Value the Opinions of Other Members in the PLC] [T-Work Well Together and Value Other Member's Opinions]	

*Cycle 3 Code List (Themes)*

<p style="text-align: center;">Theme 1 <b>Embracing Collaboration</b></p>	<p>Codes (17): [T-Attempting Instructional Strategies Outside of "Comfort Zone"] [T-Collaboration] [T-Collaboration is important to get different perspectives.] [T-Collaboration with Colleagues Leading to Change in Instructional Practice] [T-Collaborative Discussion Leading to Making Instruction Better] [T-Communication] [T-Constructive Conversations Promote Professional Growth] [T-Designing Common Formative Assessment] [T-Instagram account holder] [T-Modeling Instructional Strategies] [T-Power of Collaboration] [T-Previous Experience] [T-Sharing ideas through Instagram and collaboration] [T-Social media collaboration] [T-Utilizing Instructional Resource Specialist Positions within the PLC to Share Responsibility Based on Strength] [T-Value the Opinions of Other Members in the PLC] [T-Work Well Together and Value Other Member's Opinions]</p>
<p style="text-align: center;">Theme 2 <b>Reflecting into Planning</b></p>	<p>Codes (16): [T-Analyzing Data to Adjust Practices] [T-Designing Common Formative Assessment] [T-Desired Student Learning Outcomes Outweighs Teacher Comfort] [T-Enhance Differentiation] [T-Identifying Instructional Strategies to Overcome Student Learning Difficulties with New Concepts] [T-Implementation] [T-Learner Needs] [T-Looking at Student work] [T-Looking at Student Work and Gathering Ideas for Instruction] [T-Prototypes Provide a Concrete Example of Desired Outcomes or Necessary Revisions] [T-Recognition of the need for due dates] [T-Reflecting in to Planning] [T-Reflection] [T-Sharing Best Practices] [T-Trend Data Refutes Necessity of Pre-Test] [T-Using Data to Adjust Instructional Practices]</p>
<p style="text-align: center;">Theme 3 <b>Evidence of Student Learning Outcomes</b></p>	<p>Codes (15): [S-Developing Independent Monitoring Strategies] [S-Discovering through Models How and Why a Particular Mathematics Concepts Works] [S-Error Analysis Task Based on Student Work] [S-Establishing high expectations for all student based on student work of top performers] [S-Evidence of Learning Based on Conversations with Students] [S-Evidence of Student Learning Based on HOW it was Taught instead of WHAT was taught] [S-Grades Go Up Indicator of Learning] [S-Repeated Use of Same Skills Provides Evidence of Student Learning] [S-Results Indicators] [S-Student Application of Knowledge] [S-Student Engagement] [S-Student Learning Outcomes] [S-Student Transfer of Skill to Application] [S-Waste of Paper] [S-When students start correcting themselves and seeing their errors, that is learning.]</p>

Appendix I

Participant Instagram Posts with Captions

plc3825 Today we worked on constructing histograms. As a class we created a frequency table using the amount of siblings we have. We then created a histogram and answered questions based on our class histogram. ALM

Siblings (x-axis)	Frequency (y-axis)
0-1	12
2-3	13
4-5	3
6-7	1
8-9	1

plc3825 We began the unit 7 independent study today. This is a picture of the lesson 1 keys. ALM

plc3825 This is a picture of the lesson quiz due dates posted on the wall in my room and also posted to my blog. ALM

- Lesson 1: due by 4/12
- Lesson 2: due by 4/15
- Lesson 3: due by 4/20
- Lesson 6: due by 4/22
- Lesson 7: due by 4/26
- Lesson 8: due by 4/28

plc3825 We have been Milestone testing this week. This is allowing for less time for the independent study. Due dates for the lesson quizzes will be adjusted accordingly. ALM

**Schedule**  
 Monday's Schedule  
 HR 8:50-9:10  
 Test Readiness 9:10-9:25  
 Science Milestones 9:25-(11:25-12:40)  
 3rd 12:25-1:05  
 1st (lunch 1:23) 1:10-2:30  
 5th 2:35-3:20  
 7th 3:25-4:15



plc3825

Lesson 1: due by 4/12  
Lesson 2: due by 4/20  
Lesson 3: due by 4/21  
Lesson 6: due by 4/25  
Lesson 7: due by 4/27  
Lesson 8: due by 4/29

plc3825 I had to adjust the lesson due dates today due to Georgia Milestone testing. ALM

plc3825

SHOW ALL WORK ON A SEPARATE SHEET OF PAPER.

NS.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, debits/credits, positive/negative electric charges); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

Write an integer to represent each description.

- The football player had a 9 yard loss on the play.  $-9$
- The stock market went down 84 points today.  $-84$
- A pay cut of \$3,500.  $-3,500$
- A person who has paid off all of his/her debts.  $0$
- A loss of \$31,251 on an investment.  $-31,251$
- A profit of \$32,678 on an investment.  $32,678$
- Deposit \$827 into a bank account.  $+827$
- 8° below zero.  $-8$

9. What is the opposite of  $\frac{3}{8}$ ?

a) 38      b)  $\frac{8}{3}$       c)  $-\frac{3}{8}$       d)  $-\frac{8}{3}$

NS.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

10. Graph the points  $(-5, -3, 0, 1, 3, 7)$  on the number line above.

11. Below is a number line from  $-1$  to  $1$ . On the number line, mark  $0, \frac{2}{5}, -\frac{1}{3}, \frac{1}{2}, \frac{1}{4}, -0.8$ .

NS.6a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,  $-(-11) = 11$  and that 0 is its own opposite.

12. What is another way to write  $(-21)$ ?  $21$

13. On the vertical number line, plot 10 and its' opposite. What is the distance of each point from zero? What is the distance between 10 and its' opposite?

plc3825 I am working on a study guide and a key to post to my blog for unit 7. After discussing in PLC, it seemed best to include standards on the study guide as a way to aid students. The discussion prompted me to start doing so immediately. ALM

plc3825

plc3825 The projects turned out great. The students also did well on their unit 7 touchstone test so I feel the projected deepened their understanding of the material. ALM

plc3825

Unit 7 Task Student Task List

TASK	Completed /Grade
1. Lesson 1: Integers and Graphing. Read and do pages 633-637. Check answers on the key on wall.	
2. Take Lesson 1 quiz. $\geq 80\%$ → continue. $< 80\%$ do: 639-640, 1-12.	
3. Lesson 2: Absolute Value. Read and do pages 643-648. Check answers on the key on wall.	
4. Take the Lesson 2 quiz. $\geq 80\%$ → continue. $< 80\%$ do: 649, 1-16.	
5. Lesson 3: Compare and Order Integers. Read and do pages 653-656. Check answers on the key on wall.	
6. Take the lesson 3 quiz. $\geq 80\%$ → continue. $< 80\%$ do: 657-658, 1-10.	
7. Mid Chapter Check! Quiz average $\geq 85\%$ → continue to lesson 4. Quiz average $< 85\%$ → Do MID CHAPTER CHECK p. 664. Bring to Mrs. Harvey for grading.	
8. Lesson 4: Coordinate Plane. Read and do pages 665-668. Check answers on the key on wall.	
9. Take the lesson 4 quiz. $\geq 80\%$ → continue. $< 80\%$ do: 669-670, 1-14.	
10. Lesson 5: Graph on the coordinate plane. Read and do pages 673-676. Check answers on the key on wall.	
11. Take the lesson 5 quiz. $\geq 80\%$ → continue. $< 80\%$ do: 677-678, 1-16.	
12. INQUIRY LAB: Do pages 681-684. Check answers on the key on wall.	
13. Lesson 6: Polygons on the coordinate plane. Read and do pages 685-688. Check answers on back wall.	
14. Quiz on Inquiry Lab and Lesson 6. $\geq 80\%$ → continue. $< 80\%$ do: 689-690, 1-11.	
15. Quiz averages $\geq 80\%$ ? → START ON UNIT CULMINATING PROJECT. Quiz averages $< 80\%$ work on extra practice provided by Mrs. Harvey in preparation for Unit Test.	

plc3825 BH

**plc3825**

**Distributing And Factoring Area**

Write the expression that represents the area of each rectangle.

1. 2. 3. 4.

Find the area of each box in the pair.

5. 6. 7.

Write the expression that represents the total length of each segment.

8. 9. 10.

Write the area of each rectangle as the product of length and width and also as a sum of the areas of each box.

11. 12. 13.

AREA AS PRODUCT	AREA AS SUM	AREA AS PRODUCT	AREA AS SUM	AREA AS PRODUCT	AREA AS SUM
$2(x+7)$	$5x+35$	$3(x+2)$	$3x+6$	$5(a+8)$	$5a+40$

Use the distributive property to find sums that are equivalent to the following expressions. (You may want to use a rectangle to help you)

14.  $4(x+7) = 4x+28$       15.  $7(x-3) = 7x-21$   
 16.  $-2(x+4) = -2x-8$       17.  $3(x+9) = 3x+27$   
 18.  $4(a-1) = 4a-4$       19.  $3(m+2) = 3m+6$   
 20.  $-4(a-4) = -4a+16$       21.  $\frac{1}{2}(a-12) = \frac{1}{2}a-6$

**plc3825** I used this learning task as a way to teach the distributive property. It uses area models. Worked well!  
**plc3825** BH

**plc3825**

G'Daft...night. I guess you aren't but on my trail as it seems. I can enjoy a really great television taping of "The Bush Show" without worry. I had some extra time for this puzzle. I'm sure you won't figure it out. What is V?

$V = 36a(a-c) - 24c(2a-3c) + 2a(-2(3a+c))$  **V =** \_\_\_\_\_

So you were actually able to distribute and combine like terms. Whoopidoo. Too bad that doesn't tell you the value of V. Here's the values for a and C -- I even did it for you. **UNLESS PMLYING.**

$4+3=3+4=7$  is an example of the **associative property**

$3+(1+5)=(3+1)+5=9$  is an example of the **Commutative property**

So a = 7 and c = 9

HAHAHAHAHA see I just gave you values! **Or did I?** MUHAHAHAHA. Better figure it out quick before you plug them in to find V. I'd surely hate if you did it wrong.

**CRYPTIC PUZZLE SOLVER TEXT MESSAGE**

lol c if u can solve this. u need sum variables.

$(\$ + \phi + V) + FE\$ - @\$$

**plc3825** Based on our data discussions, students are weak in order of operations and multi-step problem solving. This CSI task is a challenging and fun way to review. I realize from our last meeting that on-level students do not know how to compute with negative numbers. However, you can make some changes to the last couple of tasks to eliminate the negatives. BH

**plc3825**

**plc3825** Since I teach three different grade levels and don't have much wall space, I decided to display our class shoe size data below the board. Since the display did not include any gaps in numbering for shoe sizes not represented, students were able to make the connection that this was not a line plot. We then used this data to create a grouped frequency table with and without intervals. Students created a mini-flip book to represent the Statistical Displays in this unit. This is an engaging activity because students were able to make personal connections with the data since it is something about them. D.T.

**plc3825**

**plc3825** Through our conversations, this represents the best of both worlds for me. Instead of using the folder that closes, this open method allows me to easily access each student's folder. Also, I like each student having a folder for his/her quiz. The folders are arranged alphabetically and numbered. This method makes it easier to return folders to their proper place after grading. I have noticed that quiz 8 is the most difficult for students. Common errors include using square units to represent distance, calculating area for perimeter, forgetting to take half when finding the area of the triangle, & subtracting either the x- or y-coordinates when they are the same to find the side length of the rectangle. #read DT.

plc3825

plc3825 The power of collaboration! @ALM thanks for sharing how you displayed answer keys for students. I revised to include color coding by lesson. D.T.

plc3825

plc3825 This is the shoe size data for my students. I have used this data for a variety of topics from frequency tables to histogram. It was great because it gave students a point of reference to attach new learning. PW

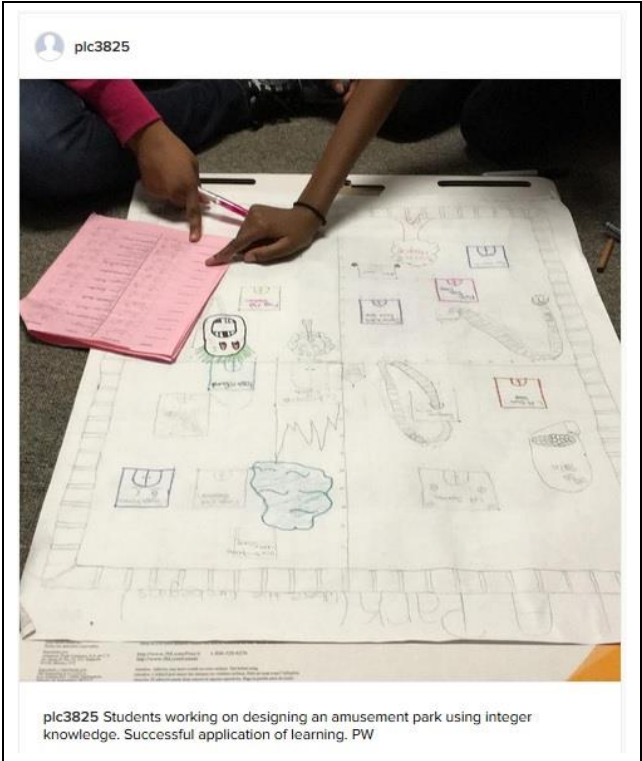
plc3825

7	1	6	4	52	6	6	1	1	23	11	2	2
20	10	5	4	6	7	2	8	10	16	8	5	9
1	3	2	2	13	3	31	12	1	19	6	5	21
2	6	1	9	30	3	1	11	9	3	9		

plc3825 This is the differentiated version of a histogram task. I gave an exit ticket and those who needed more guidance based on evidence of the ticket will receive a version in their groups today.

plc3825

plc3825 To improve unit 5 knowledge based on poor test scores, students will use these 12 questions from test that were the most commonly missed and identify errors and rework. I provided resources to help and tutoring. PW



**Appendix J****KENNESAW STATE UNIVERSITY IRB APPROVAL**

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**Study 16-267: Beyond the Core: Creating and Sustaining Data-Focused Professional Learning Communities**

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**From :** irb@kennesaw.edu

Sat, Feb 06, 2016 03:35 PM

**Subject :** Study 16-267: Beyond the Core: Creating and Sustaining Data-Focused Professional Learning Communities**To :** [redacted].net**Cc :** irb@kennesaw.edu

2/6/2016

Deena Townsend

RE: Your followup submission of 2/1/2016, Study #16-267: Beyond the Core: Creating and Sustaining Data-Focused Professional Learning Communities

Dear Ms. Townsend:

Your application for the new study listed above has been administratively reviewed. This study qualifies as exempt from continuing review under DHHS (OHRP) Title 45 CFR Part 46.101(b)(2) - educational tests, surveys, interviews, public observations. The consent procedures described in your application are in effect. You are free to conduct your study.

Please note that all proposed revisions to an exempt study require IRB review prior to implementation to ensure that the study continues to fall within an exempted category of research. A copy of revised documents with a description of planned changes should be submitted to irb@kennesaw.edu for review and approval by the IRB.

Thank you for keeping the board informed of your activities. Contact the IRB at irb@kennesaw.edu or at (470) 578-2268 if you have any questions or require further information.

Sincerely,

Christine Ziegler, Ph.D.  
KSU Institutional Review Board Chair and Director

cc: [redacted].edu

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